

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13145	0	0	0	0	Need to define "Land degradation" early in chapter [David Cooper, Canada]	Rejected. Tricky since there could also be a call to introduce all other definitions first. Chapter team discussed the logic of the storyline repeatedly and decided that the way it is written at the moment fits the team's perspective best.
33553	0	0	0	0	Overall useful introduction chapter, nice job! One topic I missed from the discussion: There might be synergies and trade-offs between effects of land use change vs greenhouse gas on climate (extremes). For instance increased irrigation (Thiery et al. 2017, JGR) or increased albedo (from changes in land use type or land use management, e.g. no-till farming; Davin et al. 2014, PNAS, Hirsch et al. 2017, JGR; Seneviratne et al. 2018, Nature Geoscience) may both counteract regional warming of extremes. Since the SRLand report is an IPCC report which should address climate-change relevant issues, this seems an important point. For instance, for low-emissions scenarios, the choice of land use options may have as much impact on regional temperature extremes as a difference of global warming of 0.5°C: Hirsch et al. 2018, Earth Future. This topic should be mentioned somewhere in the chapter since it provides the overall background for the report (note that this theme is addressed also in chapter 2). References: Thiery, W., E. L. Davin, D. M. Lawrence, A. L. Hirsch, M. Hauser, and S. I. Seneviratne, 2017: Present-day irrigation mitigates heat extremes, J. Geophys. Res. Atmos., 122.; Davin, E.L., S.I. Seneviratne, P. Ciais, A. Olliso, and T. Wang, 2014: Preferential cooling of hot extremes from cropland albedo management. Proc. Natl Acad. Sci., 111(27), 9757-9761, doi:10.1073/pnas.1317323111; Hirsch, A. L., M. Wilhelm, E. L. Davin, W. Thiery, and S. I. Seneviratne, 2017: Can climate-effective land management reduce regional warming?, J. Geophys. Res. Atmos., 122; Seneviratne, S.I., S.J. Phipps, A.J. Pitman, A.L. Hirsch, E.L. Davin, M.G. Donat, M. Hirschi, A. Lenton, M. Wilhelm, B. Kravitz, 2018: Land radiative management as contributor to regional-scale climate adaptation and mitigation. Nature Geoscience, volume 11, pages 88-96, doi:10.1038/s41561-017-0057-5; Hirsch, A. L., B.P. Guillo, S.I. Seneviratne, U. Beyerle, L.R. Boysen, V. Brovkin, E.L. Davin, J.C. Doelman, H. Kim, D.M. Mitchell, T. Nitta, H. Shiogama, S. Sparrow, E. Stehfest, D.P. van Vuuren, S. Wilson, 2018: Biogeophysical Impacts of Land-Use Change on Climate Extremes in Low-Emission Scenarios: Results From HAPPI-Land. Earth's Future, 6, 396-400. [Sonia Seneviratne, Switzerland]	Rejected - outside the scope of the chapter. Thanks, and it is an important point, but seems too specific for chapter 1 which can give only a broad-brush introduction to the overall content. As the reviewer writes, this is also covered in chapter 2. Still section 1.2.2.1 has some additional examples added that cover also heat and drought extremes
40413	0		0		Please see my general remarks on the report and those on the SPM. I appreciate the developments of chapter 1 from the FOD. Chapter 1 clearly needs more efficient coordination with other chapters (I am surprised not to see joint co-authorship across chapters). There are lots of overlaps and inconsistencies in the framing of Ch 1 and the framing / introduction of other chapters. Moreover, Chapter 1 has from the approved outline the mandate to guide the reader into the storyline of the report, narrative, sequence and linkages. This needs to be strongly improved in the final draft. [Valerie Masson-Delmotte, France]	Accepted- text revised. more detailed cross-referencing to other chapter included in the final version. Cross reading of other chapter to avoid remaining inconsistencies esp. W.r.t. definitions.
40415	0		0		Numbers should be provided systematically with uncertainty ranges. Gender aspects are not reflected in ES. [Valerie Masson-Delmotte, France]	Comment noted section totally updated and revised.
40417	0		0		I was also looking for elements on knowledge developments since AR5 and aspects assessed here not assessed in AR5 and other reports but could not find this in chapter 1. The links with SR15 are missing (for instance, in Box 1.1 supposed to link to previous IPCC reports). [Valerie Masson-Delmotte, France]	Accepted- text revised.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

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40419	0		0		For many sections, it is difficult to understand what is assessed here, and what is an introduction to other chapters. Whole papers provide references to papers but no assessment of key findings, confidence. Issues linked with UNFCCC (e.g. loss and damage, residual risk) are not introduced. There is a possibility to provide the reader with an overview of this across chapters which is relevant. [Valerie Masson-Delmotte, France]	Accepted- text revised. throughout chapter better cross-referencing to other chapters added to point te reader to the assessment of critical aspects that are introduced in chapter 1
40433	0		0		The introduction of the risk framework and how it is applied in this report is missing. [Valerie Masson-Delmotte, France]	Accepted- text revised. included in revised section 1.3.2
40441	0		0		Aspects linked to commitment, reversibility / irreversibility, non linearities / abrupt change / tipping points missing in the chapter. [Valerie Masson-Delmotte, France]	Rejected - outside the scope of the chapter . There is a limit to how many concepts the chapter can introduce. The authors believe that the specific examples mentioned fit better in chapter 2
40443	0		0		Aspects linked to SR15 (transitions, CRDP) and how SRCL is complementing SR15 are missing in chapter 1. [Valerie Masson-Delmotte, France]	Accepted- text revised.
22197	0	2			General comment on uncertainty (inc in relation to p24-32). The section on uncertainty is extremely important for policymakers. In particular the parts on unknown futures and decision-making. Consider what focused messages can be drawn from this section (on knowledge and /or key knowledge gaps) for inclusion in the SPM. Also, consider the possibility of combining insights on risk/ uncertainty from both SRCL and SROCC. A large part of the material contains messages that are broader than the scope of the individual reports. Ideally, the general insights would be the same - but with specific insights when applied land / oceans. [Anastasios Kentarchos, Belgium]	Accepted- text revised. section on uncertainty revised, added more spcifically text related to IPCC treatment of uncertainty
22199	0				This section should better clarify the scope of the report in terms of the activities and greenhouse gas categories covered, the timeframes considered. Crucially, in many parts fo the chapter it appears that the scope of land management is limited to land-use changes, and does not include processes (and emissions/removals) related to land use not involving LUC, such as the management of forest remaining forest. This is significant, given the significant, often dominant, role of existing forests in the carbon cycle. [Anastasios Kentarchos, Belgium]	Accepted- text revised. forest examples given more prominence, but the (agricultural)land-use change aspect is crucial as the SRCL has food security as one important component
22201	0				The terminology should be more consistent and should follow established conventions (e.g., UNFCCC, KP, IPCC inventory guidance) and deviate only in well-justified cases and in a transparent manner. The unexplained proliferation of seemingly synonymous terms (such as "land use conversion" / "land-use change" / "land transformation") is confusing and counter-productive. If different terms signify differnt concepts, they should be clarified. If they refer to the same concept, then one term should be used (in the above example, "land-use change" should be sufficient). [Anastasios Kentarchos, Belgium]	Accepted- text revised. checked throughout chapter
6353	0				Thank you to the authors for their work on this chapter. [, Gambia]	Thank you for the positive comment.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

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26763	0				Chapter 1 is supposed to provide framing and context of this report, and the indicative list of issues to be covered in the chapter requests information on key concepts. This is important information is currently missing in the report. While some information on individual expressions can be found in the glossary, chapter 1 should provide an introduction to basic definitions and concepts, including for all land cover types (rangeland, pastures, grass land, forests, forested ecoregions etc.) and management options (like SLM, SFM, natural resource managements, intensive/moderate/extensive management, ecological/organic/conservation agriculture, land restoration and rehabilitation). For some issues, there are also overlaps with assessments provided in other chapters and is unclear why these issues are treated in that much detail in chapter 1. Please check coherence and remove duplications with other chapters. [ , Germany]	Accepted- text revised. We are defining here crucial definitions, a complete list is provided in the glossary -- a clarification has been added to section 1.2.1
26765	0				Please provide in chapter 1 an overview of the management options, preferably in a table that contains an overview of their main characteristics, the current draft provides some information in section 1.4.1 only late in the chapter, please revise. Please provide also references to the assessment in other chapters or this report of the pros and cons of these options for the land challenges introduced in Fig. 1.1 . Please explain their relation to the concept of sustainable land management as appropriate and provide references to the assessment of their implications for other SDGs provided in other chapters. In order to avoid that the information provided in chapter 1 is disconnected from the report, we suggest moving Table 6.2 to chapter 1, as it provides an excellent overview of the issues assessed and how to navigate the report. [ , Germany]	Accepted- text revised. We introduce the main management/response options in the chapter (was already in the SOD, now refined, based on revisions to chapter 6). Regarding the placing in the chapter: the outline and order of sub-sections has been repeatedly discussed in the chapter team and this one found to work "best".
26767	0				We strongly urge the authors to mention „climate change“ as the sixth land challenge, as in chapter 6 19-2. Please see also our comment on SPM Figure SPM.1. [ , Germany]	Accepted- text revised. Figure has been redrawn
29653	0				This is a comprehensive and useful chapter - thank you to the authors. [ , Saint Lucia]	Noted no action needed.
11735	0				Uncertainty language is very well applied! However, Sections 1.4 and 1.5 still lack confidence statements. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised. Confidence language critically revised,also keeping in mind to only include these when assessment (rather than review) has been made.
11737	0				There should be more specific cross-references to sections in other SRCL chapters (and e.g., "see Chapter 5") and cross-chapter boxes. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised. cross references updated throughout the chapter
28873	0				Chapter 1 has improved since FOD and it better serves its function as scene setting and framing quite well. But, in my view, it still needs to be sharpened and more focused in some parts. [Jan Fuglestedt, Norway]	Accepted- text revised. All sections have been revised which provide more focus
28899	0				In my view, ch1 could show stronger links to SR1.5; i.e., referring more to the issues there and showing better how SRCL follows up on these and also adds more assessment. [Jan Fuglestedt, Norway]	Accepted- text revised. more cross-references provided to 1.5 degree report
28901	0				As often is the case for chapter 1 of IPCC reports: it is difficult to find the balance between what this chapter can say about various issues vs what the following chapters can say. The authors need to work on this and clarify in order to avoid contradictions and inconsistencies; as well as repetitions. [Jan Fuglestedt, Norway]	Accepted- text revised. In the revisions we aim to remove repetition and inconsistencies; also, better cross-referencing to other chapters now provides a clearer narrative.
28911	0				In some cases I think the language should be changed to avoid being value based. [Jan Fuglestedt, Norway]	Accepted- text revised. Language checked with that in mind
28967	0				I miss a section on IPCC uncertainty language and its use in SRCL. [Jan Fuglestedt, Norway]	Comment noted section totally updated and revised. More uncertainty language have been added where necessary.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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23923	0				<p>The chapter should focus more on "framing and context". A lot of text that could be included in subsequent chapters. At the same time, it fails to highlight some very important contextual elements. Most notably:</p> <ul style="list-style-type: none"> <li>- It fails to properly emphasize that previous IPCC reports and most IAMs do not treat land use as thoroughly and comprehensively as represent other sectors</li> <li>- Crucially, it fails to highlight the bioenergy-land nexus, namely that other IPCC reports, IAMs and most climate policy instruments treat bioenergy as "carbon neutral", essentially ignoring the CO2 emissions from the combustion of biomass. That is a gross simplification that can only be valid if (and to the extent that) the emissions and removals from carbon stock changes on land caused by bioenergy are properly quantified and taken into account elsewhere. This is seldom done in a satisfactory manner (i.e., in a way that ensures the integrity of the assumption of zero combustion emissions). Given the enormously important role of bioenergy both in the current renewables mix and the future mitigation scenarios, this report should help address this gap.</li> <li>- The chapter fails to transparently present/explain the relationship between the overall land sink (as land is currently a major net carbon sink), on the one hand, and land use as a net source, as presented in the chapter. Given the crucial role of the (overall) land sink in the future trajectory of climate change, and the key reference to the "balance" between anthropogenic emissions by sources and removals by sinks in the Paris Agreement, this report should synthesize our current understanding of the issue, including the nature and causes of the "residual carbon sink".</li> <li>- Linked to the above, there is almost no recognition of the role and impact of forest management (i.e., the management of forest remaining forest) in the past, present and future. It is recognised just once, in passing, that "models and projections do not represent the forestry sector explicitly" (p. 19, line 1), but then no effort is made to fill this gap, and it is not even identified as a need. It is not transparently explained where and how the legacy/age class effect (notably the rebound of temperate and boreal forest from past management (representing the bulk of the forest sink in some key economies) is taken into account. It does not seem to be included in the AFOLU term (which seems to include land use change), and it is excluded from the description of the residual land sink (as it is attributed solely to N deposition and CO2 fertilisation). It is also unclear how the latter (the residual sink, as presented) is separated from management effects, when much of that residual sink is physically located on managed forest.</li> </ul>	<p>Rejected - outside the scope of the chapter. We agree that these aspects are very important, but it goes beyond the scope of chapter 1 along. In chapter 1, the bioenergy section has been revised; The report now also has a cross-chapter box (ch. 6) on bioenergy and BECCS which should help to clarify these points. bioenergy is also discussed in chapters 2 and 4. Carbon sink aspects of land: point made more strongly in revised 1.2.2.1, however a detailed analysis of the residual sink is the scope of chapter 2.</p>
23925	0				<p>It would be useful to present photosynthesis and NPP as the fundamental basis for all land C services. [Zoltán Rakonczay, Belgium]</p>	<p>Accepted- text revised. Not sure it would be useful to have this as THE chief main element, since water, for instance, is as fundamental. However, have added net primary productivity and water in the first section</p>
23927	0				<p>The loss of productive land (land take / land loss) should be presented up front as a key risk. [Zoltán Rakonczay, Belgium]</p>	<p>Accepted- text revised. Added to section 1.3.2.1</p>
23929	0				<p>The terminology should be more consistent and should follow established conventions (e.g., UNFCCC, KP, IPCC inventory guidance) and deviate only in well-justified cases and in a transparent manner. The unexplained proliferation of seemingly synonymous terms (such as "land use conversion" / "land-use change" / "land transformation") is confusing and counter-productive. If different terms signify different concepts, they should be clarified. If they refer to the same concept, then one term should be used (in the above example, "land-use change" should be sufficient). [Zoltán Rakonczay, Belgium]</p>	<p>Accepted- text revised. see response to 22201</p>

**IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1**

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23931	0				There should be a clearer delineation of the scope of the report in terms of the activities and greenhouse gas categories covered, the timeframes considered. Crucially, in many parts fo the chapter it appears that the scope of land management is limited to land-use changes, and does not include processes (and emissions/removals) related to land use not involving LUC, such as the management of forest remaining forest. This is very disturbing, given the significant, often dominant, role of existing forests in the carbon cycle. [Zoltán Rakonczay, Belgium]	Noted no action needed. beyond scope to the chapter. Different land-use categories and associated GHG emissions are covered in depth in chapter 2 (2.4). There may indeed be a strong focus on agricultural management, which in part is related to food security having a prominent role in the report. However, forest and their role in carbon cycle (and other ecosystem services) are included explicitly e.g. in sections 1.2 and 1.4, and in the cross-chapter box on forest area expansion.
23933	0				This section should better clarify the scope of the report in terms of the activities and greenhouse gas categories covered, the timeframes considered. Crucially, in many parts fo the chapter it appears that the scope of land management is limited to land-use changes, and does not include processes (and emissions/removals) related to land use not involving LUC, such as the management of forest remaining forest. It is essential to clarify this, given the significant role of managed forests in the carbon cycle, and its policy relevance. [Zoltán Rakonczay, Belgium]	Accepted- text revised. see response to 22199
14609	1	0	1	0	The Chapter 1 summary focuses on climate change effects from the standpoint of tropical and temperate regions. Although the Arctic context is included in Chapter 4 from the land degradation perspective, this is not reflected in Chapter 1. The Chapter would be strengthened by mentioning this important component upfront. [, Canada]	Rejected. We consider tergional differentiation too detailed for a framing chapter.
34009	1	1	1	1	Chapter 1 shows a high self-citation of contributing and lead authors which reduces the credibility of such a report. Examples are in the sections value chaim management section 1.4.2.1 and 1.4.2.2. Please check these sections and cite just the most appropriate papers in all instances. Also have a look at the related other chapters (e.g. chapter 6 for response options, they also selected the most relevant citations, and in fact the citations should largely agree). [Elke Stehfest, Netherlands]	Accepted.
34057	1	1	1	1	Identical comment to chapters 1, 5 and 6: As mentioned above, there is large overlapp between chapters withou cross-referencing. The potential contribution of dietary change to mitigation is shown in 6.4.1.2, and in 5.5.2.1 and in 1.4.2.2, without referencing the other section, and apparently written completely independently. it is not even clear what the "main" location for the diet potential is in the report. [Elke Stehfest, Netherlands]	Accepted. Noted. More efforts have been made in the revised version to co-ordinate with chapter 5.
7373	1	1	1	1	Some sentences are need that will target youngsters such as increasng their awareness (they are although quite aware) and orienting those to study global threats [Erhan Akca, Turkey]	Noted no action needed.
29989	1	1	1	1	In general chapter 1 should be cross-checked with chapters 2 and 6 on inconsistencies concerning literature used and conclusions, especially on the topics bio-energy, BECCS and reforestation/afforestation. [, Netherlands]	Accepted. More effort has been made to link with all the chapters including 2 and 6 to harmonise statements and storylines.
30195	1	1	1	1	Chapter 1 shows a high self-citation of contributing and lead authors which reduces the credibility. Examples are in the sections on value chain management (sections 1.4.2.1 and 1.4.2.2). Please check these sections and cite just the most appropriate papers in all instances. Also cross-check related other chapters; e.g. chapter 6 for response options, they also selected the most relevant citations, and in fact the citations should largely agree. [, Netherlands]	Accepted.
54	1	5	1	6	It would be important to state the references for such assertion on the managed forests (natural + planted). 85% seems to be far too high". [Edson Leite, Brazil]	Section considerably revised. Executive summary subst. revised and text rewritten(incl revisions on forest management)
56	1	18	1	18	is 'a-1 the same as yr-1'?. [Edson Leite, Brazil]	Accepted- text revised. Units checked and streamlined
24139	1	25	1	29	unclear on the logc of this statement, does not provide clarity in following paragraphs, almost contradicts [Derek Berliner, South Africa]	Section considerably revised. Executive summary subst. Revised and confidence language added

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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7471	1	7	12	8	The final revision should have a legend to show the climate variability on the map across different shown in colours [Onema Adojoh, United States of America]	Accepted- text revised. Figure and legend has been revised
16963	1	1	87	20	General comment Chapter 1: - The chapter stresses the much-needed approach of evaluating interactions between climate change, environmental conditions, economic restrictions and social aspirations. In places the text is rather verbal and one gets the feeling that the complexity of the issue leads to a lack some focus in the text. - It would benefit from a revision of the parts of uncertainty analysis and decision support systems. the comments made are frequently a bit over-generic. Compared to Chapters 2 and 4 this is the weakest one. - The chapter on future challenges specifically covers reforestation and afforestation (1.3.2.1), but largely ignores the challenge to the agricultural sector of feeding 10 billion people by 2050. The threats from climate change and population pressure to further degradation of grasslands and consequences on supporting livestock grazing could receive more attention. - The relative scarcity of references to managing soil organic carbon, the largest terrestrial pool of carbon and with the potential to act as a sink for atmospheric CO2 is surprising. The complete absence of references to managing wetlands and organic soils as part of land degradation is an omission that should be addressed. If these aspects are considered outside the aim of the report it could be useful to mention this explicitly. [Roland Hiederer, Italy]	Accepted. chapter has largely highlighted future risks, threats and challenges that will pose further stress on land and make mitigation difficult.
7379	1	1	87	20	Please explain the relationship with SROCC and why polar areas are barely mentioned in the framing, although contained in subsequent chapters. Without that explanation, the reader could assume these areas are irrelevant or deemed irrelevant. To use an example from my personal work and SROCC, 9–14% of the global land area are underlain by permafrost (10.5194/tc-6-221-2012) translating climate change and land use into powerful impacts. [Stephan Stephan Gruber, Canada]	Rejected - outside the scope of the chapter. This is an important, and tricky point. Chapter 1 has tight word count, and it is difficult to give all important world regions space (same can be said e.g. for savannas, tropical regions, mountain areas, etc.; none are specifically captured in the chapter, but are discussed in more detail in the "specialist" chapters that follow.
14777	1		87		It generally applies to the entire chapter. What it comes the suggested framing of just transition in this report, it should differentiate how just transition applies to areas of industrial agriculture (transition from industrial to low carbon food and agricultural systems), and areas of subsistence agriculture (transition from subsistence to low carbon food and agriculture systems that are more productive than what is already in action). [Laxmi Pant, Canada]	Noted. The chapter assesses the literature on the interactions between climate and land and not necessarily on just transition.
1295	1		87		I feel authors nicely written this chapter and so no more amendments are required. [Pushp Raj Tiwari, United Kingdom (of Great Britain and Northern Ireland)]	Noted no action needed.
26585	1				A good and well-structured introduction to the report - well done [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted no action needed.
3517	2	1	1	27	In general: The titles could be changed a bit to better fit to texts and present a more logical structure ( ideas are included in the following comments) . This would readers to understand the line of argumentation [Cordula Ott, Switzerland]	Rejected .
31787	2	4	2	15	Here the carbon potential uptake of woody biomass for bioenergy production could be mentioned [Piera Patrizio, Austria]	Comment noted section totally updated and revised. We consider this too detailed for a framing chapter
255	2	7	2	7	Not sure if the report needs to put global in brackets (global) [Mahak Agrawal, India]	Rejected.

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257	2	8	2	8	Land use- land cover instead of merely 'land use' - because the substance of the report is discussing more than land use, the land cover and utilisation of land over geographies and time [Mahak Agrawal, India]	Rejected. land use also intuitively refer to use and cover; revised version of the chapter also includes link to IPCC definition and glossary
18273	2	6	9	37	First of all, for poverty reduction, the essence of the world, the essence of the world, it is necessary to have the use of disintegrated benefits. [Md Shahin, Bangladesh]	Noted no action needed.
18275	2	7	10	47	If you punish the poverty completely, our world-class latitude will take the upper case, the equality project will take hand, even though it will be compatible with the impression of the practice. [Md Shahin, Bangladesh]	Noted no action needed.
18277	2	8	11	21	Different development of fossil fuel can not be called sustainable development, we are going wrong, when we talk about such development, we think that the geniuses of the grinding of Greenhouse, increasing our rate of interest in our suitlies. [Md Shahin, Bangladesh]	Noted no action needed.
18279	2	10	12	3	For the increase in the average heat-middle-growth, industrial branch can not be filed, who has to be responsible for the lack of industrials of the industrial, the population of the population, increasing the population, because the demand increases. [Md Shahin, Bangladesh]	Noted no action needed.
18281	2	14	16	51	The equivalent waves in all the seats of the earth are not available, it can be the way of flammable flame. [Md Shahin, Bangladesh]	Noted no action needed.
18283	2	17	18	50	There are a universal path in the world if there is a great hero. [Md Shahin, Bangladesh]	Noted no action needed.
18285	2	22	23	18	Like Sahara desert on earth, if the desert does not be able to live in the fertile, the world is not able to reduce the Communion of the Communion, and it is with me to have a little. [Md Shahin, Bangladesh]	Noted no action needed.
18289	2	29	31	21	To strengthen the world's profit, the project will be taken to share the project according to the nature of the earth. [Md Shahin, Bangladesh]	Noted no action needed.
18287	2	26	36	28	Worldwide 235 systems work with one, the hero's traveler is saved. And the world is the capital and slogans of life. [Md Shahin, Bangladesh]	Noted no action needed.
13297	3	1	3	3	I suggest the following change: The current geographic spread of the human unsustainable use of land, and the large and rapidly increasing appropriation negative impacts on functions and processess of multiple ecosystem services are unprecedented in human history. [Marina Rosales Benites de Franco, Peru]	Rejected . Seems to make the title even more complex to follow.
26565	3	2	3	2	Replace word "spread" with "extent" to clarify meaning [Anne Woodfine, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. ES has been revised throughout
31607	3	2	3	2	The first paragraph of the first chapter sets the tone: In this case, the current message is that there is a highly negative impact of the spread of human activities. While the concerns raised in this paragraph are relevant, we would reccommend to start the chapter with a more informative paragraph, such as the one that introduces in page 5, lines 19 and next: "Land provides the basis for our livelihoods....." Humanity cannot avoid the use of the land. We are here, and the land provides our livelihood. How should we go about it, what are we doing, where should we pay more attention and review choices and decisions... and the text unfolds. [, Brazil]	Accepted- text revised. see new message 1
18151	3	2	3	2	summary of the objectivities and of gaps in previous reports (1.2.1 + box 1.1) might be helpful [Julia Nabel, Germany]	Rejected . doesn't seem to fit into an ES
8885	3	2	3	3	This section on the magnitude of land needed to support ecosystem services would be greatly strengthened by adding numbers. How much more land do we need to support future population growth and consumption? [Jean-Luc Chotte, France]	Rejected - outside the scope of the chapter . Important point. But this chapter 1 is a framing chapter and provides the context for the report; it has to consider the aspects that will then covered in more details in other chapter but should not pre-empt their analysis.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

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13223	3	2	3	4	<p>Critical to the context of the report is the scale of the biodiversity crisis (Ceballos et al. 2017) and its implications for ecosystems and biogeochemical cycles and their role in mitigation, adaptation and providing benefits in support of sustainable development. Biodiversity underpins all ecological services and the integrity, adaptive capacity and stability of ecosystems and thus the longevity of their carbon stocks (Thompson et al 2008). The IPBES (2018) suggests that the loss of biodiversity has now reached crisis proportions on a scale that is as serious for life on Earth as the climate crisis. This framing needs to be elevated throughout the report as it is critical to understanding the relationship between biodiversity, ecosystem functioning and the role of natural forests and other ecosystems in the global carbon cycle and land-based mitigation actions (Hooper et al. 2002).</p> <ul style="list-style-type: none"> <li>• Ceballos, G., Ehrlich, P.R. and Dirzo, R. (2017) Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. PNAS 114(30): E6089-E6096.</li> <li>• IPBES (2018): Summary for policymakers of the regional assessment report on biodiversity and ecosystem services for the Americas of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. J. Rice, C.S. Seixas, M.E. Zaccagnini, M. BedoyaGaitán, N. Valderrama, C.B. Anderson, M.T.K. Arroyo, M. Bustamante, J. Cavender-Bares, A. Diaz-de-Leon, S. Fennessy, J. R. García Márquez, K. García, E.H. Helmer, B. Herrera, B. K</li> <li>• Thompson I., Mackey B., McNulty S. and Mosseler A. 2009. Forest Resilience, Biodiversity, and Climate Change. Technical. Secretariat of the Convention on Biological Diversity, Montreal.</li> <li>• Hooper, David &amp; Buchmann, Nina &amp; Degrange, V &amp; Diaz, Sandra &amp; Gessner, Mark &amp; Grime, P &amp; Hulot, Florence &amp; Mermillod-Blondin, Florian &amp; van Peer, L &amp; Roy, Jacques &amp; Symstad, Amy &amp; Solan, Martin &amp; Spehn, Eva. (2002). Species diversity, functional diversity and ecosystem functioning. Biodiversity and ecosystems functioning: a current synthesis, 195-208 (2002). Chapter 17 in Biodiversity and Ecosystem Functioning: Synthesis and Perspectives, edited by M. Loreau, S. Naeem and Pablo Inchausti. Oxford University Press, pp. 195-208. [Aila Keto, Australia]</li> </ul>	Rejected - outside the scope of the chapter . Biodiversity indeed as a major concern, but has to be weighed against other challenges that are scope of the report
11739	3	2	3	13	In this paragraph (or elsewhere in this chapter) the discussion around the "anthropocene" could be referenced. including to SR15 chp 1 [Hans Poertner and WGII TSU, Germany]	Rejected. Term anthropocene to our knowledge still not universally accepted.
28875	3	2	3	13	The para is a good start of the ES. [Jan Fuglestedt, Norway]	Thank you for the positive comment.
259	3	2	3	13	In the para- mixed use of percentages, fractions and multiples - makes it difficult to comprehend comparatives of increase [Mahak Agrawal, India]	Rejected. the chief purpose of these numbers, which are illustrative only, is to demonstrate the magnitude of the changes in different land-related aspect -- not to compare these to each other
26095	3	3	3	4	The meaning of the term "appropriation" is unclear in the phrase "the large and rapidly increasing appropriation of multiple ecosystem services". Perhaps replace with: "the large and rapidly increasing impact of that land use on multiple ecosystem services" [Reid Detchon, United States of America]	Rejected . Appropriation is a commonly used term in the literature and implies a more critical reflection of (over)-use. "Use" is much more neutral. In context of this message the authors aim to differentiate with i.e. "sustainable use".
22203	3	4	3	4	Insert "directly" before "affected". All land surface is clearly and materially affected by human activities, through climate change, CO2 enrichment and other pollutants. [Anastasios Kentarchos, Belgium]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12743	3	4	3	4	I suggest to substitute the word "today" with a date to which the sentence refers to [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
23935	3	4	3	4	Add "directly" before "affected". All land surface is clearly and materially affected by human activities, through climate change, CO2 enrichment and other pollutants. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
31609	3	5	3	5	(...) 15% since 1960 alone. (...) [Brazil]	Noted no action needed.
4317	3	5	3	7	Please check it is potential NPP or actual NPP [Guangsheng Zhou, China]	Noted no action needed. checked, thanks.
1429	3	6	3	6	Suggest replacing "managed forest" with "x% of forest is under some form of use or management" following line 11 - 12, p. 9. [Henry Scheyvens, Japan]	Accepted- text revised.
23321	3	6	3	6	It is misleading to claim forested areas are 'managed'. At best, a majority might be weakly managed. [John Dixon, Australia]	Accepted- text revised.
20949	3	7	3	13	These are important framing messages that should be elevated to the SPM (they are only briefly referenced). [United Kingdom (of Great Britain and Northern Ireland)]	Thank you for the positive comment. We use these to provide input to the SPM
22205	3	8	3	8	Insert "total" before "consumption". The first part of the sentence refers to per capita values, but the rest (presumably) to absolute increases. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
23937	3	8	3	8	Add "total" before "consumption". The first part of the sentence refers to per capita values, but the rest (presumably) to absolute increases. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
146	3	8	3	9	Please make it clearer which numbers refer to per-capita change and to change in total amount. ("In the past 50 years, global per capita food consumption increased by one fifth, consumption of dairy products and vegetable oils has almost doubled, meat consumption has almost tripled, and wood harvest has increased by one third. At the same time, global fertiliser use increased by 500%, ...") [Tommy Wiedmann, Australia]	Accepted- text revised.
24969	3	9	3	11	This cannot be high or medium confidence issue, should be supported by fact or references [Binaya Shivakoti, Japan]	Noted no action needed. References provided in section 1.2.2.2, as indicated at the end of the message.
23323	3	11	3	11	correct to 'human FRESH water use'. Could be assigned 'high confidence' [John Dixon, Australia]	Accepted- text revised.
28877	3	12	3	13	What about physical conditions and resources? Wouldn't these factors also play a role? [Jan Fuglestad, Norway]	Comment noted section totally updated and revised.
23325	3	12	3	13	CORRECT: countries AND FARMING SYSTEMS in these global average trends, which reflects differences in wealth, degree of industrialization AND AGRO-ECOLOGIES RESPECTIVELY. [John Dixon, Australia]	Comment noted section totally updated and revised. suggestion partially included in revisions#
30013	3	14	3	15	The statement is too generic: rapid depletion is not taking place everywhere and climate change does not everywhere exacerbate the situation. [Netherlands]	Accepted- text revised. This message refers to global trends, which is emphasised in revisions
13299	3	14	3	15	Human over-exploitation causes rapid depletion of land resources, which in future will be further exacerbated by climate change (virtually certain). [Marina Rosales Benites de Franco, Peru]	Comment noted section totally updated and revised.
3339	3	14	3	15	I would suggest to use the following expression, i.e., it is virtually certain that human over-exploitation causes rapid depletion of land resources, which in future will be further exacerbated by climate change. [Rongshuo Cai, China]	Comment noted section totally updated and revised.

**IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
33549	3	14	3	15	It seems strange to state that climate change will only exacerbate the depletion of land resources "in the future". Already under present climate, with +1°C global warming, we have substantial impacts on land (e.g. detectable increase of drought occurrence in the Mediterranean region, see IPCC SR15 chapter 3 as well as Gudmundsson et al. 2017). Ref: Gudmundsson, L., S.I. Seneviratne, and X. Zhang, 2017: Anthropogenic climate change detected in European renewable freshwater resources. Nature Climate Change. 7, 813-816. [Sonia Seneviratne, Switzerland]	Accepted- text revised.
20951	3	14	3	23	Along with undernourishment, overweight and obesity trends should also be highlighted here. [, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. Agreed, but these aspects are food waste aspects (as much as health). Is added as example to Fig. SPM 1
17839	3	14	3	24	The challenges related to the loss of high-fertile agricultural areas at the expense of urban and infrastructure (1.2.2.3) could also be mentioned here. [Quentin Lejeune, Germany]	Comment noted section totally updated and revised.
24971	3	15	3	15	This cannot be virtually certain; deserves to be under confidence level else better to delete [Binaya Shivakoti, Japan]	Accepted- text revised.
24973	3	15	3	16	This sentence could be safely deleted for the sake of reducing word count as it does not have added value [Binaya Shivakoti, Japan]	Accepted- text revised.
38475	3	16	3	16	Run-on sentence that seems to be missing a verb or two. Try to make a clearer tie between clauses. [, United States of America]	Accepted- text revised.
28811	3	16	3	16	currently still' may be deleted. [Lokesh Chandra Dube, India]	Accepted- text revised.
33429	3	16	3	16	821 million. SPM gives 1 billion. [Stephen Humphreys, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
4319	3	16	3	18	This sentence might be unsuitable, and should give the specific water pollution. [Guangsheng Zhou, China]	Rejected. Pollution could be nitrogen, phosphorous, pesticides, particles -- would be too long a list to spell thjese all out
22207	3	16	3	19	Complicated. Revise [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
26769	3	16	3	19	Please rephrase: "the rate of ecosystem degradation 5-10 million ha a-1" has no clear relation to the rest of the sentence. [, Germany]	Accepted- text revised.
18153	3	16	3	19	sentence (structure) unclear [Julia Nabel, Germany]	Accepted- text revised.
13035	3	16	3	19	This is a long sentence with several ideas. Should there be a period after "undernourished?" [Kristi Tabaj, United States of America]	Accepted- text revised.
2189	3	16	3	19	The sentence "Yet an estimated 821 million people...and locally up to 75% of species have been lost." is disjointed, with disparate facts included together in a way that doesn't make sense, and doesn't tie to the previous sentence (implied by the "yet"). The phrase on undernourished people does not obviously tie to the section/paragraph heading the way it is currently phrased. I would recommend removing (or moving elsewhere) the "Yet an estimated 821 million people are currently still undernourished," so that the sentence starts with "While conversion of tropic forest...". [Michelle North, South Africa]	Accepted- text revised.
33427	3	16	3	19	It would be good to mention the scale of waste up front here.(see information on page 4, lines 9-10) -- as from a macro perspective this pieces of information are more informative when placed together than separated: the fact that 30% of harvested food is lost or wasted while 20% of the global population is undernourished (and a little more than that obese). [Stephen Humphreys, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
191	3	16	3	19	This section needs to be entirely re-written. Message is lost. [Wallace Tyner, United States of America]	Comment noted section totally updated and revised.
26097	3	17	3	18	Verb missing after "degradation" [Reid Detchon, United States of America]	Accepted- text revised.
1537	3	17	3	19	sentence not clear, consider rephrasing for clarity. [Lucy Atieno, Kenya]	Accepted- text revised.
33121	3	18	3	18	5–10 million ha a-1 [Amany Mansour, Egypt]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
22209	3	18	3	18	Delete "locally up to 75% of species have been lost", or replace the value with 100%. Clearly, local species extinctions can be effectively 100% (e.g., when a highrise building or a toxic lagoon replaces productive land). Setting the upper limit at less than 100% is meaningless and misleading. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
31611	3	18	3	18	see comment 19 on intensification and review the sentence. [, Brazil]	Accepted- text revised.
841	3	18	3	18	what is a-1? Per year? Shouldn't it be yr-1? [, Spain]	Accepted- text revised. units standardise across chapter
23939	3	18	3	18	Delete "locally up to 75% of species have been lost", or replace with 100%. Clearly, local species extinctions can be effectively 100%. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
8131	3	18	3	19	A statement "75% of species have been lost" is very high. I suggest to use an average estimate of global biodiversity loss as discussed on Page 11 (Line 44). Using 75% for biodiversity loss is over simplification. [Haruni Krisnawati, Indonesia]	Accepted- text revised.
261	3	18	3	19	unclear - locally what kind of water bodies are we referring to - lakes, ponds, rivers. Which species are we referring to - fauna, flora, microbes - fraction lost will vary as per size of water body and specie type. [Mahak Agrawal, India]	Accepted- text revised.
31613	3	19	3	19	(...) Large cChallenges exist (...) [, Brazil]	Noted no action needed.
3805	3	19	3	22	Replace " Large challenges exist in achieving more sustainable land and water use in view of continued population growth, accelerating demand for multiple ecosystem services and the increasing complexity in how the underlying socio-economic drivers interact (such as trade patterns, transportation, land ownership, urbanization or migration). These challenges will be... " By " Large challenges exist in achieving more sustainable land and water use in view of the accelerating demand for multiple ecosystem services and the increasing complexity in how the underlying socio-economic drivers interact (such as trade patterns, transportation, land ownership, urbanization or migration). Moreover, these challenges become considerably more difficult to meet in a situation of continued population growth. They will be..." [Philippe Waldeufel, France]	Comment noted section totally updated and revised.
24975	3	22	3	24	The challenges will be exacerbated by what, some clarification such as through X, Y,Z is necessary besides reduced crop yield, water, biodiversity etc [Binaya Shivakoti, Japan]	Comment noted section totally updated and revised.
23327	3	24	3	24	ADD TO SENTENCE 'in some areas' [John Dixon, Australia]	Comment noted section totally updated and revised.
843	3	25	3	25	delete "Further", the first word of the paragraph. Inaction, further or not, is risking the achievement of reaching Paris goals [, Spain]	Accepted- text revised.
5341	3	25	3	26	A prospect cannot be raised, I think, and I am also not sure whether one can argue that inaction in terms of GHG reduction raises the likelihood that land-based negative emission technologies will be implemented. I agree with the intention of this argument, but this needs to be sharpened. Perhaps one can say that failure to reduce GHG emission from industry etc. raises the requirement for land-based mitigation if defined goals are to be met? [Helmut Haberl, Austria]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13139	3	25	3	27	The messages in this para are very important but dissonant. Much of the para is positive (2nd, 3rd, 4th non bold sentences) but the overall framing is highly negative (bold sentences, plus last sentence of the para). Such to reformulate along the lines of: achieving Paris Agreement will require strong mitigation in energy sector as well as land-based approaches. Latter could contribute up to 30% in cost effective manner with potential co-benefits (contingent on approaches taken) as well as some tradeoffs. However, delay/inaction in overall GHG emission will add to competition for (and conflicts about) land use as well as jeopardizing achievement of Paris. [David Cooper, Canada]	Comment noted section totally updated and revised.
31615	3	25	3	27	Highly debatable. While the urgency for concrete action is agreed upon, land based mitigation measures should not, in any circumstances, be seen as the central solution to achieve the goals established by the Paris Agreement. The efforts by the land use sector are pivotal. Sustainable land management is urgent to effectively establish a more sustainable development, and is responsible for the achievement of several goals. However, relying on its capacity to reduce emissions and act as a sink for some of the gases, is to minimize the urgency to make drastic changes in other sectors, that otherwise might cause even more drastic problems in the future. A document produced by the IPCC should support the concrete action to promote SLM as one important component of the action needed towards implementing the Paris goals, while still emphasizing the urgent and necessary need to make concrete changes in energy sources, industrial pathways, and economic and societal behaviors. The higher concern of the needed investment on land use should not be the reduction of emissions, but rather is centrality to provide, in sustainable manners, food and support livelihoods. (see further comment 53). [ , Brazil]	Comment noted section totally updated and revised. Agree with these statements; revised messages provide more clarity
25279	3	25	3	27	It should be clarified that this sentence refers to the long-term temperature goal of the Paris Agreement. [ , France]	Accepted- text revised.
13225	3	25	3	28	It is important to note here that actions that protect biodiversity and ensure ecosystem integrity would also promote long term, relatively stable carbon sequestration and storage, minimize risk of future loss and of increased GHG emissions (Duffy et al. 2017, Korner 2017). <ul style="list-style-type: none"> <li>• Emmett Duffy, J., Casey M. Godwin, and Bradley J. Cardinale. 2017. "Biodiversity Effects in the Wild Are Common and as Strong as Key Drivers of Productivity." Nature 549 (7671). Nature Publishing Group: 261–64. doi:10.1038/nature23886.</li> <li>• Korner, Christian. 2017. "Carbon Sequestration: A Matter of Tree Longevity." Science 55 (6321): 8–10. doi:10.1126/science.aaal2449. [Aila Keto, Australia]</li> </ul>	reference noted but point already covered by current used citations.
20953	3	25	3	28	If land based solutions were implemented that threatened sustainable development, then this WOULD NOT be consistent with achievement of the Paris Agreement. The PA explicitly states that the Agreement is in the context of sustainable development in Article 2. Please clarify this point in the text, such that it doesn't contribute to misunderstandings about the goals of Paris. [ , United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
20955	3	25	3	28	Please consider uplifting to SPM - the message on further inaction increasing the prospect of relying on drastic, land based mitigation measures which will jeopardise sustainable development is a very important one and it very well articulated here. A1.4 and D2 allude to parts of this but the direct message on 'increased reliance with inaction' is missing. Please could you make it clearer. [ , United Kingdom (of Great Britain and Northern Ireland)]	Thank you for the positive comment. Will be kept in mind when revising the SPM

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13301	3	25	3	28	Further inaction in the rapid reduction of anthropogenic greenhouse gas emissions raises the prospect of relying on drastic, land-based, climate change mitigation and adaptation measures, in order to achieve the Paris Climate Agreement (high confidence). This will critically jeopardise achievement of other sustainable development goals that depend on land-based ecosystem services. [Marina Rosales Benites de Franco, Peru]	Comment noted section totally updated and revised.
22211	3	25	3	37	Consider making this statement more focussed. As currently written it seems to promote early land-based action, including its co-benefits, while warning against over-reliance on (unspecified) drastic land-based measures in the long-run. However this message is somewhat lost as the statement jumps between the two. Perhaps better to split the two parts. Also, please be less general about the dangers of 'additional' large-scale mitigation. Which measures? What dangers? Are the dangers intrinsic or is a management issue? [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
38477	3	25	3	37	The points of this paragraph are a bit muddled. Per the key finding in bold, this paragraph is supposed to be about how drastic LU-based mitigation activities could counteract/have trade-offs with other land-based ecosystem services, but only this sentence and the last sentence really focus on this. The next sentence about mitigation costs is true and likely here because increased LU mitigation will increase competition with other land uses, and likely increase costs and rents, though that connection isn't made/clear here. The next sentence about LU mitigation gives estimates: Are these in the 'drastic' case, per the bold sentence above or just estimates based on current BAU or some other future scenario? Not really sure what to make of the cost-efficiency/regional context sentence (line 33) in the context of this paragraph. The next sentence is about co-benefits of LU mitigation. And the last one gets back to the topic/intent of the first paragraph. Suggest trying to focus on supporting the sentence in bold rather than meander about. Consider adding another paragraph before this one that focuses on the role of forestry and agriculture in mitigation before getting to this paragraph that seems to really serve as a warning to not rely too heavily/drastically on LU-based mitigation. A key finding on mitigation seems to be lacking. [, United States of America]	Comment noted section totally updated and revised.
26099	3	25	3	37	The first half of this paragraph (lines 25-30) should be separated and/or downgraded into light-face type. The effect of "further inaction in the rapid reduction of anthropogenic greenhouse gas emissions" on the efficacy and cost of achieving the Paris Agreement is not germane to this chapter and should not be highlighted. Conversely, the material in lines 31-37 is a critical message that should be stressed prominently in this Executive Summary. [Reid Detchon, United States of America]	Comment noted section totally updated and revised. Executive summary revised; comments were taken on board partially, but not fully
4061	3	25	3	37	It is suggested to highlight which SDGs' achievement are more at risk; e.g. SDG 2, and 2.3 [Turi Fileccia, Italy]	Rejected - outside the scope of the chapter . This is indeed a critical but also difficult challenge. However, chapter 1 is not the best place to address specifics about risk to SDG --> chapter 7
28881	3	26	3	26	I suggest adding "the goals of" after "achieve" [Jan Fuglestedt, Norway]	Comment noted section totally updated and revised.
38479	3	26	3	27	The Paris Agreement is a framework for nationally determined actions to limit temperature rise. It is unclear what "achievement of the Paris Agreement" would entail. The key goal is limiting temperature rise and the associated effects on human and natural systems, not specifically achieving or implementing the Paris Agreement per se. Do the authors refer to limiting temperature rise to 2°C above preindustrial levels? If so, suggest framing in terms of this physically meaningful goal. [, United States of America]	Comment noted section totally updated and revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26101	3	26	3	36	The word "drastic" with regard to "climate change mitigation measures" is editorializing and should be deleted. In two instances, "climate change mitigation measures" is overbroad and should be replaced with "land-based carbon dioxide removal options such as reforestation and afforestation and bioenergy with carbon capture and storage" [Reid Detchon, United States of America]	Accepted- text revised. Kept climate change mitigation as a more general term
22213	3	27	3	27	Insert "objectives of the" before "Paris". Delete "Climate" before "Agreement". The title of the Agreement is "Paris Agreement", and it has been achieved (it exists). Its objectives have not been. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
845	3	27	3	27	In addition to Paris Agreement goals, a reference to the ultimate objective of the Convention is needed here. Also a link with SR1,5 would improve the quality of this chapter. [, Spain]	Noted no action needed. In the ES references to previous IPCC reports are typically not included.
28813	3	27	3	27	delete 'Climate' from 'the Paris Climate Agreement' [Lokesh Chandra Dube, India]	Accepted- text revised.
23941	3	27	3	27	Insert "objectives of the" before "Paris". Delete "Climate" before "Agreement". The title of the Agreement is "Paris Agreement", and it has been achieved (it exists). Its objectives have not been. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
6057	3	27	3	28	Additional, explanatory sentences are needed as without them the document creates the impression that no mitigation action in the land sector is justifiable. Suggested to add before this sentence: "This does not, however, imply that no land-based mitigation actions should be undertaken. Nonetheless, drastic, land based, climate change mitigation...." [, Poland]	Comment noted section totally updated and revised.
17841	3	27	3	28	This sentence considers the impacts of land-based mitigation measures on sustainable development. In order to present a balanced view of the problem, it should be however confronted with the negative effects that climate change, through its many documented impacts on several human and natural systems, can also have on sustainable development. [Quentin Lejeune, Germany]	Comment noted section totally updated and revised.
3341	3	27	3	28	Please provide the likelihood statement of this outcome. [Rongshuo Cai, China]	Comment noted section totally updated and revised.
17619	3	28	3	29	While mitigation costs increase with more stringent mitigation targets, costs related to impacts and adaptation reduce. (See SR1.5.) The statement such be balanced better, so as not to provide only part of the (net) costs and benefits of climate action. [, Sweden]	Comment noted section totally updated and revised.
13037	3	28	3	30	The sentence is confusing. Is the second half of the sentence is missing a verb ("cost and performance of technologies or lags in decision making")? Or is "lags" the verb? [Kristi Tabaj, United States of America]	Accepted- text revised.
24979	3	28	3	39	Not specific, better to mention that adaptation on agriculture and forestry can produce mitigation co-benefits [Binaya Shivakoti, Japan]	Comment noted section totally updated and revised. see revised message (4)
1689	3	30	3	37	Even though the heading of this paragraph is very clear (lines 25-28), in the text in lines 30-37 a certain ambiguity is left if land management practices will either 1) have co-benefits (line 34 and 35 - very high confidence) or 2) add pressure on ecosystem services from land use (lines 35 to 37 - high confidence). In my view this ambiguity is correct as it is currently unclear if CC mitigation through land management will have a positive or negative effect on land ecosystems & food security. This could be written more explicitly. [Renske Hijbeek, Netherlands]	Comment noted section totally updated and revised.
6059	3	32	3	32	Shouldn't it be greenhouse gas emissions as not all the gg emissions come from fossil fuels? [, Poland]	Comment noted section totally updated and revised.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
23605	3	32	3	32	it is unclear whether 15-30% refers to a reduction, or absolute (is this 15-30% lower than current, or 15-30% of current values?) [Kerri Finlay, Canada]	Comment noted section totally updated and revised.
20957	3	32	3	33	To make it clearer would recommend 'with an estimated total reduction equivalent to...' [, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
20959	3	32	3	33	The fact that you can achieve 15-30% reductions in the next decades that has co-benefits for soil water and biodiversity is a really important message. Consider splitting this paragraph - one on the risk of relying on land based mitigation and one on potential reductions. [, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
21681	3	33	3	33	"these measures can be cost-efficient" - please clarify whether you mean they can be cost-free, or they are cost-effective for a given carbon price - noting that in virtually no country today, agricultural emissions are exposed to carbon prices. The reduction potential for agricultural GHG emissions is certainly not 15-30% of today's fossil fuel emissions if the cost-effectiveness threshold is zero (i.e. reliance on co-benefits from any mitigation measures only). That would not be consistent with the assessment in chapters 5 and 6. [Andy Reisinger, New Zealand]	Comment noted section totally updated and revised.
4011	3	33	3	33	Not clear what the sentence "These measures can be..." says. Is this true for all regions? Or are they cost effective for some regions? [Vassilis Daiglou, Netherlands]	Accepted- text revised.
22215	3	33	3	37	The last two sentences of the paragraph contradict each other. The penultimate sentence needs to be qualified, as only "some of" (or "many of") the measures referred to "could" (and not "would") have the mentioned benefits. Other measures can be indifferent or harmful, as correctly pointed out in the last sentence. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
23943	3	33	3	37	The last two sentences of the paragraph contradict each other. The penultimate sentence needs to be qualified, as only "some of" (or "many of") the measures referred to "could" (and not "would") have the mentioned benefits. Other measures can be indifferent or harmful, as correctly pointed out in the last sentence. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
24977	3	35	3	37	But how large land based mitigation could exacerbate pressure on land ecosystem is not clear [Binaya Shivakoti, Japan]	Comment noted section totally updated and revised.
13039	3	35	3	37	The ideas appear to contradict each other. Broken down it appears to read some like "existing pressure on ecosystems will be exacerbated with mitigation efforts enacted." Perhaps additional detail is needed to describe the type of land pressure noted here. [Kristi Tabaj, United States of America]	Accepted- text revised.
263	3	35	3	37	Will the pressure exacerbate or decrease with implementation of mitigation efforts? [Mahak Agrawal, India]	Comment noted section totally updated and revised.
6061	3	38	3	39	Yet, it should be emphasized that adaptation alone will not contribute to solving climate change. Suggested to change to "Although adaptation strategies can produce.....of both adaptation, mitigation action in the land sector is still required" [, Poland]	Comment noted section totally updated and revised. many of the statements in the chapter refer to adaptation and mitigation as a comprehensive set of actions
1547	3	38	3	39	While there could be consistent evidence to show high confidence likelihood that adaptation strategies can produce mitigation benefits, this level of confidence could be lowered to medium or lower, if the term adaptation remains open to various interpretations. It can only be high confidence if reference is made to "sustainable adaptation" strategies. [Lucy Atieno, Kenya]	Comment noted section totally updated and revised. this point has been reviewed and corrected.
20961	3	40	3	40	In what way is adaptation linked to societal resilience? In terms of its success/effectiveness? Can you elaborate on this? [, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This has been reviewed and revised.
28883	3	40	3	40	"... is increasingly viewed as.." sounds a bit loose. Reword? [Jan Fuglestedt, Norway]	Noted. Revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12745	3	40	3	40	Two subsequent sentences start in the same way: "Adaptation is increasingly ...". I suggest to change the incipit of one of the two sentences [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. sentences revised in the new draft.
8887	3	41	3	41	Well said and the demand side of consumption is a very important point for policymakers. [Jean-Luc Chotte, France]	Noted no action needed.
13303	3	41	3	42	Adaptation is increasingly viewed as requiring shifts towards integrated and system-based good governance approaches combining technology, economics, land conservation and institutional innovations (high confidence). [Marina Rosales Benites de Franco, Peru]	Noted. The sentence refers to global decision making and models and not specifically to adaptation.
13227	3	42	3	44	It is essential to also cite the literature showing that that conservation management options also synergies with mitigation and adaptation, particularly of carbon rich systems like primary forests (Nepstad et al. 2006, Ricketts et al 2010, Keith et al. 2014).  <ul style="list-style-type: none"> <li>• Nepstad, D., S. Schwartzman, B. Bamberger, M. Santilli, D. Ray, P. Schlesinger, P. Lefebvre, et al. 2006. "Inhibition of Amazon Deforestation and Fire by Parks and Indigenous Lands." Conservation Biology 20 (1): 65–73. doi:10.1111/j.1523-1739.2006.00351.x.</li> <li>• Ricketts, Taylor H, Britaldo Soares-filho, Gustavo A B Fonseca, Daniel Nepstad, Annie Petsonk, Anthony Anderson, Doug Boucher, et al. 2010. "Indigenous Lands , Protected Areas, and Slowing Climate Change." PLoS Biology 8 (3): 6–9. doi:10.1371/journal.pbio.1000331.</li> <li>• Keith, H., D. Lindenmayer, B. MacKey, D. Blair, L. Carter, L. McBurney, S. Okada, and T. Konishi-Nagano. 2014. "Managing Temperate Forests for Carbon Storage: Impacts of Logging versus Forest Protection on Carbon Stocks." Ecosphere 5 (6). doi:10.1890/ES14-00051.1. [Aila Keto, Australia]</li> </ul>	Noted no action needed.
20947	3	1	4	1	GENERAL comment on exec summary - paragraphs are overly long. Please consider shortening and/or splitting into separate paragraphs. [United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. ES has been revised substantially
1539	3	38	4	2	I suggest that the text be specific here on not just adaptation, but sustainable adaptation, given the fact that mal adaptation exists. For additional information on sustainable adaptation, please refer to Njoroge, J. M. (2014). An enhanced framework for regional tourism sustainable adaptation to climate change. Tourism management perspectives, 12: 23 - 30. Also see comment 7 [Lucy Atieno, Kenya]	Comment noted section totally updated and revised. this point has been reviewed and corrected.
5343	3	38	4	3	I agree that adaption and mitigaion may be synergistic, but the opposite is also true and should not be concealed [Helmut Haberl, Austria]	Noted no action needed.
23609	3		4		overall, there are a lot of vague phrases in the bolded text throughout the intro pages. More precise wording is recommended. [Kerri Finlay, Canada]	Comment noted section totally updated and revised. the chapter has gone through substantial revision to offer more precision where necessary.
7301	3	1	5	15	The ES emphasises the differences between regions but does not call out clearly the particular vulnerability of the poor countries. This needs to be underlined in the ES. [Debra Roberts, South Africa]	Comment noted section totally updated and revised. message on regional aspects added, but also keeping in mind that not all detail can be covered in an introductory chapter.
7303	3	1	5	15	Urbanisation is one of the global megatrends of the 21st century with far reaching direct and direct implications for land and land use - this should be highlighted in the ES. [Debra Roberts, South Africa]	Rejected. Agreed, but there are so many important trends that there is the danger of providing a "shopping list". Urbanisation is mentioned, however, in M3

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
40161	3	1	5	15	The Chapter 1 Executive Summary should have a section highlighting the trade-offs and synergies inherent using land resources to meet a wide variety of human needs (e.g., food, feed, fuel, fiber, and carbon sequestration) while maintaining the long-term productive potential of the land as well as maintaining environmental and ecosystem services. The challenge of managing lands to meet this wide variety of needs over the long run in the face of a changing climate and growing populations is central to this report, and should be included as a paragraph in the executive summary. [United States of America]	Accepted- text revised. see revised M3 and M4
28879	3	1	5	15	I would expect that the ES makes it more clear that land based activities also are drivers of climate change. I don't think this is made very clear in the current version. [Jan Fuglestedt, Norway]	Accepted- text revised. new message 4
21685	3	1	5	15	Paris goal of well below 2C require active use of land for mitigation. Large scale use of land for bioenergy and BECCS necessarily leads to competition in land for food vs land for mitigation and a conflict with SDGs, specially in view of the future pressures due to population growth. The executive summary barely says anything about this important development. [Mustafa Babiker, Saudi Arabia]	Comment noted section totally updated and revised. The previous message 3 was entirely about this subject, and it is retained in the revised section. However we also received the message of not pre-empting too much of assessment done in the later chapters. Chapter 6 writes extensively on this topic
21687	3	1	5	15	Desertification is an existing and potential problem for many parts of the world that are also characterized by poverty and ecological vulnerability. Climate change will particularly be a great problem for these regions. One would expect the executive summary and the report to say more about this. [Mustafa Babiker, Saudi Arabia]	Rejected - outside the scope of the chapter . Desertification as one of many challenges in mentioned in message 3, but desertification as a topic in itself is covered extensively in chapter 3
4059	3	1	5	15	paragraph 1.1 is well framed, and comprehensive. [Turi Fileccia, Italy]	Thank you for the positive comment.
18291	3	37	38	8	I decrease the greenhouse gas from the earth's bombs, and inventing the inheritance. [Md Shahin, Bangladesh]	Comment noted section totally updated and revised.
211	3	1	41	13	Unfortunately, as it is written now, I think this introduction will serve mainly to convince opponents of doing something about climate change that climate change is nothing but a host for all the other liberal causes. Many social, political, and economic issues that have little or nothing to do with climate change are covered in great detail. Climate change and land use would not have to carry the burden of all social ills. This introduction as is will serve to discredit all the great work that has gone into the assessment. I strongly encourage you to tone it down, and stick to the issues that have a direct link to climate and land use. As it is, it gives opponents all the ammunition they need to discredit the good work that has been done. [Wallace Tyner, United States of America]	Rejected. this chapter is a framing chapter and provides the context for the report; it has to consider the aspects that will then covered in more details in other chapter.
8877	3	1	87	20	The UNCCD SPI reviewers welcomed the progress made on SOD Chapter 1 in terms of structure and content, compared to FOD Chapter 1. In the SOD of Chapter 1, some concerns remain and a few new ones were identified which you will see in more detail in the comments below. [Jean-Luc Chotte, France]	Thank you for the positive comment.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17837	3	1			It is problematic to mention the impact that land-based mitigation measures could have on sustainable development if they were deployed at the scale required in many currently available high-mitigation scenarios, without at the same time mentioning the climate impacts on many aspects related to the sustainable development goals that these pathways would help avoid. It presents a negative view of mitigation measures, that tends to omit why these measures have been suggested and put forward: to avoid dangerous human interference with the climate system and its associated impacts. This presentation of the negative aspects of land-based mitigation on sustainable development appears several times in the chapter, and should thus be amended to present a more balanced and complete view of the issue. Moreover, it would be even more useful to present mitigation pathways that rely on other land-based mitigation options than CDR, and may thus both limit the negative impacts of CDR on sustainable development and those of climate change. [Quentin Lejeune, Germany]	Accepted- text revised. see revised message 5
12391	3	2		24	Can the loss of natural land be quantified, e.g. how much has been there from a starting point, has been lost due to human activities over time and what is the current loss rate? % changes are more illustrative, should complement rates given in absolute numbers. [Hans Poertner and WGII TSU, Germany]	Rejected - outside the scope of the chapter . Chapter 4 and 6 provide some insights.
23603	3	18		18	it is unclear what "locally" means in this context [Kerri Finlay, Canada]	Accepted- text revised.
2191	3	18			Change "ha a^-1" to just "ha per year", since this section will be read by lay people / non scientists. [Michelle North, South Africa]	Accepted- text revised.
7295	3	27			Should be Paris Agreement - remove climate [Debra Roberts, South Africa]	Comment noted section totally updated and revised.
12393	3	28		37	The text is too unspecific and therefore puzzling. Which other development goals? What are the land management practices that support emissions reduction? Can land and biodiversity losses be quantified that would be elicited by increased pressures and depending on their magnitude? [Hans Poertner and WGII TSU, Germany]	Comment noted section totally updated and revised.
26771	3	29			Why would mitigation costs generally increase over time? This statement seems only true for delayed mitigation, please revise. [, Germany]	Comment noted section totally updated and revised.
23607	3	36			the use of the term "exacerbated" here seems contrary to the point. If large-scale mitigation effort are enacted, pressure on land ecosystems should be reduced? [Kerri Finlay, Canada]	Comment noted section totally updated and revised.
22217	4	1	4	2	"Combining..." the meaning of the sentence is not clear. Combining what with what? Production with consumption? Mitigation with adaptation? From examining Ch 1.4.4 it would appear that high confidence is only justified if the statement mentions also the need to manage trade-offs. Perhaps p36 lines 10-14 would make for a better headline statement. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. The word combining is not used as per commentary.
32805	4	1	4	2	Dietary and other consumption changes are mitigation pathways, not adaptation. [Doreen Stabinsky, United States of America]	Section considerably revised. Executive summary subst. revised and text rewritten
17621	4	1	4	2	The "Combining... for adaptation" is fairly difficult to comprehend. Does it refer to agricultural adaptation? How "combining" mean? What is the relation to the subsequent paragraph that also discusses diets and food waste in mitigation context? [, Sweden]	Comment noted section totally updated and revised. The word combining is not used as per commentary.
20963	4	2	4	2	what kind of pathways? if you mean reduced consumption, that should be made clear. [, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised . pathway analysis is the exact reference to the chapter - this can be both adaptation and mitigation.
14715	4	4	4	4	has the "largest potential" to do what, or for what? This is unclear. [Wu Felicia, United States of America]	Accepted- text revised . sentences revised in the new draft.
16867	4	4	4	5	The sentence is incomplete, since it is not clear what "the largest potential" refers to. Would it be "mitigation potential"? [Roland Hiederer, Italy]	Accepted- text revised . sentences revised in the new draft.

**IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24141	4	4	4	6	terrible worded paragraph , for an executive summary this is poor [Derek Berliner, South Africa]	Comment noted section totally updated and revised. New revisions made to the ES
20965	4	4	4	6	Please clarify whether they are there particular things that should be focussed on regarding consumption? [, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
13305	4	4	4	6	Given the increasing demands for land resources, land management to safeguard food and freshwater supply under a changing climate has by far the largest potential if, simultaneously, ambitious actions are also taken on the ethical consumption side [Marina Rosales Benites de Franco, Peru]	Accepted- text revised . sentences revised in the new draft.
32419	4	4	4	6	This is an important conclusion that should be properly reflected in the Summary for Policy Makers as well [Simone Lovera-Bilderbeek, Paraguay]	Comment noted section totally updated and revised.
22219	4	4	4	14	The paragraph conflates two important, but separate findings. First, in the absence of demand-side measures, land management measures have a limited potential and a high risk of leakage/displacement. Second, demand side measures have a high mitigation potential through relieving pressures on land. These should be articulated separately. It is misleading to link them as in the current draft, as the benefits of the latter can materialise without the former (e.g., through the natural recovery of abandoned agricultural land, or the reduced impacts from reduced inputs). [Anastasios Kentarchos, Belgium]	Section considerably revised. Executive summary subst. revised and text rewritten also for clarification of these points.
23945	4	4	4	14	The paragraph conflates two important, but separate findings. First, in the absence of demand-side measures, land management measures have a limited potential and a high risk of leakage/displacement. Second, demand side measures have a high mitigation potential through relieving pressures on land. These should be articulated separately. It is misleading to link them as in the current draft, as the benefits of the latter can materialise without the former (e.g., through the natural recovery of abandoned agricultural land, or the reduced impacts from reduced inputs). [Zoltán Rakonczay, Belgium]	Rejected. by articulating separately it would give the impression of pitting one set of statement against the other.
13141	4	5	4	5	".. The alrgest potential" of what? [David Cooper, Canada]	Comment noted section totally updated and revised. sentences revised in the new draft.
26103	4	5	4	5	Change "has by far the largest potential" to "will be most effective" [Reid Detchon, United States of America]	Comment noted section totally updated and revised. this part of the report has been revised
24981	4	7	4	8	not clear what is meant by ' the preservation and protection of pollination services under climate change' [Binaya Shivakoti, Japan]	Taken into account - combined with other comment .
23329	4	8	4	8	ADD TO SENTENCE AFTER 'AGRICULTURE': ', supported by functioning farm input and service markets' [John Dixon, Australia]	Taken into account - combined with other comment . Revised for clarity, however, not using these exact words
15183	4	10	4	11	The main relevant issue with diet is excessive animal protein consumption, specifically ruminants and esp. beef - this should not be buried in a generalized focus on globally equitable supply of nutritious calories [Daniel Zarin, United States of America]	Rejected - outside the scope of the chapter. Section revised, however, chapter 6 deals with response options in more detail, we are providing in Chapter 1 a brief introduction.
32421	4	10	4	11	The phrase is unclear and not necessarily climate related. It would be more appropriate and clear to talk about "a shift to less greenhouse gas intensive diets like Mediteranean and plant-based diets." [Simone Lovera-Bilderbeek, Paraguay]	Comment noted section totally updated and revised. this part of the report has been revised
847	4	11	4	11	Add "land and" before "land use". Dietary patterns affect land use and lands. [, Spain]	Taken into account - combined with other comment .
13041	4	11	4	11	What idea is being expressed by "cost/efficient?" Is it "Estimates of cost and efficient, sustainable greenhouse emissions. . .?" [Kristi Tabaj, United States of America]	Comment noted section totally updated and revised. this part of the report has been revised
32809	4	11	4	12	The use of "cost/efficient and sustainable" as a modifier in this sentence doesn't make much sense and is unnecessary in this context. Remove. [Doreen Stabinsky, United States of America]	Taken into account - combined with other comment .

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2193	4	11	4	12	This is unclear: "Estimates of cost/efficient and sustainable greenhouse emissions reduction...". I think there is a typo, or missing word in this sentence. Please check and rephrase to ensure it conveys the intended meaning. [Michelle North, South Africa]	Taken into account - combined with other comment .
4013	4	11	4	12	"Estimates of cost/efficient and sustainable greenhouse gas emission reduction..." [Vassilis Daiglou, Netherlands]	Comment noted section totally updated and revised. this part of the report has been revised
29655	4	11	4	14	The sentence "Estimates of cost efficient and sustainable greenhouse emissions reduction potential on land might be tripled (medium confidence) and pressure on the expansion of crop or pasture area substantially reduced (high confidence) or even reversed (medium confidence) if food demand-side measures are also taken" is very useful and its content should be lifted up to the SPM to benefit from more attention. [, Saint Lucia]	Thank you for the positive comment. We have revised this paragraph, and sentence was removed (also in response to many more critical comments)
20967	4	11	4	14	{This should be added to the message above on the ghg reduction potential of land use. How does this relate to p3 line 32's 15-30%?} Can you be explicit about the required diet shift? What is a globally equitable supply of nutritious calories? [, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - combined with other comment .
193	4	11	4	14	Not clear how demand reduction could increase the emissions reduction potential for land. Overall yes, but not per unit of land. [Wallace Tyner, United States of America]	Taken into account - combined with other comment .
24983	4	12	4	12	What is sustainable GHG reduction potential? not clear and misleading term in the executive summary section [Binaya Shivakoti, Japan]	Comment noted section totally updated and revised. ES - revised.
24985	4	14	4	14	What is food-demand side measures, for me it looks more of an issue of influencing demand through changes in patterns of food supply and consumption; [Binaya Shivakoti, Japan]	Comment noted section totally updated and revised.
23331	4	15	4	15	Omit 'land and' (land is not traded) [John Dixon, Australia]	Accepted- text revised.
148	4	15	4	15	Not clear what is meant by "global trade of land"? Maybe more correct to only refer to "global trade of land-based commodities"? [Tommy Wiedmann, Australia]	Comment noted section totally updated and revised.
20969	4	15	4	16	might want to consider re-phrasing for clarity: The consideration of sustainability criteria in the global trade of land (...) can reduce local vulnerabilities to climate and socio-economic changes. [, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
26105	4	15	4	16	Change first sentence to: "Sustainability criteria should be considered in the global trade of land and land-based commodities in order to minimize harmful local side effects." [Reid Detchon, United States of America]	Accepted- text revised.
32423	4	15	4	16	This statement is, as it is written, not true. The "consideration" of sustainability criteria by itself has not impact on land use or commodity trade. And even the existence of such criteria is no guarantee for positive impacts in light of the significant challenges with compliance and enforcement of these criteria. There is no sound evidence that existing sustainability criteria like those applied by the Forest Stewardship Council have had a positive impact on reducing deforestation and forest degradation, also due to implementation challenges and the persistent problem of indirect land use change and indirect impacts in general. [Simone Lovera-Bilderbeek, Paraguay]	Comment noted section totally updated and revised.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
23949	4	15	4	16	There is scarce evidence that the "consideration" of "sustainability criteria" can have the stated benefits. Few commodities are associated with such criteria. They are mostly implemented through certification schemes, but they are notoriously vulnerable to displacement effects. The most widely used and studied schemes are related to liquid biofuels, and multiple analytical studies have demonstrated that these schemes are ineffective in reducing impacts due to displacement. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
30849	4	15	4	27	the climate change significance of this paragraph is not explicit [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
195	4	15	4	27	This whole section goes far beyond climate change. Climate measures cannot be expected to solve all social problems. The report should be restricted to climate change. The whole report will be attacked, and justly so, if it goes far beyond climate. [Wallace Tyner, United States of America]	Comment noted section totally updated and revised. The SRCL has climate change as one important component, but goes beyond; understanding the land system, as part of climate change, cannot be achieved without considering the socio-economic components of land use.
23947	4	15	4	27	The paragraph makes multiple unsubstantiated claims, in particular related to bioenergy. E.g., it is unclear how the supply of bioenergy could contribute to food security or land restoration. Assuming an inelastic demand for bioenergy, imported supply could make a local contribution to these factors, but at the cost of exacerbating pressures elsewhere. Please clarify and balance the text. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
23951	4	15	4	27	There should be due consideration given to multiple studies on "indirect land-use change", beyond the single source currently included. The following is particularly pertinent to the scope of the report:  Searchinger, T., R. Edwards, D. Mulligan, R. Heimlich, R. Plevin, 2015. Do biofuel policies seek to cut emissions by cutting food? Science 27 Mar 2015 : 1420-1422 [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. We consider the studies already cited as supporting the points to be made.
24987	4	16	4	16	No mention in the subsequent para (line 17 to 27) about how local vulnerability could be reduced [Binaya Shivakoti, Japan]	Comment noted section totally updated and revised.
23333	4	17	4	17	INSERT 'and farming systems' after 'world regions' [John Dixon, Australia]	Rejected . too detailed, since we also consider forestry and other form of land use
32425	4	18	4	19	There is no scientific basis for the statement that global commodity trade would contribute to land restoration. Rather, there is ample scientific evidence that global commodity trade is by far the main driver of deforestation globally (see for example Boucher, 2011). [Simone Lovera-Bilderbeek, Paraguay]	Comment noted section totally updated and revised.
32811	4	18	4	20	There is nothing in the underlying chapter that provides evidence for the sentence beginning "Both local action and global trade..." Delete. [Doreen Stabinsky, United States of America]	Comment noted section totally updated and revised.
33431	4	18	4	20	The categorical nature of this statement is odd, especially given what follows in the same para.. Global trade 'can' enhance food security -- especially for food importing countries -- but it can also -- and frequently does diminish food security, by leaving local producers vulnerable to global price volatility (and in other ways). This matter is covered in Chapter 5 (esp 5.3.2.1) -- perhaps link that information to this point? The problem is not that the statement is incorrect but it is a tad misleading -- 'food security' is not a global cost-benefit analysis. [Stephen Humphreys, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
23335	4	19	4	19	INSERT 'and nutrition' into 'food security' [John Dixon, Australia]	Accepted- text revised.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
23953	4	19	4	20	Increased bioenergy supply could contribute to food security or land restoration? In general, the opposite is much more likely and well documented (with high confidence). The statement should be qualified and contextualised. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
32813	4	20	4	23	Delete "trade offers many opportunities" and rephrase the sentence to be truer to the discussion in the relevant chapter sections. This phrase about trade is meaningless, and quite frankly an unjustifiable assertion without a context. [Doreen Stabinsky, United States of America]	Comment noted section totally updated and revised.
31685	4	20	4	27	This section needs to be clearer in these sentences on links between trade and negative effects on land use management in a given landscape. landscape/ecosystem. i.e. Is this meant to point out that a sustainably managed landscape by exploiting another one in through trade of its good and services/ [Elizabeth Migongo-Bake, Kenya]	Comment noted section totally updated and revised.
23955	4	21	4	21	replace "unsustainable" with "increased". "Sustainable" is not a scientific term and cannot be objectively defined. All commodity production has impacts (including GHG impacts), or at least opportunity costs (benefits foregone by not stopping the activity). The issue here is that increasing production elsewhere will generally increase impacts (other factors considered equal), no matter how "sustainable" the production may be. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
849	4	25	4	27	delete the last part of the sentence (lines 26 and 27) so the text reads " ecosystem services and... in the assessment of decision making in relation to sustainable management, mitigation and adaptation policies and the associated costs of these actions" [, Spain]	Comment noted section totally updated and revised.
38481	4	26	4	26	This is the first mention of the term "sustainable land management" in the body of the report. As drafted, this term is in the title of the report, and discussed extensively throughout Chapter 1, but it is not defined for the reader until Section 1.4.1.1 where it is described as, "the use of land resources for the production of goods to meet changing human needs while assuring the long-term productive potential of these resources and the maintenance of their environmental functions." This description of what sustainable land management is should be brought forward to the Chapter 1 Executive Summary. [, United States of America]	Comment noted section totally updated and revised.
24989	4	28	4	28	No mention in the subsequent para (line 29 to 29) about how response to CC could be facilitated [Binaya Shvakoti, Japan]	Comment noted section totally updated and revised.
23337	4	28	4	28	CHANGE 'can be facilitated by' to requires harmonisation and adjustments of [John Dixon, Australia]	Comment noted section totally updated and revised.
13307	4	28	4	29	The response to climate change can be facilitated by cross-sectoral policies, government and non government policies, that account for systemic understanding and multiple actors, including indigenous and local knowledge [Marina Rosales Benites de Franco, Peru]	Comment noted section totally updated and revised. Section on ILK has been revised.
15115	4	28	4	33	The risk of loss to many communities of their natural and cultural heritage is an excellent example of what may bring greater coordination among actors, resulting in cross-sectoral policies. I.e., while degradation of food, energy and water resources may motivate one community, the potential loss of a temple or ancestral gravesite to coastal erosion may motivate another, resulting in synergy between sectoral policies as a means to mitigate against the challenges of climate change. [Gordon Macdonald, Canada]	Noted no action needed.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
28313	4	28	4	39	The most important cross-sectorial policy, that accounts for systemic understanding and multiple actors, including indigenous and local knowledge is land degradation neutrality. Not mentioning this would make what has been written here much harder for UNCCD country Parties to work with Chapter 1, which frames the entire report. This would be an ideal "entry" put to ensure this message can be used effectively. The final sentence could be adjust to read "Alternatives to the sector-specific governance of natural resource use and context specific actions at regional and sub regional levels can enhance land use in an overall fair and equitable way through mechanisms such as land degradation neutrality, with climate change mitigation, or adaptation being positive side-effects {1.5}". The citations are: Orr, B.J., A.L. Cowie, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron, G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton. 2017. Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. and Cowie, A.L., B.J. Orr, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron, G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton. 2018. Land in balance: The scientific conceptual framework for Land Degradation Neutrality. Environmental Science & Policy 79:25-35. doi: 10.1016/j.envsci.2017.10.011 [Barron Joseph Orr, Germany]	Comment noted section totally updated and revised. Section on ILK has been revised.
31617	4	28	4	39	There is a need to look for more balanced approaches. Reinforcing comment 24 above: while it is commendable bringing ILK to the light, other important sources of knowledge can be overlooked. Each and every knowledge development and behavioural traditions have positive and negative outcomes. ILK as well, has its good and bad, as do other sources of knowledge. Highlighting one, leads to the conclusion that others are less important. Listing all the possible actors is also impossible. It is important to develop a language that is effectively inclusive, and that will allow to consider knowledge of indicators and solutions that can face the increasing uncertainty, building more resilient systems. That knowledge can come form the most diverse sources, something already known for centuries, or something completely new, and many things in between. [, Brazil]	Comment noted section totally updated and revised. Section on ILK has been revised.
26777	4	28	4	39	This paragraph is very vague and due to the generalisations it provides almost trivial information. For example, "alternatives" are mentioned in line 36 without further explanation. Please revise. [, Germany]	Comment noted section totally updated and revised. Section on ILK has been revised.
30851	4	28	4	39	true, but generic and not really based on review of evidence. [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. Section on ILK has been revised.
197	4	28	4	39	This section says nothing of substance. Yes, people need to work together and be nice, but that does not belong in this report. [Wallace Tynner, United States of America]	Comment noted section totally updated and revised. Section on ILK has been revised.
24991	4	30	4	30	I do not think food, energy and water are ranked high in 2030SD agenda; all SDGs are raked equally, high ranking is just a claim by subject matter experts and agencies promoting food, energy and water issues (in future somebody refer Oh you see IPCC says water,energy, food are ranked high by 2030 SD Agenda!!) [Binaya Shivakoti, Japan]	Rejected. the sequencing is not meant to discount the importance of some SDGs.
13229	4	30	4	31	Promoting synergies between sectoral policies and goals is important. All the key International Conventions and instruments need to be referenced as per CBD/COP/DEC 14/30. [Aila Keto, Australia]	Noted no action needed.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21695	4	33	4	36	The discussion of SES here seems a bit misplaced, as though the authors are promoting their own field of inquiry without also acknowledging the criticisms of this approach. Perhaps it is better to say that the report uses an SES framework, and the justify this, rather than to say that SES is appropriate without justifying this or saying other approaches are possible. [Timothy Forsyth, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - combined with other comment . SES section moved to where it fits better the overall logic & shortened.
11741	4	35	4	36	The relevance of indigenous and local knowledge goes beyond trust building and collective action. For example, it also contributes to the understanding of locally specific exposure and impacts of climate change, values and land management. [Hans Poertner and WGII TSU, Germany]	Comment noted section totally updated and revised. ILK has been revised
13143	4	36	4	36	"trust building" yes. But not only. We actually need the ILK. Presnet formulation may be perceived as dismissive [David Cooper, Canada]	Comment noted section totally updated and revised. ILK srevised
16869	4	37	4	39	The sentence is unpecific in what the alternatives could be. Adding a few examples could be added to help the reader. [Roland Hiederer, Italy]	Accepted- text revised . international conventions and examples have been cited.
33123	4	38	4	38	with climate change mitigation and/or adaptation being positive side-effects [Amany Mansour, Egypt]	Accepted- text revised . international conventions and examples have been cited.
24143	4	28	5	29	Avoid using unhelpfull cliches , like 'multiple actors', be more specific for the reader , wtf does multiplemactors mean , this is not hollywood, and i know itsused for any participants in a project [Derek Berliner, South Africa]	Noted no action needed. No longer relevant in the revised version
28525	4	4	24	27	would suggest that cultural ecosystem services can be mentioned here. [Meredith Wiggins, United Kingdom (of Great Britain and Northern Ireland)]	Section considerably revised. Executive summary subst. revised and text rewritten (see new ES no. 1)
28527	4	4	35	36	It may be the way this sentence has been written, but it reads as if the authors think that indigenous knowledge is nothing more than a tool for gaining trust at the local level. [Meredith Wiggins, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. the section on indigenous knowledge has been substantially revised to convey its relative importance in land based mitigation and adaptation responses.
12395	4	5		14	largest potential needs to be defined, potential for what?, polliination services provided by whom?, food demand side measures are not explained. [Hans Poertner and WGII TSU, Germany]	Comment noted section totally updated and revised. sentences revised in the new draft.
23611	4	5			"largest potential" for what? (another example of my point above) [Kerri Finlay, Canada]	Comment noted section totally updated and revised. sentences revised in the new draft.
26773	4	10			Please explain what "Shifts of diets towards a globally equitable supply of nutritious calories" means and revise the formulation accordingly. Does this statement refer to reducing hunger or to the composition of food, i.e. less animal-rich diets? Sections 1.4.1 and 1.4.2 contain clearer statements that are understandable for non-experts. We suggest to include statements concerning dietary changes that help to pursue climate mitigation and adaptation such, e.g. "shifting to low-GHG diets with no or significantly reduced consumption of animal-sourced foods" (see executive summary Ch. 5). [, Germany]	Taken into account - combined with other comment .
26775	4	15			It would be very useful to further elucidate what "sustainability criteria" means in the context of the SRCLL, in particular in the framing chapter 1, please be more specific. [, Germany]	Comment noted section totally updated and revised.
12397	4	20			...term "land use displacement" is not intuitively understood, suggest replacing. [Hans Poertner and WGII TSU, Germany]	Comment noted section totally updated and revised.
12399	4	24		27	what are "Ecosystem services and societal impacts embodied in trade..." [Hans Poertner and WGII TSU, Germany]	Comment noted section totally updated and revised.
12401	4	28		40	Again, terminology needs explanation by illustrative examples, e.g. cross-sectoral policies, socio-ecological systems, SES framework, sector-specific goivernance. [Hans Poertner and WGII TSU, Germany]	Rejected.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1541	4	36			Biased representation on motive of inclusion of local communities and indigenous knowledge in climate action. Community inclusion should be based on their capacities to implement responsibilities on climate action, and not merely based on gaining their approval (in this case trust) for proposed climate actions. Consider rephrasing concept as appropriate. [Lucy Atieno, Kenya]	Rejected .
32707	5	1	5	1	this summary point is very difficult to understand - only an expert in the field could decipher this language. It strikes me that you are trying to say that (1) the current models are bad, (2) this is why they have errors, (3) this is how to fix them. Rewrite using this logic, and make the explanation more available. [Kate Lajtha, United States of America]	Comment noted section totally updated and revised.
16871	5	1	5	1	The word "informed" lacks meaning in the context and could be replaced by "based on" or similar. [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
24993	5	1	5	5	incomplete information, future advances, complete knowledge for decision making are never ending issues; not a good starting sentence in bold [Binaya Shivakoti, Japan]	Comment noted section totally updated and revised.
24145	5	1	5	5	Full knowledge of these uncertainties will never happen, decision making needs to be based on probabilities [Derek Berliner, South Africa]	Comment noted section totally updated and revised.
13309	5	1	5	5	Decision makers are faced with the task of developing and implementing climate policies informed in part by incomplete information in the framework of precautionary principle, taking account the information with unknowns and uncertainty to varying degree. Advances in futures analysis and modelling that better account for full environmental costs and non-monetary values in human behavioural processes would provide a more complete knowledge base for decision making (high confidence). [Marina Rosales Benites de Franco, Peru]	Comment noted section totally updated and revised.
26107	5	1	5	5	Simplify opening sentence in bold: "Better tools are needed to assess the climate impacts of land-use policies." Reduce the rest of the text to light-face type. [Reid Detchon, United States of America]	Accepted- text revised.
26779	5	1	5	15	This paragraph in the ES refers to potentially large uncertainties without further specifying the consequences of these uncertainties, please revise also taking our comment on section 1.3.3 into account. In addition, please provide references to the relevant sections of chapter 1. [, Germany]	Comment noted section totally updated and revised.
28885	5	1	5	15	This is an important para. The main focus is on limitation and how future analyses can be improved. I suggest adding a sentence or two about how the existing scenarios are used today, and in this report. [Jan Fuglestad, Norway]	Comment noted section totally updated and revised.
23957	5	1	5	15	In this paragraph, the challenges associated with the proper representation of bioenergy impacts should be mentioned. Climate policies to date consider bioenergy "carbon neutral", meaning that the emissions from biomass combustions are effectively ignored. This seldom reflects real impacts on emissions, which can be higher than those of fossil fuels, depending on the source of the biomass and the conversion pathways. The overall benefit of bioenergy can only be reflected through the proper consideration of its impacts on land, including indirect impacts (through displacement of essential demands, such as food). This is (and should be) a key motivation for improving the representation of land and the understanding of management impacts. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
31619	5	2	5	2	(...) in part by incomplete limited information, (...) (comment: the adjective "incomplete" leads to the understanding that it could be completed, in the sense that the information exist, but was not put together. However, many times, the knowledge does not exist yet. ) [, Brazil]	Comment noted section totally updated and revised.
1721	5	3	5	3	Should be "future". [William Lahoz, Norway]	Comment noted section totally updated and revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
31621	5	4	5	4	(...) provide a more complete comprehensive knowledge base (...), in the same lines of comment 38. The development of modern knowledge (and some ancient philosophies) has shown that there is a higher degree of uncertainty, and a complete knowledge might never be possible. We can approach completeness, including more elements to what we know, but probably never reach it, as we also identify new unknowns in the process. [Brazil]	Comment noted section totally updated and revised.
38483	5	5	5	7	It isn't just socio-economic assumptions underpinning analyses but also environmental assumptions (e.g., do the baseline/scenarios account for climate change or not, carbon fertilization). [United States of America]	Comment noted section totally updated and revised.
23339	5	5	5	7	STRONGLY DISAGREE. The weakness and gaps in data are overstated cf. uncertainties concerning drivers of future scenarios [John Dixon, Australia]	Comment noted section totally updated and revised.
16873	5	5	5	7	Listing "thematic land cover classes" in this context can be misleading. Land cover does not much affect the definition of scenarios, only to some degree the result of the scenario modelling. Also, land cover is but one variable in a scenario. Differences in the modelling results are more due to general data uncertainty, in particular on management practices. [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
38485	5	8	5	11	Suggestions for rephrasing this sentence for clarity: "This APPROACH IS HAMPERED BY THE LIMITED capacity of global models to account for the NON-ECONOMIC human dimensions of land systems including equity, fairness, land tenure and the role of institutions and governance, and therefore LIMITS THE ABILITY of these models to quantify transformative pathways AND adaptation and mitigation OPPORTUNITIES." Also, it is not clear what the difference is between equity and fairness, and what the definition of 'transformative' is. [United States of America]	Comment noted section totally updated and revised.
23341	5	9	5	9	INSERT 'land users' decision making, before 'equity' [John Dixon, Australia]	Rejected. equity also in a broader sense (ie share of nutrition and calories)
38487	5	11	5	13	In the parenthetical describing 'desirable pathways', suggest adding something like 'equitable' in front of 'climate change mitigation targets' to better reinforce the point in the preceding sentence. Economic models can model climate change mitigation targets pretty well, but harder if trying to incorporate the non-economic elements like equity. [United States of America]	Comment noted section totally updated and revised.
18155	5	12	5	12	SDG only introduced later [Julia Nabel, Germany]	Accepted- text revised.
1723	5	12	5	12	Have you introduced SDGs? You introduce this later, in L. 39, P. 1-5. [William Lahoz, Norway]	Accepted- text revised.
16875	5	15	5	15	"exploring uncertain futures": Can one explore a certain future? In the context it is suggested to replace the phrase with e.g. "projecting future conditions from scenario analysis". [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
23343	5	16	5	31	RESTRICTURE and EDIT FIGURE 1.1. Merge Desrtification and Land degradation blocks under title 'Land restoration' (a positive, consistent with other component titles). Insert a block covering people (recognising role of decision making) and economy (recognising investment, value chains and livelihoods) under title 'Economic security'. Insert water under 'Land restoration'. Adjust X and Y scales so segments approximately represent magnitudes of climate and degradation status areas. [John Dixon, Australia]	Accepted. Figure redrawn. However, since Figure is developed with the entire report team (--feeds into SPM--) the detailed suggestions could not be included, but are based on the SPM discussions

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30537	5	19	5	21	Land is not only a material and livelihood asset for human communities: It is also often a basis for ethnic identity through attachment to land, place and territory/landscape. It also embodies historical, ceremonial, ritual and spiritual values for peoples and communities. These intangible or non-material attributes of land are especially important and well documented for indigenous peoples - see for example Daes, E-I (2001) Indigenous people and their relationship to land. Final working paper prepared by Mrs. Erica-Irene A. Daes, Special Rapporteur. UN Doc. E/CN.4/Sub.2/2001/21, 11 June 2001 [Thomas Griffiths, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. We used a different reference, however, since report concentrates on period post-AR5
31687	5	21	5	24	I would include here not only reversing degradation and desertification but also maintenance of zero degradation, which is also an optimal challenge [Elizabeth Migongo-Bake, Kenya]	Rejected - outside the scope of the chapter . Very true point, but we would like to keep this fst introductory section as short as possible. Chapter 4 deals with degradation in detail v(including maintaining zero degradation).
33125	5	23	5	23	need to both adapt to and mitigate against [Amany Mansour, Egypt]	Accepted- text revised.
15537	5	23	5	23	Remove second "to" of the line, as it is redundant. It should read: "the need to both adapt to and mitigate against". [Annika Herbert, South Africa]	Accepted- text revised.
13231	5	24	5	24	UNCBD and UNCCD should be added to the list in brackets. [Aila Keto, Australia]	Rejected. The list is a citation of a report done jointly through the organisations listed.
38489	5	24	5	24	Suggest deleting the word 'against' in front of 'climate change'. [, United States of America]	Accepted- text revised.
24995	5	24	5	27	It is strange no reference is provided to such as important claim; [Binaya Shivakoti, Japan]	Accepted. The list in brackets (FAO...etc. is actually the reference supporting the statement). In addition we added reference to Konsager et al., 2016
15539	5	27	5	27	As the basis of what? Specify or rephrase. [Annika Herbert, South Africa]	Accepted- text revised.
22221	5	28	5	28	Clarify the sentence. Land is a very significant overall net sink of CO2. It is unclear whether "land use" is presented here as a "net source" or "only" a major factor in overall GHG emissions. It would greatly increase clarity if the statement were provided in more detail (what is meant by "land use", what GHGs and possibly other forcing factors are considered, etc.). [Anastasios Kentarchos, Belgium]	Accepted- text revised. Land as a sink (or more general: support of mitigation options) is described in the next sentence to the one commented on)
265	5	28	5	28	More than land use, the changing land cover is prime contributor to greenhouse gas emissions [Mahak Agrawal, India]	Accepted- text revised.
16877	5	28	5	28	Suggested to change "greenhouse gas" to GHG. Applies also to subsequent passages. [Roland Hiederer, Italy]	Accepted- text revised.
23959	5	28	5	28	Clarify the sentence. Land is a very significant overall net sink of CO2. It is unclear whether "land use" is presented here as a "net source" or "only" a major factor in overall GHG emissions. It would greatly increase clarity if the statement were provided in more detail (what is meant by "land use", what GHGs and possibly other forcing factors are considered, etc.). [Zoltán Rakonczay, Belgium]	Accepted- text revised. Land as a sink (or more general: support of mitigation options) is described in the next sentence to the one commented on)
38491	5	28	5	30	It seems like an important element is missing here -- acknowledgment of the role that land-based resources and activities have played already to date. This paragraph goes from stating the sector is a net source but could play a role in mitigation and adaptation BUT it is already is to some degree. Sequestration estimates should be included. This contribution should first be acknowledged and then go on to stress how the sector can and is expected to play an even bigger role. This way the concept of additionality isn't completely lost. [, United States of America]	Accepted. Section 1.2.1 should stay as short as possible, but the points raised are dealt with in (revised) section 1.2.2
24147	5	28	5	32	reads poorly, leave out the Yet.... [Derek Berliner, South Africa]	Accepted- text revised.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
31689	5	29	5	29	Instead of "Yet", which implies, an expected achievement, I would say instead, "However, on the positive side", or something on this line .... [Elizabeth Migongo-Bake, Kenya]	Accepted- text revised.
22223	5	33	5	36	It is unclear whether the discussion of "land-related" activities in NDCs includes bioenergy. If not, then the language should be clarified and a consideration for bioenergy should be added. Bioenergy is the biggest source of renewable energy and likely to remain so and all bioenergy is inherently "land-related". [Anastasios Kentarchos, Belgium]	Rejected - outside the scope of the chapter . Section 1.2.1 should remain as short as possible. The exact actions in the NDCs are in many cases intransparent, however bioenergy is discussed in several of the report's chapters (ie chapter 2, chapter 6).
23961	5	33	5	36	It is unclear whether the discussion of "land-related" activities in NDCs includes bioenergy. If not, then the language should be clarified (it is considered "land related" elsewhere in the report) and a consideration for bioenergy should be added. Bioenergy is the biggest source of renewable energy and likely to remain so. Nevertheless, the use of bioenergy (combustion of biomass, in and by itself) cannot be considered to bring any mitigation benefit, as it is at least as carbon-intensive as fossil fuels. Any GHG benefit of bioenergy assumes certain conditions on land use, which should be considered. [Zoltán Rakonczay, Belgium]	Rejected - outside the scope of the chapter . Section 1.2.1 should remain as short as possible. The exact actions in the NDCs are in many cases intransparent, however bioenergy is discussed in several of the report's chapters (ie chapter 2, chapter 6).
28815	5	34	5	34	delete 'UNFCCC' from 'parties to the UNFCCC Paris Agreement' [Lokesh Chandra Dube, India]	Accepted- text revised.
28887	5	35	5	36	I suggest adding a reference to the assessment of NDCs done in SR1.5 [Jan Fuglested, Norway]	Accepted- text revised.
62	5	38	5	38	No need to state "SDGs" in full as it is presented elsewhere and in the Glossary. [Edson Leite, Brazil]	Rejected. prefer to keep, for clarity
15541	5	43	5	43	Remove "the" so that it reads: "the current state of scientific knowledge". [Annika Herbert, South Africa]	Accepted- text revised.
31623	5	43	5	43	reinforcing comment 1: the opportunity to integrate the current state of the scientific knowledge on the issues specified in the report's title will be true if either the report's title reflects the emphasis given in the document (agricultural sector), or the content of the document broaden its analysis to all the sectors that have an impact on land use. [, Brazil]	Rejected. thanks, but the title of the report cannot be changed, as it had been approved by the governments
3525	5	41	6	31	This objective should come at the beginning [Cordula Ott, Switzerland]	Rejected . chapter team discussed structure and storyline of chapter repeatedly, and among the differing views (what comes first) the existing one was agreed upon among all as the one that functions best
28817	5	45	6	1	delete 'United Nations' from United Nations Convention on Biological Diversity (UNCBD). CBD is named as CBD and not UNCBD. [Lokesh Chandra Dube, India]	Accepted- text revised.
3523	5	18	7	16	According the title, better first outline the goal of the report before discussing the scope (see next comment) [Cordula Ott, Switzerland]	Rejected. see 3529
11665	5	12			SDG not yet defined [Paul Dirmeyer, United States of America]	Accepted- text revised.
3529	5	18			scope should also include an introduction on the key terms (CC, land degradation, desertification, food security); these are explained too late (in subchapter 1.3, page 13ff) [Cordula Ott, Switzerland]	Rejected . chapter team discussed structure and storyline of chapter repeatedly, and among the differing views (what comes first) the existing one was agreed upon among all as the one that functions best
26567	5	28		28	"Land use is a " should be more clearly phrased as "Many current land uses are" [Anne Woodfine, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
3241	5				I would like to know what is meant by land. All terrestrial surfaces? Does it include water bodies? Are coastal wetlands (i.e. saltmarshes considered as land?). This is unclear from the very beginning [John Devaney, Ireland]	Accepted- text revised. See first line of section 1.2.1

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3531	6	2	5	3	Agriculture at a crossroads - Global report. International Assessment of Agricultural Knowledge, Science and Technology for Development (2009), WB and FAO is a major report on land/agriculture and has to be considered! [Cordula Ott, Switzerland]	reference noted but point already covered by current used citations.
1431	6	1	6	2	Sendai Framework on Disaster Risk Reduction is also relevant as it explicitly recognises the importance of land mangement to its objectives [Henry Scheyvens, Japan]	Accepted- text revised.
31625	6	2	6	2	agriculture is central.... [ , Brazil]	Rejected. report needs to go beyond agriculture; this has also been voiced by many reviewers
15543	6	4	6	4	Remove "the" so that it reads: "the current state of scientific knowledge". [Annika Herbert, South Africa]	Accepted- text revised.
20971	6	4	6	7	objective 2 is part of 1. 1 & 2 could be combined or else provide more clarity on the difference. [ , United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. objectives merged
7299	6	4	6	14	The objectives should include a point re: the linkage between climate action related to land and sustainable development (as per the approved outline) [Debra Roberts, South Africa]	Accepted- text revised. revised objective 2
28889	6	4	6	14	The points 1-4 gives a nice summary/structure. Where is this taken from? [Jan Fuglestedt, Norway]	Thank you for the positive comment.
28891	6	4	6	14	Figure 1.1 has the potential to develop into a great and very useful figure. I suggest some minor modifications: 1) "Climate system" should apply for more than the sun, clouds and precip., and should therefore be moved in order to show that it also includes the atmosphere and land. ( I wonder if it would be an idea to just indicate the ocean outside the land area without giving it much space). 2) It would be good if you could separate the mitigation part from the blue sky part. [Jan Fuglestedt, Norway]	Accepted. Figure redrawn. However, since Figure is developed with the entire report team (--feeds into SPM--) the detailed suggestions could not be included, but are based on the SPM discussions
38493	6	8	6	8	The phrase "land-based response options to GHG mitigation" is a bit vague. Is it supposed to be options in response to GHG mitigation targets? Or land-based GHG mitigation options? Presumably the latter but it is unclear. [ , United States of America]	Noted no action needed. Language corresponds to chapter 67
4063	6	8	6	14	propose to change hierarchical order between bullet 3 and 4. As regards to land, 'adaptation options' are more relevant to mitigation options. [Turi Fileccia, Italy]	Rejected . We prefer the logical order as is
4015	6	10	6	14	It seems like the 4th objective could be broken up into two. Currenly it is very long and not as clear as the first three. [Vassilis Daioglou, Netherlands]	Accepted- text revised.
26109	6	12	6	12	The language beginning with "Delineate" appears to be a separate objective and needs the number 5) in front of it [Reid Detchon, United States of America]	Accepted- text revised.
38495	6	12	6	14	It seems like the sentence starting with "Delineate the policy..." should be a separate objective (objective 5) than the previous sentence. This sentence is applicable to more than just adaptation. [ , United States of America]	Accepted- text revised.
24149	6	14	6	15	In fig 1.1 the x axis designations of natural-sustainable - degraded , do not make logical sence. A degraded ecosystem such as a crop land can still be managed sustaibably. Should read: natural- modified (sustainable or non sustainable) - degraded (non susustainable) [Derek Berliner, South Africa]	Taken into account - combined with other comment. This figure has been completely re-designed to take account of reviewer concerns. The natural to sustainable transition has been removed as has reference to land degradation
289	6	14	6	15	The same exact picture seems to be used in page 4 of 30-page summary for policymakers. Just making sure it is intentional. [George Burba, United States of America]	Noted no action needed. Figure redrawn. And yes, Figure is basis for Figure in SPM
851	6	14	6	15	figure 1,1,: we miss several options in each f the 5 elements in the graph (mitigatin, adaptation, desertification, etc.). The explanatory text below (lines 16-31) should clearly specify that the list of options/measures under the five "land challenges" is not exhaustive. [ , Spain]	Taken into account - combined with other comment. This figure has been completely re-designed to take account of reviewer concerns. There has been a move away from the 5 land challenges.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38497	6	14	6	15	This is an impressive figure that conveys a lot of information. The lists of the five challenges are a bit uneven and some might be more correct elsewhere. For example, sustainable forest management fits in both mitigation and adaptation, though seems more appropriate for mitigation and perhaps have something like forest fire management for adaptation. For adaptation, crop switching and/or improved water management would be appropriate. Desertification could also include avoided deforestation, which is a big contributor. [, United States of America]	Thank you for the positive comment. Thanks. The figure has been re-designed to remove the 5 challenges and the attendant examples.
14717	6	14	6	15	Figure 1.1: I'm uncomfortable that the transition from "natural" to "sustainable" seems to indicate increased desertification (especially as it is defined on p. 14). That does not always seem to be the case in the real world; yet the arrow only has 1 direction. [Wu Felicia, United States of America]	Taken into account - combined with other comment. This figure has been completely re-designed to take account of reviewer concerns. The natural to sustainable transition has been removed
4321	6	14	6	16	Fig1.1. The climate and vegetation could not be arranged in the same coordination. [Guangsheng zhou, China]	Comment noted section totally updated and revised. This figure has been completely redrawn
5345	6	14	6	16	Good graph, but I think that the preservation of healthy/well-functioning ecosystems and biodiversity should somehow be represented in this graph. I understand that it is not the main task of the IPCC or this report to fully address this, but links to these issues are crucially important for all the processes represented in the graph, and not only in the caption. [Helmut Haberl, Austria]	Accepted- text revised. This figure has been completely re-designed to take account of reviewer concerns.
26587	6	14	6	31	The figure is clearer than in the FOD but I still have the following criticisms: a) "climate system" should be more clearly placed at the centre of the row including greenhouse gas fluxes and energy exchange, with Mitigation to one side to indicate action on the whole system b) the areoplane seems extraneous c) Food Security is too closely tied to the tropical biomes [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. This figure has been completely redrawn
32427	6	14	6	31	In light of its positive impacts on GHG emission reductions, dietary change should be categorized under 1. Mitigation measures in Figure SPM 1. It is an important element of Food Security too, especially in light of its positive health impacts. [Simone Lovera-Bilderbeek, Paraguay]	Accepted- text revised. This figure has been completely re-designed to take account of reviewer concerns. An indicator of diet (overconsumption) has been included in the revised version.
24891	6	15	6	15	I would suggest to rethink parts of the figure. Points 1-5 are mentioned as challenges. Mitigation and adaptation as main titles are aims and challenges. But within the other three points you also need mitigation and adaptation measures (some of the points listed below them are already mitigation and adaptation options). Do we really need the separation of Mitigation and Adaptation? Why is the Mitigation point placed in the blue ellipse? What does the grey triangle represent at the left side of the figure? Please rething the place and the size of the airplane. [Borbala Galos, Hungary]	Accepted- text revised. This figure has been completely re-designed to take account of reviewer concerns. There has been a move away from the 5 land challenges. The plane has been removed.
31627	6	15	6	15	There are three categories of land degradation, but the figure of a human is represented only in the "degraded" one. We suggest removing this figure because it is possible to have a "sustainable" land with humans working on it. There is also a figure of an airplane but it adds nothing to the discussion. . [, Brazil]	Accepted- text revised. This figure has been completely re-designed to take account of reviewer concerns. The human figures and plane have been removed.
6063	6	15	6	15	Fig. 1.1 Add Sustainable forest management and managing fire [, Poland]	Accepted- text revised. The revised figure removes all of the examples of specific land managemnet practices to simplify the message.
11743	6	15	6	15	Figure 1.1: Settlements and freshwater sources are not represented. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised. Urban area is now included on the figure, as well as an indicator of wetland areas

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17241	6	15	6	15	In Figure 1.1, The first land challenge should be "climate mitigation". Is "enhanced mineral weathering" a challenge ? Shouldn't it just be "mineral weathering", as a process needed to be addressed by this assessment? [Noémie Janot, France]	Comment noted section totally updated and revised. This figure has been completely redrawn
30479	6	15	6	22	The scale that runs from 'Natural' to 'Degraded' would read better with 'managed' or 'sustainably managed' in the middle. 'natural' is a realtive term when it comes to parts of the world where all aspects of the environment are heavily affected by human activity over millenia (e.g. much of Europe), the distinction is between managed and unmanaged and sustainably managed and degraded. [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. This figure has been completely redrawn
26569	6	15	6	31	Figure 1.1 omits sustainable land management under 2. Adaptation and conservation agriculture under 5. Food Security [Anne Woodfine, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. This figure has been completely re-designed to take account of reviewer concerns. The management options have been removed.
33415	6	15	6	31	Water / Hydrology is missing in this figure [Christophe Cudennec, France]	Accepted- text revised. The figure now includes an indicator for wetland area change
3343	6	15	6	31	Following Fig.1.1, I am wondering if the area bewteen tropics and temperate can be represented by only "(semi-) Arid", although the authors mean that reflects "a generalised climate zone". However, even if we follow the Fig.3.1, we could sea that there are almost 1/3 region between 20-40 N degree which belongs to Humid area,e.g., the subtropical regions of mainland China are not semi-arid areas, particularly in Eastern China. Hence, I am not sure if so called "(semi-) Arid" might be confusing or decreasing confidence for many readers. [Rongshuo Cai, China]	Accepted- text revised. This figure has been completely re-designed to take account of reviewer concerns. This includes removing the climate gradient part of the figure.
4065	6	15	6	31	not sure about clarity and representiveness of figure 1 ; suggest avoiding the use of it. [Turi Fileccia, Italy]	Accepted- text revised. This figure has been completely re-designed to take account of reviewer concerns.
32709	6	16	6	16	figure 1-1 needs work. It has good ideas in it, but the language is sloppy. Make the bullet points parallel and ideally, make them action iems. For example, "agroforestry" is a noun but "reducing losses" is an action verb. You might change to "adoption of agroforestry" or something like that, because "agrofirestry" by irself it not informative. Do this for all bullet points [Kate Lajtha, United States of America]	Accepted- text revised. These points have been taken up in a completely revised version of the figure.
13311	6	16	6	17	Figure 1.1 A representation of the principal land challenges and land-climate system processes covered in this assessment report. I suggest to include ecological corridors and protected areas. Also, consider as adaptation effective protected areas management and mainstreaming ecological corridors into the wider landscapes. [Marina Rosales Benites de Franco, Peru]	Accepted- text revised. The figure has been re-designed to remove mention of specific land management options
7375	6	16	6	31	Northern (polar) regions are obviously part of this report (land) and reflectd (via 'tundra') in this figure. While I recognise that assessment of these areas is covered in IPCC SR Ocean and Cryosphere (SROCC), it would be useful to include northern regions nore explicitly here, or alternatively, to explain (delineate) what is only partially covered in SRCL and refer to SROCC. [Stephan Stephan Gruber, Canada]	Accepted- text revised. Reference has been made to the SROCC assessment where relevant.
33581	6	21	6	22	The sentence suggests that there is an exact gradient from complete to degraded as human influence goes from zero to intensive. This should be nuanced more in line with the text in the graphics where the gradient is more multi-dimensional, including "natural", "sustainable" and "degraded" [, Norway]	Accepted- text revised. This gradient has been removed in a revised figure.
24887	6	24	6	24	Instead of "climate mitigation" I would suggest "climate change mitigation" [Borbala Galos, Hungary]	Accepted- text revised.
58	6	24	6	24	land... Rather than 'land... [Edson Leite, Brazil]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24889	6	27	6	27	Not only energy exchange but also water exchange should be included [Borbala Galos, Hungary]	Accepted- text revised.
33583	6	28	6	29	The suggestion that albedo and evapotranspiration primarily affects regional climate is unprecise and not supported by chapter 2. I would say that effects of albedo are more proximate/immediate (in time and space). However, effects may add up to significant effects even at the global scale (similar to GHGs). For evapotranspiration, the effects are regional, but not so trivial. Clearly, evaporation leads to water and heat transfer from surface to the atmosphere and back, which implies internal redistribution of heat and water across various biomes. This may or may not also impact energy-balance world-wide. Both points are substantiated in ch. 2.6. The same principle, that effects of albedo are mostly regional, can be found various places in chapter 2, see for instance ch. 2 p7, line 25-27. [, Norway]	Accepted- text revised. The figure has been cross-references to Ch2, with input from the Ch2 author team.
8291	6		7		Figure 1 is a nice graphics, but unfortunately it gives an impression that degraded land is the opposite of natural non-human touched nature. As much as I tend to side with this perspective, I am concerned that this linear thinking is not in line with perspective on "land enhancements" through agricultural practices. The more use does not necessarily mean more degradation. There are many cases in which natural lands can (and have) been enhanced by people for greater food productivity. I am afraid that the graphics may cause unwarranted negative reaction from the agricultural sector. [Kaoru Kitajima, Japan]	Accepted- text revised. Agreed. The degradation gradient has been removed from the figure.
3533	6	12			this is presumably 5) (numbering got lost) [Cordula Ott, Switzerland]	Accepted- text revised.
25281	6	15			We believe that this figure is relevant and justified, but we consider that it is currently subject to several defects that must be corrected. In particular: <ul style="list-style-type: none"> <li>• We believe that indicating activities in sub-bullets is confusing and contradicts several of the report's findings. It is not always clear how activities are divided into the different land and climate challenges. The examples of activities given under each challenge are mainly cross-cutting activities and should be also mentioned under other themes. In particular, some activities such as sustainable forest management, agroforestry (which should be complemented by other agro-ecological practices) are relevant to mitigation, but also to other challenges, including adaptation, land degradation and food security, as clearly shown by the figures on page SPM-15, as well as Chapters 2, 4 and 6. Similarly, dietary change also contributes to mitigation and food security, perhaps more than to adaptation. We suggest to remove the activities indicated in the sub-bullets (which would lighten the figure), or if it is not possible, to use a new kind of presentation in order to be more consistent with the findings of Figure SPM-15 and Chapters 2, 4 and 6, for example by using a cross table "activity versus land-climate challenges".</li> <li>• In the "climate system" part of the figure, we suggest adding a 3rd column "water exchange" in addition to "greenhouse gas fluxes" and "energy exchange". This "water exchanges" column would contain two elements: evapotranspiration and precipitation. Therefore, in the column "energy exchange", we suggest to delete "evapotranspiration" and to add "latent energy".</li> <li>• In the legend, we suggest to explain the colours and small figurative elements. We don't really understand the positioning for some of them, for example, mountains, cars, garbage cans, etc. Similarly, we would propose to use yellow for the semi-arid soils.</li> <li>• In the caption, biogeophysical should be replaced by biophysical in order to be consistent with the rest of the report.</li> <li>• We ask to remove the aircraft: it has nothing to do with the purpose of this figure. [, France]</li> </ul>	Taken into account - combined with other comment. The figure has been completely re-designed to account for these and other points. This has involved simplification.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26781	6	15			We appreciate this figure 1.1, which is taken up in the SPM. We have some questions and suggestions, please see our comments on the SPM-figure. [., Germany]	Thank you for the positive comment. See response to SPM comments
4339	6	15			Figure 1.1 Text in the figure is too small, unless the figure is oriented in landscape [Mastura Mahmud, Malaysia]	Comment noted section totally updated and revised. This figure has been completely redrawn
29389	6				Why are dietary change and food waste adaptation and not mitigation? Shouldn't adaptation give examples on how we can protect land from negative effects of climate change, e.g. change crop types, change crop calendars, protect from salinisation etc...? [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. Figure has been revised
3243	6				I very much like the concept of figure one, but the graphics need a lot of work. For example, a single symbol in each box to illustrate the point would work well (its impossible to have a symbol to represent every aspect of degradation!). [John Devaney, Ireland]	Comment noted section totally updated and revised. This figure has been completely redrawn
15583	6				I don't understand figure 1,1, the classification of the things is not logical why e.g. sustainable forest management is in adaptation and bioenergy in mitigation? The mitigation impact of forest based bioenergy could be smaller than that of other wood products. [Tuomo Kalliokoski, Finland]	Accepted- text revised. These land management classifications have now been removed from the revised figure.
29391	7	5	5		Not sure annual emissions continue to increase unabatedly. Surely there is some abatement, but way too little? [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. After an initial slow down in CO2 emission increase 2015-16 emissions have increased again in 2018. 2019. Also methane emissions increasing again
24997	7	1	7	1	I do not think the question is about uncertainty of permissible cumulative emission; Some justification is necessary before approving such a statement [Binaya Shivakoti, Japan]	Accepted- text revised.
17433	7	1	7	2	The referenced study is specifically assessing the mitigation pathway for 1.5 oC. Though the current wording is not incorrect, it is misleading and does not stay true to the study that is specific to the 1.5oC. Especially, given the significant difference between 1.5 and 2 degrees of the previously released IPCC SR15, it would be important to distinguish this difference in this Chapter and throughout this report. [Taehyun Park, Republic of Korea]	Accepted- text revised.
31629	7	1	7	10	Same argument again: highly debatable. While the urgency for concrete action is agreed upon, land based mitigation measures should not, in any circumstances, be seen as the central solution to achieve the goals established by the Paris Agreement. The efforts by the land use sector are pivotal. Sustainable land management is urgent to effectively establish a more sustainable development, and is responsible for the achievement of several goals. However, relying on its capacity to reduce emissions and act as a sink for some of the gases, is to minimize the urgency to make drastic changes in other sectors, that otherwise might cause even more drastic problems in the future. A document produced by the IPCC should support the concrete action on promote sustainable land management as one important component of the needed action towards the PA set of goals, while still emphasizing the urgent and necessary need to make concrete changes in energy sources, industrial pathways, and economic and societal behaviors. the higher concern of the needed investment on land use should not be the reduction of emissions, but rather is centrality to provide, in sustainable manners, food and support livelihoods. [., Brazil]	Accepted- text revised.
23809	7	2	7	2	et al., (correct) et al., (incorrect); consistency is required everywhere [., India]	Accepted- text revised.
28895	7	4	7	5	A new paper by Smith et al. (Nature Comms, published mid-January) is relevant to cite here. It includes inertia in infrastructure. [Jan Fuglestedt, Norway]	reference noted but point already covered by current used citations.
28893	7	5	7	5	What is meant by the aggregate "greenhouse gases" here? Better to say which gases; i.e., CO2 etc. [Jan Fuglestedt, Norway]	Accepted- text revised.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25283	7	5	7	7	Further clarification should be provided as soon as reference is made to the Paris Agreement and its objectives. "Paris Agreement long-term temperature goal" should be preferred here. [ , France]	Accepted- text revised.
38499	7	5	7	7	Suggest making this broader than just the Paris goals, by inserting text like "and other national and sub-national GHG reduction targets..." after 'Paris goals'. [ , United States of America]	Rejected. Sentence revised but we feel it is sufficient to list the Paris Agreement here
38501	7	5	7	7	Instead of "factoring in also human population growth", suggest something like "while factoring in the need for these systems to accommodate a growing human population" to be more explicit. [ , United States of America]	Accepted- text revised.
22225	7	6	7	6	Add: industry, infrastructure, etc. or "all sectors" [Anastasios Kentarchos, Belgium]	Accepted- text revised. "Energy" subsumes also industry
27817	7	6	7	6	Comma missing after "In order to meet the Paris goals" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
4067	7	7	7	10	this statement is crucial but better specification on the kind of land-based mitigation that is actually feasible from a food security perspective is warranted. See also the later statement "but the magnitude of cost-efficient emission reductions remains unresolved" .... [Turi Fileccia, Italy]	Rejected - outside the scope of the chapter . Statement has been revised, but more detail here not in the scope of the section. These are provided in the later chapters of the report
26571	7	8	7	8	"being considered against" seems very misleading - suggest change to "contributing to" [Anne Woodfine, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
24151	7	8	7	10	terribly worded paragraph , for an executive summary this is poor [Derek Berliner, South Africa]	Accepted- text revised.
31631	7	11	7	11	The report will provide compiles some evidence to enable support policy decision makers (...) (comment: while we commend the effort to cover a wide range of studies and information, and we agree that there are many instruments and data that are valid to use as references, there are still biases and limited interpretation to the information provided that lead to the suggestion to a more spot affirmation. [ , Brazil]	Noted no action needed.
38503	7	11	7	13	Is this basically the definition for the term transformative pathways (as used on page 5): "development pathways in which land can provide several fundamental needs to humanity, including climate regulation, food, water, energy, and maintaining biodiversity"? If so, make that clear. [ , United States of America]	Accepted- text revised. Shortened and clarified
3527	7	11	7	16	This objective should also come at the beginning [Cordula Ott, Switzerland]	Rejected . chapter team discussed structure and storyline of chapter repeatedly, and among the differing views (what comes first) the existing one was agreed upon among all as the one that functions best
24999	7	12	7	12	Land has been already providing these fundamental needs; it is more of sustaining the capacity of land to ensure flow of these services. [Binaya Shivakoti, Japan]	Accepted- text revised.
22227	7	18	7	41	Box 1.1 comment The contents of this box are important framing information (especially a clear explanation of the IPCC's added value compared to other land sector reports). The material should be placed nearer the start. Suggest placing it in front of the current 1.2.1 - and also including a similar (shorter) contextual statement in the SPM. Also, this box/section should mention other important reports the SRCL builds on and refers to (eg Global Land Outlook (UNCCD, 2017); 4p1000 Initiative; Global Soil Partnership work (FAO, 2017); UNEP Emissions Gap Report; World Bank; among others) [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. introductory section substantially revised
24893	7	18	7	41	I would suggest to refer here also on the IPCC Task force on National Greenhouse Gas Inventories (since it contains land-related topics) [Borbala Galos, Hungary]	Accepted- text revised .

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3535	7	18	7	41	Agriculture at a crossroads - Global report. International Assessment of Agricultural Knowledge, Science and Technology for Development (2009), WB and FAO is a major report on land/agriculture and has to be considered! [Cordula Ott, Switzerland]	reference noted but point already covered by current used citations.
24157	7	18	7	41	This long winded box full of acronyms does not belong in an executive summary, condense to 5 lines !! [Derek Berliner, South Africa]	Rejected. Chapter 1 was specifically tasked to present the overview in the box.
18157	7	18	7	41	hard to follow, seems unsorted, clearer argumentation line possible? E.g. either first other reports and afterwards SRCL (i.e. delete/move in between comments on SRCL content) or report 1 - SRCL, report2 - SRCL, ... [Julia Nabel, Germany]	Comment noted section totally updated and revised. this section has been revised.
14719	7	18	7	41	Since Box 1.1 discusses forest management strategies, the authors may benefit from citing the new US National Academy of Science, Engineering, and Medicine (NASEM) report on forest biotechnology, which came out in January 2019. [Wu Felicia, United States of America]	reference noted but point already covered by current used citations.
11745	7	22	7	27	Suggest to be more specific on how SRCL updates and fills gaps in AR5 (and SR1.5). E.g., while there was a food security chapter in AR5, land degradation has not been discussed in a comprehensive manner, etc. [Hans Poertner and WGII TSU, Germany]	Taken into account - combined with other comment . Box revised, but we need to also consider word limits to the chapter.
31633	7	23	7	23	In line with the other comments, we question the "more integrated" qualification, as the focus is limited to agriculture and food systems, and does not include other sectors and drivers to the issues at stake. [Brazil]	Taken into account - combined with other comment .
18159	7	25	7	25	introduce line break after "AR5.)" [Julia Nabel, Germany]	Accepted- text revised.
18161	7	25	7	27	maybe highlight the importance that land use has as mitigation tool in the "IPCC 1.5 degree special report" [Julia Nabel, Germany]	Taken into account - combined with other comment .
33423	7	25	7	27	The IPCC SR15 report also includes subsections in the impacts chapter (chapter 3) which provide more background on the relevance of land use changes in low-emissions scenarios (in addition to the mentioned cross-chapter box 7). Please check sections 3.6.2.1 and 3.6.2.2 (about 3 pages long) [Sonia Seneviratne, Switzerland]	Accepted- text revised . cross chapter references have been done throughout the report
33551	7	25	7	27	The IPCC SR15 report includes a cross-chapter box on the role of land use change in the context of 1.5 scenarios ("Cross-Chapter Box 7: Land-Based Carbon Dioxide Removal in Relation to 1.5°C of Global Warming"). This cross-chapter box should be mentioned here in Box 1.1. [Sonia Seneviratne, Switzerland]	Rejected. we cross reference to the relevant chapters in the 1.5 degree report (following the IPCC style guidelines) but cannot cross-reference to each specific sub-section that is of particular relevance .
18163	7	32	7	32	maybe give an example for biophysical [Julia Nabel, Germany]	Taken into account - combined with other comment .
23811	7	33	7	33	to analyse (correct), to analyses (incorrect) [India]	Accepted- text revised.
60	7	34	7	34	Should state, for the first time, 'The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services' before the acronym 'IPBES'. [Edson Leite, Brazil]	Accepted- text revised . this has been addressed
30599	7	37	7	38	Projections of land use. In box 1.1., after line 37, the prospects of land use in relation to the achievement of Sustainable Development Goals should be reinforced. A sentence such as the following could be added: Current and perspective land requirements for food and agriculture are investigated in the FAO report The future of food and agriculture - Alternative pathways to 2050 (FAO 2018b). This report analyzes comprehensive global socio-economic, environmental and climate scenarios characterized by the extent to which the key challenges to food security, nutrition and sustainability are dealt with. It shows that drastically improving food security (SDG 2) would be possible with limited land expansion if income is better distributed between and within countries". (see FAO 2018b, section 4.9, table 4.12 and figure 4.13). [Lorenzo Giovanni Bellù, Italy]	Noted no action needed.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
28897	7	38	7	38	I suggest changing "climate lens" to "climate perspective". [Jan Fuglestedt, Norway]	Accepted- text revised.
27729	7	1		10	Here it would be timely to cite Lawrence et al., 2018 DOI: 10.1038/s41467-018-05938-3, as it discusses permissible CO2 emissions and the Paris Agreement's temperature goals, as well as land-based mitigation and CDR options. [Helene Muri, Norway]	reference noted but point already covered by current used citations.
27731	7	18		41	There are two other reports that would be suitable to mention in the box, due to their content on carbon and land: National Research Council. 2015. Climate Intervention: Carbon Dioxide Removal and Reliable Sequestration. Washington, DC: The National Academies Press. <a href="https://doi.org/10.17226/18805">https://doi.org/10.17226/18805</a> . And: Schäfer, S., Lawrence, M., Stelzer, H., Born, W., Low, S., Aaheim, A., Adriázola, P., Betz, G., Boucher, O., Carius, A., Devine-Right, P., Gullberg, A. T., Haszeldine, S., Haywood, J., Houghton, K., Ibarrola, R., Irvine, P., Kristjansson, J.-E., Lenton, T., Link, J. S. A., Maas, A., Meyer, L., Muri, H., Oschlies, A., Proelß, A., Rayner, T., Rickels, W., Ruthner, L., Scheffran, J., Schmidt, H., Schulz, M., Scott, V., Shackley, S., Tänzler, D., Watson, M., Vaughan, N. (2015). The European Transdisciplinary Assessment of Climate Engineering (EuTRACE): Removing Greenhouse Gases from the Atmosphere and Reflecting Sunlight away from Earth. Funded by the European Union's Seventh Framework Programme under Grant Agreement 306993. doi: 10.2312/iass.2015.018. [Helene Muri, Norway]	reference noted but point already covered by current used citations. Citations in text already underpin this argument. There is also a Xc-chapter box on ILK in the report.
26783	7	25			The statement "...which have not received sufficient analysis previously (e.g., in the AR5)" - would mean that the AR5 was not comprehensive. Please revise. [ , Germany]	Accepted- text revised.
38505	8	1	8	41	Section 1.2.2.1 line 19 mentions that, "land also serves as a large carbon dioxide sink," but does not give any sense of the scale of the current global land sink. Given that Section 1.2.2 is on the status of global land use and the role of land in the climate system, it seems like a glaring omission that there is not a full discussion of the current global land carbon sink and how it has changed over time. This is important context for discussions of mitigation pathways that aim to enhance the global land carbon sink. [ , United States of America]	Accepted- text revised. Section shortened/restructured

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13233	8	2	8	41	<p>This section omits key literature regarding the relationship between ecosystem integrity, biodiversity and ecosystem resistance to, and resilience in the face of, climate change and related threats such as pests, disease, drought and fire is directly related to ecosystem integrity. Ecosystems with high integrity such as primary forests have a higher level of resilience, resistance and adaptive capacity than production and in particular monoculture, forests (Nakamura et al 2017, Chen et al. 2010, Briant et al. 2010, Siergert et al 2001, Cochrane et al. 1999).</p> <ul style="list-style-type: none"> <li>• Nakamura, Akihiro, Roger L. Kitching, Min Cao, Thomas J. Creedy, Tom M. Fayle, Martin Freiberg, C. N. Hewitt, et al. 2017. "Forests and Their Canopies: Achievements and Horizons in Canopy Science." Trends in Ecology and Evolution 32 (6). Elsevier Ltd: 438–51. doi:10.1016/j.tree.2017.02.020.</li> <li>• Chen, Jiquan, Sari C Saunders, Thomas R Crow, Robert J Naiman, D Kimberley, Glenn D Mroz, Brian L Brookshire, et al. 2010. "In Forest Microclimate and Ecosystem Ecology Landscape the Effects of Different Management Regimes." BioScience 49 (4): 288–97.</li> <li>• Briant, Gaël, Valéry Gond, and S. G W Laurance. 2010. "Habitat Fragmentation and the Desiccation of Forest Canopies: A Case Study from Eastern Amazonia." Biological Conservation. doi:10.1016/j.biocon.2010.07.024.</li> <li>• Siegert, F., Ruecker, G., Hinrichs, A., Hoffmann, A.A., 2001. Increased damage from fires in logged forests during droughts caused by El Nino. Nature 414 (6862), 437–440.</li> <li>• Cochrane, M.A., Alencar, A., Schulze, M.D., Souza, C.M., Nepstad, D.C., Lefebvre, P., Davidson, E.A., 1999. Positive feedbacks in the fire dynamic of closed canopy tropical forests. Science 284 (5421), 1832–1835. [Aila Keto, Australia]</li> </ul>	Accepted- text revised. Added reference to Nakamura et al.
18165	8	2	8	41	maybe introduce the terms biogeochemical and biophysical effects already here (currently only used in later parts) [Julia Nabel, Germany]	Rejected. Prefer to keep these more "technical" definitions to chapter 2 and reforestation text box.
853	8	3	8	3	delete "large". There are carbon pools with limited amount of carbon that also can play a role in fighting climate change. [, Spain]	Accepted- text revised.
23345	8	3	8	16	Recognise the role of blue and green water, and aquifers, associated with land. Recognise role of oceans as heat pool cf land [John Dixon, Australia]	Rejected - outside the scope of the chapter .
22229	8	4	8	5	The given definition of "land use" is unclear. How does it relate to land uses that are not obviously "harnessing services provided by terrestrial ecosystems". E.g., urban sprawl or mineral extraction can be major drivers of land use change (and of GHG emissions), but they are not motivated by the stated objectives. [Anastasios Kentarchos, Belgium]	Accepted- text revised. Short definition give, and cross-reference to complete definition in glossary added.
23963	8	4	8	5	The given definition of "land use" is too narrow. A lot of land use is not linked to "harnessing services provided by terrestrial ecosystems". E.g., urban sprawl or mineral extraction can be major drivers of land use change (and of GHG emissions), but they are motivated by the stated objectives. [Zoltán Rakonczay, Belgium]	Accepted- text revised. Short definition give, and cross-reference to complete definition in glossary added.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38509	8	4	8	7	Where is this definition for land use from, as there is no citation? From a quick google search, it looks very similar to an abstract found for an encyclopedia chapter by Karl-Heinz Erb in 2015 <a href="https://www.sciencedirect.com/science/article/pii/B9780080970868910584">https://www.sciencedirect.com/science/article/pii/B9780080970868910584</a> . Highly recommend (1) using a definition from IPCC or other UN report instead, and (2) making sure to cite any literature used. A general LU definition from the IPCC main site glossary (which is the same definition as the 2000 LULUCF special report) can be found here and seems to have the connotation that the authors seek: <a href="http://www.ipcc-data.org/guidelines/pages/glossary/glossary_lm.html">http://www.ipcc-data.org/guidelines/pages/glossary/glossary_lm.html</a> [, United States of America]	Accepted- text revised. Short definition give, and cross-reference to complete definition in glossary added.
22231	8	7	8	7	Clarify the ranking of "land use" and the scope of the sectors. Does "industry" include energy? What is meant by "land use"? Does it include all the impacts of the food sector? [Anastasios Kentarchos, Belgium]	Accepted- text revised. see response to 855, 22229, 38509
22233	8	7	8	7	"After industry..." Energy is the largest sector. Presumably the sentence refers to energy and industry combined, please clarify. [Anastasios Kentarchos, Belgium]	Accepted- text revised. see response to 855, 22229, 38509
855	8	7	8	7	replace "industry" by "energy", or explain that this "industry" includes emission from energy sector. [, Spain]	Accepted- text revised. Section shortened
23965	8	7	8	7	Clarify the ranking of "land use" and the scope of the sectors. Does "industry" include energy? What is meant by "land use"? Does it include all the impacts of the food sector? [Zoltán Rakonczay, Belgium]	Accepted- text revised. see response to 855, 22229, 38509
30003	8	7	8	9	This is incorrect as energy is the largest source of emissions, industry (assuming defined without energy use) is in fact smaller than land use emissions. better to just remove this sentence, the point that 25% of emissions is from land use is enough to make the point. [, Netherlands]	Accepted- text revised. Section shortened/restrucutred
38511	8	7	8	13	Does the text here (and related estimates and citations) reflect gross or net estimates? Make that clear as it is an important element to consider, and be explicit about the context of land use. [, United States of America]	Accepted- text revised. Section shortened/restrucutred
27819	8	8	8	8	Space missing before "Bodirsky" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
23813	8	8	8	8	Page et al. 2011;Bodirsky et al. 2012; one space after semi colon between two references is required [, India]	Accepted- text revised.
23815	8	9	8	9	Arneth et al. 2017;Le Quere et al. 2018; one space after semi colon between two references is required [, India]	Accepted- text revised.
26787	8	9	8	12	It is unclear to which GHG the percentages refer to - please revise. [, Germany]	Accepted- text revised.
22235	8	9	8	16	It would be reasonable to state the scope of the GHG emissions mentioned. Is it identical to AFOLU? If not, how does it differ? [Anastasios Kentarchos, Belgium]	Rejected - beyond the mandate of the report. Section shortened/revised, but we feel it is not essential to enter the AFOLU vs. LULUCF definitions here as we simply wish to highlight some relevant aspects which are discussed in more detail in chapter 2.
23967	8	9	8	16	The scope of the GHG emissions mentioned should be more clearly stated. Is it identical to AFOLU? If not, how does it differ? [Zoltán Rakonczay, Belgium]	Rejected - beyond the mandate of the report. Section shortened/revised, but we feel it is not essential to enter the AFOLU vs. LULUCF definitions here as we simply wish to highlight some relevant aspects which are discussed in more detail in chapter 2.
33127	8	10	8	10	25% of total anthropogenic emissions of the greenhouse gases methane (CH4), nitrous oxide (N2O) [Amany Mansour, Egypt]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
32711	8	10	8	10	<p>Check this statement: " An estimated up to 10 25% of total anthropogenic emissions of the greenhouse gases methane (CH4) and nitrous oxide (N2O), and 11 approximately 10% of CO2 emissions arise mainly from deforestation, ruminant livestock and fertiliser 12 application." According to <a href="https://icp.giss.nasa.gov/education/methane/intro/cycle.html">https://icp.giss.nasa.gov/education/methane/intro/cycle.html</a> - the number for methane might be way too low. It also seems like a weird split of categories - if you want LAND emissions, state them. If you want to say what emissions are due to fertilizers and crops, then use that category. Then show enteric fermentation. But these categories lumped together don't make sense. [Kate Lajtha, United States of America]</p>	Accepted- text revised. Section shortened/restructured
38513	8	10	8	26	<p>The sequencing of the text here is jumbled/out of order. It moves from current GHG emissions estimates to how mitigation options have benefits but unclear costs, then how many systems respond to climate change and how that makes land a carbon sink, and how land use change can result in regional differences in the warming/cooling. Suggest reordering this paragraph as follows:</p> <ul style="list-style-type: none"> <li>- Keep lines 7 through 13 as is</li> <li>- After ""(see also 1.3.1.4)"" on line 13, insert this text from lines 19-22 ""Land also serves as a large carbon dioxide sink (Ciais et al. 2013; Canadell and Schulze 2014; Zhu et al. 2016; Le Quere et al. 2018;). Whether or not this sink will persist in future is one of the largest uncertainties in carbon cycle and climate modelling (Ciais et al. 2013; Friend et al. 2014; Bloom et al. 2016; Le Quere et al. 2018).""</li> <li>- After ""...Le Quere et al. 2018)"" insert current lines 13-16 ""there is very high confidence that greenhouse-gas reduction measures in agriculture, livestock management and forestry have substantial benefits for biodiversity and ecosystem services beyond climate regulation, but the magnitude of cost-efficient emission reductions remains unresolved (1.5-5, or even 11.3 Gt CO2-eq a-1 (Smith et al.2013a, 2014b; Griscom et al. 2017a)).""</li> <li>- After ""...Griscom et al. 2017a)"" but before the current text in lines 18-19 (starting with ""land ecosystems...""), insert new text highlighting the important role of land use change/land use conversion and the potential for substantial emissions and in some cases sequestration caused by LUC.</li> <li>- Then follow this new text with lines 18-19 ""Land ecosystems do not only respond to direct land use, but also to changes in environmental conditions such as increasing atmospheric CO2 concentration, or prolonged growing season in cool environments.""</li> <li>- After the text ""...in cool environments"" insert current lines 22-26: ""In addition, vegetation cover changes (such as conversion of forest to cropland or grassland, and vice versa) can result in regional cooling or warming through altered energy and momentum transfer between ecosystems and atmosphere. The regional impacts can be substantial, but the sign of the effect depends on the geographic context (Lee et al. 2011; Zhang et al. 2014; Alkama and Cescatti 2016)(see also Chapter 2)."" [ , United States of America]</li> </ul>	Comment noted section totally updated and revised. Section shortened/restructured
26573	8	12	8	12	<p>it is rather the production and misapplication of fertilisers which releases GHGs [Anne Woodfine, United Kingdom (of Great Britain and Northern Ireland)]</p>	Rejected. GHG are emitted also from "normal" fertilisation, although timing and magnitude no doubt matters

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38515	8	13	8	13	The important point that much sequestration is already occurring on the landscape is again glossed over and should be made explicitly here. There is a sentence in the next paragraph that can be moved up to make this point (lines 19-22). This text change suggestion is fleshed out in the USA comment pertaining to page 8 lines 10-26. [United States of America]	Accepted- text revised. Section shortened, and more explicit cross reference to other chapters added that address this aspect in detail
24159	8	13	8	16	This sentence is not clear , poorly articulated, meaning...magnitude for what to happen? [Derek Berliner, South Africa]	Accepted- text revised. Section shortened/restructured
28903	8	13	8	16	Not sure if this statement belongs here. If you keep it be sure about consistency with later chapters. [Jan Fuglestad, Norway]	Accepted- text revised. Section shortened/restructured
30853	8	13	8	16	I am unclear what this sentence is saying do you mean potential magnitude of cost efficient emissions reductions is? [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. Section shortened/restructured
26789	8	14	8	16	What is meant by "climate regulation"? What is meant by "cost-efficient"? Please specify. [Germany]	Accepted- text revised.
3331	8	15	8	15	In page 4 line 11 it is indicated that "Estimates of cost/efficient and sustainable greenhouse emissions reduction potential on land might be tripled (medium confidence)" and in this lines it is mentioned that "greenhouse-gas reduction measures in agriculture, livestock management and forestry... but the magnitude of cost-efficient emission reductions remains unresolved" The first statement implies knowing a magnitude of cost. It is suggested to revise the paragraphs [Mexico]	Accepted- text revised.
38517	8	15	8	16	It is not clear what the numbers in the parentheses refers to here "(1.5--5, or even 11.3 16 Gt CO <sub>2</sub> -eq a-1)". Does the 1.5-5 signify number of mitigation options, of warming? What are the units? To what does the GT CO <sub>2</sub> number pertain? The degree of mitigation? That would seem odd to have here if the magnitude of cost-efficient mitigation options are unclear, per the sentence. Maybe it's just a stray artifact. [United States of America]	Accepted- text revised. Section shortened/restructured
4017	8	15	8	16	The quoted mitigation potential is stated oddly ("1.5-5, or even 11.3"). Why not 1.5-11.3? Is 11.3 an outlier? A statement explaining why the numbers are shown like this should be given. [Vassilis Daioglou, Netherlands]	Accepted- text revised. Section shortened/restructured
2931	8	16	8	16	References on GHG mitigation referred here should cite new literature published in April 2018 in PNAS which summarized recent progress on Chinese achievements in GHG mitigation. Therefore, I strongly suggest references cited here update from "Smith et al.2013a, 2014b; Griscom et al. 2017a" to "Smith et al.2013a, 2014b; Griscom et al. 2017a; Fang et al. 2018" [Dexiang Chen, China]	Comment noted section totally updated and revised.
27821	8	17	8	18	Comma missing after "...environmental conditions" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
26589	8	17	8	18	This passage is confused. The statement that "land ecosystems" respond to direct land-se seems almost tautological. Why are the examples of environmental changes seemingly positive? It would be helpful to include *reduced* growing seasons in areas of reduced rainfall and rising temperatures. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
2195	8	17	8	19	The two sentences don't obviously have a link, but by starting the second with "In consequence,..." it implies that the second sentence is concluding a topic started in the first. If they are linked, then the first one needs to be rewritten to make the link clearer. [Michelle North, South Africa]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17435	8	17	8	41	Land ecosystems in many areas of the world are impacted by the sea level rise, therefore salinization of soil, of which impacts include yield losses. This should be included in the scope of the report as well (see comment on Chapter 2 for suggested studies for reference). [Taehyun Park, Republic of Korea]	Rejected - outside the scope of the chapter .
22237	8	18	8	19	Delete "In consequence". It wrongly suggests that land is a net sink only because of the factors mentioned. In contrast, the residual carbon sink is largely due to legacy effects of past management, such as the long-term recovery, since the first half of the 20th Century, of northern temperate and boreal forests from past deforestation and degradation. This is a fundamental factor not mentioned anywhere in the text. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. reference to regrowth added
32713	8	18	8	19	small point but the line that begins "in consequence" - just because soils respond to change does not mean that they are a sink, so there is no in consequence here. Climate change also can mean that ecosystems are a source. [Kate Lajtha, United States of America]	Accepted- text revised.
30855	8	18	8	19	this is true but 'in consequence' is not necessary and confusing. Land is a large carbon sink. This sink is also liable to change with environmental conditions - they are two separate (but linked) points. [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
16879	8	18	8	19	To state 'in consequence' is not correct as a result of the conditions presented in the previous sentence. Land does not act as a carbon sink as a consequence of land use or increasing CO2 concentration, but mainly as a consequence of decomposing plant biomass, above and below ground, that captures atmospheric CO2 through photosynthesis. Rather, soil has acted and may be used to act as a sink for atmospheric CO2, but also as a source, depending on environmental conditions. [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
23969	8	18	8	19	Delete "In consequence". It wrongly suggests that land is a net sink only because of the factors mentioned. In contrast, the residual carbon sink is largely due to legacy effects of past management, such as the long-term recovery, since the first half of the 20th Century, of northern temperate and boreal forests from past deforestation and degradation. This is a fundamental factor not mentioned anywhere in the text. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. reference to regrowth added
26113	8	20	8	20	After "Cereal yields increased nearly linearly over the last six decades," insert "steadily rising almost 3% (roughly 50 kg/ha) per year, albeit" (World Bank data at <a href="https://data.worldbank.org/indicator/AG.YLD.CREL.KG">https://data.worldbank.org/indicator/AG.YLD.CREL.KG</a> ) [Reid Detchon, United States of America]	Comment noted section totally updated and revised.
22239	8	20	8	22	The nature and magnitude of the terrestrial carbon sink should be mentioned, as well as its relation to land management. This would seem essential, given that land use is presented elsewhere as a source of emissions. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
23971	8	20	8	22	The nature and magnitude of the terrestrial carbon sink should be mentioned, as well as its relation to land management. This would seem essential, given that land use is presented elsewhere as a source of emissions. [Zoltán Rakonczay, Belgium]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38519	8	22	8	26	The key point that land use change can cause substantial emissions and in some cases sequestration is missing here. The point that LUC happens is made but in the context of regional cooling/warming. This omission should be rectified, as this is an important element related to land use and climate change. There is much uncertainty surrounding estimates of LUC-related GHG emissions but that does not justify omitting it entirely. it should be acknowledged and the related uncertainties acknowledged as well. [, United States of America]	Comment noted section totally updated and revised. Land as a GHG source is listed in the section
16881	8	25	8	25	Strictly speaking, the effect depends on the local, not the geographic context. [Roland Hiederer, Italy]	Accepted- text revised.
31693	8	27	8	27	change "land" to "terrestrial"? [Elizabeth Migongo-Bake, Kenya]	Rejected. attempt to keep language simple as possible
24153	8	27	8	28	poor sentace construction and grammer [Derek Berliner, South Africa]	Comment noted section totally updated and revised.
30439	8	27	8	28	Biome shifts are a major impact attributed to anthropogenic climate change and should be solidly cited here. Add citations to the key reference globally (Gonzalez, P., R.P. Neilson, J.M. Lenihan, and R.J. Drapek. 2010. Global patterns in the vulnerability of ecosystems to vegetation shifts due to climate change. Global Ecology and Biogeography 19: 755-768.) and the key reference for an area experiencing climate change and desertification, the African Sahel (Gonzalez, P., C.J. Tucker, and H. Sy. 2012. Tree density and species decline in the African Sahel attributable to climate. Journal of Arid Environments 78: 55-64.) [Gonzalez Patrick, United States of America]	Accepted- text revised. added ref to Gonzalez et al., and other relevant references
4069	8	27	8	41	complex to read, merits re-writing [Turi Fileccia, Italy]	Comment noted section totally updated and revised.
24161	8	28	8	28	incomplete sentence.... Include.. 'leading to woody plant invasions of grasslands and other biomes" [Derek Berliner, South Africa]	Accepted- text revised.
27823	8	28	8	28	Badly stated phrase. I would change to: " Moreover, in semi-arid regions, as a result of atmospheric CO2 increases, woody cover densifies and encroaches, usually in the expence of grasslands". [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
38521	8	28	8	28	Change 'woody cover increase' to 'woody cover can increase' as this is not necessarily universal (other factors aside from simply being in a semi-arid region). [, United States of America]	Accepted- text revised.
26591	8	28	8	28	"In addition" would read better as "for example" [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
16883	8	28	8	28	Climate change is not just 'warming', which is elaborated in other parts of the document. Biome boundaries vary with changes in the climate, which can also be a different pattern of precipitation. Suggested to modify to 'climatic conditions'. [Roland Hiederer, Italy]	Accepted- text revised.
32715	8	28	8	29	this sentence: In addition, as a result of atmospheric CO2 increases woody cover increases in semi-arid regions - is simply not true. Woody biomass has increased due to warming and grazing and reduced fire, and these effects cannot be separated from increased CO2. So teh statement is simply false [Kate Lajtha, United States of America]	Accepted- text revised. There are some local studies that hav attributed woody encroachment also to land management change, but across the globeCO2 has been put forward as the chief factor. Sentence revised.
1543	8	28	8	29	sentence not clear. [Lucy Atieno, Kenya]	Accepted- text revised.
267	8	29	8	29	Habitat shifts - migration pattern, hibernation and aestivation periods change [Mahak Agrawal, India]	Rejected . True, but seems too detailed for a short introductory section
27825	8	31	8	31	Change to: "can reduce yields in areas that are already under..." [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
31635	8	35	8	35	The increase of atmospheric CO2 might not lead to increase of productivity etc. The impact it has on plant and animal metabolism might affect several development process, not necessarily having positive impact on fruit or seed development, for instance, having the opposite effect on expected productivity. C fertilization should be considered more comprehensively. [ , Brazil]	Rejected - outside the scope of the chapter . Considering the full CO2 respons in chapter 1 seems to much detail. Sentence revised however
26111	8	35	8	36	After "staple crops" insert "albeit with a loss in nutritional value" (See for example the Myers citations or <a href="https://ccafs.cgiar.org/news/how-climate-change-impacts-concentration-key-nutrients-crops#.XDZldlxKiUk">https://ccafs.cgiar.org/news/how-climate-change-impacts-concentration-key-nutrients-crops#.XDZldlxKiUk</a> ) [Reid Detchon, United States of America]	Rejected - outside the scope of the chapter . Sentence/paragraph has been shortened; nutritional aspects are covered in chapter 5.
24155	8	37	8	38	failed to mention impact of flooding and droughts on urban coastal areas , mass migration etc [Derek Berliner, South Africa]	Rejected - outside the scope of the chapter . Sentence/paragraph has been shortened; nutritional aspects are covered in chapter 5.
26593	8	38	8	38	Replace "prone to" with "increasing the risk of". [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
16885	8	38	8	38	Cause and effect are inverted in the sentence: wild fires are prone to heat waves and conditions of drought. [Roland Hiederer, Italy]	Accepted- text revised.
15545	8	40	8	40	Misspelled "clearly". [Annika Herbert, South Africa]	Accepted- text revised.
199	8	43	8	44	The sentence states that most of the ice-free land is under land use. That is obvious. Do the authors mean managed land use? Land which is not being managed is still under a land use. [Wallace Tyner, United States of America]	Accepted- text revised. Thank you for the comment. Table 1.1 was revised, now making clear that ca. 3/4 of land area is used, and 1/4 is left unused / wilderness / unproductive
22243	8	42	9	19	The presented land areas do not seem to add up (difficult to tell, as some land uses are given in ha, others in %). They are certainly inconsistent with Table 1.1. E.g., "mining" and "infrastructure" together make up more than the area of ""urban and built-up land" in Table 1.1.. It would be preferable to present numbers only in the table, and keep description in the text. [Anastasios Kentarchos, Belgium]	Accepted- text revised. the table has been revised for clarity and simplified, text and table have been better reconciled
23973	8	42	9	19	The presented land areas do not seem to add up (difficult to tell, as some land uses are given in ha, others in %). They are certainly inconsistent with Table 1.1. E.g., "mining" and "infrastructure" together make up more than the area of ""urban and built-up land" in Table 1.1.. It would be preferable to present numbers only in the table, and keep description in the text. [Zoltán Rakonczay, Belgium]	Accepted- text revised. the table has been revised for clarity and simplified, text and table have been better reconciled
8165	8	43	9	8	On page 8 line 43 the total icefree land area is expressed in millions of km2, on page 9 line 2 and 8 the areas for resp. Agriculture and forest is expressed in Mha. The use of different units is confusing and in this case thefigures are also wrong. If using Mha it should have been 100 times as much. I would suggest the use of km2 resp 43-53 millions for agriculture and 40 millions for forest. This is also consistent with Table 1.1 [Harold Leffertstra, Norway]	Accepted. All units changed to km2, only where appropriate, t ha-1 yr-1 (agricultural units)
4323	8	1	12	24	This part only talks about terrestrial ecosystem and climate change (mainly climate affecting vegetation), current land use patterns, past and future trends, but does not involve the role of land use in the climate system. It is suggested to supplement the relevant content. [Guangsheng zhou, China]	Rejected - outside the scope of the chapter . The first two paragraphs in this section introduce the role of climate change in the climate system, which are discussed in more details in chapter 2 and 6. Cross reference to these chapters has been added. Section shortened/restrucrtred

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38507	8	2	12	7	A very important component that has been largely omitted in this section (and possibly the entire chapter) is the provision of numeric estimates of terrestrial GHG fluxes (emissions and sequestration), globally and for the various land use sectors. Other parts of this chapter (e.g., page 17, line 2) refer to Section 1.2.2.1 for a discussion of GHG fluxes, but that overview/discussion isn't given here. There are a couple percentages given in lines 9-12, but no other metrics or discussion. The lack of discussion of GHG fluxes is a glaring omission that should be rectified in these sections and this chapter overall. [United States of America]	Rejected - outside the scope of the chapter. The point is well taken, but we feel that it goes beyond the scope of Chapter 1 (with exception of a very few examples) - a detailed listing of GHG fluxes, and the potential to reduce these as part of climate change mitigation is given in chapters 2 and 6. We provide a clearer cross-reference to these in the revised text (section 1.2.2.1). Section shortened/restructured
3539	8	2	13	24	consider changing the sequence of the paragraphs, starting with 1.2.2.2 Current land use pattern, followed by 1.2.2.3 Past and ongoing trends (in land use patterns); and then: 1.2.2.1 Land ecosystems and climate change, as this reflects increase in complexity of issues discussed... [Cordula Ott, Switzerland]	Rejected. chapter team discussed structure and storyline of chapter repeatedly, and among the differing views (what comes first) the existing one was agreed upon among all as the one that functions best
26791	8	42	13	24	These sections contain background information on land and trends that is essential for understanding the report. However, the way the information is presented in the current draft makes it difficult to fully comprehend the issues. Please introduce all land cover types preferably in a table that contains an overview of their main characteristics and past and ongoing trends, or provide references to the chapters where this information can be found. It would also be useful to improve the structure of the sections starting with the current 1.2.2.2 that introduces the land use pattern, followed by the current section 1.2.2.3. on trends and closing with section 1.2.2.1 on their relevance for climate. [Germany]	Partly accepted. We revised the table for clarity and reconciled terminology with the text. Space did not allow to explain the major characteristics of land-cover or land-use categories, but attention was paid to use self-explaining labels wherever possible, or to give definitions (e.g. for intensity classes discerned). The text now discusses the scale of the categories displayed in the table (Infrastructure, Cropland, Grazing land (split to permanent pastures and other grazing land), used forests and unused land. As the table already consists of seven columns, we refrained from adding past trends, also because this would have complicated the table's strongly due to the need to also include information on the uncertainties in trends for some of the categories, and the lack of information for others - in particular as the trends discussed are now extended to the last half-century (starting mainly in the 1960ies). Also, future trends could not be included for the sake of space and clarity. We now elaborate in more detail on the uncertainty of future developments of land use (pg 13, lines 30-40, linking the the Cross-chapter Scenario Box). Instead of referring to the chapters where more information can be found, we decided to quote the major references used in compiling the table. We did not change the overall structure of the text, starting with the land-climate nexus, than discussing status, past and ongoing trends, and future trends, as this allowed to be more efficient in terms of word count. But we inserted the major trends in Fig. 1.2 and improved the flow of this section, and aligned the terminology to the terminology of the table.
5347	8	42	13	24	Strong section that gives a really useful, robust overview of the current human use of the biosphere, underpinned by highly detailed data and excellent table respectively figure. Some clumsy formulations to be removed in final editing, though, e.g. complex and unclear sentences etc. [Helmut Haberl, Austria]	Accepted- text revised. Sentences have been simplified
269	8	42	18		The section talks of not just the land use but land cover as well [Mahak Agrawal, India]	Accepted- text revised. We revised the text for clarity and distinction between land use and land cover
3541	8	1			consider changing title to: Status of global land use system and the dynamics between land and climate system. Or status and dynamics of land use (or: land system - as this is used latter as title of 1.3.1.1 , p13) [Cordula Ott, Switzerland]	Accepted- text revised.
3537	8	3			Explain land ecosystem? [Cordula Ott, Switzerland]	Rejected . this is a widely used well-know term

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26785	8	7			Electricity and heat production is the largest source? [, Germany]	Accepted- text revised.
29393	8	16			Is it worth pointing out that the uncertainty in quantification of land-use emissions is higher than that of fossil fuel combustions? If not here than somewhere else. But(But this uncertainty desn;t meat we should delay action. [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)])	Rejected - outside the scope of the chapter . chapter 2 discussed uncertainties related to land-use change emissions in detail (incl a Figure)
29395	8	17			Land ecosystems do not only respond to direct land-use and land-use change (including abandonment), but....(Perhaps worth pointing out that land is a carbon sink broadly through two mechanisms: land abandonomnt / reforestation and forests soaking up more carbon than they release for reasons you mention here? [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)])	Accepted- text revised.
29397	8	19			Maybe worth quantifyiong the scale of 'land carbon sink': is it still about a fifth of all antropogenic GHG emissions? [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
8133	8	19			A statement "Land also serves as a large carbondioxide sink" is quite unclear. It depends on the type of land, e.g. forestland serve larger CO2 sink than agricultural land, or grassland, etc. I suggest to use "land ecosystem" instead of just land. [Haruni Krisnawati, Indonesia]	Comment noted section totally updated and revised.
27733	8	22		26	For a more recent citation; this is also shown in Muri, H. (2018) The role of large - scale BECCS in the pursuit of the 1.5°C target – an Earth system model perspective. Environmental Research Letters. vol. 13 (4). [Helene Muri, Norway]	reference noted but point already covered by current used citations.
2197	8	24			Change "but the sign of the effect..." to "but, whether the effect is positive or negative depends on the geographic context", or "but, whether the effect leads to warming or cooling will depend on..." [Michelle North, South Africa]	Accepted- text revised.
22241	8	35		36	Would be good to mention that CO2 fertilization often leads to decline in micronutrients. [Anastasios Kentarchos, Belgium]	Rejected - outside the scope of the chapter . Sentence/paragraph has been shortened; nutritional aspects are covered in chapter 5.
5257	8	40			cleary should be clearly [Joseph Mutemi, Kenya]	Accepted- text revised.
6967	8				Fig 2.1: "geographical distribution" implies a map of sorts, whereas this is a schematic. Propose to change legend to "Different unmanaged, managed ecosystems, with different levels of anthropogenic disturbance, have different effects on local, regional and global climate." [Debra Roberts, South Africa]	Rejected. does not belong here, should be in Chapter 2.
28529	9	9	4	4	Peatlands should be mentioned. [Meredith Wiggins, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. A sentence related to wetlands was included, after the trend section
26595	9	1	9	7	Mixing land-use categoies with land-cover types makes the passage hard to follow and creates an impression of figures summing to >100%. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. Passage was revised, now paying more attention to the distinction. Figures have been revised and carefully checked.
4991	9	1	9	16	Many numbers and terminologies used here are different from those used in Table 1.1. In addition, overall picture of land use status is not easy to understand. Suggest providing not only area but also percentile of area like stated in Table 1.1. Details are as follows: - line 1 of page 9 says "Agriculture" vs in Table 1.1 states "Agricultural land" - line 2 of page 9: agriculture land total is explained (total ca. 43-53 Mha, Table 1.1) vs in Table 1.1 from 43.93 to 51.57 (= ca.44-52 Mha) - line 4 of page 9 says "Natural grassland and savanna are with 40%" - line 14 of page 9 says "Mining, although with 0.3-0.8 km2, and infrastructure with 0.7-1.6Mkm2," but , it is not clear where mining and infrastructure are classified in table 1.1. [, Japan]	Accepted- text revised. Text and table have been reconciled and, for the sake of word-count, the text has been shortened.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8167	9	1	9	22	The size of the different land categories is expressed in a mixture of km2 and prosent. This makes it im-possible to compare. Please improve [Harold Leffertstra, Norway]	Accepted chapter restructured. Table has been restructured for easier access, untis have been reconciled along the entire chapter
27827	9	2	9	2	Change "represents the largest land-use categories" to "category" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. Passage revised and restructured, mistake corrected
17243	9	2	9	2	"Mha" should be "Mkm <sup>2</sup> " (otherwise numbers are wrong) [Noémie Janot, France]	Accepted- text revised.
4071	9	2	9	2	Mha or Mkm <sup>2</sup> ?here and elsewhere, please check! [Turi Fileccia, Italy]	Accepted- text revised.
33129	9	4	9	4	Natural grasslands and savannas are with 40% of the ice-free terrestrial surface conistituting the largest global land-cover type [Amany Mansour, Egypt]	Accepted chapter restructured. Text and table have been reconciled and, for the sake of word-count, the text has been shortened.
31691	9	4	9	5	add commas after ".savannahs are" and "after surface" [Elizabeth Migongo-Bake, Kenya]	Accepted- text revised.
38523	9	4	9	7	Suggest adding an actual number estimate of the natural grasslands and savannas area after the word "type" to give a sense of how large this land cover type actually is. Presumably it is bigger than 40 Mha, which is the estimated forest LC area in the next paragraph. And seems like there is a word or two missing after the word 'surface' (perhaps "and it is"?). [, United States of America]	Accepted chapter restructured. The text has been restructured, the numbers corrected. (forests: 35-42 Mkm <sup>2</sup> , grazing land 41-55 Mkm <sup>2</sup> )
30857	9	4	9	7	this sentence is ambiguous - what is the definitiion of 'natural' if it encompasses some land use. 'Natural or semi-natural' might be better [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. Passage was revised, rephrased
25285	9	8	9	8	There is probably a mistake: it should be written Mkm <sup>2</sup> and not Mha. Otherwise, this value seems strangely low: the latest FAO FRA totals 3999 Mha of forests, 100 times the value indicated here. Would it be possible to double-check this value? [, France]	Accepted. corrected, thank you
17245	9	8	9	8	"Mha" should be "Mkm <sup>2</sup> " (otherwise numbers are wrong) [Noémie Janot, France]	Accepted- text revised.
26597	9	8	9	9	uncertainty relating to natural grasslands and savannas should have been dealt with in the preceding paragraph. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. A statement on uncertainty of estimates added

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13235	9	8	9	14	<p>The report needs to recognize that the three broad categories of forests recognized by the FAO (2010) – (i) primary forests, (ii) production forests reliant on natural regeneration, and (iii) plantation forests - have significantly different characteristics w.r.t. effective climate mitigation (Mackey et al. 2015). Primary forests store 30-70% more biomass carbon than logged, secondary re-growth or plantation forests (Keith et al. 2009; Bryan et al. 2010, Blanc et al. 2013, (Siik et al. 2013, Lutz et al. 2018). And, when a primary forest is logged, it takes decades to centuries to regrow the carbon stocks, depending on the intensity of logging and collateral damage to the forest (Blanc et al. 20013). It is also important to note that the CBD and FAO identified the importance for biodiversity of primary forest conservation and the need to avoid further fragmentation of primary forests (CBD/SBI/10 add 2).</p> <ul style="list-style-type: none"> <li>• Mackey B., DellaSala, D.A., Kormos, C., Lindenmayer, D., Kumpel, N., Zimmerman, B., Hugh, S., Young, V., Foley, S., Arsenis, K. and Watson, J.E.M (2015) Policy options for the world's primary forests in multilateral environmental agreements. Conservation Letters 8, 139–147.</li> <li>• Keith H, Mackey B. and Lindenmayer D. (2009) Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests. PNAS 106, 11635-11640.</li> <li>• Bryan, J, P Shearman, J Ash, and J. B. KIRKPATRICK. 2010. "Impact of Logging on Aboveground Biomass Stocks in Lowland Rain Forest, Papua New Guinea." Ecological Applications 20 (8): 2096–2103. doi:10.1890/09-1818.1.</li> <li>• Blanc, Lilian, Marion Echard, Bruno Herault, Damien Bonal, Eric Marcon, Jérôme Chave, and Christopher Baraloto. 2009. "Dynamics of Aboveground Carbon Stocks in a Selectively Logged Tropical Forest." Ecological Applications : A Publication of the Ecological Society of America 19 (6): 1397–1404. <a href="http://www.ncbi.nlm.nih.gov/pubmed/19769089">http://www.ncbi.nlm.nih.gov/pubmed/19769089</a>.</li> <li>• Slik, J. W.Ferry, Gary Paoli, Krista Mcguire, Ieda Amaral, Jorcely Barroso, Meredith Bastian, Lilian Blanc, et al. 2013. "Large Trees Drive Forest Aboveground Biomass Variation in Moist Lowland Forests across the Tropics." Global Ecology and Biogeography 22 (12): 1261–71. doi:10.1111/geb.12092.</li> <li>• Lutz, James A. et al. 2018. "Global Importance of Large-Diameter Trees." Global Ecology and Biogeography 27 (7): 849–64. doi:10.1111/geb.12747. [Aila Keto, Australia]</li> </ul>	Accepted- text revised. text and table have been revised, now primary and naturally regenerated forests are mentioned there. Literature is not taken into account due to the word count limits; here, a mere account of areas is presented, not climate etc. consequences of land use.
38525	9	8	9	19	Include a delineation of wetland areas. They are a very important land-use category needed to understand the important greenhouse gas methane. [, United States of America]	Accepted. A sentence was included, after the trend section
16887	9	8	9	19	Not mentioned as a land use categories is the expansion of built-up areas, such as housing and infrastructure. The expansion of these areas predominantly affects agricultural land and thus has less of a direct impact on GHG emissions, but on food production. The effect on GHG emissions from land use changing to built-up areas is rather indirect, but worth mentioning. This is only referred to on page 14. [Roland Hiederer, Italy]	Accepted. A statement was now inserted earlier, in this very same subchapter
38527	9	11	9	11	Delete 'and' and insert 'including'. Insert a comma after 'southern boreal forests'. [, United States of America]	Accepted- text revised. the statement was shortened, not it reads "). Large areas of unused (primary) forests remain only in tropics an northern boreal"
38529	9	13	9	13	Insert 'and' before 5-7%. [, United States of America]	Accepted- text revised. sentence deleted, table gives the figures
17247	9	14	9	14	why mining and infrastructure not shown in Table 1.1? Numbers given here in the text are higher than the "urban & built-up lands" surface given in Table 1.1 [Noémie Janot, France]	Accepted- text revised. Numbers are now subsumed under the infrastructure label. Specific data are not given due to the word count limits

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27829	9	14	9	16	Put full stop after "... Pavelsky 2018)". Then, continue like this (makeing sure you change "activities" to "activity"): "However, they represent a particularly pervasive land-use activity..." [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. sentence reformulated
18167	9	14	9	16	sentence structure/language [Julia Nabel, Germany]	Accepted- text revised.
30859	9	14	9	16	true, but I'm not clear what point this sentence is making - there are many small area land uses, do you need to highlight these? [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. The passage discusses major land-use / land cover categories, along the figure in table 1.1., and infrastructure is one of these elements, therefore it needed to be mentioned (it is in many cases treated as an own land-use category, e.g. in the Best Practice Guidelines as category "settlement" - at the same level as e.g. the much larger categories grasslands, cropland, or forest land.) - therefore, it is important to mention infrastructure, and this particularities. To omit it, in compliance with the comment, would not have been a satisfactory solution. In the course of the revision, the sentence was changed, in order to make this statement better align with the table: "Infrastructure areas (including settlements, transportation and mining), while being almost negligible in terms of extent, represent particularly pervasive land-use activities, with far-reaching ecological, social and economic implications (Cherlet et al. 2018; Laurance et al. 2014)."
15547	9	15	9	15	Remove "a", so that it reads: "represent particularly pervasive". [Annika Herbert, South Africa]	Accepted- text revised.
38531	9	15	9	15	Insert 'but' before 'represent'. [, United States of America]	Accepted- text revised.
26599	9	17	9	19	The explanation of the concept is too brief to be helpful, and doesn't convey the advantages of using "biomes" [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. A sentences was added to make it clearer
27831	9	20	9	20	Elsewhere, you always use "land-use", rather than "land use". Need to be consistent. Twice in this line. [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. carefully checked. It should be land use, if it is single standing, and land-use, if it is followed by a specification, e.g. land-use change.
20973	9	21	9	22	consider uplifting to SPM as a framing message. Also line 25-26. [, United Kingdom (of Great Britain and Northern Ireland)]	Noted no action needed. Thanks
38533	9	23	9	25	Does the 2200-3800 km <sup>3</sup> a-1 estimate represent all cropland, fertilized cropland, or all irrigated cropland? Also, this number doesn't match any estimates for agricultural lands in Table 1.1. [, United States of America]	Rejected. The figures have been deleted, the text now reads: "Irrigation is responsible for 70% of ground- or surface-water withdrawals by humans (Wisser et al. 2008; Chaturvedi et al. 2015; Siebert et al. 2015; FAOSTAT 2018)." Note that the 2200-3800 km <sup>3</sup> relate to the volume of freshwater used for irrigation, not the area irrigated (would be in the unit [km <sup>3</sup> ])
32717	9	24	9	24	that unit is bizzare - what si the "a-1" all about? Use standard units [Kate Lajtha, United States of America]	Accepted. changed to yr-1
935	9	24	9	24	ground- [Nocera Francesco, Italy]	Accepted. Changed to "ground- or surface-water"
30481	9	25	9	26	Human societies appropriates one quarter to one third of..' typo - 'Human Societies appropriate ' [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. changed to humans appropriate
22245	9	25	9	27	Human societies appropriate one quarter to one third of the total potential net primary production...' This statement requires context to understand what is the point of mentioning it (e.g. what does 'appropriation' mean and under what circumstances is it sustainable? how large is this appropriated area relative to pre-industrial? How fast is it growing?) [Anastasios Kentarchos, Belgium]	Accepted- text revised . An explanatory expression to "appropriation" was added, but no sustainability threshold nor time series information is given in the light of word count limits

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

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31637	9	25	9	30	The appropriation of the net primary production by human societies has an important impact on development, food security, health, livelihoods... Those affirmations should consider that the interactions between humans and their environment has a goal: survival and well-being. We certainly need to qualify how we, as humans, establish these interactions and use the land. However, just presenting statistics of how large is our impact, without the context and the positive results, will not achieve an adequate qualification and analysis of the issues, hence hindering effective development of concrete solutions. [, Brazil]	Accepted. Added a sentence at the beginning of 1.2.1.
23817	9	26	9	26	appropriate (correct) appropriates (incorrect) [, India]	Accepted- text revised. changed to humans appropriate
1725	9	26	9	26	Should be "appropriate". [William Lahoz, Norway]	Accepted- text revised. changed to humans appropriate
33131	9	27	9	27	PgC a-1 Abbreviation meaning [Amany Mansour, Egypt]	Accepted. all changed to GtC yr-1
27833	9	27	9	27	Elsewhere, you always use "land-use", rather than "land use". [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. carefully checked. It should be land use, if it is single standing, and land-use, if it is followed by a specification, e.g. land-use change.
8169	9	27	9	30	The unit Pg is used while Gt is used most other places in the report [Harold Leffertstra, Norway]	Accepted- text revised.
5259	9	28	9	30	Since we are still in the 21st century, probably still in the early century, review statements like these can still be put in appropriate context, for example written as present day estimates of biomass harvest or put as forward looking statement. [Joseph Mutemi, Kenya]	Accepted. changed to around 2010
29401	9	14	14		Does infrastructure include housing / built-up/ urban areas? Why is infrastructure not in Table 1.1? [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Now stated in the table and in text "Infrastructure areas (including settlements, transportation and mining)"
23613	9	21		22	The authors differentiate between "intensive", "moderate" and "extensive" management. What is the difference between intensive and extensive? [Kerri Finlay, Canada]	Accepted. (some indicators added)
22247	10	1	10	1	Table 1.1: It would be good to make it clear that "Cropland" and "pasture" are just subcategories of "agricultural land" (so the latter is a subtotal). [Anastasios Kentarchos, Belgium]	Accepted- text revised. This is now mentioned in the text, to avoid too many rows in the table
4993	10	1	10	1	Suggest replacing comma in Table 1.1 with period in order to be consistent with other tables in other chapters. [, Japan]	Accepted- text revised.
18169	10	1	10	1	Forests managed for wood production -> low/high % 0? [Julia Nabel, Germany]	Accepted. revised
937	10	1	10	2	The symbol km <sup>2</sup> :use superscript [Nocera Francesco, Italy]	Accepted- text revised.
38535	10	1	10	3	Table 1.1 has lots of interesting information but the presentation of values is a little confusing (the placement of the commas and the stated units specifically) and use of KM makes it harder to easily compare with areas of text when area is given in ha. For example, for the best estimate of forests, Table 1.1 has 39,00 mkm <sup>2</sup> and the text has 40 Mha. So is the 39,00 mkm <sup>2</sup> to be read as 39,000,000? Seems too large. 40 Mha would be 390,000 km, correct? Even with the commas as periods for U.S.-centric reviewers, that would make the forest best estimate 39mkm <sup>2</sup> which is still too big in terms of ha. [, United States of America]	Accepted- text revised. Table has been restructured for easier access, units have been reconciled along the entire chapter
28819	10	1	10	3	Table 1.1: Decimal should be denoted by internationally acceptable format i.e. point (.) in place of comma (,) [Lokesh Chandra Dube, India]	Accepted- text revised.
40421	10		10		Table could provide an indication of recent trends rather than a snapshot in 2015. [Valerie Masson-Delmotte, France]	Partly accepted. Trends are presented in Figure 1.2
23615	10	1			Decimals are hard to follow here - use the same number of significant digits throughout? [Kerri Finlay, Canada]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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2199	10	1			Table 1.1. I do not understand the AGRICULTURAL LANDS, TOTAL subheading "Of which, agricultural land (cropland / pastures) with trees cover (low: >30%, high: >10%)", and think that it could be rephrased to convey what is meant more clearly (i.e., the "low:>30%, high:>10%" - is this referring to the percentage tree cover (then why is low greater than high?), or is it referring to the column headings "Low" and High"?). Why are these column headings low and high anyway, are you referring to the lower and higher extents of the range? If so, then this may be better labelled as maximum and minimum, because those are commonly used in statistics. [Michelle North, South Africa]	Accepted- text revised. Table was revised and simplified. The relevant passages are deleted now.
2201	10	1			Remove all the "of which" from under Agricultural lands and Cropland headings [Michelle North, South Africa]	Accepted- text revised.
23347	10			10	SHARPEN TABLE 1.1 definitions, data estimates and confusing structure. Clarify what is a smallholder (normally includes smallscale herders managing large pastoral extents). See FAO/World Bank Farming Systems and Poverty global study (Dixon Gulliver Gibbon (2001). Also Dixon (2019) in Elsevier Food Encyclopedia. And Dixon (2019) African Farming Systems, Earthscan. [John Dixon, Australia]	Accepted. line removed. Table revised and simplified for clarity
4341	10				Table 1.1 The metric system is preferable. The comma should be replaced with a dot for all the numbers in the table (eg. 130,0 replaced as 130.0). [Mastura Mahmud, Malaysia]	Accepted- text revised.
4343	10				Table 1.1. What does the last column represent? There should be a heading to the column [Mastura Mahmud, Malaysia]	Accepted. "Ref." for "References" added and explained in the caption
27835	11	1	11	2	Change to: " This table is based on data and approaches described in Lambin and Meyfroidt (2011,2014), Luyssaert et al. (2014), Erb et al. (2016a), and references below. [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
1727	11	3	11	3	How is this scaling done? [William Lahoz, Norway]	Accepted. rephrased: their mix applied to the extent
26793	11	14	11	29	Would it be possible to provide information on the meaning of these trends including an assessment potential limits of further expansion and of the side effects, e.g. of irrigation or fertilisation, and on the degree of sustainability? Please add this information to chapter 1 or provide references to relevant remaining SRCL-chapters. [, Germany]	Rejected. This is beyond the scope of chapter one.
31639	11	15	11	15	(...) 15% since 1960 alone. (...) [, Brazil]	Accepted- text revised.
31641	11	16	11	21	Consider the increase of production, how many people it is feeding, how it has impacted food access and quality, especially considering population growth? Further, it is considered that a large amount of cropland change is reverted to (confined) livestock production; while questioning those numbers, how much of this change is being reverted to agroindustry, as components of processed food (sugar, oils, proteins...)? It is important to understand that the issues of the food system are not defined by animal production. A broader and integrated analysis is still needed. [, Brazil]	Rejected. This is certainly highly interesting and important, but beyond the scope of Ch1. It will be dealt with eg. In chapter 5
30601	11	18	11	18	Reference to add. Add reference to (FAO 2018b) just after the reference to (FAO 2017). It is important because FAO 2018b provide a whole section (4.5) on consumption patterns. [Lorenzo Giovanni Bellù, Italy]	Accepted- text revised.
20977	11	19	11	19	important message, consider uplifting to SPM: '2017). Livestock production plays a pivotal role in cropland expansion, causing 50–65% of cropland change ' [, United Kingdom (of Great Britain and Northern Ireland)]	Noted no action needed.
23349	11	19	11	19	HUGE VARIABILITY in correlation between livestock populations and crop area -- the opposite relationship exists in many Asian farming systems. THE FUNDAMENTAL FLAW IN THESE SECTIONS IS THE FAILURE TO RECOGNISE OR DISCUSS DIFFERENTIATION OF LAND USE AND FARMING SYSTEMS. [John Dixon, Australia]	Accepted- text revised. Passage has been reformulated, a sentence on large regional variations added. Figure 1.2 displays world-regional patterns and trajectories

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

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5263	11	22	11	29	World's irrigated cropland area roughly doubled, it is informative to clarify which type of irrigated land, e.g. arid areas of the world since areas like the Nile Delta and other like areas of the world are not in this category.  On pasture and grazing land, there could be areas where pastures have decreased due to change in land use or simply land degradation and livestock conditions are worse. Authors can verify this for traditionally pastoralists communities for example in parts of E. Africa. [Joseph Mutemi, Kenya]	Rejected. While this is interesting, it is too detailed to present in this succinct account of global patterns and trends in land use.
31643	11	23	11	23	Qualify the increase of fertiliser use. How is the fertiliser being used? Is the increase in use needed or is it an over use of this input? What category of fertiliser is being consider? Is the higher use (or only sales?) because farmers are aware of its need, and have the capacity to access it, or is it an excessive consumption due to supply pressure, or also due to incorrect application and loss of fertiliser quality? How does productivity compare regarding now and TO of the 500% increase presented? There are many aspects to consider that might better qualify the number that is being presented, considering that soil fertility is an important aspect of agricultural production and land quality. [, Brazil]	Partly accepted. Fertilizer is now specified to be nitrogen fertilizer, the passage now reads "...total nitrogen fertiliser use increased 9 times (FAOSTAT 2018; IFASTAT 2018) since the early 1960s.", similar specifications were made in the text around figure 1.1. It would have been out of the scope of chapter 1 to elaborate on fertilization in the asked for detail (if it is an increase is an overuse, or associated with changes in nitrogen use efficiency, or to elaborate on drivers of increased nitrogen use, issues of use vs. sales, or inappropriate or inefficient uses). Word count limits would not have allowed to dig these important factors in a text that needs to be balanced with regard to many items discussed, not just fertilizer use. However, productivity increases in general are discussed and displayed in Figure 1.2. together with regional trends in fertilization-dynamics.
22249	11	26	11	29	It is good that urban expansion is mentioned, but it is excluded from the definition of "land use" (page 8, lines 4-5). [Anastasios Kentarchos, Belgium]	Accepted. Reformulated, now land use is the sum of activities and arrangements on land.
23975	11	26	11	29	It is good that urban expansion is mentioned, but it is excluded from the definition of "land use" (page 8, lines 4-5). [Zoltán Rakonczay, Belgium]	Accepted. Reformulated, now land use is the sum of activities and arrangements on land.
271	11	30	11	30	leading to shrinkage of forest area - by what percent or area? [Mahak Agrawal, India]	Accepted- text revised. The section has been reformulated in order to take new literature into account. The trend in forest area is now discussed more detail.
23977	11	30	11	30	"shrinking forest areas" seems to contradict "net area gain" on p. 19, line 37. [Zoltán Rakonczay, Belgium]	Accepted- text revised. The section has been reformulated in order to take new literature into account. The trend in forest area is now discussed more detail.
15549	11	31	11	31	Insert comma so that it reads: "continues, especially". [Annika Herbert, South Africa]	Accepted- text revised. passage reformulated

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13237	11	31	11	32	<p>There is substantial literature which quantifies how secondary forests and plantations do not compensate for forest losses, and in particular the loss of primary forest. Following are some examples of relevant literature:</p> <ul style="list-style-type: none"> <li>• Barlow, Jos, Gareth D. Lennox, Joice Ferreira, Erika Berenguer, Alexander C. Lees, Ralph Mac Nally, James R. Thomson, et al. 2016. "Anthropogenic Disturbance in Tropical Forests Can Double Biodiversity Loss from Deforestation." <i>Nature</i> 535: 144–147. doi:10.1038/nature18326.</li> <li>• Alroy, John. 2017. "Effects of Habitat Disturbance on Tropical Forest Biodiversity." <i>PNAS Proceedings of the National Academy of Sciences</i> 114 (23): 6056–61. doi:10.1073/pnas.1611855114</li> <li>• Blanc, Lilian, Marion Echard, Bruno Herault, Damien Bonal, Eric Marcon, Jérôme Chave, and Christopher Baraloto. 2009. "Dynamics of Aboveground Carbon Stocks in a Selectively Logged Tropical Forest." <i>Ecological Applications : A Publication of the Ecological Society of America</i> 19 (6): 1397–1404. <a href="http://www.ncbi.nlm.nih.gov/pubmed/19769089">http://www.ncbi.nlm.nih.gov/pubmed/19769089</a>.</li> <li>• Brouwer L.C. Nutrient cycling in pristine and logged tropical rain forest: a study in Guyana   Leonard Cornelis Brouwer - Georgetown, Guyana - Tropenbos Guyana Series 1. 1996</li> <li>• Cazzola Gatti, Roberto, Simona Castaldi, Jeremy A. Lindsell, David A. Coomes, Marco Marchetti, Mauro Maesano, Arianna Di Paola, Francesco Paparella, and Riccardo Valentini. 2014. The Impact of Selective Logging and Clearcutting on Forest Structure, Tree Diversity and above-Ground Biomass of African Tropical Forests. <i>Ecological Research</i> 30 (1): 119–32. doi:10.1007/s11284-014-1217-3.</li> <li>• Dean, C., Wardell-Johnson, G. &amp; Kirkpatrick, J. B. (2012) Are there any circumstances in which logging primary wet-eucalypt forest will not add to the global carbon burden? <i>Agric. For. Meteorol.</i> 161, 156–169.</li> <li>• Frey, Sarah J.K., Adam S. Hadley, Sherri L. Johnson, Mark Schulze, Julia A. Jones, and Matthew G. Betts. 2016. "Spatial Models Reveal the Microclimatic Buffering Capacity of Old-Growth Forests." <i>Science Advances</i> 2 (4). doi:10.1126/sciadv.1501392</li> <li>• Kanowski, J. &amp; Catterall, C. P. Carbon stocks in above-ground biomass of monoculture plantations, mixed species plantations and environmental restoration plantings in north-east Australia. <i>Ecol. Restor. Manag.</i> 11, 119–126 (2011). [Aila Keto, Australia]</li> </ul>	Partly accepted. The term "compensate" was deleted, the passage reformulated. Literature was not taken into account due to limits in word count and because these papers deal with implications of replacing pristine with secondary vegetation, not focus of the passage.
273	11	32	11	33	Do we have a statistics on changes in areas in secondary forests, forest plantations and forest losses [Mahak Agrawal, India]	Rejected. Statistics do not exist, but modelled data. As many data are shown now, we decided not to include these datasets for the sake of word count
20975	11	34	11	34	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)]	Accepted- text revised. Text has been revised, and reconciled with CH2 and CH4
22251	11	34	11	36	It should be explained what "tree cover change" means, and/or whether these "studies" (how many??) are reliable. As it now stands, the report fails to clarify whether global forest area is increasing (as in line 30 above), or decreasing (as mentioned here, or on page 19, line 36). [Anastasios Kentarchos, Belgium]	Accepted- text revised. Text has been revised, reasons for discrepancies listed
23979	11	34	11	36	It should be explained what "tree cover change" means (how it differs from forest area), and/or whether these "studies" (how many??) are reliable. As it now stands, the report fails to clarify whether global forest area is increasing (as in line 30 above), or decreasing (as mentioned here, or on page 19, line 36). [Zoltán Rakonczay, Belgium]	Accepted- text revised. Text has been revised, reasons for discrepancies listed

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
23351	11	34	11	41	RECOGNIZE TREE-CROPLAND INTERACTIONS. There have been large increases in forest cover in the Sahel because of evergreening, or farmer managed natural regeneration (World Vision and others), and increased trees in and around food crop fields in souther Africa (e.g., Zambia) and Asia (e.g., Nepal) [John Dixon, Australia]	Accepted- text revised. Text has been revised, now stating the differences between forest area and tree cover area, as well as quoting Bastin et al. Who make exactly this point. The interaction, though, is not mentioned explicitly, as it is a special case and would have required also to make other expamples, which was not possible due to the word count limits of ch1
275	11	35	11	37	Discrepancies of time of data collection should be included too [Mahak Agrawal, India]	Accepted- text revised. Text has been revised, reasons for discrepancies listed
23511	11	37	11	39	Cerrado has lost 88 Mha (46%) of its native vegetation cover, and as little as 19.8% remains undisturbed. (Strassburg et al. 2017). I recommeend to use this reference Strassburg, B.B., Brooks, T., Feltran-Barbieri, R., Iribarrem, A., Crouzeilles, R., Loyola, R., Latawiec, A.E., Oliveira Filho, F.J., Scaramuzza, C.D.M., Scarano, F.R. and Soares-Filho, B. (2017). Moment of truth for the Cerrado hotspot. Nature Ecology & Evolution, 1(4), p.0099. [Renata Libonati, Brazil]	Accepted- text revised.
31645	11	37	11	40	Especially when implying a negative qualification of one particular country, a broader set of references should be consulted to refer the numbers. There might be debate on what is presented. [, Brazil]	Accepted- text revised.
759	11	39	11	39	Replace 'catinga' for 'caatinga'. [Edson Leite, Brazil]	Accepted- text revised.
23513	11	39	11	39	Please change Catinga to Caatinga [Renata Libonati, Brazil]	Accepted- text revised.
25287	11	40	11	41	Probably not prosperity. Should perhaps be "to enhance agronomical productivity". [, France]	Accepted. Revised to "agricultural production"
26601	11	40	11	41	Confusing phrasing, I suggest: "it has been proposed that African savannas are following a similar pathway driven by expansion of cropland." [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. Passage deleted due to word-count limitations in ch1
22253	11	41	11	41	Delete "revolution" [Anastasios Kentarchos, Belgium]	Accepted- text revised.
22255	11	41	11	41	Replace "prosperity" with "profits" or, perhaps, "productivity". [Anastasios Kentarchos, Belgium]	Accepted. Revised to "agricultural production"
23981	11	41	11	41	Delete "revolution" [Zoltán Rakonczay, Belgium]	Accepted. Revised to "agricultural production"
23983	11	41	11	41	Replace "prosperity" with "profits" or, perhaps, "productivity". [Zoltán Rakonczay, Belgium]	Accepted- text revised.
32719	11	44	11	44	those percentage loss numbers - specify what they mean. Of thse of all species, or individuals, or what? [Kate Lajtha, United States of America]	Accepted- text revised. passage reformulated.
25289	11	44	11	45	To which unit of measurement do these percentages refer? [, France]	Accepted- text revised. passage reformlated
22257	11	45	11	45	Delete reference to 75%, or explain what it means. Clearly, "local" losses can be much higher, up to 100%. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
15551	11	45	11	45	Insert "as", so that it reads: "as high as a loss of 75%", or rephrase. [Annika Herbert, South Africa]	Accepted. statement deleted, only global figures mentioned
23985	11	45	11	45	Delete reference to 75%, or explain what it means. Clearly, "local" losses can be much higher, up to 100%. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
40423	11		11		Links with demography relevant here. Role of population increase, consumption increase, lifestyle changes? [Valerie Masson-Delmotte, France]	Accepted. Some key drivers added
38537	11	13	12	7	There are some interesting stats here but every single one in this section is given in percents (except the current increase rate of cropland) and no actual numeric estimates, so the reader has no real concept of magnitude, which is very important. For some estimates, like species decline, percentages are OK, but not for all the other items (like cropland and forest area changes, per capita consumption, etc.). [, United States of America]	Accepted- text revised. passage was revised and restructured, figure 1.2 now gives the trends for the discussed items.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30941	11	30	19	38	Two sentences seem to contradict each other: Wood harvest increased by 30% since 1970, on shrinking forest areas (FAOSTAT 2018) [line 30, p. 11]. Compare to this sentence: Recent data show that net forest area additions outweighed forest loss. A recent analysis of satellite remote sensing data estimated a net forest area gain, driven by forest expansion in extratropics outweighing tropical deforestation, of 224 Mha since 1982 (Song et al. 2018) [Line 36 to 38, p. 19]. The second statement seems to be heavily caveated, including a statement that some increased forest cover was replacing native forests with plantations. [Kelsey Perlman, France]	Rephrased, more info on forest trends added
3543	11	13			consider title: Past and ongoing trends in land use (patterns), (in the land system) [Cordula Ott, Switzerland]	Noted no action needed.
23617	11	15		16	Need to be consistent whether decimals are "," or "." both are used in the same sentence here. [Kerri Finlay, Canada]	Accepted- text revised.
4345	11	15			Goldewijk15 et al. 2017; Remove the semi colon [Mastura Mahmud, Malaysia]	Accepted- text revised.
5261	11	19			"causing 50-65% of cropland change ...". Clarify if this increase or decrease. [Joseph Mutemi, Kenya]	Accepted- text revised. Passage revised
4349	11	21			Fig 1.2 Text in the figure is too small, unless the figure is oriented in landscape [Mastura Mahmud, Malaysia]	Accepted- text revised. font increased and checked for readability
24163	11	44		44	Need to include the impact of land conversion on the fragmentation of natural habitat and how this exacerbates the direct impact of climate change on narrowing species habitat suitability envelopes. ie climate change reduces habitat suitability, species can no longer migrate to suitable habitat to adapt, due to habitat fragmentation. THIS IS VERY IMPORTANT ! [Derek Berliner, South Africa]	Accepted- text revised. passage reformulated, a sentence on the link climate change land use was added.
23819	12	2	12	2	increase (correct) but increases (incorrect) [, India]	Accepted- text revised.
13239	12	3	12	5	<p>It is perplexing that the report appears to question whether Earth is experiencing its 6th mass extinction crisis. It is clear from the ongoing work and reports of IPBES that Earth is experiencing a human induced extinction crisis which is arguably as great a threat to sustainable development and the well being of humanity as the climate crisis and that the adverse impact on ecosystem integrity will result in further loss of ecosystem carbon to the atmosphere and loss of adaptive capacity.</p> <p>And while the biodiversity crisis no doubt does present difficulties for restoring some ecosystems, linking solutions to both the climate and biodiversity crisis would present great opportunities for improving the amount and stability of carbon stored in land and forests (IPBES 2018; CBD/COP/14 21, CBD 2009). It is entirely feasible to ensure resilient restoration outcomes. For example, buffering and reconnecting areas of primary forest and encouraging regeneration of degraded natural forests (including of production natural forests with potential high carbon carrying capacity) to primary forests would offer the best chance of achieving successful forest restoration and climate mitigation outcomes (Cohen-Shacham 2016).</p> <ul style="list-style-type: none"> <li>• (CBD 2009) Connecting Biodiversity and Climate. Change Mitigation and Adaptation. Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. CBD Technical Series No. 41. Secretariat of the Convention on Biological Diversity. ISBN: 92-9225-134-1.</li> <li>• Cohen-Shacham, Emmanuelle &amp; Walters, Gretchen &amp; Maginnis, Stewart &amp; Janzen, Christine. (2016). Nature-based Solutions to address global societal challenges. 10.2305/IUCN.CH.2016.13.en. [Aila Keto, Australia]</li> </ul>	Accepted. Passage deleted

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27837	12	7	12	8	Put letter A of Figure 1.2 on the top left hand corner, just as in the case of B. [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
38539	12	7	12	8	Figure 1.2 might be incredible but the text and graphics are too small, cramped, and voluminous to really be able to (1) see it and (2) get a sense for any key points the authors want to make, rendering it useless. Highly recommend reevaluating goal of this graphic and perhaps separate the map and all the charts. Make the map bigger and maybe select a few example charts to highlight key points/regions. [, United States of America]	Accepted- text revised. Figure revised for clarity, reconciled with text. However, owing to space limitations and other comments, the figure size has been decreased.
4325	12	7	12	8	Fig1.2 might divid the globe into different region in order to identify the responsible little figure. [Guangsheng zhou, China]	Accepted- text revised. Added "For regional grouping, see Figure 2.8" to the figure caption
6733	12	8	12	8	Figure 1.2 should be improved in terms of image resolution because it is unreadable. [JINGLI FAN, China]	Accepted- text revised.
23353	12	9	12	12	As planned FIGURE 1.2 needs revision. Fig 1.2A legend classification is poor and unclear. No legend in Fig 1.2B. Figure would be enhanced by the addition of FAO World Bank Farming Systems classification map of 72 farming systems of 6 developing regions. [John Dixon, Australia]	Accepted- text revised. Figure strongly revised, caption rewritten
7377	12	9	12	12	The classes "Remote unused Forests", "Wild forests" and "Wild barren land" marginalises or ignores (devalues) the landuse pactice of indinenous peoples. I suggest to recast this in more inclusive terms and concepts. [Stephan Stephan Gruber, Canada]	Rejected. the legend entries are taken from the original source. Wild denotes areas without land use and human populations
27839	12	10	12	10	Change to "The map shows..." [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
40425	12		13		anthromes to be more explicitly introduced (key in the framing of chapter 6 too). Very very long caption of map, missing information on confidence / uncertainty [Valerie Masson-Delmotte, France]	Accepted- text revised. reformulated.
25291	12	8			We believe that this figure is relevant and justified, but we consider that it is currently subject to several defects. In particular: <ul style="list-style-type: none"> <li>• The choice of the 2000-2015 period considered is too short to really assess the historical trend of land-climate challenges. We suggest using a longer period if possible, using for example the statistical data compiled by FAO since the 1960s. To be consistent with the other periods generally used in the IPCC reports: the trend should be considered, ideally from pre-industrial levels or by default, on the 2nd half of XXth century.</li> <li>• We suggest to add a dimension about international trade of food and fibre products, or to explain briefly how it's taken into account, cause that is another driver of the trends, which can be major e.g. in Latin America for exports or in North Africa for imports. More generally, it is not clear how other factors are taken into account. In the case of indirect role, a sentence should be added to help the reader to understand which flows are behind the static figures.</li> <li>• We suggest that the unit of measurement used in the land use intensity figures be duly specified. The axes of this figure are not completely clear. The left axis works for the 2 first indicators (even if they use different measures: t/ha/year and m3/ha)? When we look at the cereals indicator, corresponding to the right axis, do we have to consider "1" is the value for 2000, or would it be "3"?</li> <li>• The consistency between the two identical figures Figure SPM-2 page SPM-5 and Figure 1.2 pages 1-12 to 1-13 should be enhanced, in particular in the use of the unit of measurement "t/ha/year" in the captions.</li> <li>• Generally, the clarity and the readability of this figure is still too low as too many details are presented: the background world maps could be deleted (at least, the date of the data displayed should be specified), that could allow to increase the size of the boxes, more informative. This figure should be improved by harmonizing the colour code of land-use extent. [, France]</li> </ul>	Accepted- text revised. Figure strongly revised, caption rewritten

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11667	12	8			Figure truncated on right side - cannot read [Paul Dirmeyer, United States of America]	Accepted- text revised.
6959	12				Figure 1.2: this looks like a highly informative figure. The information is very complex though, A is pretty clear, but B is not understandable. Remove all acronyms from figure and legend. They make it all even more difficult to understand than it is already. Separate the legends for A (directly after map A) and for B. For B, please consider explaining simply what the categories mean, e.g. what does it mean that LCC >> LM? or LCC - LM? Just in plain English please. For each little graph a clear definition is required. Make the information very easy to find. e.g. "B. Insets: Graph 1: Potential net primary production that is harvested (yellow), lost to land use change (blue) and remains standing(?) (green). Graph 2: Loss of intact forest, showing percentage of original forest extent in 2013 as a percentage of total land area - or whatever the case may be - (blue), and the percentage of this forest (or total area - as the case may be) lost between 2000 and 2013 (orange). Graph 3: Land CO2 fluxes, in Gt CO2 per year, emitted due to land conversions and forest management (orange) and ..." (the meaning of the legend is not clear). Please continue in this manner. Everything should be spelled out very clearly and systematically. Line 9: start a new sentence: "The map depicts, by category, where LCC dominate or where LM dominate." (or whatever the case may be - but please explain this more clearly, currently it is a bit nebulous.). Question: if Potential NPP is just a total of the three categories under Actual, does it need to be shown? It is just confusing. It suggests that total potential NPP is 'up for grabs', available for appropriation. Whereas that is not really the case. The right bar shows - if we understand it correctly - harvested (yellow), lost (blue) and unappropriated (green). It seems that more NPP is lost than is harvested. Is this on an annual basis? [Debra Roberts, South Africa]	Accepted- text revised. Figure and caption revised substantially, taking the suggestions into account.
4347	12				Kastner et al. 2012; Remove the semi colon [Mastura Mahmud, Malaysia]	Rejected.
15585	12				Why specifically cereals are showed in figure 1.2, no other crops? These inlay figures are difficult to understand, e.g. the role of vegetable products differ in different regions but if they are different species produced for different purposes are they comparable? [Tuomo Kalliokoski, Finland]	Accepted- text revised. Figure changes, now all crop products are shown
27841	13	1	13	1	Space missing after 2015 [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
23821	13	1	13	1	2015 is (correct) but 2015is (incorrect) [, India]	Accepted- text revised.
18171	13	3	13	3	why unit for cereal yields in "/year" and other units not? [Julia Nabel, Germany]	Accepted- text revised.
1729	13	18	13	18	Have you introduced "IFL"? [William Lahoz, Norway]	Accepted- text revised. was deleted from the figure
18173	13	22	13	22	does this include abandonment? [Julia Nabel, Germany]	Accepted. Added, not accounted for land-use changes
8879	13	23	13	23	How is "long term" defined in the definition of land degradation? What time scales are suggested here? If biological productivity is lost over a decade would this be considered long term? [Jean-Luc Chotte, France]	Rejected - outside the scope of the chapter . definition is same as used in chapter 4 and discussed there in detail
18175	13	23	13	23	why only seven of the 12 DGVMs? [Julia Nabel, Germany]	Accepted. was a typo, corrected
18177	13	24	13	24	the GCB -> 2017 <- (since in 2018 two budgets were published) [Julia Nabel, Germany]	Accepted- text revised.
8881	13	25	13	29	The IPBES definition included language on the decadal time period for recovery to indicate that some threshold change has occurred in the system and that without human intervention recovery of the broad range of ecosystem functions and services will not recover over that time peiod. [Jean-Luc Chotte, France]	Rejected - outside the scope of the chapter . definition is same as used in chapter 4 and discussed there in detail

**IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24895	13	26	13	27	These titles should be consistent with Fig 1.1 (page 6). Here, 3 challenges are mentioned, therefore on the fig 1.1 the Adaptation and Mitigation should not be mentioned separately as challenges. Fig 1.1 has to be modified corresponding to the structure of this chapter. [Borbala Galos, Hungary]	Comment noted section totally updated and revised. Figure considerable revised
11747	13	26	13	28	Three headings in a row without any further explanatory text are confusing. [Hans Poertner and WGII TSU, Germany]	Partially accepted. Title is revised, but as a framing chapter we need to ensure that the connection to the title of the entire report is maintained where possible
4327	13	27	13	27	The title of 1.3.1 does not correspond to the content. This part actually assesses the trend of land system under the influence of climate change. It is suggested that the title be revised as follows: land system pattern change, land degradation, desertification and food security. [Guangsheng zhou, China]	Accepted- text revised. Title revised
4329	13	28	13	28	It is suggested the the title of 1.3.1.1 should be changed as land system pattern change. [Guangsheng zhou, China]	Accepted- text revised. Title revised (but slightly differnt to the suggestion, in response also to other review comments)
23359	13	28	13	42	Poor section, which refers to only a few of the drivers of land use change. ENRICH with discussions on demand growth and preference change, science and technology, infrastructure, education (human and social capital), markets, institutions and policies. [John Dixon, Australia]	Accepted- text revised. due to word count limitations, we could not elaborate in detail on these issues. But we now mention the most important drivers and refer to the scenario box.
26575	13	29	13	29	unit for 9.8 missing [Anne Woodfine, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
15553	13	29	13	29	Add unit of measure. [Annika Herbert, South Africa]	Accepted- text revised.
857	13	29	13	29	specify units of human population, not clear. [, Spain]	Accepted- text revised.
38541	13	29	13	29	"Human population is projected to increase to close to 9.8 (± 1 bio) by 2050..." "bio" is not a standard abbreviation for billion. [, United States of America]	Accepted- text revised.
102	13	29	13	29	bio should be billion [Ken'ichi Matsumoto, Japan]	Accepted- text revised.
28821	13	29	13	29	"Human population is projected to increase to close to 9.8 (± 1 bio) by 2050" may be written as "Human population is projected to increase to close to 9.8 (± 1) billion by 2050" [Lokesh Chandra Dube, India]	Accepted- text revised.
4351	13	29	13	30	( <a href="https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html">https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html</a> ). [Mastura Mahmud, Malaysia]	Accepted- text revised.
3549	13	29	13	42	This should be moved to Food security (1.3.1.4).. It is part of the trends there [Cordula Ott, Switzerland]	Accepted- text revised. The section was rewritten, now discussing the factors that determine land consequences. But the text does only partly deal with food, thus it cannot be moved down.
13043	13	33	13	35	The ideas appear to contradict each other. Broken down it appears to read some like "exisiting pressure on ecosystems will be exacerbated with mitigation efforts enacted." This sentence is also in the introduction of this chapter. Perhaps additional detail is needed to describe the type of land pressure noted here. [Kristi Tabaj, United States of America]	Accepted- text revised. Sentence rewritten, in now reads: ...enhance the pressure towards expanding crop and pasture area and intensifying land management. Changes in diets, efficiency and technology could allow to reduce these pressures
22259	13	33	13	36	Problematic statement because it relies on many assumptions that would need to be spelled out. [Anastasios Kentarchos, Belgium]	Accepted- text revised. The passage was revised, and added "in unabated by dietary or technology changes"
27843	13	34	13	34	Change to: "will, with high confidence, be..." [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
22261	13	36	13	36	What is the meaning of "woody and crop biomass commodities"? By default, this would include all plant-based agricultural crops and all wood products, as all of them are biomass. Also, some crops are woody, so the categories are not mutually exclusive. [Anastasios Kentarchos, Belgium]	Accepted.
27845	13	36	13	36	Put comma after "internationally" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
23355	13	36	13	36	Increased trade is questionable -- provide data or reference [John Dixon, Australia]	Accepted. thanks, references added
23987	13	36	13	36	What is the meaning of "woody and crop biomass commodities"? By default, this would include all plant-based agricultural crops and all wood products, as all of them are biomass. If it means energy commodities only, it should say so. Also, some energy crops are woody, so the categories are not mutually exclusive. [Zoltán Rakonczay, Belgium]	Accepted.
8883	13	38	13	39	What is the reference for the "diminution or destruction of the potential of land..." and why lead off this section with that definition when it appears the UNCCD definition has been adopted for this assessment [Jean-Luc Chotte, France]	Rejected. unclear, passage not found in chapter 1 SOD
859	13	39	13	39	the term "leakage" might not be clear for policy makers, therefore, we would be replaced by an explanation of what this term means. [Spain]	Accepted. Added a bracket explanation, link to the glossary
27847	13	45	13	45	Put comma after "although" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
18181	13	45	13	45	uncertainty: can counteract -> might counteract [Julia Nabel, Germany]	Accepted- text revised.
26603	13	45	13	46	Worth mentioning that AR5 WGII Ch.7 presents a much more nuanced discussion of direct impacts of CO2 on crop productivity. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
18179	13	45	13	46	confidence? [Julia Nabel, Germany]	Accepted- text revised.
15587	13	45	13	46	CO2 fertilization effect may counteract adverse effects but it's uncertain and region specific mainly due to soil nutrients. I recommend to mention the role of nutrients here. [Tuomo Kallikoski, Finland]	Accepted- text revised. now discussed in the first paragraphs of 1.2.1
26795	13	28	14	15	Section 1.3.1.3 describes challenges but lacks an assessment of the information provided. The reader needs to understand what these changes and trends actually mean. For example, what does science say about future availability of food given limited availability of land and growing population? Are there trends in land degradation that are not reversible? What is the role of fertilizers? How many calories are available per capita, how are these distributed? If these questions cannot be addressed in chapter please provide references to relevant remaining SRCL-chapters. [Germany]	Accepted- text revised. due to word count limitations, we could not elaborate in detail on these issues. But we now mention the most important drivers and refer to the scenario box.
23357	13	43	14	3	ESSENTIAL to recognise and discuss the large areas of world agriculture which will benefit from climate change, e.g., wheat cropping in Siberia (in this section and elsewhere) [John Dixon, Australia]	Accepted- text revised. is included, albeit with a caveat that areas might also be lost by shifts in suitability
1309	13	26	15	24	I've missed considerations to natural limits, tipping points. How far can we still go and to where will it lead? [Oswaldo Lucon, Brazil]	Accepted. a half-sentence was added, in the passage introducing the scenario box.
30603	13	13	36	36	Future trends in the global land system. This section can be enriched by mentioning future land requirements under comprehensive alternative future scenarios, by adding a sentence after the fullstop at line 36, such as: "Future trends of cropland and arable land have been projected under future scenarios in a foresight exercise to 2050 run by FAO (FAO 2018b). Interactions among demographic dynamics, economic growth, technical progress and climate change, as influenced by policy decisions, give rise to scenario-specific food security and nutrition outcomes and land requirements. The need of additional arable land by 2050 varies from + 6 percent (best case) to + 21 percent (worst case)". (see table 4.12). [Lorenzo Giovanni Bellù, Italy]	Partly accepted. The list in the comment and the one in the text have been reconciled, the quote added. The text was not included owing to the twist in argument it would have caused and the word count limit.
8135	13	12			Move bracket ")" after 1, i.e. 9.8 (± 1) bio and add the unit of population, i.e. "people" [Haruni Krisnawati, Indonesia]	Accepted- text revised.
3545	13	26			reconsidering title: Key trends affecting land systems? [Cordula Ott, Switzerland]	Rejected. after reconsiderations, we decided to keep the title, because they are not only impact, but also drivers

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3551	13	27			Be clear what to discuss here... clarification of terms (CC; land degradation; desertification and fod security) and/or linages to land use... but not mix it [Cordula Ott, Switzerland]	Accepted- text revised. Title revised
3547	13	28			In 1.2.2. we had status (and dynamics); incl. Past and ongoing trends..(1.2.2.3); now Future trends... thsi si a bit confusing for readers; could this title be something as 'Prospction and Scenarios'? [Cordula Ott, Switzerland]	Rejected. For the flow of the text, we keep the future trends in a separate section. Not all is about scenarios, so "Prospction and Scenarios would be misleading.
28629	13	29		47	Human population is projected to increase by 2050. Population growth (Human Population) is increasing day by day in Africa and south-east Asia. Therefore land degradation is inevitable with rapid human population and high demands for land resources and socio-economic advancement. I recommend; Integrated Combat system on the loss of land for future reference i relation to extreme and Climate Change adaptive response. [Abiodun Adegoke, Nigeria]	Accepted- text revised. degradation is now mentioned
26797	13	29			Please provide projections for human population beyond 2050. It is essential for policy makers to be aware of the long-term challenges from climate change and land. [, Germany]	Accepted- text revised.
23619	13	29			What is "bio"? Billion? [Kerri Finlay, Canada]	Accepted- text revised.
2203	13	29			"9.8 (± 1 bio)" needs units, please [Michelle North, South Africa]	Accepted- text revised.
22263	14	2	14	2	Clarify the sentence. All people rely substantially on agriculture. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
23989	14	2	14	2	Clarify the sentence. All people rely substantially on agriculture (especially for food). [Zoltán Rakonczay, Belgium]	Accepted- text revised.
28905	14	4	14	4	Is "projected" the right word ? And I wonder if this word is used in different ways cross chapters and reports. [Jan Fuglestedt, Norway]	Accepted. Changed to anticipated
4195	14	4	14	9	Please also note reference to relevant New Zealand studies (currently leading to policy changes on protection of versatile land): 2. Ministry for the Environment & Stats NZ (2018). New Zealand's Environmental Reporting Series: Our land 2018. Retrieved from www.mfe.govt.nz and www.stats.govt.nz. More specifically Andrew and Dymond (2012) report impact of urbanisation and fragmentation on productive land: ANDREW, R. & DYMOND, J. R. 2012. Expansion of lifestyle blocks and urban areas onto high-class land: an update for planning and policy. Journal of the Royal Society of New Zealand 43, 128-140 [Anne-Gaelle Ausseil, New Zealand]	Rejected. due to the word count limit, and the publication data of the paper, reference to the specific case was not made. But the challenge is stated
15555	14	7	14	7	Remove "and", so that it reads: "biodiversity hotspots, with far-reaching". [Annika Herbert, South Africa]	Accepted- text revised.
23515	14	13	14	13	Please remove the second parenthesis (e.g.,( [Renata Libonati, Brazil]	Accepted- text revised.
28907	14	16	14	35	Section 1.3.1.2 refers to definition of desertification adopted in previous reports but does not make it clear what is done in SRCL. [Jan Fuglestedt, Norway]	Accepted. By advice of desertification chapter, it is decided to use definition of the UNCCD of desertification, more come in that chapter.
8709	14	16	14	35	I would suggest to emphasise the idea that desertification is the sum of already existing soil atrophic processes that have taken place over last decades. Thus, desertification is a cumulum of factors that have contributed to soil degradation. [Mihaela Stefanescu, Romania]	Accepted- text revised with considering the comment.
861	14	17	14	21	It would be clearer if the report uses only the definition of desertification provided by UNCCD, instead of adding a new definition as the one included in lines 17-18. [, Spain]	Accepted- text revised. We start to introduce desertification with some general ideas, then folow with official and globally accepted definition made by UNCCD
15557	14	24	14	24	Add "the" so that it reads: "intensity of the desertification process". [Annika Herbert, South Africa]	Accepted- text revised.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27849	14	24	14	26	Change to: " While climatic variability can change the intensity of the desertification process, some authors exclude climate impact, emphasising that desertification is purely a human-induced process of land degradation, with different levels of severity and consequences". [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
4073	14	24	14	27	even if some authors do, it is misleading in this context to exclude climate impact on land degradation. Climate is a dynamic factor, and climate change is largely man-induced [Turi Fileccia, Italy]	Noted no action needed. We have considered both factors on desertifications and have not exclude any of them.
15559	14	33	14	33	Remove "the" so that it reads: "vulnerable to both climate change". [Annika Herbert, South Africa]	Accepted- text revised.
27851	14	33	14	33	Change to: "...vulnerable to both climate change and unsustainable land management." [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
25293	14	36	14	36	As desertification seems to be land degradation in arid areas why in this chapter « land degradation » are cited Abu Hammad et al. 2012 and Abahussain et al. 2002: It seems that they discuss about land degradation in arid and semi-arid areas ? [, France]	Accepted- text revised, those references are removed.
13241	14	37	14	40	<p>The proposed definition of forest degradation is problematic because it is based on an agricultural science perspective where "soil" is a "given resource" that is to be "managed" in order to maintain crop productivity. This is entirely inappropriate framing when the focus is on natural ecosystems in the context of climate change mitigation and adaptation. There is a substantial body of literature address forest degradation in terms of depletion of forest ecosystem carbons stocks and ecosystem integrity particularly with respect to micro-climate stability, nutrient conservation and loss of biodiversity. This well documented understanding of forest degradation provides an appropriate framing to facilitate the monitoring and evaluation of forest condition in ways that are relevant for climate change mitigation and adaptation (Burns et al. 2015, Brouwer 1996, Dean et al. 2012, Mackey et al. 2008, Keith et al. 2010, Keith et al. 2009, Zimmerman and Kormos 2012)</p> <ul style="list-style-type: none"> <li>• Burns, Emma L., David B. Lindenmayer, John Stein, Wade Blanchard, Lachlan McBurney, David Blair, and Sam C. Banks. 2015. "Ecosystem Assessment of Mountain Ash Forest in the Central Highlands of Victoria, South-Eastern Australia." <i>Austral Ecology</i> 40 (4): 386–99. doi:10.1111/aec.12200</li> <li>• Brouwer L.C. Nutrient cycling in pristine and logged tropical rain forest: a study in Guyana   Leonard Cornelis Brouwer - Georgetown, Guyana - Tropenbos Guyana Series 1. 1996</li> <li>• Dean, C., Wardell-Johnson, G. &amp; Kirkpatrick, J. B. (2012) Are there any circumstances in which logging primary wet-eucalypt forest will not add to the global carbon burden? <i>Agric. For. Meteorol.</i> 161, 156–169.</li> <li>• Mackey B., Keith H., Berry S. and Lindenmayer D.B. (2008). Green Carbon: the role of natural forests in carbon storage. Part 1. A green carbon account of the eucalypt forests of south east Australia. ANU E Press, Canberra.</li> <li>• Keith H., Mackey B., Berry S., Lindenmayer, D. and Gibbons P. (2010) Estimating carbon carrying capacity in natural forest ecosystems across heterogeneous landscapes: addressing sources of error. <i>Global Change Biology</i> 16, 2971-2989.</li> <li>• Keith K, Mackey B. and Lindenmayer D. (2009) Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests. <i>PNAS</i> 106, 11635-11640.</li> <li>• Zimmerman, Barbara L, and Cyril F Kormos. 2012. "Prospects for Sustainable Logging in Tropical Forests." <i>BioScience</i> 62 (5): 479–87. doi:10.1525/bio.2012.62.5.9. [Aila Keto, Australia]</li> </ul>	Accepted. We modified the definition in accordance with that in the Glossary of IPCC. The new definition is :negative trend in land condition caused by direct or indirect human-induced processes, including climate change, expressed as long-term reduction or loss of at least one of the following: biological productivity, ecological integrity, and value to humans"

**IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26605	14	37	14	40	I think a note has to be included that this applies to all systems other than drylands [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We added a sentence mentioning that we talk about the process in non dry land
15561	14	41	14	41	Add comma so that it reads: "loss of productivity, carbon storage". [Annika Herbert, South Africa]	Accepted- text revised.
32721	14	41	14	41	That first sentence makes no sense at all. Rewrite to make the point clearer - it is simply very bad English grammar [Kate Lajtha, United States of America]	Accepted. The sentence now reads "Land degradation is a critical issue for ecosystems around the world due to the loss(es) it causes"
27853	14	44	14	44	Put fullstop after "utility" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
22265	14	16	15	14	The distinction between desertification and degradation is problematic as many of the response options relating to degradation in dryland (aka desertification) are similar. This leads to duplication. Would it be possible to apply a more narrow definition for desertification to avoid this duplication? [Anastasios Kentarchos, Belgium]	Rejected. By advice of desertification chapter, it is decided to use definition of the UNCCD of desertification, more come in that chapter.
3429	14	36	15	4	Considering that both Chapters 3 and 4 deal with land degradation, with the former focusing on dry-land and the latter on non-dry-land, it is suggested that the concepts, logical links and interfaces involved in this report be explained in Chapter 1. [, China]	Accepted- text revised . A sentence providing the link between land desertification and land degradation was inserted.
30539	14	37	15	4	Insert a comma and the words ", trade and investment" after the word 'production' at line no.2 (page 1-15). A primary challenge globally is unsustainable and often illegal (sometimes criminal) trade in goods derived from land conversion, extractive industries or intensive industrial plantations which all embody climate change, land degradation and often harmful social and human rights impacts. See for example Lambin, F et al (2016) "Land-use policies and corporate investments in agriculture in the Gran Chaco and Chiquitano" Proc Natl Acad Sci US A 113(15)(2016): 4021–4026 <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4839429/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4839429/</a> [Thomas Griffiths, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
4075	14	43	15	2	consider adding " unsustainable production and land management ... practices " [Turi Fileccia, Italy]	Accepted. The following sentence have been adjusted to accommodate the suggestion.
3807	14	44	15	2	Replace " it is driven to a large degree by unsustainable agriculture and forestry, socioeconomic pressures, such as rapid urbanisation and population growth, and unsustainable production practices " By " it is driven to a large degree by unsustainable agriculture and forestry, population growth, other socioeconomic pressures, such as rapid urbanisation, and unsustainable production practices " [Philippe Waldteufel, France]	Accepted- text revised . Accepted with modification. It now reads "...it is driven to a large degree by unsustainable agriculture, forestry and land management practices, population growth, other socioeconomic pressures, such as rapid urbanisation, in combination with climatic factors"
11599	14	29	20	29	The paragraph excludes the issue concerning the development of supply chain business models to reduce waste through maintenance and servicing of products and support to the development of the circular economy (Ellen MacArthur Foundation 2019; Lansink 2017) [Paul Dumble, United Kingdom (of Great Britain and Northern Ireland)]	Noted no action needed. Outside the scope of the chapter covered in Chapter 5
11601	14	29	20	29	Ellen MacArthur Foundation (2019). Sector based circular economy case study publications, accessed 13/1/2019 at <a href="https://www.ellenmacarthurfoundation.org/">https://www.ellenmacarthurfoundation.org/</a> ; Lansink, Ad (2017), Challenging Changes, Connecting Waste Hierarchy and Circular Economy, LEA Nijmegen, ISBN/EAN 978-90-821783-5-7 NUR 971, pp398; [Paul Dumble, United Kingdom (of Great Britain and Northern Ireland)]	Noted no action needed. Combined with other comment

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
28631	14	1		15	The extents of urban areas which is projected to increase by 2030 is of global concern. A strict actions must be taken to protect future trends in the global land use system. I recommend "Urban Protection Acts ", prevention and Adaptive measures for future trends land use management system. i recommend the acts be signed by the United Nations members States in Agreements to combating climate change in relation to land use management system, land degradation, food demands, food security, production and land conservation. [Abiodun Adegoke, Nigeria]	Noted. No revision action is asked for in the comment. Rather, the comment suggests a policy prescription which is outside the scope and mandate of chapter 1. However, on page 14 the urgency of the challenge is presented: "Furthermore, urban growth is anticipated to occur at the expense of fertile (crop)land, posing a food security challenge, in particular in regions of high population density and agrarian-dominated economies, with limited capacity to compensate for these losses (Seto et al. 2012; Güneralp et al. 2013; Aronson et al. 2014; Martellozzo et al. 2015; Bren d'Amour et al. 2016; Seto and Ramankutty 2016; van Vliet et al. 2017). "
2205	14	4			"up to a factor of 2 to 3" could probably be phrased "the extent of urban areas is projected to double or triple by 2030" or similar (or "extent of urban areas is projected to increase significantly (2-3 times current extent) by 2030..."), to help make the scope of urbanisation more understandable to non-scientists reading the report. [Michelle North, South Africa]	Accepted- text revised.
2207	14	4			Also, is it "until 2030" (implying increase by factor of 2-3 per year or per time interval, until 2030) or should it rather be "by 2030" (i.e., urban areas in 2030 will be 2-3 times as large as currently)? Just check which is most accurate [Michelle North, South Africa]	Accepted- text revised.
11749	14	16			A short statement regarding the evidence on climate change causing/amplifying desertification would be helpful. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised with considering the comment.
5265	14	32			Can delete "frequently" [Joseph Mutemi, Kenya]	Accepted- text revised.
11751	14	36			As for desertification, a short statement regarding the evidence on climate change causing/amplifying land degradation would be helpful. [Hans Poertner and WGII TSU, Germany]	Noted. "Climate change" is one of the factor that has been mentioned in line 39 (page 14), amplifying land degradation
26799	14	37			This unclear definition of desertification as either a trend or an irreversible change is confusing, definitions need to be unambiguous. In addition, this definition does not fully match the one of the glossary. Please revise. [, Germany]	Accepted. We now have used the definition as in the Glossary.
11669	14	38			biological productivity (particularly for purposes of agriculture) and ecological complexity are often inherently at odds, as agriculture often results in monocultures that increase productivity at the cost of complexity. Thus the definition conflates internally inconsistent notions - this needs to be clarified. [Paul Dirmeyer, United States of America]	Accepted. We now have used the definition as in the Glossary.
34015	15	1	15	1	Table SPM1, panel A): Bio-energy and BECCS are combined, while several impacts only occur for one of the two. Please split into 2 items, which is also justified given their mitigation potential and relevance in current discussion. If you need to save space, rather combine afforestation and reforestation, which show identical impacts and characteristics, except for their costs. [Elke Stehfest, Netherlands]	Noted. Table restructured
31647	15	1	15	2	The paragraph lists unsustainable adjectives, referred to legal processes. There is as well a large problem, rarely studied and debated, that are illegal land use activities, which cause problems and should be addressed, but that are not covered when technical and a more general sectorial governance are discussed. There is a very large percentage of deforestation and land degradation that are consequence of illegal logging, land appropriation or production of illegal substances. They are not interested in the production side of it, hence not sensitive to public policies directed to economic sectors. While it is a complex issue, and unknown in many ways, it is a topic worthy to be mentioned and researched. [, Brazil]	Noted. The detail of illegal land use is provided in Chapter 7

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30493	15	1	15	14	there is no mention of peatlands and peatland degradation [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised . Peatland and peat degradation are now included.
27855	15	2	15	2	Add comma after "practices" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
25295	15	5	15	7	Does « Global estimates of total degraded area » means desertification and land degradation? We suggest to clarify this point. [, France]	Noted, the data as provided does not include desertification, and it's now been clarified in the sentence.
17249	15	5	15	7	surface units should be given in km <sup>2</sup> and not ha, in order to be consistent with the rest of the text and facilitate the reader's understanding [Noémie Janot, France]	Accepted- text revised.
32723	15	7	15	7	what is increasing at this rate? Not a decline in ecosystem services - I think you mean land - in any case this I also very poorly written and needs the grammar fixed [Kate Lajtha, United States of America]	Accepted- text revised . Accepted and modified. The sentence now reads, "The increase of an estimated 5–10 million ha a-1 of degraded land area (Stavi and Lal 2015), could be associated with the loss of total ecosystem services equivalent to about 10% of the world's GDP in the year 2010 (Sutton et al. 2016).
27857	15	8	15	8	Change "have" to "has" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
24165	15	10	15	12	forest fragmentation is not an issue in desertification of arid and semi arid ecosystems. Fragmentation and climate change has been inadequately discussed in this summary, but should not be under this section [Derek Berliner, South Africa]	Noted and no change was made. This discussion is about degradation, rather than desertification.
27859	15	11	15	11	Add space after "2009" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
13243	15	12	15	12	The statement "...so-called "intact" forests through fragmentation (Haddad et al. 2015)" does not reflect a proper understanding of forest definitions. The phrase "so-called" is dismissive of what is a well-documented and scientific discourse of quests of forest types and condition. As noted above, the term primary forest should be used as per FAO (2010) and the term "intact forest landscapes" when these are discussed in a landscape context, for example, when discussing fragmentation (Potapov et al. 2008).  <ul style="list-style-type: none"> <li>• Haddad, N.M. et al. (2015) Habitat fragmentation and its lasting impact on Earth's ecosystems. Science Advances 1(2): e1500052.</li> <li>• Potapov, Peter, Aleksey Yaroshenko, Svetlana Turubanova, Maxim Dubinin, Lars Laestadius, Christoph Thies, Dmitry Aksenov, et al. 2008. "Mapping the World's Intact Forest Landscapes by Remote Sensing" 13 (2). [Aila Keto, Australia]</li> </ul>	Accepted. The terms so called" has been removed and "intact forest" has been changed to "primary forest" to suit the context of discussion.
27861	15	12	15	12	Add "the" before "so-called" [Elias Symeonakis, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
30485	15	15	15	24	there needs to be clear reference to the relevance of cultural heritage to food. Food is not just a matter of nutrition, particularly for many indigenous communities and their traditional ways of knowing and doing. [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Figure corrected (food as culture is mentioned in figure 1.3). All comments on figure 1.3 were addressed by a vast revision of the figure
31695	15	16	15	16	delete the word "to" and "gather" at the beginning of the HLPE definition so it reads --"is defined as "all elements .... [Elizabeth Migongo-Bake, Kenya]	Accepted- text revised.
26607	15	16	15	16	Awkward grammar here, perhaps 'define the food system as "gather[ing] all the elements..." [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

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30607	15	24	15	24	Reference to add. Please add reference to (FAO 2018b) just after referring to figure 1.3, which was fruitfully inserted in this second-order draft, as suggested in the revision of the first draft. The sentence at line 24 could then read: "Food security and nutrition are among the key outcomes of food and agricultural systems as highlighted in (FAO 2018b) and illustrated in Figure 1.3". Substantial elements of figure 1.3 and related narrative are indeed similar to box 8 (p.86) of FAO 2018b, where the linkages among the various elements of food and agricultural systems, climate change and policy decisions are highlighted. [Lorenzo Giovanni Bellù, Italy]	Accepted. Reference added. All comments on figure 1.3 were addressed by a vast revision of the figure
40427	15		15		production of fiber, link with textile industry / fashion missing (why not covered in report, one of main crops, literature relevant to climate change available) [Valerie Masson-Delmotte, France]	Accepted. Text corrected; Added a reference to fiber in addition to food (see SOD - page 25 line 30)
3847	15	15	16	19	The FAO definition of food security while covers this term comprehensively, the demand side of food security needs to investigate more effectively. The lack of demand of food in climate affected regions still existing. This is due more to loss of land to sea level rise or salinity. Coastal regions have been affected more in recent time. On the other hand, influential people with money are making land owners surrendering their inundated lands for shrimp cultivation in Bangladesh, for example. This makes the farmers losing lands and being evicted eventually. Becomes refugees in their own nation. SLR making the poor more poorer and affecting seriously their livelihoods. [Md Hossain, Australia]	Noted. In chapter 1, we only frame the climate-food linkages; the full assessment of the food demand in climate affected regions is treated in chapter 5
4077	15	15	17	8	the paragraph is weak as compared with its demanding title [Turi Fileccia, Italy]	Partially accepted . Paragraph is revised as per the various comments received and references to more detail assessments in later chapters are introduced
28637	15	15		23	Over 97.5 per cent of human need food for diet. As measured by calories consumed, all come from land. Climate Change has already caused and will continue to cause changes in global temperature and precipitation patterns, most importantly at local and regional weather pattern as well as change in soil process and properties. Climate Change could compromise food security which would lead to an overall decline in human health. Therefore; I recommend check and balance, Urban climate process, factors and adaptive response to food security in an intense growing human population. Strict implementation of re-use and re-plant process should be implemented at local, regional and global level. (UN member nations implementation) and strict adaptive measures. [Abiodun Adegoke, Nigeria]	Noted. No action taken. How cc affect food security and health is sufficiently covered in the chapter
2209	15	41			"Due to loss of productivity carbon storage" - there is something missing from this sentence (possibly a comma after productivity?). Please remedy. [Michelle North, South Africa]	Accepted- text revised.
4079	15				Fig. 1.3 this as most of the figures of this chapter, is unclear and unnecessary [Turi Fileccia, Italy]	Accepted. Figure vastly revised based on several comments. All comments on figure 1.3 were addressed by a vast revision of the figure
26803	16	10	10	19	This is highly important information. Is there only one source; please use the IPCC uncertainty language. The reader needs to understand what this information actually means. Where in the world do these changes happen, and why? And please provide separate figures for overweight and obesity. If these questions cannot be addressed in chapter 1 please provide references to relevant remaining SRCL-chapters. [, Germany]	Accepted. Text revised, uncertainty language added, regional trends specified and numbers on obesity and overweight added

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14611	16	20	15	24	In an Arctic context, climate change also affects the food system via access to land due to the variability of sea-ice formation being increasingly unpredictable. This is in addition to the other components mentioned such as productivity of land, affects on the ocean (which in chapter 5 seems to be corroborated with ocean acidification), etc. Stronger acknowledgement of the climate change impact of sea-ice formation in an Arctic and ocean context should be considered. This will give acknowledgement to this climate change effect, which is starkly affecting Arctic communities and people. [., Canada]	Rejected. Outside the scope of the chapter remit. Refer to SROCC for an assessment of the issues raised in the comment (sea-ice formation; land-ocean interactions)
22267	16	1	16	1	In the diagram, "GHG fluxes" should be supplemented, as the climate impacts of the "food system" are much wider and include forcing factors like albedo, changing evapotranspiration, etc. [Anastasios Kentarchos, Belgium]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
18183	16	1	16	1	green box states "Socio-culture" [Julia Nabel, Germany]	Accepted. Figure 1.3 revised and corrected. All comments on figure 1.3 were addressed by a vast revision of the figure
18185	16	1	16	1	might be faster to comprehend in if the three core components would be named the same in caption and figure [Julia Nabel, Germany]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
104	16	1	16	1	Figure 1.3 shows feedback system of food system. In the figure climate and land systems are shown in drivers and also as systems (yellow colored boxes). This looks strange and I consider it is necessary to revise figure that climate and land in drivers are same with those as systems. [Ken'ichi Matsumoto, Japan]	Accepted. Fig 1.3 revised and three sub-systems (climate, land and food) are brought in consistent manner. All comments on figure 1.3 were addressed by a vast revision of the figure
17251	16	1	16	1	In Figure 1.3, "Diets" should be "food demand" in order to match the legend. [Noémie Janot, France]	Accepted. All comments on figure 1.3 were addressed by a vast revision of the figure
23991	16	1	16	1	In the diagram, "GHG fluxes" should be supplemented, as the climate impacts of the "food system" are much wider and include forcing factors like albedo, changing evapotranspiration, etc. [Zoltán Rakonczay, Belgium]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
5349	16	1	16	7	Should albedo be mentioned in the figure, or at least the caption? Land use can affect albedo, this can also have an impact on the climate system, which is also discussed in other chapters, e.g. 2 and 3 [Helmut Haberl, Austria]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
13147	16	1	16	8	Figure 1.3. Redundancy between "food and nutrition security" and "health and well being". Latter is consequence of former as well as of livelihoods/economic growth (missing) and environmental impacts. Also environmental impacts includes land use change (missing from "outcomes" boxes). Therefore, suggest to revise categories of outcomes and make a link back from environmental impacts on to land/ecosystems, with additional link to GHG. [David Cooper, Canada]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
30487	16	1	16	8	the cultural aspects of food procurement need to be included in this diagram under outputs not just drivers [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
26609	16	1	16	8	"food environment" is an awkward piece of terminology - why not "food system"? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. "food environment" was reframed in the figure 1.3. All comments on figure 1.3 were addressed by a vast revision of the figure
13313	16	1	16	8	Figure 1.3 Food system. I would like you to consider in land ecosystems services (function, structure and processes) [Marina Rosales Benites de Franco, Peru]	Accepted. Fig 1.3 revised - land system box brought in line with food system and climate system. All comments on figure 1.3 were addressed by a vast revision of the figure
1419	16	1	16	8	The caption for figure 1-3 does not perfectly correspond to the elements in the figure. If "enabling conditions" were replaced with "demand" there would be a better correspondence. Or, the caption needs to explain the enabling conditions, and the figure needs to more clearly include demand. [Susan Clayton, United States of America]	Accepted. All comments on figure 1.3 were addressed by a vast revision of the figure

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14721	16	1	16	8	Figure 1.3 and its caption do not match. There is no mention of supply, demand, or food environment in the Figure, though there is in the caption. And where is the necessary component of nutrition? [Wu Felicia, United States of America]	Accepted. Fig 1.3 caption is revised to be more consistent with the figure. All comments on figure 1.3 were addressed by a vast revision of the figure
2961	16	1	16	8	The arrow from the Land ecosystem in the figure should not point to Food Supply alone, but to the entire Food System. Similarly, the arrow pointing to GHG FLUXES from Food System should not come from Environmental impacts alone, but from the entire Food System. [Xiaoming Kang, China]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
31649	16	10	16	19	The decline of food insecurity is a consequence of many international and national initiatives that involved the various components of the food system, from supply to access. The causes, as mentioned, highlight the vulnerability of regions that are already poor, and should receive more attention, highlighting the importance, mentioned in comments 36 and 43, that the concerns with land use should not, in any circumstances, reduce the urgency to invest in changing development patterns, energy sources and use, of sectors that have a much more higher influence on GHG emissions. [Brazil]	Accepted. Sentence added that makes the link between poverty and development objectives and sustainable land use for mitigation in those regions most vulnerable to food insecurity
15563	16	14	16	14	Rephrase end of line, or add "populations", so that it reads "overweight populations". [Annika Herbert, South Africa]	Accepted. Text edited as suggested
30605	16	19	16	21	Food security, food systems and land-based ecosystems. The explanation of the interlinkages if figure 1.3 could benefit from the inclusion of the following paragraph (or the like) at line 19: "Food security and nutrition outcomes depend on complex dynamic interactions among various elements in food and agricultural systems. Demographic trends determine the need for food to adequately feed people, while economic growth patterns influence changes in per capita income and the purchasing power of various layers of societies. Population growth and purchasing power determine the demand for food and other agricultural goods and services. Shifts in demand impel changes in the supply of such goods and services, which, in turn, shift the requirements of land and water as well as GHG emissions from food and agricultural systems. The pressure upon available land and water resources and the amount of GHG emissions caused are influenced by technologies and management practices with an impact on the productivity of land and water resources (FAO 2018b). The productivity of land is also affected by climate change" (Iizumi and Ramankutty 2015) which also affects the nutritional quality of food" (Loatze 2014,... [Lorenzo Giovanni Bellù, Italy]	Accepted with modifications. Much of what is proposed is imbedded in the revised caption to fig 1.3
13149	16	22	16	22	Bett et al 2017 missing from list at end [David Cooper, Canada]	Accepted. Accepted and corrected
31651	16	25	16	25	Unclear message: human ability to process ingested food ? [Brazil]	Accepted. Accepted and corrected (replaced with "ability to digest food properly")
40429	16		16		feedback loops missing in figure. [Valerie Masson-Delmotte, France]	Accepted. Fig 1.3 corrected. All comments on figure 1.3 were addressed by a vast revision of the figure
40431	16		16		Chapter 1 could introduce the challenges of attribution (e.g. in relationship with floods and droughts) [Valerie Masson-Delmotte, France]	partially accepted. attribution had already been in the SOD but now more prominence in section 1.3 (without specific examples).
23361	16	35	17	8	Include discussion of the increased rainfall and temperature variability on crop and livestock production. Directly through plant growth, and indirectly through increased risk which reduces investment in inputs and management of food crops. Applies to many earlier sections too. [John Dixon, Australia]	Accepted. Accepted and corrected. Link between CC and food production/supply variability was added

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
22269	16	1			The figure is problematic because policies and measures are often drivers in their own right, whereas market forces, social, and cultural drivers are often the results of policies and measures). Consumption change is missing as a driver (obviously connected to population and income). Would it more accurate to portray the enabling environment (inc policies) as a 'lense' that filters the drivers rather than something separate? [Anastasios Kentarchos, Belgium]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
26801	16	1			-A figure explaining the food system is very useful, but there is room for improvement - Please be consistent with the text on page 15, lines 22-24; - Enabling conditions seem to overlap with drivers; - Light blue parts: the concept of three components mentioned in the figure caption seems unclear and the third components (demand) cannot be easily identified in the figure; what exactly is meant with "food environment"? The arrows from the centre of the light blue circle should be both ways? [, Germany]	Accepted. Fig 1.3 revised as suggested. All comments on figure 1.3 were addressed by a vast revision of the figure
23993	16	14			1.3.4.4. The "biochar" discussion should be separated. Assuming (but not necessarily allowing) that charring biomass offers a viable mitigation strategy, the resulting char can be more safely and efficiently sequestered in locations other than the soil, such as in landfills or abandoned mines, etc. Incorporation in the soil makes sequestration less certain (and the char is less likely to be stable), more expensive and energy intensive (need for spreading), more difficult to monitor. It also involves considerable risks to soils and to the environment (including the reduction of albedo and the pollution of black carbon). The only case were incorporation into soils should be considered is when significant improvements of the soil are demonstrated, risks are mitigated. Neither is generally proven. [Zoltán Rakonczay, Belgium]	Rejected.. Although in some cases the use of biochar does not improve soil fertility and crop performance, but in many cases it improves soil fertility and crop performance as long as the right material is applied to the right soil (See Cross Chapter Box 8, Chapter 7).
23995	16	14			1.3.4.4. whole section: Instead of "soil carbon sequestration", it should be "soil organic carbon management". The avoidance of soil C losses is at least as important as increased sequestration. [Zoltán Rakonczay, Belgium]	Noted. We discussed broadly soil (carbon) management in Section 1.4.2.1. on the topic of Agricultural, forest and soil management, in which management of soil organic carbon was included. The more detailed explanation on soil organic carbon management is provided in Chapters 3, 4, and 5. We also recognize the importance of avoidance of soil C loss, for instance conservation of high C stock peatland and wetlands (Section 1.3.1.2. Chapter 1) and management of soil carbon (Section 6.3.1.1. Chapter 6)
6961	16				Figure 1.3: The different font sizes are confusing. Intuitively font size means importance, same size = same importance, but in this figure it seems font size is determined by the size of the polygon. Visually this figure needs some development. Why is the land ecosystem connected with food supply, but not with biophysics? Spelling "Scocio-culture". It is also strange that Enabling conditions is not connected with Economics and technology, and other Drivers. How exactly do Enabling conditions and Drivers connect with food availability, access etc and each other? [Debra Roberts, South Africa]	Accepted. Figure 1.3 revised. All comments on figure 1.3 were addressed by a vast revision of the figure
28909	17	1	17	1	many readers (e.g. from natural sciences) are not familiar with the terms "externalities". Thus I suggest you explain or use a different word. [Jan Fuglested, Norway]	Partially accepted. Noted. A short clarification of externality added

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
23997	17	1	17	8	Examples of malmitigation should not be limited to "developing regions". In particular, bioenergy policies of developed regions (in particular ethanol in the US and biodiesel, solid biomass in the EU) have been shown in many cases to be counter-productive from a mitigation perspective, although all those policies were justified largely by mitigation objectives. [Zoltán Rakonczay, Belgium]	Noted no action needed. Comment is unrelated to the text referred to. The issue is addressed in chapter 7 (7.3.3 under risk of mitigation failure)
22271	17	2	17	2	Also mention water, ecosystems [Anastasios Kentarchos, Belgium]	Accepted. Text corrected and additional references added
31653	17	2	17	2	Food waste and loss are not externalities. GHG emissions and pollution are residues that could be avoided or minimized through adequate practices. Food waste and loss are not residues, or rests that have no utility. They are a result of inadequate food manipulation (from seed to table). They do have further externalities, regarding the economic loss, the GHG emissions related to it, and most of all, the unacceptable social impact, as it reinforces food insecurity. [, Brazil]	Accepted. Text corrected
2763	17	7	17	12	insert "on" before "biodiversity" [Bettina Weber, Germany]	Accepted- text revised. Typos corrected.
31697	17	9	17	20	it would be good to also mention the impact of land governance and urbanization in relation to conversion of potential and even productive landscaped to real estates , thus impacting on available land for food production. This is especially true in growing middle class driven-economies in the southern hemispheres and Eastern Africa is a good example. [Elizabeth Migongo-Bake, Kenya]	Accepted- text revised . revision done
6591	17	9	17	20	We suggest to include in the section "in the context of such transactions" the problem related to land tenure in some develop countries. [, Mexico]	Accepted- text revised . this has been revised
32725	17	10	17	11	what an odd sentence. Unrest leads to elite capture or the reverse? Also don't use such jargon: people outside the field won't know what you are talking about. This isn't a particularlry necessary part of the chapter. [Kate Lajtha, United States of America]	Noted no action needed.
32429	17	10	17	11	The statement that land use change can lead to economic growth lacks nuance and thus scientific foundation. This depends on many factors, and both the redistributive impacts and the long-term effects of land use change and related economic growth should be taken into account, including the gender aspects. [Simone Lovera-Bilderbeek, Paraguay]	Noted no action needed.
201	17	10	17	11	The words at the end of the sentence, "and competition" should be dropped. Competition is not a bad thing, yet it is cast that way in that sentence. The rest of the paragraph is about competition. [Wallace Tyner, United States of America]	Rejected. Well - the point here is that due to the diminution of land resources, available resources will be open to competition with resource dependent communities competing for these resources. The word 'competition' is not a bad thing but, the more we draw on the decreasing available resources, the greater the prospects for social tension.
13151	17	10	17	12	add to this sentence, ref to biodievrstiy loss and degradation of ecosystems [David Cooper, Canada]	Accepted- text revised . this has been dealt with
38543	17	10	17	12	Land-use change also can, in some cases, be the cause of substantial direct and indirect emissions leakage, which should be acknowledged here. Also, make it clear that 'competition' here is land competition. [, United States of America]	Rejected . The competition is not exclusively land but land as a productive resource and all the resources that are linked to land. On direct and indirect leakages - point taken.
1433	17	10	17	20	For reference to define land governance: Palmer, David, Szilard Fricska, Babette Wehrmann, Clarissa Augustinus, Paul Munro-faure, Mika-petteri Törhönen, and Anni Arial. 2009. Towards Improved Land Governance. <a href="http://www.fao.org/3/a-ak999e.pdf">http://www.fao.org/3/a-ak999e.pdf</a> . [Henry Scheyvens, Japan]	Accepted- text revised .
11753	17	12	17	20	Please add references for this paragraph. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised . paragraph reviewed

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38545	17	13	17	13	Here and in other places in the chapter, the authors refer to 'urban spaces' and not 'development' or settlements. The latter is the usual term used in IPCC guidelines and accounting, and can include non-urban development which is also an important aspect and is not included usually in 'urban'. Suggest using 'settlements' or other more inclusive term. [United States of America]	accepted. Sentence revised
30609	17	14	17	14	The issue of competition for land (and natural resources) is thoroughly dealt with in chapter 3 of the FAO report The future of food and agriculture. Please, add here a reference to (FAO 2017) [Lorenzo Giovanni Bellù, Italy]	reference noted but point already covered by current used citations. Citations in text already underpin this argument.
22273	17	16	17	16	After the parenthesis, at the end of the sentence add "as well as government policies and interventions", as many countries have very strong policies in place mainly to address land competition issues. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. governance section has been revised
16889	17	16	17	16	The meaning of the term "power relations" is not obvious. It is suggested to use another, more explicit term. [Roland Hiederer, Italy]	Comment noted section totally updated and revised. governance section has been revised
23999	17	16	17	16	After the parenthesis, at the end of the sentence add "as well as government policies and interventions", as many countries have very strong policies in place mainly to address land competition issues. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. governance section has been revised
13153	17	17	17	17	add to this list, nomadic herders and hunter/gatherers [David Cooper, Canada]	Comment noted section totally updated and revised. governance section has been revised
16891	17	28	17	28	Change 'can also a play a role' to 'can also play a role'. [Roland Hiederer, Italy]	Accepted- text revised.
2759	17	28	17	31	remove "a" before "play"; remove full stop after "afforestation [Bettina Weber, Germany]	accepted. corrected, thanks.
20979	17	28	17	31	does this mean climate mitigation policies rather than climate policies? Rephrase for clarity [United Kingdom (of Great Britain and Northern Ireland)]	accepted. it can be both. Sentence revised for clarity
16893	17	29	17	29	Change 'afforestation. or energy' to 'afforestation, or energy' replace full stop with comma. [Roland Hiederer, Italy]	Accepted- text revised.
24001	17	29	17	29	Replace "energy crop production" with "the promotion of bioenergy use". This is because the bulk of bioenergy is not based on energy crops (most of it is forest biomass, followed by food commodities diverted to energy, energy crops are rare and relatively insignificant), but they do have a major impact on land use, land prices and competing uses of biomass. [Zoltán Rakonczay, Belgium]	Rejected . Energy crops can include food crops, as well as 2nd gen bioenergy crops.
203	17	30	17	31	Not clear what people disposition means here. [Wallace Tyner, United States of America]	accepted. Sentence revised
2761	17	32	17	34	comma after "foreign investors" [Bettina Weber, Germany]	accepted. Sentence revised
22275	17	32	17	35	The first two sentences of the paragraph contradict each other. The first one claims that land grab peaked in 2008 (which assumes that it declined thereafter), whilst the second claims that there are no signs of stagnation. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
24003	17	32	17	35	The first two sentences of the paragraph contradict each other. The first one claims that land grab peaked in 2008 (which assumes that it declined thereafter), whilst the second claims that there are no signs of stagnation. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
26611	17	32	17	40	This could be phrased more cautiously. Cotula, Oya et al, JDS, 2014 emphasise domestic over foreign land acquisition, and show the small areas actually transacted in three African countries. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
22279	17	33	17	33	Delete "foreign". The issue is by no means limited to foreign buyers, and the sources of finance are often no identifiable. [Anastasios Kentarchos, Belgium]	accepted. Sentence revised
24005	17	33	17	33	Delete "foreign". The issue is by no means limited to foreign buyers, and the sources of finance are often no identifiable. [Zoltán Rakonczay, Belgium]	accepted. Sentence revised
15565	17	34	17	35	Remove comma so that it reads: "hectares of land have been acquired". [Annika Herbert, South Africa]	Accepted- text revised.
16895	17	36	17	37	Suggested to rephrase the sentence, Eastern Europe and Latin America are not part of the 'global south'. [Roland Hiederer, Italy]	accepted. Sentence revised
30471	17	38	17	38	by investors? [Angel Angel de la Vega Navarro, Mexico]	accepted. Sentence revised
30473	17	39	17	40	Also their economic impacts, i.e. when local population lose their livelihoods [Angel Angel de la Vega Navarro, Mexico]	partially rejected. Included by "social" (see next paragraph)
30475	17	41	17	43	LSLA exacerbates existing structural inequality in the distribution of land. It does not act on a political and institutional vacuum. Because land is unequally distributed, LSLA makes access to land more complicated (as communities and peasant farmers cannot compete with large-scale investors). Further, even if local communities have land rights, they might not be able to benefit from their land, if surrounding LSLA cut access to water and to infrastructure. Also, there are other mechanisms whereby land is not actually acquired by large investors, who nevertheless, still gain control over the land. I recommend citing the Special Issue edited by Peluso and Lund (2011) on new frontiers of land control. "What is new is not only land grabbing or ownership but also new crops with new labor processes and objectives for the growers, new actors and subjects, and new legal and practical instruments for possessing, expropriating, or challenging previous land controls." Peluso & Lund, 2011, 668. Nancy Lee Peluso & Christian Lund (2011) New frontiers of land control: Introduction, The Journal of Peasant Studies, 38:4, 667-681, DOI: 10.1080/03066150.2011.607692 Here a link to the full special : issuehttps://www.tandfonline.com/toc/fjps20/38/4?nav=toCList [Angel Angel de la Vega Navarro, Mexico]	Noted no action needed. Many of these aspects already mentioned in the sub-section. Land governance issues discussed in more detail in chapter 7.
3297	17	41	17	43	Quite a complicated sentence with all the commas, which ultimately has a simple message. Consider breaking up into two sentences? [Viola Heinrich, United Kingdom (of Great Britain and Northern Ireland)]	Noted - chapter has gone through substantial review and editing
22281	17	43	17	44	Instead of "aspirations", it would seem more appropriate to refer to "promises". The latter can be documented, the former can only be presumed. [Anastasios Kentarchos, Belgium]	accepted. Sentence revised
24007	17	43	17	44	Instead of "aspirations", it would seem more appropriate to refer to "promises". The latter can be documented, the former can only be presumed. [Zoltán Rakonczay, Belgium]	accepted. Sentence revised
30489	17		17		reference to cultural aspects of food production and traditional ways fo nknowing and doing of indigenous communities. [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	reference noted but point already covered by current used citations. Citations in text already underpin this argument. There is also a Xc-chapter box on ILK in the report.
26805	17	9	18	6	Section 1.3.1.5 lists challenges arising from land governance, but without providing context or assessing their relevance. The reader needs however to understand what this information actually means in the context responding to the threads of climate change. If these issues cannot be addressed in chapter 1 please provide references to relevant remaining SRCCL-chapters. Please consider also to lift this information to the SPM. [, Germany]	accepted. Cross references to other chapters include (throughout the chapter)

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30541	17	9	18	6	This framing section is weak and could be much improved by also recording the challenges linked to corruption in land administration, land speculation, illegal and criminal land trafficking as well as outdated land laws that fail to properly recognise and respect customary land ownership rights of communities who occupy forest and other rangelands and practice SLM: such outdated laws still apply in many central African countries (e.g. Cameroon). Good land governance is also undermined by corruption in environmental licencing, defective environmental impacts assessments and flawed land concessions and land conversion regulations, which can also undermine state moratoria on land conversion, as in Indonesia - see for example - Wijedasa L S et al (2018) "Carbon emissions from South-East Asian peatlands will increase despite emission-reduction schemes" Global Change Biology (June 2018) <a href="https://doi.org/10.1111/gcb.14340">https://doi.org/10.1111/gcb.14340</a> [Thomas Griffiths, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised . governance section has been revised
22277	17	32	18	6	Maybe better suited for a box (or drop it). LSLA is not the only result of weak tenure. It would be better to focus on tenure and describe a range of possible outcomes (including LSLA). Also, the statement that LSLAs are not achieving their objectives is unsourced. Is it worth even discussing LSLA as a separate issue? Maybe better to discuss land tenure, and the pros & cons of foreign investment in agriculture (and the linkages between them where applicable). [Anastasios Kentarchos, Belgium]	Rejected. The report deals with a broad set of land-related challenges, which are directly or indirectly linked to land. Large scale land acquisition is a fundamental aspect to be discussed in this context and the provided references underpin the arguments made in the section
205	17	32	18	6	Not clear at all what the land grab has to do with climate change. If this report links every liberal cause with climate change, it will result in plenty of I told you so remarks from those who consider climate change just a liberal conspiracy. [Wallace Tyner, United States of America]	Rejected. The report deals with a broad set of land-related challenges, which are directly or indirectly linked to land. Large scale land acquisition is a fundamental aspect to be discussed in this context.
3553	17	35			presumably correct reference is (Land Matrix 2018); in reference list: Matrix L. 2018....is incorrect [Cordula Ott, Switzerland]	accepted. Ref corrected
21697	18	1	18	20	The discussion of reforestation places too much emphasis on carbon, without discussing overall livelihoods, outcomes, etc.. It seems too narrow, and at odds with Chapter 7. [Timothy Forsyth, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
31655	18	2	18	2	(...) of inequitable or irregular land acquisition (...) [Brazil]	accepted. Sentence revised
30477	18	2	18	3	Consider also green grabbing; e.g. James Fairhead, Melissa Leach & Ian Scoones (2012) Green Grabbing: a new appropriation of nature?, The Journal of Peasant Studies, 39:2, 237-261, DOI:10.1080/03066150.2012.671770 <a href="https://www.tandfonline.com/doi/abs/10.1080/03066150.2012.664138">https://www.tandfonline.com/doi/abs/10.1080/03066150.2012.664138</a> [Angel Angel de la Vega Navarro, Mexico]	reference noted but point already covered by current used citations. Citations in text already underpin this argument; more detail on this specific aspect would be beyond scope of framing chapter
16897	18	3	18	6	The sentence lacks purpose. Suggested to modify, such as: the task of building governance capacity and securing land tenure becomes essential to achieving sustainable land use, ... [Roland Hiederer, Italy]	Comment noted section totally updated and revised. governance section has been revised
30611	18	6	18	6	Please, here it is important to refer to the "voluntary guidelines on the responsible governance of tenure of land fisheries and forests in the context of national food security" (CFS -FAO 2012) <a href="http://www.fao.org/docrep/016/i2801e/i2801e.pdf">http://www.fao.org/docrep/016/i2801e/i2801e.pdf</a> [Lorenzo Giovanni Bellù, Italy]	Comment noted section totally updated and revised. revised
24009	18	6	18	8	Don't capitalise "sustainable land management". [Zoltán Rakonczay, Belgium]	Accepted- text revised.
24011	18	6	18	8	Land management includes forest management. It does not seem to be covered. If it is excluded, the title should reflect that (talk only about agriculture). The lack of reflection on forest management is curious throughout the report. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. Forestry mentioned explicitly several times in 1.4.2.1, and briefly also in 1.2 and 1.3; we added cross references to the sub-sections in chapter 4 which treat forest management in detail.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4331	18	8	18	9	Since the parts of 1.3 Key challenges related to land use change, 1.3.1 Climate change, land degradation, desertification and food security include challenge content,so the title of 1.3.2 Future challenges identified in large-scale land-based climate change mitigation is not suitable, moreover, it is not correspondence with the following three subtitles. [Guangsheng zhou, China]	Comment noted section totally updated and revised. Moved to section 1.4 and revised completely
32797	18	8	18	13	The discussion of the serious limitations of scenarios is extremely important and should be echoed in other parts of the report, including chapter 2. All of these scenarios discussed are economic optimization scenarios, with two land-based mitigation options: BECCS and large-scale afforestation. There are many more land-based mitigation options that have not been included in IAM models and this limitation of IAM models and scenarios needs emphasis. Much of the current narrative ends up reifying those two types of mitigation strategies (and BECCS is really a hypothetical right now and the foreseeable future) as all that's out there, because of the prominence of IAM modeling in IPCC analysis to date. This is so far from reality, but options such as agroforestry and other "natural" climate solutions are left out of this narrative as they don't fit into existing IAM models. It is super important to make sure the narrative of the report goes beyond what IAMs can tell us and very clearly and explicitly lays out the limitations of IAMs with respect to land-based mitigation options. [Doreen Stabinsky, United States of America]	Comment noted section totally updated and revised. Agreed. Scenario Box tries to include some of these aspects, similar the new report cross-chapter box on BECCS; revised text in 1.4.1 summarises some criticism.
28913	18	8	18	30	This section contains some very important info about teh scale of land use. I wonder if this could be elaborated in order to make it even more clear how huge the challenges are. The section could also contain some comparisons for the land use areas. (And you may consider using km2 as in SPM of SR1.5). [Jan Fuglestedt, Norway]	partially rejectd. Detail on the various response options are dicsussed in Chapters 2 and 6, we provide improved cross-referencing to help the reader. Km2 throughout the report now.
16901	18	10	18	10	Also land use is included: Change to 'A number of options exist for land use and management ...'. [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
38547	18	10	18	13	There has been no real discussion about mitigation activities taking place to date/currently, the approximate magnitude of mitigation from activities to date, which is a large omission. This text and this section are supposed to look at the potential related to different mitigation opportunities but should have a basis of current mitigation to start from for context. [, United States of America]	Rejected. A very good thought, but it seems out of scope for the chapter. And literature about the magnitude of current land-activities globally, specifically related to targeted mitigation measures seems scarce
38549	18	10	18	19	There is no real transition to/introduction of modeling/projections here at all, the second paragraph just dives into speaking about scenarios. As there has been no concrete discussion about projections/modeling yet in this document in the context of baseline future emissions/sequestration, etc., it is very odd/awkward to have this discussion about mitigation scenerios, which in general principle should be contrasted against the future BAU projections, so the potential magnitude and effectiveness of the different mitigation options can be estimated. Without some sort of baseline to compare against, this scenarios discussion is not as useful/insightful as it really could and should be. [, United States of America]	Comment noted section totally updated and revised. see also the cross chapter box on scenarios
26613	18	10	18	19	The way this sub-section is introduced fails to make clear how important and sui generis large scale afforestation/resforestation scenarios are, and thus why they need a sub-section at this level and at this point in the chapter, rather than in 1.4. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. See cross chapter box on AR
4019	18	12	18	12	"...realising these potentials depends..." [Vassilis Daioglou, Netherlands]	Accepted- text revised.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18187	18	14	18	17	maybe introduce concept of negative emissions [Julia Nabel, Germany]	Comment noted section totally updated and revised. a highly technical term; prefer to leave this to chapter 2 and 6, don't think it is essential in chapter 1
13155	18	14	18	18	Framing of this sentence is biased. Suggest something along lines of: "Most scenarios explore reductions in demand and/or land based mitigation including BE and/or AR" [David Cooper, Canada]	Comment noted section totally updated and revised. Sentence revised
1511	18	14	18	18	The often misunderstood studies by van Vuuren et al. 2018 (NCC) and Grubler et al. 2018 (NE), which try to minimize the demand for CDR via lifestyle changes or low energy demand, nevertheless require huge amounts of CDR methods, mainly from AF/RF. [Oliver Geden, Germany]	Comment noted section totally updated and revised. Agreed. Included in X-chapter box on BECCS (chapter 6)
18143	18	14	18	19	Please discuss, whether alternative technical options to produce "negative emissions" (e.g. a combination of direct air capture with CCS) have been assessed in the models, or whether this constitutes a gap in the literature [Astrid Schulz, Germany]	Rejected - outside the scope of the chapter . Partially discussed in chapter 6, but other technical options (ie beyond -and-related techniques are not the scope of the SRCL
26807	18	14	18	19	Afforestation/Reforestation is not an element of decarbonisation, since it does not substitute carbon-intensive provisions of goods and services. The way it is formulated in most scenario analyses, A/R is more of a CDR strategy. [Germany]	Comment noted section totally updated and revised. Sentence revised
38551	18	14	18	19	Suggest changing the 'or' between bioenergy and AR to 'and/or'. [United States of America]	Accepted- text revised.
106	18	14	18	19	Matsumoto et al. (2018) Evaluating multiple emission pathways for fixed cumulative carbon dioxide emissions from global-scale socioeconomic perspectives published in Mitigation and Adaptation Strategies for Global Change(23, 1-26; <a href="https://link.springer.com/article/10.1007/s11027-016-9726-8">https://link.springer.com/article/10.1007/s11027-016-9726-8</a> ) is also a related peer-reviewed article - the effect of early action and bioenergy and CCS. [Ken'ichi Matsumoto, Japan]	reference noted but point already covered by current used citations.
17437	18	14	18	19	As per the findings of the IPCC SR15, the difference between 1.5 and 2 oC is significant. The repeated use of referencing to the Rogelj et al 2018a study which is specific to 1.5oC in Chapter 1 as "...of 2oC or well below.." is misleading (same for Rogelj et al 2018b). This type of generalization between 1.5oC and 2oC is unhelpful and deteriorates the new understanding of the gap between the temperatures of the Paris Agreement goals. This must be corrected throughout the report. [Taehyun Park, Republic of Korea]	Comment noted section totally updated and revised. The SRCL does not specifically explore the difference between 1.5 and 2 degrees, but also covers a wide range of futures. The repeated references to some "high end" mitigation studies are nonetheless important in context of land-based mitigation options and tradeoffs.
7493	18	14	18	30	Addressing/strengthening indigenous and community land rights may be critical to accommodating SDG challenges from enhancing the land carbon sink. See, e.g., Blackman & Veit (2018) Titled Amazon Indigenous Communities Cut Forest Carbon Emissions, ECOLOGICAL ECONOMICS. [Durwood Zaelke, United States of America]	Rejected - outside the scope of the chapter . Would be too detailed in chapter 1/introductory chapter
38553	18	14	18	30	This paragraph discusses bioenergy and afforestation/reforestation requirements in 1.5°C scenarios from Rogelj et al. 2018a, and notes, "there is high confidence that these cannot be achieved sustainably." This is a very dramatic finding, and calls into question the feasibility of the pathways discussed in the IPCC 1.5°C Special Report, and highlights the trade-offs faced when managing land for multiple objectives. [United States of America]	Thank you for the positive comment.
7573	18	14	18	30	Addressing/strengthening indigenous and community land rights may be critical to accommodating SDG challenges from enhancing the land carbon sink. See, e.g., Blackman & Veit (2018) Titled Amazon Indigenous Communities Cut Forest Carbon Emissions, ECOLOGICAL ECONOMICS. [Kristin Campbell, United States of America]	Rejected - outside the scope of the chapter . Would be too detailed in chapter 1/introductory chapter
15567	18	15	18	15	Add comma so that it reads: "(Rogelj et al. 2018a), most". [Annika Herbert, South Africa]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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29975	18	16	18	17	please change ...bioenergy or afforestation/reforestation... to ...bioenergy and/or afforestation/reforestation... as most scenarios rely on both options. [, Netherlands]	Accepted- text revised.
38555	18	17	18	17	Many global studies focus not only on afforestation/reforestation but also avoided conversion, which should be mentioned here. [, United States of America]	Accepted- text revised. Reduced deforestation added to 1.4. and cross-reference to chapter 4 where it is discussed in detail
1731	18	17	18	17	Have you introduced BECCS? You introduce this later, in p. 1-22. [William Lahoz, Norway]	Accepted- text revised.
16903	18	19	18	19	Change 'Estimate' to 'Estimates'. [Roland Hiederer, Italy]	Accepted- text revised.
4021	18	19	18	19	"Estimates of bioenergy..." [Vassilis Daioglou, Netherlands]	Accepted- text revised.
32747	18	19	18	24	The references here to energy crop expansion, forest area and bioenergy use for mitigation are all given for 2050. This is misleading, as reliance on land-based mitigation, in particular bioenergy for BECCS, scales up considerably between 2050 and 2100. The scaled up reliance on BECCS post-2050 is implicit in the land-use values pre-2050. This point should be made explicitly, and/or 2100 values given. [Dooley Kate, Australia]	Comment noted section totally updated and revised. a cross-chapter box on BECCS is provided in the final version of the report
26809	18	19	18	30	Information on land requirements associated with BECCS in pathways consistent with the Paris Agreement is highly policy relevant. Please provide a more detailed assessment referring to additional references and using the IPCC uncertainty language. Please include a discussion on the assumptions that lead to these numbers. In addition, does the statement in line 27 (which is not consistent with other statements in chapter 1) imply that the Paris Agreement is not achievable in a sustainable manner? Please check and combine with section 1.3.2.2 which provides a more detailed assessment. Please provide references to other chapters where BECCS is addressed. [, Germany]	Comment noted section totally updated and revised. a cross-chapter box on BECCS is provided in the final version of the report & cross references to sections in chapter 2 and 6 provided
761	18	20	18	20	Add 'Mha' to '...100 to 700 ...'. [Edson Leite, Brazil]	Comment noted section totally updated and revised.
16905	18	20	18	20	Change to '100 to 700 Mha'. [Roland Hiederer, Italy]	Accepted- text revised.
38557	18	21	18	22	Sentence fragment, seems to be some words missing. [, United States of America]	Comment noted section totally updated and revised.
2213	18	21	18	22	"Forest area changes by between -100 to >800 Mha and -80 to > 900 Mha (2oC, and 1.5oC trajectories, respectively" - link this sentence to the one before, it doesn't make sense on its own. [Michelle North, South Africa]	Comment noted section totally updated and revised. section shortened, some information now in cross-chapter boxes
16907	18	21	18	22	The negative values in the range of changes in forest areas should be explained. Are these the confidence limits of the estimates? [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
22283	18	22	18	22	What is meant by "carbon uptake (...) for bioenergy pathways"? Bioenergy releases carbon to the atmosphere through combustion and collateral losses (e.g., through soil disturbance from harvesting). If it refers to "additional" uptake (as stipulated by Searchinger, 2010), then it is relevant, but which projections would include this additionality requirement? [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
24013	18	22	18	22	What is meant by "carbon uptake (...) for bioenergy pathways"? Bioenergy releases carbon to the atmosphere through combustion and collateral losses (e.g., through soil disturbance from harvesting). If it refers to "additional" uptake (as stipulated by Searchinger, 2010), then it is relevant, but which projections would include this additionality requirement? [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
33585	18	22	18	24	It is unclear whether or not bioenergy pathways in line 22 includes BECCS? [, Norway]	Comment noted section totally updated and revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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38559	18	22	18	24	Make it clear whether the bioenergy statistics cited here are specially for BECCS or only bioenergy use. There is a marked difference between the two. [, United States of America]	Comment noted section totally updated and revised. Addressed in BECCS box (chapter 6)
38561	18	22	18	24	Citation needed for the statistics presented here. [, United States of America]	Comment noted section totally updated and revised.
22285	18	24	18	28	The statement that low warming scenarios cannot be achieved sustainably cannot simply be left here. SR1.5 and other sections of this report establish both the serious challenges of large-scale land-based mitigation, and the potential need for it in low-emission scenarios. Overarching statements of this kind should therefore be left to a part of the report that brings these aspects together in a balanced manner (e.g. Ch6). [Anastasios Kentarchos, Belgium]	Rejected. The section does not dispute that the economic-centric IAM simulations that provide scenarios for 1.5/2oC warming need to rely on large-scale land measures. However, there is ample scientific evidence (including the numerous papers listed in the section) that have demonstrated potential conflicts with biodiversity, water use, food prices. Cross references to chapter 6 and 7 are included, also the the X-chapter box on BECCS.
25297	18	24	18	28	This message is new in relation to the 1.5°C special report, which was limited to stating that: "CDR deployment of several hundreds of GtCO2 is subject to multiple feasibility and sustainability constraints (high confidence)." (SR15 SPM-23). If this difference in appreciation compared to SR15 is fully assumed and is well proven by science, it would be necessary to highlight it further. See GENERAL COMMENT ON CDR AND SUSTAINABILITY. [, France]	Comment noted section totally updated and revised. Section has been shortened; however, report now also has cross-chapter box and cross-refs also made to chapters 2 and 6 where these aspects are discussed in more detail
38563	18	24	18	28	Where it says 'see below' list specific section(s), as this is a big point to make and the reader should be able to easier find the citations that are used to justify this assertion. [, United States of America]	Comment noted section totally updated and revised. Cross-refs added (mostly now to X-chapter boxes)
26115	18	24	18	28	The phrase "there is high confidence that these cannot be achieved sustainably" would benefit from the addition of a mitigating qualifier, such as "without the widespread adoption of sustainable management practices for forests and soils" [Reid Detchon, United States of America]	Comment noted section totally updated and revised. True that some management practices would support sustainable mitigation. However, given the very large area requirements in some scenarios it seems extremely challenging to acheive sustainability even w better land management. In any case, a more detailed discussion is provided in chapter 6; here we really only emphasise the very large-area based options.
24015	18	24	18	28	The statement that low warming scenarios cannot be achieved sustainably cannot simply be left here. SR1.5 and other sections of this report establish both the serious challenges of large-scale land-based mitigation, and the potential need for it in low-emission scenarios. Overarching statements of this kind should therefore be left to a part of the report that brings these aspects together in a balanced manner (e.g. Ch6). [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. The section does not dispute that the economic-centric IAM simulations that provide scenarios for 1.5/2oC warming need to rely on large-scale land measures. However, there is ample scientific evidence (including the numerous papers listed in the section) that have demonstrated potential conflicts with biodiversity, water use, food prices.
6065	18	26	18	26	It should be emphasized that this reffers only to large-scale, thus, "large-scale" should be added before land-related. [, Poland]	Comment noted section totally updated and revised. Emphasised already in title of the subsection
22287	18	27	18	27	See general comment on entire report: "balanced approach to large-scale, land-based mitigation"  The report should bring together different considerations related to large-scale, land-based mitigation in a dedicated section. Other sections of the report should not make overarching conclusions that pre-judge this. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. see response to 22285
13157	18	27	18	27	what cannot be achieved sustainably? (Not clear) [David Cooper, Canada]	Comment noted section totally updated and revised. Revised text/sentences on p 29
4023	18	27	18	27	"...food prices..." [Vassilis Daioglou, Netherlands]	Accepted- text revised.
207	18	27	18	27	What are food prizes in this context? [Wallace Tyner, United States of America]	Comment noted section totally updated and revised. The amount of money paid for food commodities, such as investigated in Kreidenweis et al (ref cited)
1733	18	27	18	27	prizes -> prices. I presume this is what you mean. [William Lahoz, Norway]	Accepted- text revised.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

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24017	18	27	18	27	Delete "sustainably". Such increases cannot be achieved, full stop. It would require a corresponding increase in net primary productivity or a corresponding decline in current biomass use (including food), or a combination of the two. It does not seem plausible, regardless of "sustainability", whatever that may mean. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. Sentence rewritten
24019	18	27	18	28	If the additional uptake cannot be achieved, then the mentioned actions cannot be considered "mitigation", as they will not reduce, but increase emissions. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. Revised text p. 29, mitigation potential reduced (does not necessarily increase emissions, but not achieve target net C uptake)
32749	18	28	18	30	A reference to - Dooley, K., & Kartha, S. (2018) Land-based negative emissions: risks for climate mitigation and impacts on sustainable development. International Environmental Agreements, 18:79–98. DOI <a href="https://doi.org/10.1007/s10784-017-9382-9">https://doi.org/10.1007/s10784-017-9382-9</a> - could be added here. This paper evaluates the impact on land-based NETs on three SDGs. [Dooley Kate, Australia]	references useful some or all added.
6067	18	28	18	30	This sentence is inaccurate, as it reads that ANY land mitigation options might have severe consequences. Suggest to add "large-scale" before land-based. Then, a following sentence: "This does not exclude that smaller-scale land-based climate mitigation can have positive outcomes for the achievement of these goals". [Poland]	Comment noted section totally updated and revised. Suggested qualifier added to revised section
24021	18	29	18	32	Delete. It does not seem to belong in this section. [Zoltán Rakonczay, Belgium]	Rejected . Chapter 1 provides examples to some response options and details provided in chapter 7 and 6; cross-references to these chapters included
13245	18	30	18	30	Given that a large percentage of the world's remaining primary forests and natural lands are home to indigenous people and that deforestation and forest degradation rates are much lower in indigenous held land than on non customary land, recognizing and supporting the rights and livelihoods of indigenous communities would clearly help prevent the loss of primary forests and other carbon rich natural ecosystems and help meet their social, cultural and development goals" (Missing Pathways Report). This fact should receive greater attention in the report and there is a substantive body of relevant literature (Walker et al. 2014, Alzahrani 2012, Garnett et al. 2018, Nepstad et al. 2006, Nepstad et al. <ul style="list-style-type: none"> <li>• Walker, Wayne, Alessandro Baccini, Stephan Schwartzman, Sandra Ríos, María A. Oliveira-Miranda, Cicero Augusto, Milton Romero Ruiz, et al. 2014. "Forest Carbon in Amazonia: The Unrecognized Contribution of Indigenous Territories and Protected Natural Areas." Carbon Management 3004 (January): 478–85. doi:10.1080/17583004.2014.990680.</li> <li>• Alzahrani, Damna A. 2012. "Indigenous Community Conserved Areas in Brazil." Murdoch University Law Review 19 (2): 1–10.</li> <li>• Garnett, Stephen T, Neil D Burgess, John E Fa, Álvaro Fernández-Illamazaes, Zsolt Molnár, Cathy J Robinson, James E M Watson, et al. 2018. "Indigenous Lands for Conservation." Nature Sustainability 1 (July). Springer US: 369–74. doi:10.1038/s41893-018-0100-6.</li> <li>• Nepstad, D., S. Schwartzman, B. Bamberger, M. Santilli, D. Ray, P. Schlesinger, P. Lefebvre, et al. 2006. "Inhibition of Amazon Deforestation and Fire by Parks and Indigenous Lands." Conservation Biology 20 (1): 65–73. doi:10.1111/j.1523-1739.2006.00351.x. [Aila Keto, Australia]</li> </ul>	Rejected - outside the scope of the chapter . chapter 4 discusses various aspects related to degradation
6069	18	31	18	31	This part does not only focus on R&A but also deforestation and FM practices, therefore, the title should be changed to forestry or the forest sector. [Poland]	Comment noted section totally updated and revised. subst. shortened section (1.4.1)
14613	18	31	18	38	The many co-benefits and risks (e.g. vector-borne infectious diseases) of reforestation or greening of urban areas could be discussed here. [Canada]	Rejected - outside the scope of the chapter /report. SRCL does not have health as a key aspect. Urban aspects discussed in chapter 4 and 7

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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13247	18	32	18	32	Preventing forest degradation is as important for emissions reduction as preventing deforestation and needs to be elevated in the report to encourage greater effort to tackle both problems (Asner et al. 2010, Huang et al. 2010, Foley et al. 2007). <ul style="list-style-type: none"> <li>• Asner, Gregory P, George V N Powell, Joseph Mascaro, David E Knapp, John K Clark, James Jacobson, Ty Kennedy-Bowdoin, et al. 2010. "High-Resolution Forest Carbon Stocks and Emissions in the Amazon." Proceedings of the National Academy of Sciences of the United States of America 107 (38): 16738–42. doi:10.1073/pnas.1004875107.</li> <li>• Huang, Maoyi, and Gregory P Asner. 2010. "Long - Term Carbon Loss and Recovery Following Selective Logging in Amazon Forests." GLOBAL BIOGEOCHEMICAL CYCLES 24 (June): 1–15. doi:10.1029/2009GB003727.</li> <li>• Foley, Jonathan A, Gregory P Asner, Marcos Heil Costa, Michael T Coe, Ruth Defries, Holly K Gibbs, Erica A Howard, et al. 2007. "Amazonia Revealed : Forest Degradation and Loss of Ecosystem Goods and Services in the Amazon Basin." Front Ecol Environ 5: 25–32. [Aila Keto, Australia]</li> </ul>	reject. This section meant to give examples only. Details on larger range of options e.g., in ch. 4 and 6
22291	18	32	18	33	"forest management practices" have little to do with (reduced) deforestation. Deforestation is seldom driven by forest management, and mostly by agricultural expansion or infrastructure projects, both of them beyond the scope of forest management. Improved forest management practices that aim to avoid C losses would belong under a discussion on forest management (which is entirely missing in this chapter), but not under afforestation, reforestation or (reduced) deforestation. [Anastasios Kentarchos, Belgium]	partially accepted. Word constraints unfortunately limit a more extensive discussion of management. We added some text on forest changes to section 1.2, 1.3, refer to it under the response options, however (1.4) and cross reference better to chapter 4.
6071	18	32	18	33	Remove brackets as forest management practices are a much broader term. [, Poland]	Comment noted section totally updated and revised. moved to cross-chapter box
24023	18	32	18	33	"forest management practices" have little to do with (reduced) deforestation. Deforestation is seldom driven by forest management, and mostly by agricultural expansion or infrastructure projects, both of them beyond the scope of forest management. Improved forest management practices that aim to avoid C losses would belong under a discussion on forest management (which is entirely missing in this chapter), but not under afforestation, reforestation or (reduced) deforestation. [Zoltán Rakonczay, Belgium]	partially accepted. Word constraints unfortunately limit a more extensive discussion of management. We added some text on forest changes to section 1.2, 1.3, refer to it under the response options, however (1.4) and cross reference better to chapter 4.
38565	18	32	18	36	A sentence is needed here to acknowledge that forest carbon mitigation activities have to date been implemented and somewhat successful in mitigating carbon. The text here connotes that these activities are not fruitful at all, which is not the case. This is biased and misleading. It is important to recognize the limitations and drawbacks as the text currently does but it is just as important to recognize the benefits and magnitude of those activities to date, which the text does not do at all. Make this more balanced. [, United States of America]	revised for more balance. we emphasise that the area-scale of mitigation measures is critical
22289	18	32	18	37	Section title is "afforestation and reforestation", yet section primarily discusses "reduced deforestation". Please clarify section structure. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2
24025	18	32	18	37	It is not reasonable to discuss reduced deforestation under the heading of "reforestation and afforestation". [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2
4995	18	34	18	34	"been put forward" seems better to be strengthened by adding "frequently, to read "been frequently put forward", and the sentence should include the list of reference as the FOD, (Smith et al. 2016; Humpenoder et al. 2014; Popp et al. 2014; Griscom et al. 2017a). [, Japan]	references useful some or all added. text revised and moved into cross chapter box

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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8889	18	36	18	36	The glossary definition of "carbon sequestration" is succinct. However the document itself needs ensure that it is understood that soil carbon sequestration, both organic and inorganic, is critically important to adaptation and mitigation of climate change and also advancement of the Sustainable Development Goals of the United. Nation especially the Goal #15 " Life on Land" with regard to land degradation neutrality. [Jean-Luc Chotte, France]	Comment noted section totally updated and revised. Degradation (and changes in soil C) is covered in depth in Chapter 4, and introduced briefly in Chapter 1
13249	18	36	18	38	It needs to be noted that integrating climate and biodiversity restoration action would improve ecosystem stability, resilience, resistance and adaptive capacity and maximize long term carbon storage (CBD 2009).  • CBD 2009) Connecting Biodiversity and Climate. Change Mitigation and Adaptation. Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. CBD Technical Series No. 41. Secretariat of the Convention on Biological Diversity. ISBN: 92-9225-134-1. [Aila Keto, Australia]	reference noted but point already covered by current used citations.
24167	18	37	18	37	include the example of the conservation of old growth forest for synergies between biodiversity and carbon stocks [Derek Berliner, South Africa]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2
4025	18	39	18	41	The publication Doelman et al. (2018) [already cited in the report] also supports this statement. Interestingly, this publication is based on an integrated assessment model coupled to a dynamic global vegetation model (LPJmL), and thus offers an interesting insight given the subsequent sentences. [Vassilis Daioglou, Netherlands]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2
2933	18	40	18	41	References on effects of afforestation on GHG mitigation discussed here should cite new literature published in April 2018 in PNAS which summarized significant roles of Chinese recent key ecological projects on GHG mitigation. Therefore, I strongly suggest references cited here update from "Humpenoder et al. 2014; Popp et al. 2014; Smith et al. 2016; Griscom et al. 2017a" to "Humpenoder et al. 2014; Popp et al. 2014; Smith et al. 2016; Griscom et al. 2017a; Lu et al. 2018" [Dexiang Chen, China]	Rejected. Cited references already cover the point to be made
32751	18	41	18	41	The paragraph notes that A/R potentials are of a similar magnitude to BECCS in models - it should also note that these potentials are mutually exclusive; they represent a trade-off not only between other land-use demands (i.e.: food and biodiversity) but also against each other. [Dooley Kate, Australia]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2 and X-chapter Box on BECCS, and line 12 page 29
4997	18	42	18	42	"bioenergy, combined with carbon capture and storage" seems better to be written as "BECCS" for the readers to understand the context. [Japan]	Accepted- text revised.
29977	18	42	18	43	additional relevant reference: Doelman, J.C., Stehfest, E., van Vuuren, D.P., Tabeau, A., Hof, A.F., Braakhekke, M.C., Gernaat, D.E.H.J., van den Berg, M., van Zeist, W., Daioglou, V., van Meijl, H., Lucas, P. Estimating afforestation potentials and possible risks to food security. Global Change Biology, in review. [Netherlands]	reference noted but point already covered by current used citations.
16909	18	8	19	8	Change 'effects biodiversity' to 'effects on biodiversity'. [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
32799	18	31	19	12	A range of other land and forest-based mitigation options exist that should be covered by the report, including forest and ecosystem restoration and agroforestry. The report should provide a much more holistic and ecosystem-based treatment of the mitigation potential of forests. A great amount of the most current literature is summarized in Dooley et al. 2018. [Doreen Stabinsky, United States of America]	Rejected - outside the scope of the chapter . Dooley et al now cited; the section is also meant only as one example (see introductory statements to 1.4), details provided in chapters 4 and 6

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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319	18	32	19	6	Need to note that this reinforces earlier work showing that avoided deforestation, reforestation, and forest management could be 30% of global mitigation targets using a global integrated assessment model and a global forestry model from Sohngen and Mendelsohn (2003): Sohngen, B. and R. Mendelsohn. 2003. "An Optimal Control Model of Forest Carbon Sequestration" American Journal of Agricultural Economics. 85(2): 448-457. [Brent Sohngen, United States of America]	reference noted but point already covered by current used citations. Advantages of using different mitigation measures (incl forest) at lower area-needs is discussed in detail in chapter 6.
38567	18	32	19	6	This text and cited references ignore research conducted using global forestry models like the global timber model (Sohngen, Mendelson, Sedjo 2001; Tian et al. 2017, etc.) which have very detailed forest sectors. [, United States of America]	Rejected - outside the scope of the chapter . Chapter 4 and 6 discusses various aspects related forestry in greater detail
38569	18	32	19	6	Need to note that this reinforces earlier work showing that avoided deforestation, reforestation, and forest management could be 30% of global mitigation targets using a global integrated assessment model and a global forestry model from Sohngen and Mendelsohn (2003): Sohngen, B. and R. Mendelsohn. 2003. "An Optimal Control Model of Forest Carbon Sequestration" American Journal of Agricultural Economics. 85(2): 448-457. [, United States of America]	reference noted but point already covered by current used citations. Advantages of using different mitigation measures (incl forest) at lower area-needs is discussed in detail in chapter 6.
7495	18	39	19	6	Because CDR technologies are so prevalent in the climate projection pathways, future climate policies will need to account for this estimation, either by enhancing CDR technologies or more robust climate mitigation to offset not meeting the CDR levels prescribed by the future projections that have been made. See e.g., Vaughan & Gough (2016) Expert assessment concludes negative emissions scenarios may not deliver, ENVIRONMENTAL RESEARCH LETTERS. [Durwood Zaelke, United States of America]	accepted. agree with comment; citation added
7575	18	39	19	6	Because CDR technologies are so prevalent in the climate projection pathways, future climate policies will need to account for this estimation, either by enhancing CDR technologies or more robust climate mitigation to offset not meeting the CDR levels prescribed by the future projections that have been made. See e.g., Vaughan & Gough (2016) Expert assessment concludes negative emissions scenarios may not deliver, ENVIRONMENTAL RESEARCH LETTERS. [Kristin Campbell, United States of America]	accepted. agree with comment; citation added
22293	18	41	19	3	"The carbon uptake potential of these scenarios has been estimated to be of similar magnitude to bioenergy, combined with carbon capture and storage". Is this true? Are there not important differences between use of BECCS and afforestation etc? See SR1.5 Figure 2.11 for example. [Anastasios Kentarchos, Belgium]	partially accepted. details now also provided in cross-chapter box on BECCS, as well as in chapter 6 (and improved cross-references included in section here
4081	18	8	24	2	paragraph 1.3.2 is well discussed, informative and documented. More discussion on adaptation option and on mitigation-adaptation integration would be highly beneficial through a dedicated paragraph. [Turi Fileccia, Italy]	Comment noted section totally updated and revised. Section on adaptation has also been updated
33009	18	8			Add a section (1.3.2.x) on the role of nature-based solutions in large-scale land-based climate change mitigation scenarios. Nature-based solutions should be prioritized as low-risk and 'no regrets' mitigation measures that also offer adaptation co-benefits such as building ecosystem resilience against natural disasters. [Christopher Pereira, Canada]	partially rejected. Details on the multiple "nature-based solutions" are provided in chapter 6 we only introduce here some examples to demonstrate the concept
2211	18	12			"restauration" is misspelt [Michelle North, South Africa]	Accepted- text revised.
27735	18	14		30	The following article addresses land use and BECCS and carbon draw down potentials and should be cited here: Muri, H. (2018) The role of large - scale BECCS in the pursuit of the 1.5°C target – an Earth system model perspective. Environmental Research Letters. vol. 13 (4). Doi: 10.1088/1748-9326/aab324/ [Helene Muri, Norway]	reference noted but point already covered by current used citations.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4355	18	17			BECCS Acronym is not introduced, the full initials are introduced on page 22, line 37 [Mastura Mahmud, Malaysia]	Accepted- text revised.
23621	18	21		22	I don't understand how trajectories can range from a negative to a positive number in this context. This suggests that in order to meet our AR requirements, it would either have to go up, or down from currently levels? [Kerri Finlay, Canada]	Comment noted section totally updated and revised.
4353	18	22			Replace restauration to restoration [Mastura Mahmud, Malaysia]	Accepted- text revised.
28635	18	32		34	Reducing deforestation in the tropical rainforests regions will reduce carbon loss from the large forest in the tropics. Integrated carbon sink system should be put in place. Integrated carbon sequestration in relation with forest management. I recommend integrated forest management system, technology and techniques for forest management;(Reforestation is very high level in Carbon sink in relation to forest management. The process of reforestation to reduce carbon loss into the atmosphere from the forest should be consistent. Most importantly public awareness to combat forest loss must be published, made available for conservation and the general public for human benefits at local, regional and global level. [Abiodun Adegoke, Nigeria]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2
24169	19	7	12	19	This sentence is terribly worded, and incomplete ? [Derek Berliner, South Africa]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2
22295	19	1	19	2	The finding that the models do not represent the forestry sector explicitly is important and should be elaborated. The GHG impacts of forest management (i.e., the harvesting and regeneration of forest that remains forest and does not undergo land-use changes) dominates the LULUCF balance of developed countries and a key factor in the global carbon balance. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2 and discussion of LULUCF in chapter 2
24027	19	1	19	2	The finding that the models do not represent the forestry sector explicitly is exceptionally important and should be elaborated. The GHG impacts of forest management (i.e., the harvesting and regeneration of forest that remains forest and does not undergo land-use changes) dominates the LULUCF balance of developed countries and a key factor in the global carbon balance. Such forests are also the main source of bioenergy, which is the biggest source of renewables. A lack of proper representation of this sector is a major gap in our understanding and a major weakness of the models. The implications of this should be explored in more detail in a dedicated section. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2 and discussion of LULUCF in chapter 2
26811	19	1	19	6	What are the implications of these shortcomings for the estimates of the land carbon sink? How large is the difference in land carbon between IAMs and dynamic vegetation models? Please provide an assessment of the relevance of these uncertainties for the findings of this report, and please provide references to the remaining chapters of this report where this difference is relevant. [, Germany]	Comment noted section totally updated and revised. length restrictions prevent a more detailed discussion, but we add cross-reference to chapter 2
29979	19	3	19	6	In Doelman et al, in review it is shown that using either a representation of natural forest growth or planted forest in a DGVM might explain part of the difference between IAM and DGVM results. Important to mention that DGVMs in Krause et al use natural forest growth which is especially relevant on the short term as growth starts very slowly as natural establishment is required which is not the the case when afforestation is planned. Doelman, J.C., Stehfest, E., van Vuuren, D.P., Tabeau, A., Hof, A.F., Braakhekke, M.C., Gernaat, D.E.H.J., van den Berg, M., van Zeist, W., Daioglou, V., van Meijl, H., Lucas, P. Estimating afforestation potentials and possible risks to food security. Global Change Biology, in review. [, Netherlands]	reference noted but point already covered by current used citations. Forest re-establishment is calculated v differently in all DGVMs in Krause et al., and again represented differently in IMAGE. Which of these is the most realistic approach remains indeed to be seen.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
28915	19	3	19	6	This is important info. Could you add a couple of sentences about the potential implications of this for various prevailing views, conclusions etc? Without preemting the assessment in later chapters. [Jan Fuglestedt, Norway]	Comment noted section totally updated and revised. length restrictions prevent a more detailed discussion, but we add cross-reference to chapter 2
23823	19	7	19	7	if these address the potentially large adverse side effects of biodiversity (correct) [, India]	Accepted- text revised.
4999	19	7	19	7	"will only be successful if.." are too strong language when referring to "potentially large side effects". The part seems better to be changed to "incentives towards afforestation and reforestation need to address ...", and the argument should be qualified with the brackets indicating the degrees of evidence and agreement. [, Japan]	Comment noted section totally updated and revised. Sentence rewritten as part of revising section
6593	19	7	19	7	We suggest to mention in the section towards the success of afforestation and reforestation the challenge of security. [, Mexico]	Comment noted section totally updated and revised. Not relevant for revised section
13251	19	7	19	9	The report also needs to note that successful restoration pathways that avoid adverse impacts on biodiversity, ecosystem services and competitive pressure on land are already evident in large landscape scale planning initiatives, particularly in the field of connectivity conservation. Developing landscape scale restoration initiatives that buffer and reconnect areas of primary forest and integrate wood and food production into improved agro-ecological farming practices can improve carbon, biodiversity and sustainable development options and avoid competitive pressure on land (Cohen-Shacham 2016).  • Cohen-Shacham, Emmanuelle & Walters, Gretchen & Maginnis, Stewart & Janzen, Christine. (2016). Nature-based Solutions to address global societal challenges. 10.2305/IUCN.CH.2016.13.en. [Aila Keto, Australia]	partially accepted. we cross-reference more clearly to chapter 6 where these different options are discussed in more detail
18189	19	7	19	9	sentence structure/language "on biodiversity"? [Julia Nabel, Germany]	Accepted- text revised.
22297	19	7	19	12	afforestation and reforestation having adverse effects on biodiversity and other ecosystem services, the existence of such adverse effect certainly would probably depend on the type of afforestation/reforestation. It would be useful to clarify. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. see also cross chapter box
321	19	7	19	12	wording here is odd. What do you mean by successful. Success could be just sequestering carbon, but of course that could damage biodiversity. So recommend changing the language to just highlight the important tradeoffs without using a confusing word like "successful". [Brent Sohngen, United States of America]	Comment noted section totally updated and revised. Sentence rewritten as part of revising section
29981	19	7	19	12	please refer to Hasegawa 2015 and 2018: HASEGAWA, T., FUJIMORI, S., HAVLÍK, P., VALIN, H., BODIRSKY, B. L., DOELMAN, J. C., FELLMANN, T., KYLE, P., KOOPMAN, J. F. L., LOTZE-CAMPEN, H., MASON-D'CROZ, D., OCHI, Y., PÉREZ DOMÍNGUEZ, I., STEHFEST, E., SULSER, T. B., TABEAU, A., TAKAHASHI, K., TAKAKURA, J. Y., VAN MEIJL, H., VAN ZEIST, W.-J., WIEBE, K. & WITZKE, P. 2018. Risk of increased food insecurity under stringent global climate change mitigation policy. Nature Climate Change, 8, 699-703. and HASEGAWA, T., FUJIMORI, S., SHIN, Y., TANAKA, A., TAKAHASHI, K. & MASUI, T. 2015a. Consequence of climate mitigation on the risk of hunger. Environmental science & technology, 49, 7245-7253. [, Netherlands]	accepted. Hasagewa et al., 2018 added
38571	19	7	19	12	Incentives for AR can be successful in terms of adding forested lands and sequestering carbon but they may not achieve these other goals. Suggest rewording this to be more specific about the authors' intent with this conclusion. For example: incentives for AR will only be considered successful if AR projects are designed and implemented in ways that address the potentially large adverse side effects..." [, United States of America]	Comment noted section totally updated and revised. Section mostly removed, see also X-chapter Box 2

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38573	19	7	19	12	Wording here is odd. What is meant by 'successful'? Success could be just sequestering carbon, but of course that could damage biodiversity. So recommend changing the language to just highlight the important trade-offs without using a confusing word like "successful". [United States of America]	Comment noted section totally updated and revised. Sentence rewritten as part of revising section
15569	19	8	19	8	Add "of" so that it reads "effects of biodiversity". [Annika Herbert, South Africa]	Accepted- text revised.
23825	19	9	19	9	correct land (Shi et al. 2013; (correct); land(Shi et al. 2013; (incorrect), one space is required [India]	Comment noted section totally updated and revised.
24029	19	10	19	10	It is unclear why dietary and consumption habits would fall beyond economic incentives. The same could be said about all elements of mitigation and adaptation. People do respond to price in their dietary choices, and economic incentives go beyond prices. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
24031	19	14	19	20	Afforestation and reforestation seem to be used here as defined under the Kyoto Protocol. What is the rationale for this? The definitions and terminology if the Protocol is avoided in almost every other respect. This distinction is maintained, although the two categories are essentially the same in the KP (they are defined differently, but operationally not distinguished), and these definitions are not used anywhere else in this form. It would be sufficient to refer to afforestation. [Zoltán Rakonczay, Belgium]	Rejected. The definition given is in accordance with the SRCL glossary
30491	19	14	19	41	need reference to cultural services of afforestation and reforestation. Opportunity for traditional ways of knowing and doing to inform these too. Cultural sustainability is important as we are talking about human responses and human behaviours. [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
18191	19	18	19	18	"afforestation refers to..." [Julia Nabel, Germany]	Accepted- text revised.
22299	19	21	19	21	Delete "aims" and replace with "reasons". This is because a very significant part of forest expansion (about half in the EU, probably more in the US and Canada) happened spontaneously, as forests overgrew abandoned agricultural land (old field succession). This is a natural process with no aim, but the resulting forest is predominantly managed. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
26815	19	21	19	21	"Expansion of managed forest land" can also be achieved by managing pristine / virgin forests or trees on restored lands, without preceding re-/ afforestation. Please clarify what is meant here. [Germany]	Comment noted section totally updated and revised.
24033	19	21	19	21	Delete "aims" and replace with "reasons". This is because a very significant part of forest expansion (about half in the EU, probably more in the US and Canada) happened spontaneously, as forests overgrew abandoned agricultural land (old field succession). This is a natural process with no aim, but the resulting forest is predominantly managed. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
6661	19	21	19	25	I suggest to refer these articles "Miyamoto et al. 2008, 2011" which analyzed the historical increase of managed forest from both aspects of changes in forest policy and utilization of local residents. References: Miyamoto, Asako, Sano, Makoto (2008)The Influence of Forest Management on Landscape Structure in the Cool-Temperate Forest Region of Central Japan. Landscape and Urban Planning 86: 248,248-256. Miyamoto, Asako, Sano, Makoto, Tanaka, Hiroshi, Niiyama, Kaoru (2011) Changes in forest resource utilization and forest landscapes in the southern Abukuma Mountains, Japan during the twentieth century. Journal of Forest Research v.16 no.2 pp. 87-97 [Asako Miyamoto, Japan]	references useful some or all added.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5001	19	21	19	30	<p>By the end of World War II in 1945, up to two million hectares of logged forest remained unplanted since there was serious overcutting and little planting activity for high demand for timber products. By 1950, the government was funding replanting programs and enacted the new Forest Law. Some 10 million hectares of Japanese plantations have been established since the end of World War II.</p> <p>References:                      Noda, I. (1999) A Study on Forecasting Yield for Regional Private Forest Planning(1) -Problems and improvements on the gentan probability methodology. Bull. For. &amp; For. Prod. Res. Inst. 376:53-99, 1999 (in Japanese with English summary)  <a href="https://www.ffpri.affrc.go.jp/labs/kanko/376-2.pdf">https://www.ffpri.affrc.go.jp/labs/kanko/376-2.pdf</a>                      Mcdermott, Constance &amp; Cashore, Benjamin &amp; Kanowski, Peter (2010) Global Environmental Forest Policies: An International Comparison. 10.4324/9781849774925.                      Sasse, J. (1998) The Forests of Japan, Japan Forest Technical Association, Tokyo,75 pp. [, Japan]</p>	Reference noted but point already covered by current used citation. This paragraph on AR efforts was substantially shortened.
23827	19	22	19	22	(Shoyama 2008) (correct); (Shoyama 2008) (incorrect) [, India]	Accepted- text revised.
4197	19	23	19	23	Suggest removing Chirino-Valle et al 2016 as it does not refer to the sentence "Expansion of managed forest area in the past has occurred for a variety of aims...". The article is about an experiment of afforestation and impact on soil P. [Anne-Gaelle Ausseil, New Zealand]	Taken into account - combined with other comment. Accepted and taken into account. Section has been substnatially revised.
17843	19	24	19	24	"soil erosion" should be replaced by "limitation of soil erosion" [Quentin Lejeune, Germany]	Accepted- text revised.
22301	19	25	19	25	After the parenthesis, at the end of the sentence add ", as well as spontaneous expansion of forests". [Anastasios Kentarchos, Belgium]	Accepted- text revised.
4199	19	25	19	25	Suggest adding a reference: Ministry for the Environment (2018). New Zealand's greenhouse gas inventory 1990–2016. Available from <a href="http://www.mfe.govt.nz">www.mfe.govt.nz</a> . This relates to the impact of the Emission Trading Scheme in 2008 on an increase in afforestation/decrease in deforestation in New Zealand between 2008-2012 (first Kyoto Protocol commitment period). [Anne-Gaelle Ausseil, New Zealand]	Comment noted section totally updated and revised.
24035	19	25	19	25	At the end of the sentence (after the parenthesis) add ", as well as spontaneous expansion of forests". [Zoltán Rakonczay, Belgium]	Accepted- text revised.
22303	19	31	19	31	Delete "widely accepted" and replace with "often mentioned". This is because there is little evidence of their cost-effectiveness. Under the CDM, the uptake of afforestation/reforestation projects was marginal at best, despite much expectation and significant public sector investment. Hardly any developed countries increased their afforestation to comply with the obligations under the Kyoto Protocol, and afforesatation actually declined in many since it was recognised as a mitigation measure. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
24037	19	31	19	31	Delete "widely accepted" and replace with "often mentioned". This is because there is little evidence of their cost-effectiveness. Under the CDM, the uptake of afforestation/reforestation projects was marginal at best, despite much expectation and significant public sector investment. Hardly any developed countries increased their afforestation to comply with the obligations under the Kyoto Protocol, and afforesatation actually declined in many since it was recognised as a mitigation measure. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21699	19	31	19	32	The discussion of mitigation costs seems lazy here and repeats common policy myths that land based solutions are cheaper than energy and transport -- there is actually a long-standing discussion that the debate about costs is more complex and depends on many simplistic assumptions about costs and shared costs, ie that it is not always true that land-based options are cheaper: see Forsyth, T. (2008) 'Promoting the "development dividend" of climate technology transfer: can cross-sector partnerships help?' World Development 35: 10 1684-1698. [Timothy Forsyth, United Kingdom (of Great Britain and Northern Ireland)]	Rejected . The word limits to the box do not allow an in depth discussion of costs unfortunately. However, chapter 6 provides a more detailed discussion on different land-based mitigation options. Energy and transport not covered in the special report, however, the scenarios, provided by IAMs (which are ALL models with the economy at their core) imply land-based mitigation as cost-efficient measures.
24039	19	31	19	32	delete the sentence after "mechanisms". It is trivial that it could only be considered cost-effective in comparison with (mostly) these sectors, and the statement is questionable anyway. [Zoltán Rakonczay, Belgium]	Accepted, text revised. We added uncertainty statement (medium agreement/medium evidence)
32431	19	31	19	33	The number of references is too limited to support a statement that Afforestation and Reforestation have been "widely" accepted as an effective climate change mitigation measure, and does not properly reflect the findings in Chapter 2 (2.6.2). Afforestation can trigger GHG emissions when carbon-rich ecosystems are converted into monoculture tree plantations (see also Dellasala, in press). Also, forest expansion is not necessarily the same as afforestation, as the establishment of monoculture tree plantations, a controversial activity, is included under the definition of afforestation too. [Simone Lovera-Bilderbeek, Paraguay]	Accepted, text revised. We added uncertainty statement (medium agreement/medium evidence)
15571	19	33	19	33	Add "a" so that it reads: "expansion as a mitigation mechanism". [Annika Herbert, South Africa]	Accepted- text revised.
13159	19	33	19	35	add reference to Aichi Target 15 under CBD"By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification" <a href="https://www.cbd.int/sp/targets/">https://www.cbd.int/sp/targets/</a> [David Cooper, Canada]	Comment noted section totally updated and revised.
25299	19	36	19	36	Time horizons should be clarified as currently, there is a contradiction between this sentence and the sentence 11-32,33. Latest FRA suggests that in the period 2010-2015. the global forest balance is still a net loss. [, France]	Comment noted section totally updated and revised.
29969	19	36	19	38	This box discusses reforestation and afforestation which implies 'planting of forest'. The result of expanding forest from Song et al. 2018 is mainly driven by forest expansion due to climate change in boreal regions, i.e. this is not a direct anthropogenic effect. This should be reflected in the text, or otherwise this statement should be removed as it is irrelevant to discussing anthropogenic afforestation/reforestation. [, Netherlands]	Taken into account - combined with other comment. Taken into account - Section/cross-chapter box substantially revised; Reference (Song 2018) was removed.
24041	19	37	19	37	"net area gain" seems to contradict "shrinking forest areas" on p. 11, line 30. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
22305	19	39	19	41	Delete last sentence ("In many cases...") as the statement is impossible. If native forest is replaced by plantations, the forest area cannot "expand". If plantations are considered forest (as under the definition of the KP and FAO), then forest area would remain unchanged. If plantations are not considered "forest" (as is the case in many countries for short-rotation plantations), then such conversions would mean a forest loss, rather than an expansion. [Anastasios Kentarchos, Belgium]	Accepted- text revised.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24043	19	39	19	41	Delete last sentence ("In many cases...") as the statement is impossible. If native forest is replaced by plantations, the forest area cannot "expand". If plantations are considered forest (as under the definition of the KP and FAO), then forest area would remain unchanged. If plantations are not considered "forest" (as is the case in many countries for short-rotation plantations), then such conversions would mean a forest loss, rather than an expansion. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
1671	19	40	19	41	In China, that replacing of native forests with plantations is strictly prohibited, and this situation won't cause the changes in forest area. Furthermore, "Hua et al., 2018" isn't listed in the references. As a result, it is strongly suggested to remove "China (Hua et al., 2018)" from the sentence "In many cases, forest area expansion included also replacing native forests with plantations as in Chile (Heilmayr et al. 2016), China (Hua et al., 2018) or Cambodia (Scheidel & Work, 2018)". [Chaozong Xia, China]	Accepted, sentence reformulated, reference added.
14737	19	40	19	41	1.The situation described does not accord with China's reality; and 2. There is not "Hua et al., 2018" in the reference; 3. Please delete 'China ( Hua et al., 2018 )' [Guobin ZHANG, China]	Accepted, sentence reformulated, reference added.
13253	19	41	19	41	As noted above, there is considerable research noting that degradation and loss of primary and other natural forests cannot be offset by planting monocultures of trees. [Aila Keto, Australia]	Accepted, sentence reformulated, reference added.
24171	19	41	19	41	The mixing up of industrial plantations and natural forest has occurred in many of these assessments,. This is misleading and needs to be unpacked. They a very different land use system, forests conserves biodiversity, while plantations are a major threat to most biodiversity. FAO and others have done a major disservice to forest biodiversity conservation by not explicitly seperating these two [Derek Berliner, South Africa]	Accepted- text revised.
23831	19	41	19	41	(Hua et al., 2018) correct; (Hua et al., 2018) (incorrect) [, India]	Accepted- text revised.
28917	19	1	22	34	Cross chapter Box 1 is very useful [Jan Fuglestedt, Norway]	Thank you for the positive comment.
4333	19	13	22	34	In addition to reforestation, the conversion of farmland to forestry and grassland and the protection of natural forests in China are also contributions to the land system. It is suggested that the land system should be supplemented and improved in appropriate places. [Guangsheng zhou, China]	Comment noted section totally updated and revised.
13161	19	14	22	34	add erference to natural regeneration eg Chzdon 2016b (already included) and Poorter 2016 "Biomass resilience of Neotropical secondary forests" Nature. [David Cooper, Canada]	references useful some or all added.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
32753	19	14	22	34	A cross-chapter box devoted to Afforestation / Reforestation gives the impression this is the only, or the most significant forest-related mitigation measure. This framing neglects the importance of forest restoration. The restoration of degraded forests should be given as much prominence as A/R, given the mitigation potential, which is increased through the greater resilience of natural undisturbed forests, and also the more certain benefits for biodiversity. All carbon in land and forests is not equal. Biodiverse, relatively unmodified natural ecosystems store carbon with greater resilience to disturbance than modified landscapes, including mixed-species reforestation, and tree longevity is critical to long-term carbon storage. The importance of natural ecosystems should be brought out more strongly throughout the chapter, but is notable in the narrow A/R framing of this cross-chapter box. Suggested references: 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. <a href="https://doi.org/10.1111/conl.12120">https://doi.org/10.1111/conl.12120</a> 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. <a href="https://doi.org/10.1073/pnas.0901970106">https://doi.org/10.1073/pnas.0901970106</a> 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. Körner, C., 2017. A matter of tree longevity. Science 355, 130–131. <a href="https://doi.org/10.1126/science.aal2449">https://doi.org/10.1126/science.aal2449</a> [Dooley Kate, Australia]	Accepted- text revised. Accepted, revised
34007	19	14	22	34	Cross-chapter box 1: It is unclear what the purpose of this box is, and why this response option afforestation / reforestation is highlighted, while others are not (e.g. why not also a box on BECCS?). Most of this info already is in chapter 2, or elsewhere. and adding a paragraph "conclusion" is very strange in such a report... Better remove to be consistent with the handling of other mitigation options. [Elke Stehfest, Netherlands]	Rejected. The box was discussed and agreed across report authors, as reforestation/afforestation is an important aspect of mitigation scenarios and is mentioned across chapters. A box on BECCS is in the final draft of the report.
26813	19	14	22	34	Please shorten Cross-Chapter Box 1. Please use "implications for" instead of the term "impacts" in the sub titles of this box because this term has a specific meaning in the context of climate change, see glossary. In addition, please revise policy prescriptive language in this box, e.g. "must be designed". [., Germany]	Accepted. Accepted, Box shortened. Implications instead impacts. Text revised for prescriptive language.
30197	19	14	22	34	Cross-chapter box 1: It is unclear what the purpose of this box is, and why this response option afforestation / reforestation is highlighted, while others are not (e.g. why not also a box on BECCS?). [., Netherlands]	Noted no action needed. The box was discussed and agreed across report authors, as reforestation/afforestation is an important aspect of mitigation scenarios and is mentioned across chapters. A box on BECCS is in the final draft of the report.
32435	19	14	22	34	The box reflects some important findings that should be better reflected in the Summary for Policy Makers. As mentioned above, impacts on biodiversity and carbon values should also take into account the foregone natural ecosystem restoration opportunities in a set-aside scenario, especially when afforestation takes place on currently degraded land that still has significant natural restoration potential. This also reflects the findings on Latin America, where forest expansion has been partly due to natural forest restoration and vegetation recovery on previously degraded land. Lastly, the recommendations made in the conclusion for reforestation projects are valid for afforestation activities too. [Simone Lovera-Bilderbeek, Paraguay]	Comment noted; however, at this stage the authors of the SPM did not manage to add these details to the draft messages, since there is pressure to keep the messages short. However, the SPM attempts to clarify that esp. Afforestation can have negative side-effects (ie on biodiversity, if native grasslands are planted in trees).

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8137	19	18	22	34	Combining both A and R seems over simplification, R is relatively easier than A as land ownership of R is clear (land status: still forest land), while A the land status is already non-forest land (at least for the last 50 yrs) [Haruni Krisnawati, Indonesia]	Accepted definition clarified. Accepted, definition clarified.
40435	19		22		check coherency between x chapter box and text in various chapters, provide confidence associated with key finding, reflect this in the chapter ES. Why are storms not mentioned, they are relevant for this box. [Valerie Masson-Delmotte, France]	Accepted- text revised.
5267	19	9			"land(Shi ...)" insert space "land (Shi ...). There are many minor errors like to correct, e.g. Pg1-24, Line 21 Valyamkunnath et al.2018Kostyanovsky et al.2018), Pg. 1-31 Line 20 "(e.g.(Rosenzweig ..."; [Joseph Mutemi, Kenya]	Accepted- text revised.
29403	19	14			Cross-chapter box 1 talks about reforestation and afforestation both as managed, planted activities (actively planting of trees). Where does land abandonment and natural succession back to ecosystem climax fit in all of this? Is there any research that shows one is better than the other (planting vs. natural succession), for carbon sequestration and biodiversity? [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
4359	19	15			Baldur Janz (Ch1) What does the Ch1 stand for? [Mastura Mahmud, Malaysia]	Accepted- text revised.
4361	19	16			Kaoru Kitajima (Ch2) What does the Ch2 stand for? [Mastura Mahmud, Malaysia]	Accepted- text revised.
8731	19	24			"soil erosion" is not a kind of environmental services, and may be changed to "soil erosion control". [Changxiao Li, China]	Comment noted section totally updated and revised.
26817	19	33			Which "international community"? Countries or scientists? [, Germany]	Comment noted section totally updated and revised.
4365	19	34			Replace as : Bonn Challenge (2011). Add to the reference section: Bonn Challenge (2011) <a href="http://www.bonnchallenge.org/">http://www.bonnchallenge.org/</a> (accessed 1 January 2019). [Mastura Mahmud, Malaysia]	Accepted- text revised.
4363	19	35			Add reference as Trillion Tree Campaign (2018). Add to the reference section: Trillion Tree Campaign (2018). Add reference as Trillion Tree Campaign (2018) <a href="https://www.trilliontreecampaign.org/">https://www.trilliontreecampaign.org/</a> (accessed 1 January 2019). [Mastura Mahmud, Malaysia]	Accepted- text revised.
2765	20	1	20	1	several typos in figure; "desert" written with two "s"; "world's" without "" and more [Bettina Weber, Germany]	Accepted, the map and AR examples were removed from the box due to regional unbalance.
11755	20	1	20	1	The colour coding needs to be explained in the figure. [Hans Poertner and WGII TSU, Germany]	Accepted, the map and AR examples were removed from the box due to regional unbalance.
4201	20	1	20	6	The example of New Zealand on the cross-chapter box 1 is misleading: yes, there has been an increase in AR between 1985-2000 (referred indirectly in Chirino-Valle et al 2016, it should be MFE (2018) New Zealand's greenhouse gas inventory 1990–2016. Available from <a href="http://www.mfe.govt.nz">www.mfe.govt.nz</a> ), but the trend has reversed for a long time now, with conversion of forest into grassland due to higher profit of livestock farming (Reference: Ministry for the Environment & Stats NZ (2018). New Zealand's Environmental Reporting Series: Our land 2018. Retrieved from <a href="http://www.mfe.govt.nz">www.mfe.govt.nz</a> and <a href="http://www.stats.govt.nz">www.stats.govt.nz</a> ). Suggest deleting the NZ example. [Anne-Gaelle Ausseil, New Zealand]	Accepted, the map and AR examples were removed from the box due to regional unbalance.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1023	20	1	20	6	<p>It would be useful to enrich Figure 1 by highlighting Algeria's efforts in afforestation and reforestation.</p> <p>Indeed, the forestry sector in Algeria has experienced several stages, including the Green Dam project from 1970 to 2000, which allowed the rehabilitation of some 300000 ha of degraded forest areas of the Saharan Atlas (Merdas et al. 2015).</p> <p>Furthermore, the National Reforestation Plan, which was implemented in 2000 aims to reforest a total area of 1,245,000 ha over 20 years (Merdas et Al., 2017)</p> <p>Merdas Saifi, Bolghobra Nouar, Lakhdari Fattoum (2015) Thee Green Dam in Algeria as a tool to combat desertification. Planet@Risk 3: 3-6.</p> <p>Merdas, S., Mostephaoui, T., &amp; Belhamra, M. (2017). Reforestation in Algeria: History, current practice and future perspectives. Reforesta, (3), 116-124. [Farid Rahal, Algeria]</p>	Comment noted section totally updated and revised. Figure was removed from draft.
23829	20	1	20	6	<p>In India, there have been lots of programmes launched in the past regarding afforestation. These programmes for afforestation range from Joint Forest Management to Green India Mission. However, these initiatives of India have not been reflected. [, India]</p>	Accepted, the map and AR examples were removed from the box due to regional unbalance.
17253	20	1	20	6	<p>What is the color code of the Figure ? [Noémie Janot, France]</p>	Accepted, the map and AR examples were removed from the box due to regional unbalance.
24045	20	1	20	6	<p>Check (and correct, as appropriate) the statements in the box "South America". It is highly unlikely that there was a (net) increase in woody vegetation in the region over the first decade of the 21st century, as suggested by the unqualified reference to "increase in woody vegetation". If there was a net increase, the reference to 66% should be clarified. If it is some expansion that only partially compensates for the areas lost to ongoing deforestation, it should be clarified in the first sentence.</p> <p>However, if the reference is to a limited expansion (less than ongoing loss), then there is nothing new about it, as such processes have been ongoing for much longer than just the 21st century. Furthermore, extensive afforestation (mostly plantations) in several parts of Latin America should be recognized.</p> <p>Lastly, the reference to "tropical forest" in the last point seems relevant only to humid tropical forests, so it is not valid to the dominant forest types mentioned above (xeric, less productive forest types). [Zoltán Rakonczay, Belgium]</p>	Accepted, the map and AR examples were removed from the box due to regional unbalance.
32433	20	2	20	2	<p>the term "forest area" is misleading in this case as most activities concern the establishment of monoculture tree plantations. It would be more appropriate to use the term "tree cover". See also Dellasala, in press [Simone Lovera-Bilderbeek, Paraguay]</p>	Accepted, the map and AR examples were removed from the box due to regional unbalance.
24173	20	2	20	6	<p>Agiajn this is bad bad science mixing up proper reforestaion with plantation monocrop aforestaton . Note thatt South africa has only expanded its plantation forests.This has occure dat great environmental cost, for example there has been loss of many valuable grasslands, and wetlands , and in the past idigenouse forests. They have also causing fragmentation of natural habitat.particularlrly idigenouse forest patches that have become islands in a sea of plantatations . We also know that natural grasslands have very high soil carbon, of which much is lost , when they are converted to monocrop plantations. So there is a net loss of carbon in this fom of land conversion! [Derek Berliner, South Africa]</p>	Accepted, the map and AR examples were removed from the box due to regional unbalance.
15573	20	12	20	12	<p>Add "a" so that it reads: "policies as a climate change mitigation mechanism". [Annika Herbert, South Africa]</p>	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30861	20	13	20	15	I'm not convinced sentence this holds as a generalisation. Much is site specific / soil specific. Tree planting on previously unforested peat soils can cause carbon losses. On the otherhand many (most?) managed grasslands will show carbon accumulation on afforestation assuming you include biomass (wood) as well as soil. Either clarify the circumstances you are referring to from the 3 papers or delete. [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
22307	20	14	20	14	Delete "abandoned". The mentioned benefit would occur whether the cropland was abandoned earlier, or cropping is discontinued for the sake of afforestation. If it is abandoned earlier, the benefit is likely to be less, as such lands generally undergo some recovery anyway (natural succession), so the added value of afforestation is less. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
24047	20	14	20	14	Delete "abandoned". The mentioned benefit would occur whether the cropland was abandoned earlier, or cropping is discontinued for the sake of afforestation. If it is abandoned earlier, the benefit is likely to be less, as such lands generally undergo some recovery anyway (natural succession), so the added value of afforestation is less. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
38575	20	14	20	23	The paragraph needs to be clear which carbon stocks are being discussed. It says "they" (C stocks) have been shown to decrease ... after conversion from managed grasslands [to forest]. Clearly this is not referring to all C stocks, perhaps just soil? It seems most of the paragraph is focused on soil carbon stocks and soil nutrient dynamics, but this is not explicitly stated. [, United States of America]	Accepted- text revised.
4203	20	20	20	20	At the end of sentence finishing by "increase with time after afforestation", this is the place to add Chirino-Valle et al 2016. [Anne-Gaelle Ausseil, New Zealand]	Comment noted section totally updated and revised. Figure was removed from draft.
24049	20	30	20	30	It is a myth that PES has worked well for forest. There are a few isolated examples often quoted, but they are rather insignificant inthe big scheme of things and most are not really "PES" in the real sense, just subsidy schemes dressed up as PES for ideological or legal reasons. [Zoltán Rakonczay, Belgium]	Noted no action needed. We say "effectively only..", and introduce PES crtically overall.
763	20	Fig.	20	Fig.	In the South America text box should be 'Although known' rather than 'Although know". [Edson Leite, Brazil]	Accepted, the map and AR examples were removed from the box due to regional unbalance.
26819	20	1			Please mention that the figure shows a non-exhaustive list of examples including an explanation for the choices of these specific examples. [, Germany]	Accepted, the map and AR examples were removed from the box due to regional unbalance.
4367	20	1			Cross-Chapter Box 1, Figure 1 Text in the figure is too small, unless the figure is oriented in landscape [Mastura Mahmud, Malaysia]	Accepted, the map and AR examples were removed from the box due to regional unbalance.
6963	20				Figure 1, CCBox 1: What do the categories on the map mean? NDVI or something? Land cover type? What is AR? Please avoid acronyms in Figures. It is important to distinguish between commercial forestry and between reforestation, and forestry/re-/afforestation with indigenous/exotic species. For instance, in South Africa indigenous forests were logged and the commercial forestry with eucalyptus, exotic acacia (wattle) and pine has negative ecological impacts, even if they now sequester some CO2. All three species are now invasive. [Debra Roberts, South Africa]	Comment noted section totally updated and revised.
23363	20				Cross chapter Box 1. Basic content is good but lacks icoverage of important area of agroforestry as increasing prevalence of trees in and around food crop fields with positive and negative interactions between crops and trees. [John Dixon, Australia]	Rejected - outside the scope of the chapter . Beyond scope: the contet of the box was agreed in discussion accross all chapters; the focus was decided to be explicitly on reforestation and afforestation (ie expansion of forest area), not on forest management per se.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17845	20				America, does "66% of deforested area" refers to the fact that 66% of previously deforested area has seen regrowth during this decade, or that the equivalent of 66% of the area that was deforested at the same time but ELSEWHERE in South America saw some forest regrowth? This should be clarified. [Quentin Lejeune, Germany]	Accepted, the map and AR examples were removed from the box due to regional unbalance.
17847	20				In Figure 1, in the box on South Africa, were the mentioned negative effects due to AR activities or to the conflicts with water resources? This is not clear. [Quentin Lejeune, Germany]	Accepted, the map and AR examples were removed from the box due to regional unbalance.
4205	21	2	21	2	Suggest adding another evidence for albedo reduction implication: Kirschbaum MUF, Whitehead D, Dean SM, Beets PN, Shepherd J.D. and Ausseil A-GE (2011). Implications of changes in albedo changes following afforestation on the benefits of forests as carbon sinks. Biogeosciences 8: 3687-3696 {doi:10.5194/bg-8-3687-2011}. Available at: <a href="http://www.biogeosciences.net/8/3687/2011/">http://www.biogeosciences.net/8/3687/2011/</a> [Anne-Gaelle Ausseil, New Zealand]	reference noted but point already covered by current used citations.
15589	21	3	21	8	These referred studies are missing the known process related to forests i.e. VOC and their effect on the aerosol formation and thereafter to cloud formation. Thus, this conclusion is too definitive since net impact also in boreal region could be cooling when direct and indirect aerosol effect is taken into account. [Tuomo Kalliokoski, Finland]	Accepted- text revised.
22309	21	9	21	20	Forests in this paragraph are solely presented as 'water consumers', whereas other literature points to the positive effects of forests on the water cycle. It would be useful to elaborate on how the interaction of vegetation type (open landscape to closed forest, natural forest vs. plantation) and climatic zone (humid to xeric) influence the role of vegetation in the hydrological cycle (see for instance p,36 of chapter 1, lines 38 to 43). [Anastasios Kentarchos, Belgium]	Accepted and revised. Considering the word limit and broad topics this text box will cover, interaction with vegetation and climatic zone is out of scop.
6355	21	9	21	20	Afforestation / reforestation can provide benefits for ecosystem resilience against water security, but this does not come across in this paragraph, which instead focuses on the negative implications of A/R for water security. [Gambia]	Accepted- text revised.
17849	21	9	21	20	This paragraph draws an exaggeratedly dark picture of the impacts of AR on the water balance, by mentioning only potential negative effects on water scarcity. This goes in contradiction with the understanding we have of some impacts of deforestation on the water cycle, especially in the tropics. Especially on these aspects, the results summarised here should better reflect those presented in Chapter 2, for example in 2.6.2.1.1. [Quentin Lejeune, Germany]	Accepted and revised. Cross reference to Chapter 2 added.
24051	21	9	21	20	Forests in this paragraph are solely presented as 'water consumers', whereas other literature points to the positive effects of forests on the water cycle. It would be useful to elaborate on how the interaction of vegetation type (open landscape to closed forest, natural forest vs. plantation) and climatic zone (humid to xeric) influence the role of vegetation in the hydrological cycle (see for instance p,36 of chapter 1, lines 38 to 43). [Zoltán Rakonczay, Belgium]	Accepted and revised. Considering the word limit and broad topics this text box will cover, interaction with vegetation and climatic zone is out of scop.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24053	21	13	21	19	The challenges associated with offsetting schemes seem to be underappreciated in this discussion. Private standards proliferate, but their effectiveness is unproven. Economic logic would suggest these unregulated systems to be weak at best and fraudulent at worse. Systems of high integrity are unlikely to be able to compete (race to the bottom.). Even if they are developed, efficient, wide-spread operations are made next to impossible in the absence of a regulated international framework that could ensure comparability and avoid multiple counting of performance (possibly beyond the control and responsibility of good-faith actors involved). Even the strictly controlled CDM had many failings (non-additional projects, etc.), [Zoltán Rakonczay, Belgium]	Rejected - outside the scope of the chapter . Important points to discuss but are outside the scope of a cross-chapter text box
11671	21	18	21	20	This sentence is unclear - what is meant by "resilience through... hydrologic cycle" and what are the "long-term risks"? In an effort to be brief, too much meaning has been lost. [Paul Dirmeyer, United States of America]	Accepted- text revised.
15575	21	19	21	19	Add "the" so that it reads: "climate change through the hydrological cycle". [Annika Herbert, South Africa]	Accepted- text revised.
4207	21	20	21	20	Water scarcity: an issue that has been highlighted in New Zealand too, with a study on trade-offs between afforestation, reduced water yield and increased erosion control: Dymond J.R., Ausseil A-GE, Ekanayake J, Kirschbaum MUF. Tradeoffs between soil, water, and carbon – a national scale analysis from New Zealand (2012). Journal of Environmental Management, 95, 124-131. [Anne-Gaelle Ausseil, New Zealand]	references useful some or all added.
15577	21	22	21	22	Add "the" so that it reads: "depend mostly on the vegetation cover". [Annika Herbert, South Africa]	Accepted- text revised.
15741	21	27	21	36	Add on continue line 36: "The IAD framework lacks sufficient attention to the dynamics of power enforcement in a governance system [3]. The application of the IAD framework requires the precise definition and categorization of outcomes as fundamental aspects of a policy issues. Many of these consequences can't be identified even by conducting a detailed analysis and detailed technical examination with a limited range of the related factors [1]. Although Common theory considers the underlying variables such as the size of the group or the complexity of the resources, real context assessment involves looking beyond these variables. In other words, considering people's decision-making and actions situations, understanding how to formulate rules and property rights requires identifying the underlying contextual factors and factors that are wider than the variables mentioned in the Ostrom's framework and varying according to each country and region [2]." References: 1.Ribor, J. C., A. Agrawal, and A. M. Larson. (2006). Recentralizing while decentralizing: how national governments re appropriate forest resources. World Development 34(11):1864-1886. 2. McCay, B. J. (2002). Emergence of institutions for the commons: contexts, situations, and events. Pages 361-402 in E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, and E. U. Weber, editors.The drama of the commons. National Academy Press, Washington, D.C., USA. 3.Johnson, C. )2004(. Uncommon ground: the "poverty of history" in common property discourse. Development and Change 35 (3):407-434.. [, Iran]	Rejected - outside the scope of the chapter . Details on governance aspects (and pros and cons) are covered in chapter 7.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38577	21	31	21	32	Text says "commercial plantations potentially can support biodiversity unless plantations are monocultures". This is simply not universally true. In the southeast US, longleaf pine ecosystems are some of the most biodiverse regions in the country, and are dominated by a single overstory species. Even longleaf pine plantations (monocultures) can offer tremendous biodiversity. The forest overstory is not the only relevant component when assessing forest biodiversity. [ , United States of America]	Accepted- text revised.
2935	21	34	21	35	References on effects of afforestation on biodiversity discussed here may cite latest paper finished by Chinese, German and Swiss joint group and published in SCIENCE in 2018. The paper pointed out new findings on how mixed forest affect forest biodiversity. Therefore, I strongly suggest references cited here update from "Lindenmayer and Hobbs 2004; Barlow et al. 2007; Gilbert-Norton et al. 2010"to"Lindenmayer and Hobbs 2004; Barlow et al. 2007; Gilbert-Norton et al. 2010; Huang et al. 2018" [Dexiang Chen, China]	references useful some or all added.
38579	21	41	22	3	This paragraph (beginning with "conversions of natural forests to industrial forest management...") is not true in North America, where rights over land use are well established and protected. Amend text to refer to places (regions or political/institutional situations) where this applies. [ , United States of America]	Rejected - outside the scope of the chapter. The box is specifically on general issues (ie global patterns), space does not allow a more detailed view of regional specificities.
26821	22	1	22	3	The formulation is policy prescriptive. Rather than stating that "Policies...should be reappraised" and "subsidies...must be reoriented" we suggest language such as "options include" or "evidence shows...are more effective" [ , Germany]	Accepted- text revised.
20981	22	1	22	3	Please consider revising - unclear structure. [ , United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
4027	22	1	22	3	This sentence needs to be edited or improve its grammar. Currently it doesn't make sense. [Vassilis Daioglou, Netherlands]	Accepted- text revised.
15579	22	2	22	2	Insert comma so that it reads: "reappraised, that is". [Annika Herbert, South Africa]	Accepted- text revised.
22311	22	4	22	13	A reality check of these figures would be in good order. It is telling that the low end of Houghton's estimate for sequestration on 500 Mha ("at least 3.7 GtCO <sub>2</sub> /yr") is higher than the low end of the previous estimate for 3 to 5 times that amount of land. Then the "median" estimate of Griscom for an unspecified amount of land is higher than the top end of the estimate for 2580 Mha, although the latter would involve a 65% increase in global forest area. It may be preferable to present these estimates in a tabular form (with area, sequestration rate and timeframe), without repeating unreasonable estimates of the sources. [Anastasios Kentarchos, Belgium]	Accepted and revised. Cross reference to Chapter 2 added.
24055	22	4	22	13	A reality check of these figures would be in good order. It is telling that the low end of Houghton's estimate for sequestration on 500 Mha ("at least 3.7 GtCO <sub>2</sub> /yr") is higher than the low end of the previous estimate for 3 to 5 times that amount of land. Then the "median" estimate of Griscom for an unspecified amount of land is higher than the top end of the estimate for 2580 Mha, although the latter would involve a whopping 65% increase in global forest area. It may be preferable to present these estimates in a tabular form (with area, sequestration rate and timeframe), without repeating unreasonable estimates of the sources. [Zoltán Rakonczay, Belgium]	Accepted and revised. Cross reference to Chapter 2 added.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38581	22	5	22	11	There are a few problems with this paragraph and how reforestation and related GHG estimates are being presented. The most pressing problem is that there is no mention of the scenarios used to generate these estimates -- e.g., are they C pricing scenarios, are they achieving a 2°C warming targets, are they based off different SSPs, do they reflect global action on climate or no countries acting on climate? The scenarios' designs (as well as the model used, the model type, function, etc.) will have a large impact on the generated estimates. So just pulling estimates from the literature from different models using very different scenario designs with no acknowledgement of the differences and/or what scenarios are being used is VERY problematic. For example, in lines 7-9, what kind of scenarios generated this range? This approach (mixing and matching models, scenarios, and outputs) has been used in recent LU literature (Griscom et al. (2017)), but it is not a recommended way to compare/present results. This advice is given in this report and should be followed throughout (lines 25-26 from page 30 of this chapter) "With all models, it is important to be aware of the underlying assumptions in order to interpret model output and the conclusions that are drawn from these studies." [, United States of America]	Accepted and revised. Cross reference to Chapter 2 added.
29971	22	7	22	9	The range mentioned (3.5-9.6 GtCO <sub>2</sub> /year) is based on just two studies that used the same model (MagPie). However, the literature on this topic is much wider and discussed in chapter 2.7.1.2.2 (page 2-99) where it is stated that "Afforestation/Reforestation (A/R) can increase carbon sequestration in both vegetation and soils by 1.5–11.8 Gt CO <sub>2</sub> yr <sup>-1</sup> (robust evidence, medium agreement)" based on five studies. [, Netherlands]	Accepted and revised. Cross reference to Chapter 2 added.
4209	22	14	22	14	"None of the scenarios... as constraints". Add "at the global scale". There has been trade-offs analyses of afforestation at the country level (See Dymond et al (2012) in New Zealand for example). [Anne-Gaelle Ausseil, New Zealand]	Comment noted section totally updated and revised.
13255	22	14	22	15	It should be noted that these studies also did not assess the potential positive or negative impacts on water balance or other ecosystem services of different kinds of restoration action. As a general rule, restoration action that integrates biodiversity and climate mitigation goals could be expected to improve ecosystem integrity and thus the provision of all ecosystem services (refs). [Aila Keto, Australia]	Accepted- text revised.
33133	22	17	22	17	REDD+ Abbreviation meaning [Amany Mansour, Egypt]	Comment noted section totally updated and revised.
29973	22	22	22	24	The reference to Kreidenweis et al does not allow the statement 'like all large-scale land uses', so please remove this part of the sentence. Also Kreidenweis et al do not look into 'where GDP increase can compensate' detrimental effects. we suggest to reformulate the sentence as follows: "Competition for land will increase food prices with detrimental societal impacts in some regions." ans to add two references to Hasegawa 2015 and 2018: (1) HASEGAWA, T., FUJIMORI, S., HAVLÍK, P., VALIN, H., BODIRSKY, B. L., DOELMAN, J. C., FELLMANN, T., KYLE, P., KOOPMAN, J. F. L., LOTZE-CAMPEN, H., MASON-D'CROZ, D., OCHI, Y., PÉREZ DOMÍNGUEZ, I., STEHFEST, E., SULSER, T. B., TABEAU, A., TAKAHASHI, K., TAKAKURA, J. Y., VAN MEIJL, H., VAN ZEIST, W.-J., WIEBE, K. & WITZKE, P. 2018. Risk of increased food insecurity under stringent global climate change mitigation policy. Nature Climate Change, 8, 699-703. (2) HASEGAWA, T., FUJIMORI, S., SHIN, Y., TANAKA, A., TAKAHASHI, K. & MASUI, T. 2015a. Consequence of climate mitigation on the risk of hunger. Environmental science & technology, 49, 7245-7253. [, Netherlands]	Accepted, text revised, references useful, some or all are added.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13257	22	25	22	27	<p>The conclusion that maintaining a sink requires harvest and storage in harvested wood products illustrates a major problem with the framing of the whole report. From a climate change mitigation perspective, this statement is nonsensical. The primary mitigation value of a forest resides in its long term ecosystem carbon stock, not in the short-term flux of CO2 in and out of the atmosphere (Mackey et al. 2013). This is primarily because of the very long, millennial, life-time of the air-borne fraction of a pulse of CO2 (Archer et al. 2009) ; a fundamental climate change fact that seems to have been largely ignored by this report. Furthermore, it has also been established that primary forest and even old growth forest continue to function as a sink from a landscape perspective (Luyssaert et al. 2008).</p> <ul style="list-style-type: none"> <li>• Mackey B., Prentice I.C., Steffen W., House J.I., Lindenmayer D., Keith H. and Berry, S. (2013) Untangling the confusion around land carbon science and climate change mitigation policy. Nature Climate Change 3, 552–557; doi:10.1038/nclimate1804.</li> <li>• Archer, David, Michael Eby, Victor Brovkin, Andy Ridgwell, Long Cao, Uwe Mikolajewicz, Ken Caldeira, et al. 2009. "Atmospheric Lifetime of Fossil Fuel Carbon Dioxide." Annu. Rev. Earth Planet. Sci. 37: 113–34. doi:10.1146/annurev.earth.031208.100206.</li> <li>• Luyssaert, Sebastiaan, E. Detlef Schulze, Annett Börner, Alexander Knohl, Dominik Hessenmöller, Beverly E. Law, Philippe Ciais, and John Grace. 2008. "Old-Growth Forests as Global Carbon Sinks." Nature 455 (7210): 213–15. doi:10.1038/nature07276. [Aila Keto, Australia]</li> </ul>	Noted no action needed. Text on climate mitigation in box revised (and overall text in the box substantially edited), aiming to clarify some of the aspects. The box (or any other part of the chapter/the report) does not deny the importance of existing forest as C pools and C sinks.
18193	22	25	22	34	conclusion should contain a sentence on the biophysical aspect [Julia Nabel, Germany]	Comment noted section totally updated and revised.
22313	22	26	22	26	Delete "and cost-effective". No evidence and no estimate (absolute or relative cost) has been provided. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
24057	22	26	22	26	Delete "and cost-effective". No evidence and no estimate (absolute or relative cost) has been provided. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
13259	22	28	22	34	<p>This also misses the point that forest restoration can be approached to deliver multiple goals of great benefit to climate mitigation and adaption, biodiversity, ecosystem integrity, ecosystem services and sustainable development (Cohen-Shacham 2016). These points are made well later on Page 29 lines 29-32 where the benefits of integration begin to be acknowledged.</p> <ul style="list-style-type: none"> <li>• Cohen-Shacham, Emmanuelle &amp; Walters, Gretchen &amp; Maginnis, Stewart &amp; Janzen, Christine. (2016). Nature-based Solutions to address global societal challenges. 10.2305/IUCN.CH.2016.13.en. [Aila Keto, Australia]</li> </ul>	Comment noted section totally updated and revised.
28919	22	31	22	32	I think you should avoid words like "should" and "must" and instead use more neutral words. [Jan Fuglestedt, Norway]	Accepted- text revised.
26823	22	32	22	34	The formulation is policy prescriptive and not in line with IPCC language. We suggest wording such as "Managing reforestation with both adaptation and mitigation objectives in mind can help avoid trade-offs..." rather than stating what "should" be done. [Germany]	Accepted- text revised.
22317	22	38	22	38	What is meant by "uptake rate"? Is it the net amount transferred to geological storage, or the net flux from the atmosphere to the CCS system (including related land use, foregone sequestration, etc) [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. could be both, clarified in revised sentence of the revised section

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
22319	22	38	22	38	What does the energy figures represent? Is it net energy output (net of the parasitic energy cost of CCS) or the gross energy output? Does it take into account the (presumably very substantial) energy inputs of the supply chain? [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
28921	22	38	22	38	I think you should give range, not only median. [Jan Fuglestedt, Norway]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
24061	22	38	22	38	If these figures should be critically reviewed and/or better presented. Taking the lower end of the estimates (3GtC/yr and 150 EJ/yr), and assuming that the former represents the carbon contents of the biomass used as fuel, and further assuming that the biomass contains 50% C per (oven dry) mass, the figures would give 25 MJ/kg dry mass. That is higher than the energy contents of solid biomass. Therefore, the amount of biomass corresponding to the reported "uptake" would not be able to deliver the reported amount of energy even under ideal (laboratory) conditions, and without CCS. Assuming real life conditions (less than bone dry biomass, the emissions associated with the supply chain that cannot be captured, the energy penalty of CCS, the fact that 100% capture is not possible, neither is reasonable to assume perfect and permanent storage etc.), the figures quoted appear much more optimistic than what realistic assumptions would suggest. [Zoltán Rakoncay, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
24063	22	38	22	38	What does the energy figure represent? Is it net energy output (net of the parasitic energy cost of CCS) or the gross energy output? Does it take into account the (presumably very substantial) energy inputs of the supply chain? [Zoltán Rakoncay, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
24065	22	38	22	38	What is meant by "uptake rate"? Is it the net amount transferred to geological storage, or the net flux from the atmosphere to the CCS system (including related land use, foregone sequestration, etc) [Zoltán Rakoncay, Belgium]	Comment noted section totally updated and revised. could be both, clarified in revised sentence of the revised section
18145	22	38	22	42	Have these models been tested with other technical options to produce net carbon uptake and that do not rely on land, like e.g. direct air capture in combination with CCS? To what extent are the projected uptake rates an outcome of a limited technology portfolio in the models that does not include all technical options to remove CO2 from the atmosphere? [Astrid Schulz, Germany]	Rejected - outside the scope of the chapter .
38585	22	38	22	42	This BECCS estimate is the only one in this chapter that is given for 2100 (most of the other estimates are 2050, some 2030), which is notable and rather inappropriate. Choosing a median BECCS estimate in 2100 suggests that there is an extremely high adoption rate of BECCS in IAMs, making these C and EJ estimates seem shockingly high when compared with the other estimates given (like of cropland) and especially when compared with historic LU and other estimates later in the section. Suggest choosing an earlier year/shorter timeframe for the BECCS carbon estimates and removing comparisons with historic LU estimates. [, United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
22323	22	40	22	41	It is unclear why an expansion of "cropland" is assumed, when most solid biomass to date is based on forest biomass (wood), and there is no obvious reason why it would change in the future. In any event, in a report focussing on land, it would be reasonable to give estimates of the requirement of land (area, productivity), rather than (or in addition to) numbers on "carbon uptake" and energy delivered, especially as the latter are not explained and hard to interpret. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26827	22	40	22	41	It is not clear why a range is given with three numbers: "between about 10% and 40%, or even 100%". Either more clarity is needed so it is clear why three potentials for increases in cropland are listed - e.g. with what conditions is each potential associated. Or we suggest giving the median followed by the interquartile range in round brackets, as is customary for IPCC reports. [, Germany]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
38589	22	40	22	41	Explain why these increases in cropland are happening in these scenarios (e.g., to produce X amount of crop-derived biomass for energy production/BECCS). Without any context, these numbers are not very insightful, especially to policymakers. And does cropland here mean also forestry? If not, why not? Are these ag-only scenarios? [, United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
17851	22	40	22	41	Is "20-100%" meant here? [Quentin Lejeune, Germany]	Comment noted section totally updated and revised.
24067	22	40	22	41	It is unclear why an expansion of "cropland" is assumed, when most solid biomass to date is based on forest biomass (wood), and there is no obvious reason why it would change in the future. In any event, in a report focussing on land, it would be reasonable to give estimates of the requirement of land (area, productivity), rather than (or in addition to) numbers on "carbon uptake" and energy delivered, especially as the latter are not explained and hard to interpret. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
38591	22	41	22	41	For these estimates, especially the 100% cropland increase estimate, it is essential to mention how/why (i.e., under what scenario) that 100% LUC estimate was generated, as it is a huge number and likely a pretty drastic scenario was used to get it. To not give any indication of the drivers of such results can be seen as misleading/cherry-picking and should be rectified. [, United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
22315	22	37	23	15	Section 1.3.2.2 (BECCS) Fails to explore how the assumptions on BECCS compete with the assumptions on afforestation and reforestation presented in the box above. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
323	22	37	23	15	missing discussion of Favero and Mendelsohn (Journal of the Association of Environmental and Resource Economists, 2014) and Favero et al. (Climatic Change, 2017). The key issue in Favero et al (2017) is the interaction between BECCS and carbon sequestration policies. They show that the two policies are complementary, and could produce up to 10 Gt CO2 per year in abatement at prices consistent with a 4.5 W/m2 scenario. This interaction is also addressed in a recent paper published in Energy Policy online by Baker and others ( <a href="https://doi.org/10.1016/j.enpol.2018.10.009">https://doi.org/10.1016/j.enpol.2018.10.009</a> ). They present a broader range of prices, and mitigation scenarios including carbon sequestration policies, bioenergy policies, and the two policies combined. They do not require BECCS. [Brent Sohngen, United States of America]	Rejected - outside the scope of the chapter . cost effectiveness and policy aspects are covered in chapter 6 and 7
20983	22	37	23	15	There are a number of important messages here that could be elevated to the SPM section on CDR/BECCS, such as BECCS median net C uptake rates and EJ yr-1 delivered in IAMs v size of estimated C sink on land and 2011 primary energy consumption; that confidence in the net BECCS C uptake potential is low; that bioenergy provision under politically unstable conditions may be an issue; that growth of bioenergy crops pose challenges for food prod and prices etc. [, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for the positive comment. will be kept in mind hen revising the SPM

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38583	22	37	23	15	Missing discussion of Favero and Mendelsohn (Journal of the Association of Environmental and Resource Economists, 2014) and Favero et al. (Climatic Change, 2017). The key issue in Favero et al. (2017) is the interaction between BECCS and carbon sequestration policies. They show that the two policies are complementary, and could produce up to 10 Gt CO2 per year in abatement at prices consistent with a 4.5 W/m2 scenario. This interaction is also addressed in a recent paper published in Energy Policy online by Baker and others ( <a href="https://doi.org/10.1016/j.enpol.2018.10.009">https://doi.org/10.1016/j.enpol.2018.10.009</a> ). They present a broader range of prices, and mitigation scenarios including carbon sequestration policies, bioenergy policies, and the two policies combined. They do not require BECCS. [United States of America]	Rejected - outside the scope of the chapter . cost effectiveness and policy aspects are covered in chapter 6 and 7
27737	22	37	23	15	In this section it should be added that even with large-scale deployment of BECCS, temperatures might not go down, despite of the negative emissions from BECCS (Muri 2018, ERL). This depends on the land management and what regions are prioritised for bioenergy. i.e. prioritising tropical forested areas for BECCS may warm the climate, whilst mid-latitudinal BECCS has a higher potential for lowering temperatures and atmospheric CO2 concentrations. This should be added to this section. [Helene Muri, Norway]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
4031	22	37	23	15	In this section, besides mentioning potentials, it is important to also highlight the importance of location, and the tradeoffs between Bioenergy/BECCS and Afforestation/Reforestation since they both compete for land. This is the greatest advance recent studies have made concerning bioenergy and BECCS. A recent paper by Harper et al. (2018) highlighted the tradeoffs of BECCS/afforestation, showing that for most locations afforestation offers greater mitigation. The importance of location and other uncertainties concerning bioenergy production (and how it may be counter-productive on many locations) is also highlighted in Daioglou et al. (2017). These tradeoffs, and how to manage them, are a major knowledge gap in operationalizable potential of land based mitigation as a whole.  References: Harper, A., Powell, T., Cox, P., House, J., Huntingford, C., Lenton, T., Sitch, S., Burke, E., Chadburn, S., Collins, W., Comyn, E., Daioglou, V., Doelman, J., Hayman, G., Robertson, E., van Vuuren, D.P., Wiltshire, A., Webber, C.P., Bastos, A., Boysen, L., Ciais, P., Devaraju, N., Jain, A.K., Krause, A., Poulter, B. & Shu, S. Land-use emissions play a critical role in land-based mitigation for Paris climate targets. Nature communications 9, doi: 10.1038/s41467-018-05340-z (2018).  Daioglou, V., Doelman, J., Stehfest, E., Müller, C., Wicke, B., Faaij, A., & van Vuuren D.P., Greenhouse gas emission curves for advanced biofuel supply chains. Nature Climate Change 7, 920-924, 10.1038/s41558-017-006-8 (2017). [Vassilis Daioglou, Netherlands]	Comment noted section totally updated and revised. land competition added (incl Harper et al ref.)
24059	22	37	23	15	Section 1.3.2.2 (BECCS) Fails to explore how the assumptions on BECCS compete with the assumptions on afforestation and reforestation presented in the box above. It appears possible that both approaches may be counting on the availability of some of the same land, in which case they are mutually exclusive. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
26825	22	38	23	3	The comparisons of today's and modelled values in EJ, Gt and cropland are very useful information. Displaying these values in a small table would help communicate them more effectively and increase the likelihood of them being communicated further. [Germany]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38587	22	38	23	6	This paragraph is VERY problematic. It is imperative that a statement addressing the scenarios being used for the cited estimates -- specifically the aggressive use of BECCS by some IAMs to achieve deep decarbonization 1.5/2°C scenarios -- be added to this paragraph. To present these estimates then compare them with historic LUC and related emissions grossly misrepresents the modelling and the results, and is setting the stage for this report to be labeled alarmist which is counterproductive. [, United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS; still, putting simulated numbers in context should not be considered alarmist but helps the reader to understand the magnitude.
22321	22	38	23	15	See also general comment on entire report: "balanced approach to large-scale, land-based mitigation"  The energy figure quoted in line 38 should be explained: Is it net energy output (net of the parasitic energy cost of CCS) or the gross energy output? Does it take into account the (presumably very substantial) energy inputs of the supply chain?  A section of the report on bioenergy should also bring together some of the caveats mentioned in this chapter concerning the potential energy yield of bioenergy and BECCS and ability of existing models to measure this. Related caveats exist in other sections of the report. This would also need to contribute to a discussion of the wider considerations and caveats concerning bioenergy (see general comment for an incomplete list of bioenergy mini-sections in different parts of the report). [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
4357	22	13			BECCS Acronym is not introduced, the full initials are introduced on page 22, line 37 [Mastura Mahmud, Malaysia]	Accepted- text revised.
11757	22	25			Suggest to add confidence levels where appropriate in this concluding paragraph. [Hans Poertner and WGI TSU, Germany]	Accepted- text revised.
7297	23	40	3	42	Meaning of sentence unclear. [Debra Roberts, South Africa]	Taken into account - combined with other comment. Sentence rephrased for improved clarity
38593	23	1	23	3	Suggest either remove this sentence (especially if preceding paragraph does not remove the 2100 estimates) or make it clearer that the 3.5 value is net flux, not the land carbon sink as stated. [, United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
13163	23	4	23	4	This sentence should be reflected in the Key messages in the SPM [David Cooper, Canada]	Thank you for the positive comment. will be kept in mind when revising the SPM
5003	23	4	23	4	The reasons of low confidences of the net BECCS is explained after "due to" with quite a long list of examples. Suggest saying "due to various uncertainties arising from such as" and continue the list of issues. [, Japan]	Accepted- text revised.
29987	23	4	23	4	Please rephrase because there is agreement in energy modelling studies that bio-energy has high net potential to limit emissions or result in net negative emissions. The uncertainty indeed is much larger on the land-use side and greatly depends on location. If located well, BECCS is certain to have net carbon uptake. In section 2.7.1.2.5 a nuanced analysis is provided that should be taken into consideration here. Relevant references: (1) van der Hilst, Floor. "Location, location, location." Nature Energy 3.3 (2018): 164. (2) DAIOGLOU, V., DOELMAN, J. C., STEHFEST, E., MÜLLER, C., WICKE, B., FAALJ, A. & VAN VUUREN, D. P. 2017. Greenhouse gas emission curves for advanced biofuel supply chains. Nature Climate Change, 7, 920. [, Netherlands]	Comment noted section totally updated and revised. Agreed that BECCS has potential w.r.t. energy, this is not disputed. But in simulation models at large scale the cponflict with biodiversity, food water, and other ecosystem services is highlighted in multiple studies (which are listed in the section)

**IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
325	23	4	23	10	This discussion could be enhanced with references to the forestry literature which shows the effect of increasing demand for forests encourages increased management of forests and thus increased carbon storage in forests. See Favero and Mendelsohn (Journal of the Association of Environmental and Resource Economists, 2014); Tian et al. (Land Economics. 94(1): 97-113.); and Kim et al (Resource and Energy Economics. 53:198-219). [Brent Sohngen, United States of America]	Comment noted section totally updated and revised. see response 38597
32755	23	4	23	10	An additional paper, which compares the scale of bioenergy use and land-use change in IAM scenarios for RCP2.6 to sustainability constraints in the literature, could be added to the references for this sentence: Dooley K, Christoff P, & Nicholas KA. (2018) Co-producing climate policy: negative emissions, land-use and sustainable futures. Global Sustainability, 1, e3: 1–10. <a href="https://doi.org/10.1017/sus.2018.6">https://doi.org/10.1017/sus.2018.6</a> [Dooley Kate, Australia]	references useful some or all added.
38595	23	4	23	10	Studies in the forestry literature focus on market effects, including how increased demand for forest products can lead to increased management of and carbon storage in forests (e.g., Favero and Mendelsohn (Journal of the Association of Environmental and Resource Economists, 2014); Tian et al. (Land Economics. 94(1): 97-113.); and Kim et al (Resource and Energy Economics. 53:198-219). [United States of America]	Rejected - outside the scope of the chapter . more discussed in chapter 4
38597	23	4	23	10	This discussion could be enhanced with references to the forestry literature that shows the effect of increasing demand for forests encouraging increased management of forests thus increased carbon storage in forests. See Favero and Mendelsohn (Journal of the Association of Environmental and Resource Economists, 2014); Tian et al. (Land Economics. 94(1): 97-113.); and Kim et al (Resource and Energy Economics. 53:198-219). [United States of America]	Rejected - outside the scope of the chapter . more discussed in chapter 4
5351	23	4	23	10	I think it is very important to mention not only direct forest clearance for energy crops assumed to be used for BECCS, but also indirect effects, e.g. energy crops replacing food crops or grazing, which in turn moves somewhere else and results in deforestation there, and also the option to afforest land not used for cropping, grazing or bioenergy. See the large discussion on iLUC emerging from Searchinger et al. 2007 and many others thereafter. [Helmut Haberl, Austria]	Rejected - outside the scope of the chapter . indirect LUC is a challenge. Indirect LUC is discussed in chapter 2 (and to lesser degree in chapters 5 and 6)
7497	23	4	23	15	Using BECCS to draw down the between 2 and 10 Gt CO2 annually that is mentioned in IAM reports would require the dedication of land equivalent to the size of India, or even twice this amount. See Anderson K. & Peters G. (2016) The trouble with negative emissions, Science 354:182–183, 183. Land requirements for BECCS could accelerate loss of forest and grassland, leading to more species loss than scenarios without BECCS. See Williamson, P., Emissions reduction: Scrutinize CO2 removal methods (Nature Comment, 10 February 2016). Large-scale BECCS could put significant strains on global freshwater use, land-system change, biosphere integrity, and biogeochemical flows. Vera Heck et al., Biomass-based negative emissions difficult to reconcile with planetary boundaries, Nature Climate Change (2018). [Durwood Zaelke, United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
7499	23	4	23	15	Biomass burning releases pollutants harmful to human health, similar to coal burning. See Sierra Club, The Conventional Biomass Industry in California. [Durwood Zaelke, United States of America]	Noted no action needed. Too detailed for introd. Chapter. Aerosols covered in chapter 2, see also X-chapter box on fire.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7501	23	4	23	15	BECCS is also further complicated by the fact that it is not carbon neutral in the near-term, which is crucial for mitigating emissions and avoiding critical tipping points. See Danielle Venton, Core Concept: Can bioenergy with carbon capture and storage make an impact?, PNAS (2016); Mary S. Booth, Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy, ENVIRON. RES. LETT. 13 (21 February 2018); Sterman J. D., et al. (2018) Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy, ENVTL. RESEARCH LETTERS 13(015007):1–10, 1 (“We simulate substitution of wood for coal in power generation, estimating the parameters governing NPP and other fluxes using data for forests in the eastern US and using published estimates for supply chain emissions. Because combustion and processing efficiencies for wood are less than coal, the immediate impact of substituting wood for coal is an increase in atmospheric CO2 relative to coal. The payback time for this carbon debt ranges from 44–104 years after clear-cut, depending on forest type—assuming the land remains forest. Surprisingly, replanting hardwood forests with fast-growing pine plantations raises the CO2 impact of wood because the equilibrium carbon density of plantations is lower than natural forests. Further, projected growth in wood harvest for bioenergy would increase atmospheric CO2 for at least a century because new carbon debt continuously exceeds NPP. Assuming biofuels are carbon neutral may worsen irreversible impacts of climate change before benefits accrue. Instead, explicit dynamic models should be used to assess the climate impacts of biofuels.”). See, also Duncan Brack, Wood Is Not a Carbon-Neutral Energy Source (1 March 2017). [Durwood Zaelke, United States of America]	reference noted but point already covered by current used citations. in addition: section considerable revised
38599	23	4	23	15	The scientific literature on large-scale applications of bioenergy presents widely diverging views. The text of this paragraph, and the literature cited in this paragraph, does not represent this range of views, and is very pessimistic about BECCS. Given the prominence of BECCS in the IPCC 1.5°C Special Report, a more balanced approach is needed. The cited literature is particularly lacking an economic perspective, which would help assess the trade-off between energy system mitigation and BECCS. The question to be addressed here is: "what is the right amount of BECCS?"; and not whether we should or should not use BECCS. [United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS and further discussion in chapter 6
7577	23	4	23	15	Using BECCS to draw down the between 2 and 10 Gt CO2 annually that is mentioned in IAM reports would require the dedication of land equivalent to the size of India, or even twice this amount. See Anderson K. & Peters G. (2016) The trouble with negative emissions, Science 354:182–183, 183. Land requirements for BECCS could accelerate loss of forest and grassland, leading to more species loss than scenarios without BECCS. See Williamson P. (2016) Emissions reduction: Scrutinize CO2 removal methods, Nature Comment. Large-scale BECCS could put significant strains on global freshwater use, land-system change, biosphere integrity, and biogeochemical flows. Vera Heck et al. (2018) Biomass-based negative emissions difficult to reconcile with planetary boundaries, Nature Climate Change. [Kristin Campbell, United States of America]	Comment noted section totally updated and revised. see also new cross-chapter box on BECCS
7579	23	4	23	15	Biomass burning releases pollutants harmful to human health, similar to coal burning. See Sierra Club, The Conventional Biomass Industry in California. [Kristin Campbell, United States of America]	Noted no action needed. Too detailed for introd. Chapter. Aerosols covered in chapter 2, see also X-chapter box on fire.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7581	23	4	23	15	BECCS is also further complicated by the fact that it is not carbon neutral in the near-term, which is crucial for mitigating emissions and avoiding critical tipping points; see Chatham House (2017) Woody Biomass for Power and Heat: Impacts on the Global Climate. [Kristin Campbell, United States of America]	reference noted but point already covered by current used citations. in addition: section considerable revised
29983	23	11	23	11	Delete the phrase 'It is virtually certain that' since there are many studies that investigate policies that will prevent negative effects including diet change food aid and agricultural intensification. [, Netherlands]	Comment noted section totally updated and revised.
29985	23	11	23	12	Rephrase into: "Growth of bioenergy crops could pose..." instead of "poses". [, Netherlands]	Comment noted section totally updated and revised.
13165	23	11	23	13	This sentence should be reflected in the Key messages in the SPM [David Cooper, Canada]	Thank you for the positive comment. will be kept in mind when revising the SPM
26833	23	11	23	15	This statement is strong, clear, virtually certain and supported by a large body of evidence. It is also highly politically relevant and should therefore be given more prominence. We therefore suggest raising it into the Executive Summary as well as the SPM. Please refer also to other chapters where this issue is addressed. [, Germany]	Thank you for the positive comment. will be kept in mind when revising the SPM; cross reference to other chapters added
32437	23	11	23	15	This is an important conclusion that should be properly reflected in the Summary for Policy Makers as well [Simone Lovera-Bilderbeek, Paraguay]	Thank you for the positive comment. will be kept in mind when revising the SPM
29991	23	15	23	15	Please add the following sentence: However, other studies investigate policies that will prevent negative effects including diet change food aid and agricultural intensification. Fujimori, Shinichiro, et al. "Inclusive climate change mitigation and food security policy under 1.5° C climate goal." Environmental Research Letters 13.7 (2018): 074033. and 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. [, Netherlands]	Comment noted section totally updated and revised.
22325	23	16	23	16	The heading of 1.3.2.3 mentions "mitigation cost", but no estimate of cost (absolute or relative) is given. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. Accepted. Section revised and "mitigation costs" in title replaced by Economics of mitigation to bring out both the costs and benefits of early action
24069	23	16	23	16	The heading of 1.3.2.3 mentions "mitigation cost", but no estimate of cost (absolute or relative) is given. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. Accepted. Section revised and "mitigation costs" in title replaced by Economics of mitigation to bring out both the costs and benefits of early action
26835	23	16	23	28	Please revise to improve comprehensibility of the different concepts ("GDP loss", "consumption loss" or "reductions in growth rates", SCC) including applications and weaknesses of these concepts. A better understand of these issues is of key policy relevance. [, Germany]	reference noted but point already covered by current used citations. Accepted. Section revised and weak concepts listed removed.
28923	23	16	23	28	It is not clear to me why Social Cost of carbon is getting so much focus here. (The SCC contains a damage function and discount rate, and these crucial elements are not discussed. ) It is unclear how SCC is used on mitigation strategies, especially when a goal is defined. Wouldnt it be better to focus on Marginal Abatement Costs instead or in addition? [Jan Fuglestedt, Norway]	Noted. Section revised SCC rewritten and MAC added
28925	23	16	23	28	"Welfare loss" could probably be added to the list of how costs are given. [Jan Fuglestedt, Norway]	Noted. Section revised - welfare loss reframed in the revised section

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38601	23	17	23	39	There is an element missing here or at least some confusion. Lines 17-28 are focusing on one specific aspect of 'mitigation costs' -- through the lens of 'cost to society'/macro perspective rather than project-related costs, though the term 'mitigation costs' could be used for either (and usually applies to project costs in quantitative mitigation studies). Lines 29-39 appear to focus more on the analysis of mitigation costs in the context of costs associated with mitigation options -- including actual capital costs, land rental rates, labor, transportation, transaction costs, as well as other costs like opportunity costs. Suggest adding text to differentiate between these pretty different aspects of mitigation costs. For example, in line 17: "The overarching societal costs associated with GHG emissions and potential implications of mitigation activities can be measured by various metrics..." Line 29: "the costs associated with mitigation (both project, e.g., capital costs, land rental rates - and in some cases social) generally increase with stringent mitigation targets..." [United States of America]	Noted. Section revised and suggested text inserted
38603	23	19	23	26	The brief discussion of the social cost of carbon (SCC) in Section 1.3.2.3 insufficient to cover the complexities of the topic. Furthermore, the section is focused on mitigation costs, and the discussion of SCC, a measure of mitigation benefits, is out of place here. Given that the IPCC 1.5°C Special Report includes a much more comprehensive discussion of the SCC (Cross-Chapter Box 5), and the SCC is not directly relevant to this section, the discussion of SCC should be struck from Chapter 1. [United States of America]	reference noted but point already covered by current used citations. SCC revised and references to SR15 added
22327	23	21	23	21	"Discount rate" is rightly mentioned as an important parameter, but the text provides no substantive detail that would help contextualise it. It would be important to note the range of discount rates typically assumed by the models, the impact of discount rates on the cost-effectiveness of different options and perhaps some theoretical guidance related to the "right" rates to use (in light of intergenerational equity, atmospheric residence time of GHGs, urgency to act, etc.). [Anastasios Kentarchos, Belgium]	Rejected. Discount rate is introduced. But detail discussion of discount rate is outside the scope of the chapter/section
24071	23	21	23	21	"Discount rate" is rightly mentioned as an important parameter, but the text provides no substantive detail that would help contextualise it. It would be important to note the range of discount rates typically assumed by the models, the impact of discount rates on the cost-effectiveness of different options and perhaps some theoretical guidance related to the "right" rates to use (in light of intergenerational equity, atmospheric residence time of GHGs, urgency to act, etc.). [Zoltán Rakoncay, Belgium]	Rejected. Discount rate is introduced. But detail discussion of discount rate is outside the scope of the chapter/section
38605	23	28	23	28	Recommend deleting bioenergy as an example here. Presumably this is here due to the estimates presented earlier in this section, but the estimates given were from deep decarbonization scenarios in 2100 with extremely high BECCS adoption. In some cases and especially in the near term, bioenergy production can start to scale up without massive land-use changes so this general example is misrepresenting the potential magnitude of bioenergy impacts by putting it on the same footing as afforestation LU impacts. [United States of America]	Taken into account - combined with other comment.
13045	23	29	23	32	This sentence is used in the introduction of this chapter, but with the addition of the final phrase. The addition of this phrase "which have been demonstrated by the uptake of land use policies" helps with understanding this sentence. This is lacking in the introduction. [Kristi Tabaj, United States of America]	Noted. The paragraph was revised
277	23	29	23	32	Land use and land utilisation policy [Mahak Agrawal, India]	Noted. Text corrected

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
327	23	32	23	39	Griscom 2017 didn't actually calculate costs, they just used a bunch of earlier studies that did actually estimate costs. This report should cite the underlying studies that do assess costs of land based activities that have been accomplished over the years, and in particular the ones in Griscom that have been used by that study. Those studies include Sohngen and Mendelsohn (American Journal of Agricultural Economics, 2003); Kindermann et al. (PNAS; 2008); Golub et al. (PNAS, 2012); Favero et al. (Climatic Change, 2017); Baker et al. (Energy Policy online in 2018). The last sentence that refers to a rebound effect is accounted for in all of these studies cited above. [Brent Sohngen, United States of America]	Noted Additional relevant references added
38607	23	32	23	39	Griscom 2017 didn't actually calculate costs, they just used a bunch of earlier studies that estimated costs. This report should cite the underlying studies that do assess costs of land-based activities that have been accomplished over the years, and in particular the ones in Griscom that have been used by that study. Those studies include Sohngen and Mendelsohn (American Journal of Agricultural Economics, 2003); Kindermann et al. (PNAS; 2008); Golub et al. (PNAS, 2012); Favero et al. (Climatic Change, 2017); Baker et al. (Energy Policy online in 2018). The last sentence that refers to a rebound effect is accounted for in all of these studies. [, United States of America]	Noted. Additional relevant references added
4373	23	39	23	40	The lack of understanding which and how important process in climate, land and socio-economic systems should best be described through algorithms are chief sources of uncertainty across models. Grammatical error? [Mastura Mahmud, Malaysia]	Rejected. Not clear what the comment actually refer to
38609	23	40	23	40	Explain how or give an example why it lowers mitigation opportunity cost. [, United States of America]	reference noted but point already covered by current used citations. Sentence rephrased for improved clarity
38611	23	42	23	42	After the word 'adaptation', add an example of an adaptation activity and after the word 'mitigation' add an example of a mitigation option that work together to achieve this end (to differentiate this from the reason stated in the second half of the sentence). [, United States of America]	Taken into account - combined with other comment. Noted. Examples added
16911	23	16	24	2	Paragraph 1.3.2.3 lacks substance, in particular the concept of 'mitigation cost' is rather abstract. The uncertainties in the data suggest that using a global value can be more misleading than helpful. [Roland Hiederer, Italy]	Noted. Section substantially revised and reframed in terms of economics of mitigation (and not just costs)
26829	23	2			Is this referring to the net sink? [, Germany]	Comment noted section totally updated and revised.
26831	23	5			Please clarify "CCS energy demand". [, Germany]	Accepted- text revised.
26837	23	28			Please explain the meaning of "rebound effect" in this context. [, Germany]	Noted. Rebound effect explained
26839	23	29			Please provide context and mention the costs of inaction, i.e. the impacts of climate change which are generally higher than mitigation costs as stated in other parts of the report. [, Germany]	Noted. Section revised and costs of inactions included in the framing
4371	23	41			trough replaced by through [Mastura Mahmud, Malaysia]	Accepted- text revised.
11673	23	41			change "trough" to "through" [Paul Dirmeyer, United States of America]	Accepted- text revised.
11675	23	42			change "generate" to "generates" [Paul Dirmeyer, United States of America]	Accepted- text revised.
4335	24	4	24	4	The title of 1.3.3 Uncertainties in assessing land processes in the climate system is not suitable, because it is understandable that the uncertainty comes from the process. In order to correspond with the titles mentioned above, it is suggested that it should be changed as 1.3.3 Land processes and its uncertainties in the climate system. [Guangsheng Zhou, China]	Accepted- text revised. title revised (however suggestion was not fully adopted)

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16913	24	5	24	10	The IPCC assessment reports use the estimates of confidence not only for "the state of scientific understanding". Confidence may also refer to the uncertainty in the data available, the model used or the scenario investigated. It does not seem to be appropriate to equate the concept of uncertainty as used in the assessment reports with the concepts of the SRCL as given here. [Roland Hiederer, Italy]	Comment noted section totally updated and revised.
26843	24	7	24	10	This sentence provides new definitions of detection and attribution that are not consistent with previous IPCC reports, please check. [, Germany]	Accepted- text revised.
38613	24	11	24	28	The first paragraph of Section 1.3.3.1 discusses the uncertainties in observations. What is missing here is a discussion of the methods commonly used in GHG inventory accounting of LULUCF Carbon Stock Change under UNFCCC reporting requirements, the uncertainties associated with those methods, and the uncertainties in historical estimates. Generally, the chapter is missing a good discussion of what the current estimates are of the global LULUCF carbon stock change, how it has evolved in recent decades, and what the uncertainties are in those historical estimates, including how estimates of historical LULUCF carbon stock changes have themselves changed as methodologies have been updated. [, United States of America]	Accepted- text revised. The IPCC LULUCF guidelines are well addressed by all the IPCC cycle of reporting, and here we mostly focus on primary sources of data with related uncertainties covering also measurements which are used beyond carbon and other GHG estimates. We have included however reference ( Grassi et al.2018 ) to address ways to reconcile different approaches including LULUCF inventories based on IPCC guidelines.
16917	24	11	24	28	The paragraph is rather brief in the presentation of the uncertainties related to land use. One may argue about the temporal period of land cover from satellite images, since it now stretches back to the 1970s. One may also argue about the availability of data on the type of vegetation cover. Yet, the problem arising from satellite images in evaluating land use and land use change is that the data are of limited is the confusion between land use and land cover. In addition, the data are limited with respect to management practices. [Roland Hiederer, Italy]	Accepted- text revised. The text has been changed addressing more the progress in reducing uncertainties and the cited literature is covering also the progresses in temporal continuity of satellite products.
16919	24	19	24	26	The restriction of the response of soil organic carbon to changes in land use to remote sensing data is quite misleading. The matter is introduced by "Analogously", but the text refers to remote sensing data and ignores that the bulk of information comes from field trials and in situ measurements. Since the text presented under the heading 'land use' includes soil organic carbon this should be reflected in the header or given its own paragraph. [Roland Hiederer, Italy]	Accepted balance revised. The text has been changed trying to reflect in a more balanced way the uncertainty issues of both remote sensing and in situ data
25301	24	21	24	21	Kostyanovsky et al. 2018 is not in references list. [, France]	references useful some or all added.
16915	24	21	24	21	Missing comma in 'Valayamkunnath et al. 2018Kostyanovsky'. [Roland Hiederer, Italy]	Accepted- text revised.
16921	24	26	24	28	In the simplified form stated here this is absolutely not the case. It depends on the uncertainties in the data coming from different sources and the model uncertainties. It is strongly suggested to modify the sentence to reflect the conditions, also given in the articles referenced. [Roland Hiederer, Italy]	Accepted- text revised. Thanks. Due to limited space we modified the sentence giving the reader the possibility to check literature.
14615	24	29	24	37	Suggest that authors provide examples of specific early warning systems in this section (e.g. drought early warning systems, or early warning systems for famine etc.) [, Canada]	Accepted- text revised. The text has been merged in observation uncertainty. The included references report examples of EWS
26845	24	29	24	37	Not only weather forecast and early warning systems, but also seasonal forecast is increasingly becoming important for decision making. Please add. [, Germany]	Accepted- text revised. OK added reference to seasonal climate predictions

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16923	24	29	24	37	The paragraph seems to be unrelated to the heading and the purpose of the document. At least some examples of early warning systems should be given, not just a reference to Chapter 7. The systems are generally part of precision farming techniques and target a very short timeframe, usually a single growing period. [Roland Hiederer, Italy]	Accepted- text revised. In the framing chapter there is not enough space to cover specific examples. However the text report several applications of EWS and cited literature refer also to specific examples. We added a short wording to identify the short time scale as correctly pointed out by reviewer.
23365	24	35	24	37	Suitability also depends enormously on whether farmers have faith in the expert systems and advice -- the benefits are often exaggerated [John Dixon, Australia]	Accepted- text revised.
3311	24	39	24	39	First sentence should read 'The lack of understanding OF which and how important processes in climate, land and ... [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
20985	24	39	24	40	consider re-structuring sentence as it currently isn't clear. [, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
8297	24	39	24	40	This sentence is a bit too abstract. For natural process modeling, perhaps it can refer to Chapter 2 which describes certain new processes that are now considered important and becoming incorporated into DVGMs and Earth System Models. [Kaoru Kitajima, Japan]	Accepted- text revised.
15591	24	39	24	40	I don't understand this. Should be clarified. [Tuomo Kalliokoski, Finland]	Accepted- text revised.
40437	24		24		This should provide a framing of the assessment of uncertainty in the report and looks like an assessment, not always consistent with the outcomes of all chapters. What about deep uncertainty? This notion is introduced in SROCC and is also relevant for land. [Valerie Masson-Delmotte, France]	Comment noted section totally updated and revised. The concept of deep uncertainty has been introduced already in the SOD and is maintained here. WE have added more general information about uncertainty and confidence in IPCC reports and provide more detailed cross-references to the sub-sections of chapter 7 that deal with risks and uncertainties.
24073	24	4	25	35	This section, in particular section 1.3.3.1, should point out the uncertainty related to the lack of representation of forest management in IAMs (cf p.19, line 1). To the extent it can be deciphered, it focuses on the estimation of land use changes, largely ignoring the crucial role of carbon stock changes caused by management in forest not subject to land-use change. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
38615	24	39	25	12	Disagree that the chief area of uncertainty in modeling land use lies with how to describe algorithms. That is an important issue, especially for bio/geophysical models. Other key areas of uncertainty lie in model structure, model inputs, and assumptions. These elements should be highlighted here as well and given equal weight to algorithms. Also, though model intercomparisons are great to help test for uncertainties between models and improve the robustness of projections estimates (albeit with caution), there are other important and established ways of testing models/model outputs for uncertainties, including running sensitivities, especially with certain model types (optimization models). Being broader than GCMs and IAMs is important for this report and this section. [, United States of America]	Comment noted section totally updated and revised. Section has been shortened, but hope that some of the misunderstanding have been removed in the revisions#

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26841	24	4	32	12	<p>Section 1.3.3. seems to respond to the bullet "Treatment of uncertainties" of the indicate list of issues of the IPCC's outline decision. However, the current draft lacks the information on the IPCC's treatment of uncertainties according to the guidance (referring to Mastrandrea, not Allen, please) including the figure showing how confidence is based on evidence and agreement. Please add this information.</p> <p>In addition, it is unclear to us, why uncertainty issues are addressed both in chapter 1 and in chapter 7 in the current draft. Chapter 1 lists various sources of uncertainties but lacks explanations and the relevance of these uncertainties for key findings of the SRCL. E.g. the uncertainty associated with early warning systems is fundamentally different to the uncertainty associated with the understanding of processes in climate, land, and socio-economic systems. The current presentations of uncertainties might wrongly imply a deep lack of knowledge and an unknown level of uncertainty to the reader suggesting that the uncertainty on climate change issues is larger than the uncertainty associated with other political decisions. This cannot be the intention of the authors? We strongly suggest revising section 1.3.3. to provide an introduction of the IPCC's uncertainty language and moving the discussion on uncertainties including their relevance for the findings of the report and for potential political decision making based on these findings to chapter 7. Please streamline both chapters and avoid duplication.</p> <p>In addition, we appreciate that each SRCL chapter provides a section on "knowledge gaps" (as in the SR1.5, but please see also our comment on the "Entire Report" regarding knowledge gaps) and chapter 1 should please follow this approach instead of scattering the information across thematic sections. [, Germany]</p>	<p>Comment noted section totally updated and revised. More information added, and text cross-checked again w. chapter 7. We do feel, however, that it is necessary to introduce also some concepts related to the uncertainty in decision making. We do not wish to imply that the uncertainty w.r.t. climate decision making is larger than w.r.t. other decision making; the revised (shortened) subsection clarifies this misunderstanding.</p>
22329	24	11	32	12	<p>The box on scenarios provides useful information but is far too long. Please consider how it could be a) shortening; b) integrated more closely with the most relevant parts of the main text. [Anastasios Kentarchos, Belgium]</p>	<p>Comment noted section totally updated and revised.</p>
4369	24	16			<p>SM1 On pg 80, table is written as Table S1 [Mastura Mahmud, Malaysia]</p>	<p>Accepted- text revised.</p>
11677	24	21			<p>change "2018Kostyanovsky" to "2018; Kostyanovsky" [Paul Dirmeyer, United States of America]</p>	<p>Accepted- text revised.</p>
2215	24	41			<p>"trough" should be "through" [Michelle North, South Africa]</p>	<p>Accepted- text revised.</p>
16925	25	3	25	6	<p>This statement is too general.</p> <p>It does not distinguish between modelling scenarios, i.e. future conditions, and historic or present conditions. For historic and present conditions a comparison to data from actual measurements are the preferred method.</p> <p>The use of a mean value derived from several models or repeated runs from a single model has its limitations, in particular when models are not independent. Other problems with averaging model results are at least presented in the next sentence.</p> <p>It is suggested to revise this part with respect to the conditions and interactions modelled, the temporal range and stress the remaining uncertainties of model comparisons, as given in lines 11-12. [Roland Hiederer, Italy]</p>	<p>Accepted- text revised.</p>
16927	25	13	25	13	<p>The use of the plural of 'future' could be argued about. It is used, but in a different context. Consider changing "unknown futures" to a less controversial term, such as "unknown developments". [Roland Hiederer, Italy]</p>	<p>Accepted- text revised.</p>

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
33417	25	13	25	35	The following reference from the ICSU synthesis of the Anthropocene is a milestone on the topic: Bai X., van der Leeuw S., O'Brien K., Berkhout F., Biermann F., Brondizio E.S., Cudennec C., Dearing J., Duraiahapp A., Glaser M., Revkin A., Steffen W., Syvitski J., 2016. Plausible and desirable futures in the Anthropocene: A new research agenda. Global Environmental Change, 39, 351-362, <a href="http://dx.doi.org/10.1016/j.gloenvcha.2015.09.017">http://dx.doi.org/10.1016/j.gloenvcha.2015.09.017</a> [Christophe Cudennec, France]	references useful some or all added. This is a more conceptual paper on anthropocene and future tranformations. Section 4.2. of the paper discusses scenario approaches in a qualitative way.
38617	25	14	25	16	Need to make it clearer that this sentence intends to compare between models. For example: Since AR5, an increasing number of studies have highlighted the large differences that exist BETWEEN MODELS in the extent and location of future cropland, pasture and forest, both between scenarios, but also even within a single scenario. [, United States of America]	Accepted- text revised. Agreed and this correction has been made to the revised text
16929	25	14	25	22	This part could be placed in the previous paragraph. It does not cover the uncertainty of future developments, but the modelling effort. [Roland Hiederer, Italy]	Comment noted section totally updated and revised. This part of the text has been completely revised
32757	25	17	25	19	This same finding, that differences in projections are attributable to model structures more than scenario characteristics, is supported by Dooley K, Christoff P, & Nicholas KA. (2018) Co-producing climate policy: negative emissions, land-use and sustainable futures. Global Sustainability, 1, e3: 1–10. <a href="https://doi.org/10.1017/sus.2018.6">https://doi.org/10.1017/sus.2018.6</a> , which found that bioenergy demand was better explained by individual models assumptions than SSP narratives. [Dooley Kate, Australia]	reference noted but point already covered by current used citations. It's good to have additional evidence, although we are limited by a word count for the box and so, cannot include additional references.
38619	25	17	25	19	Agree with this sentence, though suggest moving it to previous section, as this sentence focuses on uncertainties due to modal structure and the previous section is supposed to cover that though it currently does not cover it adequately. [, United States of America]	Accepted- text revised. Agreed and the text has been restructured accordingly
17853	25	17	25	22	What is also of relevance here is the fact that another layer of uncertainty is added when land cover projections from even one single land-use model are interpreted by for example climate models to look at the impact of future changes in land-cover on climate. This is because climate models have different representations of land-use systems and thus may only capture a small part of the changes projected by the land-use model, which would lead to an underestimated impact of future land-cover changes on climate. See Di Vittorio, A. V., Chini, L. P., Bond-Lamberty, B., Mao, J., Shi, X., Truesdale, J., Craig, A., Calvin, K., Jones, A., Collins, W. D., Edmonds, J., Hurtt, G. C., Thornton, P., and Thomson, A.: From land use to land cover: restoring the afforestation signal in a coupled integrated assessment–earth system model and the implications for CMIP5 RCP simulations, Biogeosciences, 11, 6435-6450, <a href="https://doi.org/10.5194/bg-11-6435-2014">https://doi.org/10.5194/bg-11-6435-2014</a> , 2014. [Quentin Lejeune, Germany]	Noted no action needed. Agreed, although the focus of this box is on uncertainties in the land system, rather than climate system feedbacks of land use change.
18195	25	19	25	22	maybe shortly introduce RCPs and SSPs? At least abbreviations [Julia Nabel, Germany]	Accepted- text revised. This is now done in the main body of the Ch1 text
28927	25	20	25	20	I think you need to explain what is meant by "harmonised" here. [Jan Fuglestvedt, Norway]	Accepted- text revised. The word has been deleted
4029	25	30	25	30	The phrase "...using a solution-oriented scenario analysis approaches..." needs to be corrected appropriately [Vassilis Daioglou, Netherlands]	Accepted- text revised.
765	25	32	25	32	Drop '(Erb et al. 2016b)'. [Edson Leite, Brazil]	Accepted- text revised.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
32759	25	34	25	35	When referring to the usefulness of normative scenarios, recent scenarios that have achieved 1.5C temperature limits without the reliance on BECCS or large-scale land-use may also be worthwhile to mention: 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., Havlík, 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. <a href="https://doi.org/10.1038/s41560-018-0172-6">https://doi.org/10.1038/s41560-018-0172-6</a> Holz, C., Siegel, L.S., Johnston, E., Jones, A.P., Sterman, J., 2018. Ratcheting ambition to limit warming to 1.5 °C—trade-offs between emission reductions and carbon dioxide removal. Environ. Res. Lett. 13, 064028. <a href="https://doi.org/10.1088/1748-9326/aac0c1">https://doi.org/10.1088/1748-9326/aac0c1</a> [Dooley Kate, Australia]	Taken into account . The BECCS issue has been substantially reduced in this box, since another cross-chapter box focuses explicitly on this topic. The new box on bioenergy is located in Chapter 6 of this assessment.
38621	25	34	25	35	Yes, it is important to be able to develop scenarios of ideal sustainable futures, BUT it is also important to construct scenarios that reflect near-term possible/probable/implementable policy constructs. The latter is crucial for offering policymakers estimates of potential outcomes of policy decisions. It is helpful to have some scenarios constructed only with highly idealized scenarios, as they are useful in terms of ideal goal-setting but not necessarily for offering insights for implementable/realistic policy implementation in this imperfect world. [, United States of America]	Accepted- text revised. Policy and planning scenarios are now mentioned in the boxes table.
4083	25	37	26	36	this box is excellent providing a lot of food for thoughts! [Turi Fileccia, Italy]	Thank you for the positive comment.
22331	25	37	31	16	This discussion again ignores the critical role of forestry (management of forest remaining forest). It is the biggest factor in current LULUCF emissions and removals and is it likely to remain a dominant factor in future land carbon balances and biomass supplies (and their interactions). The box should explain how it is represented in scenarios, any gaps and the implications thereof. [Anastasios Kentarchos, Belgium]	Taken into account . This box mentioned afforestation/reforestation scenarios, but another cross-chapter box in Ch1 takes up these issues explicitly, so there is no need to repeat here.
34011	25	37	31	16	cross-chapter box 2: While the role of scenarios in this report and other assessments is important, this box has several problems. It is overly lengthy, and for many details it is unclear why this is of relevance for this report. Further, the concluding paragraph "ways forward" is inappropriate for this review (it suggests that there is a major problem and the text is rather opinion than review). (on many research issues addressed in this report, one might want to put a section "ways forward"), but if at all, this would be justified for large scale CDR, where a strong controversy can be identified in the literature, and where the question "ways forward" is relevant to the core of this report. To make this a useful box, remove the part on "ways forward", add a section on where scenarios are used in this report and describe aspects of this use of scenarios: dependency of pathway, uncertainties. Please remove the table and explanations on "futures method" as this is not very relevant to this report. The use and meaning of scenarios in the single chapters is not very explicit and systematic, therefore this detailed explanation is not helpful for the reader, but rather confusing. e.g "conditional probabilistic future scenarios are not visible in the entire report. [Elke Stehfest, Netherlands]	Accepted- text revised. The length of the box has been reduced considerably, including removal of the section on ways forward
34013	25	37	31	16	Cross-chapter box 2: the scenario box seems to have a high self-citation of the contributing authors... [Elke Stehfest, Netherlands]	Accepted- text revised. The authors are the authorities in the field, so it is natural that their publications appear. However, an attempt has been made to include non self-citations.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26847	25	37	31	16	<p>Please streamline Cross-Chapter Box 2 on Scenarios and improve its structure and clarity of concepts presented, including:</p> <ul style="list-style-type: none"> <li>- Please describe the „generic model types“ mentioned on page 26, line 28;</li> <li>- The methods described and listed Table 1 of the Box are unclear and seem to overlap;</li> <li>- The term pathways has been used differently in previous IPCC reports, in particular in the SR1.5;</li> <li>- Please explain the difference between the analysis of pathways and the analysis of exploratory scenarios;</li> <li>- Why can scenario analysis not lead to stylized assumptions or visions?</li> <li>- What is the difference between a „probabilistic future analysis“ and „visions and pathway analysis“?</li> <li>- Stakeholder participation is discussed twice;</li> <li>- The question "What are the limitations of land use futures" is highly relevant, but seems outside the scope of this box and should be treated in the main text. Here again, uncertainties and knowledge gaps are discussed, they should please be treated in a concise manner in the main text including an assessment of the implications for the findings of this report (or references to other chapters);</li> <li>- The question "What are the ways forward?" is answered in a normative, policy-prescriptive way, please revise. In addition, it should be moved to the proposed section on knowledge gaps;</li> <li>- Please check consistency with chapter 7, in particular Box 7.4 and avoid duplication. [, Germany]</li> </ul>	Accepted- text revised. The box has been considerably revised to reflect these and other comments. There is now no mention of generic model types, the table has been revised for clarity and to reduce overlap, there is a footnote to explain the different use of the term pathway, the difference between pathways and exploratory scenarios is explained, the role of visions is clarified, the stakeholder discussion has been combined, the limitations section has been reduced considerably, but is still seen to be relevant to the box, the ways forward section has been removed
30191	25	37	31	16	<p>cross-chapter box 2: While the role of scenarios in this report and other assessments is important, this box has several problems. It is overly lengthy, and for many details it is unclear why this is of relevance for this report. Furthermore, the concluding paragraph "ways forward" is inappropriate for this review. It suggests that there is a major problem and the text is rather an opinion than a review (on many research issues addressed in this report, one might want to put a section "ways forward"), but if at all, this would be justified for large scale CDR, where a strong controversy can be identified in the literature, and where the question "ways forward" is relevant to the core of this report. [, Netherlands]</p>	Accepted- text revised. The length of the box has been reduced considerably, including removal of the section on ways forward
38623	25	37	31	16	<p>This scenarios discussion is very well done. It hits most of the main points -- the strengths, limitations of modeling and scenario development, the variety of models (not just IAMs), etc. -- and does a nice job explaining in simple terms a very complex subject. Recommend gleaning some of the key points made here to reflect in the main text on this subject (preceding page) as that text misses most of these key points. [, United States of America]</p>	Accepted- text revised. The discussion of scenarios in the main text of Ch1 has been revised with reference to the box.
28929	25	37	31	16	<p>Cross chapter Box 2 is very useful. I find the broad perspective in the start (i.e. future analysis) and the further branching into methods very helpful for the reader. I think some more references to what SR1.5 did could be useful. The box has the potential to be useful also for other SRs are for the WG reports and SyR. [Jan Fuglestedt, Norway]</p>	Accepted- text revised. Thanks, reference has been made to SR1.5
28947	25	37	31	16	<p>Cross chapter Box 2 needs a better distinction between what is relevant regarding use of future analysis, scenarios pathways on one hand and more general findings (that can be assessed in other parts of the report). Many of the findings presented are based on scenario studies but if they are kept here it should be clearer how they are related to the aspects of future analysis discussed in the box. [Jan Fuglestedt, Norway]</p>	Accepted- text revised. These findings are useful as a summary, but they have now been reduced in length.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
28949	25	37	31	16	Cross chapter Box 2 could say a little more about how the following chapters do future analysis; ie. Connect the box stronger to the rest of the reprt. [Jan Fuglestvedt, Norway]	Accepted- text revised. The box table now includes a column that indicates explicitly which methods are used in which chapters/sections of the full report.
29283	25	37	31	16	Cross chapter Box 2: Some coordination with WGI and WGII could be useful here. It was briefly discussed at WGI LAM2 BOG on scenarios. I suggest you get in touch with Malte Meinshausen (WGI) and Brian O'Neill (WGII) during the revision. [Jan Fuglestvedt, Norway]	Accepted- text revised. This has been done. Other WGs have commented on the revised version of the box.
24075	25	37	31	16	This discussion again seems to ignore the critical role of forestry (management of forest remaining forest). It is a crucial factor in current LULUCF emissions and removals and is likely to remain a dominant factor in future land carbon balances and biomass supplies (and their interactions). The box should explicitly explain how it is represented in scenarios, any gaps and the implications thereof. [Zoltán Rakonczay, Belgium]	Taken into account . This box mentioned afforestation/reforestation scenarios, but another cross-chapter box in Ch1 takes up these issues explicitly, so there is no need to repeat here.
14773	25		31		The framing of issues in this Chapter is very important. Overall, it has been done very nicely but there is scope of further improvement, particularly regarding just transition, responsible innovation and agricultural science and engineering ethics. It would be very important to shed some lights on varous modes of agricultural production from industrial aagriculture to sustainable intensification and agroecology. See the comments on Chapter 7. Again, framing in this Chapter should discuss both socoo-ecological regime shifts (negative implication) and socio-technical regime shifts (positive implication). [Laxmi Pant, Canada]	Rejected - outside the scope of the chapter . This is not within the scope of the box.
3575	25	13			unknown futures' .. I wonder, if futures are not always unknown [Cordula Ott, Switzerland]	Accepted- text revised.
28937	26	3	26	3	What does "elsewhere" in the last line of footnote refer to? [Jan Fuglestvedt, Norway]	Noted no action needed. This means outside of the climate change research communities.
11759	26	5	26	7	Would it be possible to give a brief overview of how and which futures analysis are used in the SRCL chapters or cross-reference to chapters/sections, where appropriate? [Hans Poertner and WGII TSU, Germany]	Accepted- text revised. Agreed. A column has been included in the table to do exactly this.
30613	26	11	26	11	Scenario analysis. Here, the typology of scenarios can be fruitfully enriched by mentioning scenarios focused on specific human welfare achievements often related to the achievement of selected Sustainable Development Goals. In the list of types of scenarios, please add: after the reference to Warszawski et al 2014, the following sentence (or the like): "... as well as comprehensive socio-economic and climate change scenarios for investigating specific welfare-related outcomes and related environmental implications, relevant to the achievement of selected Sustainable Development Goals (SDGs) targets, such as future scenarios for food security, nutrition and sustainable agriculture (FAO 2018b)". [Lorenzo Giovanni Bellù, Italy]	Rejected - outside the scope of the chapter . Food security scenarios are discussed at length in ch5. The intention of this cross-chapter box is to provide an overview of methods rather than to focus on single issues.
2217	26	12	26	13	SRES and RCPs/SSPs should be written out in full at first mention [Michelle North, South Africa]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
32761	26	13	26	16	Grubler et al should be included here as an example of a stylised (or normative) scenario. While the specific normative aim related more to the energy sector than the land sector in this scenario, the implications of greater reductions in energy use were profound in terms of reduced reliance on land-sector mitigation. 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. <a href="https://doi.org/10.1038/s41560-018-0172-6">https://doi.org/10.1038/s41560-018-0172-6</a> [Dooley Kate, Australia]	references useful some or all added. The reference is noted, although the word count limits the extent of literature used.
38625	26	23	26	24	A statement like this should be made in the section 'Uncertainties in model structures, parameterisations and inputs' that starts on page 24. [United States of America]	Accepted chapter restructured. The structure of the text has been re-written
28931	26	25	26	25	"DGVM" needs explanation [Jan Fuglestedt, Norway]	Accepted- text revised. DGVM is spelt-out in the main body of the Ch1 text on first mention (before the box).
16931	26	26	26	27	The sentence implies that harmonised scenarios would reduce the uncertainty in ecosystem responses to land use and land use change. This is an over-simplification. Harmonisation in data may reduce the variability in the model results, but not necessarily their uncertainty. [Roland Hiederer, Italy]	Accepted- text revised. Agreed. Reference to harmonised scenarios has been removed.
28933	26	30	26	30	I find this unclear "Scenarios can be implemented by domain experts...." [Jan Fuglestedt, Norway]	Accepted- text revised. Text has been simplified.
28935	26	37	31	16	The word "scenario" is used very differently across communities and disciplines. In WGI a "scenario" usually refers to the temperature and climate response. While in other communities it refers to the development of emission or the drivers behind these. I think the box could make this point, and also say that the word "scenario" must be used together with what the scenario describes; i.g., population, emission, or temp etc. A footnote could be added on this (as you did for pathways). [Jan Fuglestedt, Norway]	Accepted definition clarified. This point has been taken up by the glossary team, who will clarify definitions in the glossary.
40439	26		31		Quite conceptual box on scenarios. Could be completed with an introduction to RCP and SSP used throughout the report (missing). Last section looks prescriptive (what are the ways forward). [Valerie Masson-Delmotte, France]	Accepted- text revised. This description has been included in the main text of Ch1.
28531	26	26	34	34	See: <a href="https://www.iisd.org/sites/default/files/publications/participatory-scenario-development-climate-change-adaptation-part-ii.pdf">https://www.iisd.org/sites/default/files/publications/participatory-scenario-development-climate-change-adaptation-part-ii.pdf</a> , <a href="https://www.researchgate.net/publication/275214576_Participatory_mapping_to_negotiate_indigenous_knowledge_used_to_assess_environmental_risk">https://www.researchgate.net/publication/275214576_Participatory_mapping_to_negotiate_indigenous_knowledge_used_to_assess_environmental_risk</a> , <a href="http://eprints.whiterose.ac.uk/124038/27/Flynnetal_Manuscript_Scenarios.pdf">http://eprints.whiterose.ac.uk/124038/27/Flynnetal_Manuscript_Scenarios.pdf</a> , <a href="https://unfccc.int/files/adaptation/nairobi_work_programme/application/pdf/care_psp_indigenous_knowledge.pdf">https://unfccc.int/files/adaptation/nairobi_work_programme/application/pdf/care_psp_indigenous_knowledge.pdf</a> <a href="https://www.cbi.org/assets/files/ES-2017-9386.pdf">https://www.cbi.org/assets/files/ES-2017-9386.pdf</a> , <a href="https://www.ecologyandsociety.org/vol23/iss2/art9/">https://www.ecologyandsociety.org/vol23/iss2/art9/</a> , [Meredith Wiggins, United Kingdom (of Great Britain and Northern Ireland)]	references useful some or all added. Thanks for the suggested publications.
11679	26	16			here "Vuuren" but elsewhere "van Vuuren" for same name/person. Also in references. Should be consistent. [Paul Dirmeyer, United States of America]	Accepted- text revised.
26849	26	25			Please explain DGVM. [Germany]	Accepted definition clarified. The full chapter text spells out DGVM on first use
4375	26	25			DGVM Acronym is not introduced [Mastura Mahmud, Malaysia]	Accepted- text revised.
28939	27	1	27	1	Cross-Chapter Box 2, Table 1 is very useful. I suggest you add the SR1.5 scenarios to this (even if you have referred to the underlying literature) [Jan Fuglestedt, Norway]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
28941	27	1	27	1	Cross-Chapter Box 2, Table 1: In column for time Horizon, case b) in first row: only 5-10 years? [Jan Fuglestedt, Norway]	Accepted- text revised. Agreed
32763	27	2	27	2	As per the above comment, Grubler et al should be included in the list of normative scenarios: 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. <a href="https://doi.org/10.1038/s41560-018-0172-6">https://doi.org/10.1038/s41560-018-0172-6</a> [Dooley Kate, Australia]	reference noted but point already covered by current used citations. The box word count limits the inclusion of the complete literature. Instead we give examples.
30615	27	2	27	2	Normative scenarios. Please, under the line "Normative scenarios (visions, target seeking scenarios" add the reference to (FAO 2018b) Reference is made here to "The future of food and agriculture - Alternative pathways to 2050" <a href="http://www.fao.org/3/I8429EN/i8429en.pdf">http://www.fao.org/3/I8429EN/i8429en.pdf</a> [Lorenzo Giovanni Bellù, Italy]	Rejected - outside the scope of the chapter . This study is discussed at length in ch 5
30495	27		29		needs to include cultural heritage and the role of cultural practices in these systems. This is particularly relevant to the 'storyline' approaches. [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - outside the scope of the chapter . In our view this is too specific for a general cross-chapter box on scenarios.
4085	27	1	31	16	quite exhaustive on models and land-use/climate futures. Alternative scenarios and models should be food security centred/based [Turi Fileccia, Italy]	Accepted. The box is about more than food security scenarios, although these are now mentioned in the table and text in terms of shock scenarios.
28943	28	1	28	5	This figure can be improved if you indicate that the scenario analyses start from the left (i.e. Socio economic assumptions...). I hope the authors also can read ch1 of WGI and check for consistency between these two reports. [Jan Fuglestedt, Norway]	Taken into account - combined with other comment. The authors have cross-checked with Ch1 of WG1
26851	28	2	28	5	We appreciate this figure as it provides important background knowledge which is key for this report. It needs however some improvements please: - Please describe generic model types and their purposes; - Please describe input and output data; - The direction of the arrows is unclear; - Are all these models coupled? - What is a "non-IAM"? - What is the difference between a scenario, a pathway and a trajectory? - Please use the same expressions as in the text, e.g. are "socio-economic assumptions" the same as "narrative/storyline" mentioned in the text? [, Germany]	Accepted- text revised. The fig and text have been revised by: checking the arrows, removing 'generic' models, changing non-IAM to dedicated land use models. Further definitions are also given for scenarios, pathways and trajectories, as well as in the glossary.
18197	28	3	28	3	maybe add arrows from ESM to Ecosystem model indicating climate change influence [Julia Nabel, Germany]	Accepted- text revised.
22333	28	3	28	5	The diagram seems to consider only "land-use change", but not land use in general, and apparently not forestry (management of forest remaining forest). Given that forest remaining forest (mostly managed forest) is the biggest factor in current LULUCF emissions and removals and is it likely to remain a dominant factor in future land carbon balances and biomass supplies (and their interactions), this should be identified as a critical gap in the models and our understanding. [Anastasios Kentarchos, Belgium]	Rejected - outside the scope of the chapter . The figure is a generalised representation and so there is no focus on specific components of the land system, i.e. food security, land degradation, forests, etc. ...
24077	28	3	28	5	The diagram seems to consider only "land-use change", but not land use in general, and apparently not forestry (management of forest remaining forest). Given that forest remaining forest (mostly managed forest) is the biggest factor in current LULUCF emissions and removals and is it likely to remain a dominant factor in future land carbon balances and biomass supplies (and their interactions), this should be identified as a critical gap in the models and our understanding. [Zoltán Rakonczay, Belgium]	Rejected - outside the scope of the chapter . The figure is a generalised representation and so there is no focus on specific components of the land system, i.e. food security, land degradation, forests, etc. ...

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30617	28	6	28	6	Please, add here, after thereference to Pradhan et al. 2013. 2014) the reference to (FAO 2018b) which portray global scale scenarios for food security and nutrition. [Lorenzo Giovanni Bellù, Italy]	Rejected - outside the scope of the chapter . This study is discussed at length in ch 5
16933	28	17	28	17	Remove space before full stop in "Kreidenweis et al. 2018) ." [Roland Hiederer, Italy]	Accepted- text revised.
30619	28	19	28	19	Changes in consumption patterns. Please, among the studies that found that changes in consumption patterns, waste reduction and diets are critical in affecting land use changes quote (FAO 2018 b). [Lorenzo Giovanni Bellù, Italy]	Rejected - outside the scope of the chapter . This study is discussed in detail in ch 5.
28945	28	19	28	22	This is a finding that could be related to the use of scenarios. As presented now it seems disconnected from the purpose of the box. Alternativey you may delete this. [Jan Fuglestvedt, Norway]	Rejected. We find it relevant to discuss trade-offs in this box
27739	28	6		22	global scale scenarios for bioenergy are also provided in Muri 2018, ERL. [Helene Muri, Norway]	Rejected - outside the scope of the chapter . The study iss on BECCS: <a href="https://iopscience.iop.org/article/10.1088/1748-9326/aab324">https://iopscience.iop.org/article/10.1088/1748-9326/aab324</a> , and so the topic of the cross-chapter box on bioenergy
6965	28				C-C Box 2, Fig 1: This is very helpful, thank you. To complete the loop, could you also add in the climate models?Which model produces temperature, sea level and rainfall predictions? Where do RCPs and SSPs fit in? These acronyms come up all the time, and it would be nice to see once and for all how it all fits together. [Debra Roberts, South Africa]	Rejected. Climate modelling is already in the figure as Earth system models. The RCPs/SSPs are now discussed in the main body of the Ch1 text.
14723	28				Cross-chapter Box 2 Figure 1 is not helpful at all. Where is the endpoint in this figure? Right now it looks like a continuous loop, so it's unclear how the different models would be used to generate meaningful results. [Wu Felicia, United States of America]	Rejected . The point of the figure is to show how the modelled components of the land, vegetation and climate systems interact for scenario analysis. We feel that the fig serves this purpose, and other reviewers agree with this perspective.
30621	29	11	29	13	Quantified projections. Please, note that FAO 2018b provides a full set of quantified projections to 2050 of key variables related to food and agricultural systems. Please, the sentence at lines 12-13 could read: "Studies that quantify pathways to achieve stylized assumptions or normative visions are still rare, especially at global scale, with some exceptions such as the FAO analysis of future pathways for food and agriculture to 2050 (FAO 2018b) and this is a major gap in current knowledge (Dokken 2014)" [Lorenzo Giovanni Bellù, Italy]	Rejected - outside the scope of the chapter . This literature is discussed in much more detail in Ch5
767	29	38	29	38	Replace 'in common' for 'is common'. [Edson Leite, Brazil]	Accepted- text revised.
29769	29	30	39	20	This section would benefit from stronger language around the market incentives, or lack thereof, for businesses to fully internalise the cost of emissions into economic calculations. [Tanya Smith, Canada]	Rejected - outside the scope of the chapter . This is an important point, but out of scope of the cross chapter box on scenarios. A further discussion of market incentives is given in sections 1.4 and 1.5.
30623	30	12	30	12	RCP/SSP based scenarios. Please, note that in FAO 2018b RCP/SSPs based scenarios have been adapted to analyse food security and nutrition concerns. By making scenario assumptions explicit and by using quantitative models a good degree of comparability with other RCP/SSP based scenarios in maintained. Thus, the sentence at line 12 could be can be fruitfully complemented by the following (or the like): " However, RCPs/SSPs frameworks have been recently adapted to address specific non-climate questions by using quantitative models which explicitly capture cause-effect linkages between socio-economic drivers and climate change, as portrayed by SSPs and RCPs on one side, and key indicators reflecting specific non-climate questions such as food security and nutrition outcomes and/or other SDG targets, on the other side (FAO 2018b)". [Lorenzo Giovanni Bellù, Italy]	Rejected - outside the scope of the chapter . This study is discussed at length in Ch5
769	30	16	30	16	Drop 2nd 'affect'. [Edson Leite, Brazil]	Accepted- text revised.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
38627	30	37	30	40	Suggestions for rephrasing this sentence for clarity: "This APPROACH IS HAMPERED BY THE LIMITED capacity of global models to account for the NON-ECONOMIC human dimensions of land systems including equity, fairness, land tenure and the role of institutions and governance, and therefore LIMITS THE ABILITY of these models to quantify transformative pathways AND adaptation and mitigation OPPORTUNITIES." Also, it is not clear what the difference is between equity and fairness, and what the definition of 'transformative' is. [United States of America]	Accepted- text revised. The text has been revised to account for this point
34017	30	4	31	2	Cross-chapter box 2: several statement on the limitations of land futures are wrong or biased. The statement "Model projections do not well account for human behaviour" will not be shared by most of the modellers, who see economic models trying to represent human behavior, with all sorts of elasticities representing inertia (i.e. not immediate optimization). If at all, a paragraph on limitation or uncertainties need to be specific on the use of scenarios here, i.e. which conclusions from the scenario studies used here are uncertain or have limitatins due to limitations of the scenarios or models. [Elke Stehfest, Netherlands]	Accepted- text revised. The text has been revised to recognise the economic approaches to behaviour
1735	30	32	31	2	I understand there are economics studies that look at the impact of human decisions (a check on google suggests they fall under the name of behavioural economics; prominent is the work of Kahneman). Could the authors comment on the applicability of these studies to human behaviour and land use futures? [William Lahoz, Norway]	Accepted- text revised. The text has been revised to recognise the economic approaches to behaviour
22335	31	3	31	16	A better representation of forest management should be identified as a critical gap to be addressed. [Anastasios Kentarchos, Belgium]	Rejected - outside the scope of the chapter . Forest management is important, but not specifically for a box on scenarios. It is however discussed in Chapter 1 within the cross-chapter box 2 on 'Large-scale conversion from non-forested to forested land'
28951	31	3	31	16	Cross chapter Box 2: I miss a sentence or two about how importnat scenarios are for policymaking and definition of climate targets. In spite of all limiations and uncertainties, scenarios have had a strong effect on policy formulation (e.g. the Paris goals). I think this could be mentioned. The last sentence in the box says something along these lines, but is quite general. [Jan Fuglestedt, Norway]	Accepted- text revised. The importance of scenarios for decision making is now stated in the introduction to the box
24079	31	3	31	16	A better representation of forest management should be identified as a critical gap to be addressed. [Zoltán Rakonczay, Belgium]	Rejected - outside the scope of the chapter . Forest management is important, but not specifically for a box on scenarios. It is however discussed in Chapter 1 within the cross-chapter box 2 on 'Large-scale conversion from non-forested to forested land'
2767	31	4	31	4	remove comma after "On-going" [Bettina Weber, Germany]	Accepted- text revised.
23367	31	4	31	16	ADD. In this otherwise excellent section on scenarios and pathways, the recognition of the need for improved modelling of socioeconomic trends, human decision making and pathways needs to be complemented by a brief discussion of the ways forward on integrating institutional/decision-making aspects into bio-physical land use and climate models. Good systems modelling should balance disciplinary knowledge inputs (in this case, sufficient analysis and incorporation of socioeconomic knowledge alongside the predominant biophysical analysis. A further minor point -- of course economic optimization is a crude representation of decision making. Two options are multi-criteria land user DM, and the results of ongoing behavioral economics. [John Dixon, Australia]	Accepted- text revised. The text has been revised to account for these points
2769	31	7	31	7	remove comma before "land use models" [Bettina Weber, Germany]	Accepted- text revised.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
22337	31	11	31	12	What is "land transformation"? It should be replaced with "land-use change" or, if it is a different concept, the differences should be explained. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
24081	31	11	31	12	What is "land transformation"? It should be replaced with "land-use change" or, if it is a different concept, the differences should be explained. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
16935	31	21	31	22	The statement "Standard decision theory focuses mostly on the uncertainty of consequences." is an over-simplification. Rather, the theory covers in general all aspects of uncertainty in decision making, but users often concentrate only on the uncertainty in the consequences, or risks. [Roland Hiederer, Italy]	Accepted- text revised. sectioned shortened
13261	31	22	31	22	<p>The discussion on risk needs to include elaboration of the risks that climate mitigation action in land a forest will fail if it doesn't support ecosystem integrity and longevity of carbon storage (Missing Pathways to 1.5"). A risk assessment approach that reflects carbon stock stability, restoration capacity and differences in actual and potential carbon density is needed, to identify and prioritise climate action in land and forests that will deliver the most resilient, long-lived mitigation results (Ajana et al., 2013). In primary forests and intact landscapes, the natural patterns of distribution and abundance of biodiversity creates the greatest resilience and stability of the natural carbon stock, which strengthens the case for protecting and restoring natural forests, including degraded and secondary forests. An important consideration in forest protection is the identification of "high biomass forests", which have critically important climate benefits that should be maintained and protected because of their disproportionate importance in climate mitigation. Forests ranging from the temperate rainforests of the Pacific Northwest US, to the temperate moist eucalypt forests in south-east Australia, to intact forest reserves in Malaysian Borneo have exceptionally high carbon density (Asner et al., 2018; Keith et al., 2009; Krankina et al., 2014; Law et al., 2018). Protecting these forests is a priority for climate mitigation and brings important ecosystem benefits (Brandt et al., 2014; Mackey et al. 2017; Mackey, 2014).</p> <ul style="list-style-type: none"> <li>• Dooley, K., Stabinsky, D., Stone, K., Sharma, S., Anderson, T., Gurian-Sherman, D. and Riggs, P. (2018). Missing Pathways to 1.5°C: The role of the land sector in ambitious climate action. CLARA: Climate Land Ambition and Rights Alliance.</li> <li>• Ajani, J.I. et al. (2013). Comprehensive carbon stock and flow accounting: A national framework to support climate change mitigation policy. Ecological Economics. 8961-72. Available from: <a href="http://linkinghub.elsevier.com/retrieve/pii/S092180091300030X">http://linkinghub.elsevier.com/retrieve/pii/S092180091300030X</a>.</li> <li>• Asner, G. P. et al. (2018) Mapped aboveground carbon stocks to advance forest conservation and recovery in Malaysian Borneo. Biological Conservation. 217289–310. Available from: <a href="http://linkinghub.elsevier.com/retrieve/pii/S0006320717310790">http://linkinghub.elsevier.com/retrieve/pii/S0006320717310790</a></li> <li>• Brandt, P. et al. (2014) Multifunctionality and biodiversity: Ecosystem services in temperate rainforests of the Pacific Northwest, USA. Biological Conservation. 169362–371. Available from: <a href="http://linkinghub.elsevier.com/retrieve/pii/S0006320713004242">http://linkinghub.elsevier.com/retrieve/pii/S0006320713004242</a></li> <li>• Keith, H. et al. (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 (28), 11635–11640. Available from: <a href="http://www.pnas.org/lookup/doi/10.1073/pnas.0901970106">http://www.pnas.org/lookup/doi/10.1073/pnas.0901970106</a></li> <li>• Krankina, O. N. et al. (2014) High-Biomass Forests of the Pacific Northwest: Who Manages</li> </ul>	Rejected - outside the scope of the chapter . Too detailed for an introduc. Chapter. Part of these issues mentioned in X-chapter box 2; parts also covered in chapter 2 and 4

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26853	31	26	31	29	This statement is misleading as it suggests that the lack of knowledge would prevent decision making, i.e. that inaction would be the preferred option. Please add that while the term „deep uncertainty“ is used in the scientific community to denote the inconclusiveness of the analysis related to individual decisions, it is sufficiently clear that deciding for non-action, i.e. the BAU-scenario, will have extremely negative consequences. Please contextualize this information with the degree of uncertainty that is associated with decision making in other political fields. Please check consistency with chapter 7 and avoid duplication, preferably moving the entire discussion to chapter 7. [, Germany]	Accepted- text revised.
16937	31	31	31	37	From the text there appears to be some confusion between uncertainty and risk in decision making. These two aspects are related, uncertainty leads to decision risk, but are not identical or on the same level. Hence, in decision theory they are not generally dealt with in the matter described, i.e.as juxtapositions with an economic cost-benefit analysis vs. risk aversion. Uncertainty refers to the data and decision rules/functions. Risk refers to a probability that a decision will be wrong. At times a cost of a wrong decision is included, but not generally, as implied here. [Roland Hiederer, Italy]	Accepted- text revised.
16939	31	41	31	41	Are there any unreal options? The sentence is very abstract and it is suggested to be more specific. [Roland Hiederer, Italy]	Accepted- text revised.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
33587	31	18	32	12	<p>The text introduces two approaches for decisions under uncertainty, the cost-benefit-approach and the precautionary approach. In the text, both are presented in stereotypes, while the precautionary principle even more so. Consider to put the argument differently, that both are valid, under certain domains.</p> <p>From one viewpoint, climate change appears as a relatively trivial but also fundamental challenge. Generally, GHG emissions, which attracts most scrutiny for climate change, are homogeneous and additional/cumulative in nature. For such cases, it is relatively trivial to quantify the scale of the problem, and also acknowledge the fundamental causes. Accordingly, the adoption of models and cost-benefit-analysis from economical disciplines is trivial, just because these are also designed for effective management and allocation of resources.</p> <p>Such quantitative methods have been helpful to indicate the scale of the problem and the efforts needed. On the other hand, the attraction of such models can also lead to over-emphasis. Generally, cost-benefit-analysis have often been criticized for providing only partial approaches and responses, while other interests and values are ignored (see ch. 7.3).</p> <p>Generally, human induced influences belong to two domains, the fossil/industry domain and the land domain. While for the fossil domain, quantitative approaches seem well suited and fit-for-purpose, this may be less true for the land domain. For the latter, challenges rather seem to be interwoven with other urgent challenges such as loss of biodiversity. With such complexities, economical analysis tend to fall short. The precautionary approach, on the other hand, presents no single way out, as priorities for precaution may be different for climate, food security or the biosphere. Chapter 7.3 provides a broader picture of such complexities and how to find a way out.</p> <p>While there is no single approach for guiding decisions, multi-criteria assessment hold a certain promise, which is provided in chapter 6.</p> <p>Further, while insights from models and calculations may not be satisfactory, this report indicate that such insights can be complemented with insights from a more immediate and "on the ground" perspective. Further, while consequences of inaction is overwhelming, there is certain arguments for a "do-no-harm" approach. For instance, avoided conversion of forest</p>	Accepted- text revised.
1513	31	18	32	12	<p>This subchapter overestimates the role of uncertainty in non-decisionmaking, and therefore should broaden its perspective on why (climate) policymaking tends to be inconsistent and not strictly evidence based. This doesn't mean that uncertainty isn't a problem, but to acknowledge that uncertainty is very often used by policymakers as an excuse for inappropriate action. There are many "procedural"/"institutional" reasons stemming from political/bureaucratic structures and policymaking processes why there are huge inconsistencies between (climate) policy talk, decisions, and actions, including strategic stakeholder management, political competition, institutional inertia, time constraints and limited capacities to process information and - specifically relevant in long-term policymaking - fluid participation and shifting preferences. There is vast social science literature on this, for example Cairney 2016 (The Politics of Evidence-Based Policymaking, Palgrave Macmillan), Geden 2016 (WIREs Clim. Change 7, 790-797); Howlett 2014 (Glob. Environ. Change 29, 395-403); Munck af Rosenschöld et al. 2014 (WIREs Clim. Change 5, 639-648), Brunsson 2007 (The Consequences of Decision-Making, Oxford University Press) [Oliver Geden, Germany]</p>	Comment noted section totally updated and revised. Section shortened, and some of the suggested details are beyond the scope of the chapter. More cross-refs. to chapter 7 included, where some of these aspect are covered.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12651	31	18	32	12	Decision making under uncertainty is the main theme. Two extreme approaches are presented: socio-economic analysis and precautionary. There is also mention of strategic visioning. The iterative adaptive management process should also be included as this is an important approach highlighted in Chapter 7. [Zelina Binti Zaiton Ibrahim, Malaysia]	Accepted- text revised. Adaptive governance is also mentioned briefly in section 1.5
4377	31	26			SM2 On pg 83, table is written as Table S2 [Mastura Mahmud, Malaysia]	Accepted- text revised.
26855	31	37			Probably the word "cost" does not refer to money here, but is confusing, please revise. [, Germany]	Accepted- text revised.
16941	32	4	32	5	Current decision making does not assume that the future can be predicted. This would be a poor use of the outcome. Instead, it tries to quantify the likelihood of future conditions based on scenarios and adds trade-off and risk evaluation to manage uncertainties. It is suggested to revise the sentence. to reflect the complexity of the interpretation of the output of decision support systems. [Roland Hiederer, Italy]	Accepted- text revised.
20987	32	4	32	6	Please consider revising - unclear structure. [, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
18199	32	4	32	6	sentence structure/language [Julia Nabel, Germany]	Accepted- text revised.
28953	32	4	32	12	I find this para unclear (e.g., what is meant by "reasonable pluralism"? [Jan Fuglestedt, Norway]	Accepted- text revised.
5269	32	5	32	6	Check and correct the statement "flexibility in ..... by decisions ?? are not ...". [Joseph Mutemi, Kenya]	Accepted- text revised.
1737	32	6	32	6	"...that are not set in stone...". [William Lahoz, Norway]	Accepted- text revised.
26857	32	7	32	9	The statement on COP21 is out of scope here. In addition, a discussion on COP21 should either be done in a proper way, not only citing one reference, or not at all. Please delete. [, Germany]	Accepted- text revised.
24083	32	7	32	9	The sentence "As regards [...] uncertainties." should be deleted. It is rather speculative, not very informative and wrong, as "a" [i.e., single] temperature threshold has not been agreed (arguably because it was not possible to agree on such a threshold). [Zoltán Rakonczay, Belgium]	Accepted- text revised.
8299	32	9	32	12	This sentence is too abstract, and the term "the deep uncertainty community" does not make sense. [Kaoru Kitajima, Japan]	Accepted- text revised.
16943	32	15	32	17	The sentence would benefit from rephrasing. Example: To address the identified challenges the complexity of climate change and changes in the global socio-economic environment requires a comprehensive link to model interactions with food production, consumption and land-resources more broadly. [Roland Hiederer, Italy]	Accepted- text revised. Sentence has been revised
13263	32	15	32	37	'response options' refers to the potential to adopt 'nexus thinking' but questions what this means in practice. This section should refer to the extensive experience with and literature on, landscape scale planning that has proven well able to integrate and support multiple ecological and community goals (Chen-Shacham 2016).  • Cohen-Shacham, Emmanuelle & Walters, Gretchen & Maginnis, Stewart & Janzen, Christine. (2016). Nature-based Solutions to address global societal challenges. 10.2305/IUCN.CH.2016.13.en. [Aila Keto, Australia]	Accepted- text revised. The text has been revised considerably to take account of this and other points
23369	32	17	32	17	NOTE. The integration of production and consumption in household decision making stems back in history to Ahn Singh and Squite in 1980s and Nakajima in 1990s. This should be recognised as an intrinsic element of the production, consumption and land management nexus. [John Dixon, Australia]	Rejected - not supported by the peer-reviewed published literature or no scientific evidence/publication provided to support changes suggested by the reviewer. It is not clear from this statement why this literature is important? Because they are old references?

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16945	32	27	32	29	There is a sudden change from "land use" to "land management". IPCC separates these to aspects, where a land use system is a combination of land use type, management practice and input level. It is not evident what the text refers to. If one cannot remain close to the IPCC concept the difference should be explained. [Roland Hiederer, Italy]	Accepted- text revised. The use of terminology has been tightened-up
3431	32	29	32	30	It is suggested that the definitions of land management, value chain management and risk management be given. [China]	Rejected - outside the scope of the chapter . These categories are discussed in detail in Ch6
23371	32	14	33	10	Agroforestry (expanding) and conservation agriculture (CA - expanding at 10Mha per year, see Kassam 2017) are two of the most promising responses. Another response is sustainable intensification (Pretty 2018) which maintains ecosystem services whilst increasing productivity, therefore reducing the carbon footprint per unit of food or other agricultural produce -- with obvious aggregate benefits. As noted, ideally many of these responses will be combined at the farm and landscape level. Therefore Figure 1.4 misrepresents these responses as linear silos -- it should recognise the critical synergies across these silos. [John Dixon, Australia]	Accepted- text revised. The figure has been revised based on the changes proposed by Ch6
28955	33	1	33	1	Useful figure. [Jan Fuglestedt, Norway]	Thank you for the positive comment.
16947	33	1	33	1	Item under "Soil management Examples": Biochar does not add to soil organic matter. Its functions in the soil are quite different from organic matter. [Roland Hiederer, Italy]	Accepted- text revised. Text has been edited accordingly
13167	33	1	33	4	Figure 1.4. The three way classification is fine, but the name of the second "Value-chain management" is not. For 2 reasons. 1 "value-chain" implies the supply chain (and businesses so comprised), but individual behaviour lies outside this. 2 this category excludes the consumption side but excludes the production side which is included under "land management". Perhaps something along the lines of "wider food system" might be better [David Cooper, Canada]	Rejected - outside the scope of the chapter . An explanation of the titles of these categories is given in Ch6
13169	33	1	33	4	Figure 1.4. The three way classification is fine, but potential role of land restoration (including A/r, ecosystem restoration, ag land rehabilitation) is dispersed under other headings and somewhat lost. Moreover the presentation is very sectoral (while the underlying chapter argues for a cross-sectoral approach). [David Cooper, Canada]	Rejected - outside the scope of the chapter . An explanation of the titles of these categories is given in Ch6
13315	33	2	33	3	Please, you could consider in Land Management (Figure 1.4) Forest sustainable management and include example restore forest degradation. Also, in others environmental management could consider as examples: restoring wetlands and others ecosystems. [Marina Rosales Benites de Franco, Peru]	Accepted- text revised. Forest management is included. The classes have been modified.
8711	33	2	33	35	I would suggest to mention not just how can we reduce food waste, but also to include a reference on how can we prevent food loss as part of the efforts to green the supply chain. [Mihaela Stefanescu, Romania]	Noted and accepted. References on food loss (in developing countries) were added [Yuping - see additional references in page 27 - lines 18-19 in SOD-FINAL-V5]
22341	33	5	33	30	The section is seriously unbalanced. Forest management (which is and will remain a crucially important, decisive factor) is barely (and oddly) mentioned, whilst substantial space is dedicated to biochar, a largely speculative and currently negligible concept. [Anastasios Kentarchos, Belgium]	Accepted- text revised.
11681	33	5	33	30	Fig 1.4 lists 2 additional forms of land management: "other environmental management" and "targeted decarbonisation", but these are not covered in §1.4.1. §1.4.1.1 covers the first 3 - there should be a §1.4.1.2 to cover the other two. [Paul Dirmeyer, United States of America]	Partially accepted. Section has been considerably rewritten, But as stated, we provide here only some examples, more detail provided in chapters 6 and 7.
4087	33	5	33	30	25 lines to refer to all SLM practices are insufficient even for a "summary" chapter [Turi Fileccia, Italy]	Taken into account - combined with other comment.

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24085	33	5	33	30	The section seems rather unbalanced. Forest management (which is and will remain a crucially important, decisive factor) is barely (and oddly) mentioned, whilst substantial space is dedicated to biochar, a largely speculative and currently negligible concept. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
22345	33	6	33	6	Heading 1.4.1.1. should be deleted, as it is a sole subheading under 1.4.1. [Anastasios Kentarchos, Belgium]	Taken into account . Taken into account
17255	33	6	33	6	There is no 1.4.1.2. What about other environmental management and targeted decarbonisation? [Noémie Janot, France]	Partially accepted. Section ref. corrected. Examples are here given only, more extensive coverage in chapter 6 and 7
24087	33	6	33	6	Heading 1.4.1.1. should be deleted, as it is a sole subheading under 1.4.1. [Zoltán Rakonczay, Belgium]	Accepted- text revised.
32807	33	6	33	23	Include discussion of agroecology and agroecological approaches in this paragraph. [Doreen Stabinsky, United States of America]	Accepted- text revised.
13265	33	6	33	30	This section on Land Management fails to mention the climate mitigation and adaptation value of well designed and well managed Protected Areas (Bebber et al. 2017). Given the extensive documentation of ecosystem service and sustainable development benefits that Protected Areas can and do provide the oversight must be rectified. Appropriate references can be found by looking through IUCN publications and those of the various expert Commissions including the World Commission on Protected Areas. Failure to include increases in and improvements to Protected Areas as a critical climate strategy is a serious oversight. • Bebber, Daniel P, and Nathalie Butt. 2017. "Tropical Protected Areas Reduced Deforestation Carbon Emissions by One Third from 2000 – 2012." Scientific Reports, no. October. Springer US: 1–7. doi:10.1038/s41598-017-14467-w. [Aila Keto, Australia]	Accepted- text revised.
30497	33	6	33	30	should include reference to peatlands [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
28957	33	10	33	10	Not sure about the word "conceptually". Do you mean that these aspects are implicit in the text in italics above? [Jan Fuglestedt, Norway]	Accepted- text revised.
4033	33	11	33	11	The abbreviation SLM has not been defined [Vassilis Daioglou, Netherlands]	Accepted- text revised.
1739	33	11	33	11	Have you introduced the acronym SLM, presumably "sustainable land management"? [William Lahoz, Norway]	Accepted- text revised.
28959	33	11	33	17	What is meant by "high agreement" here? Is this meant as IPCC uncertainty language? The sentence is unclear. [Jan Fuglestedt, Norway]	Accepted. Text revised
25303	33	11	33	23	Agroecology should be mentioned here, as it is a sustainable land management system, and encompasses among others diversification, agroforestry, ecosystem based adaptation . 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]	Accepted- text revised.
22347	33	13	33	13	"crop and forest rotations" is odd wording, as they refer to very different concepts (the sequence of different annual crops versus the rotation length of tree crops in rotational forest systems). [Anastasios Kentarchos, Belgium]	Accepted. Text revised
24089	33	13	33	13	"crop and forest rotations" is odd wording, as they refer to very different concepts (the sequence of different annual crops versus the rotation length of tree crops in rotational forest systems). [Zoltán Rakonczay, Belgium]	Accepted. Text revised
25305	33	17	33	20	We would like to recall that conservation agriculture can use more herbicides than conventional agriculture, which should be written as a warning message. [, France]	Rejected . We consider this too detailed for a framing chapter; see also chapter 5 and 6
11761	33	17	33	23	Add a cross-reference to Cross-chapter box 5 (on agricultural intensification), which deals with these approaches. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16949	33	19	33	19	It is "permanent soil cover" rather than "permanent soil surface". [Roland Hiederer, Italy]	Accepted- text revised.
32727	33	25	33	25	The references supporting the idea that soils can be an effective sink for atmospheric carbon are weak and incomplete. There are many more studies that suggest the exact opposite - unless we remove all agricultural practices, the answer to warming will not be found in soils. The authors should read the decent SOCCR-2 analysis for a more in-depth coverage of this topic. [Kate Lajtha, United States of America]	Rejected. We consider this too detailed for a framing chapter; see also chapter4, 5 and 6
1741	33	25	33	25	Although you reference Chapter4, perhaps a brief description of what is biochar would be appropriate. [William Lahoz, Norway]	Noted and accepted. A brief intro of biochar is added [Yuping - page 26-line 41-42]
16951	33	27	33	27	Without additional qualification a statement such as "Enhancing soil carbon storage and addition of biochar can be practised without competition for land area, ..." may be argued. This depends very much on the measure applied. When a measure of increasing soil organic matter in agriculture leads to a lower yield per area, as may happen under systems of reduced tillage in some areas, the measure may very well lead to competition for land. This demand for land may lead to losses of soil organic carbon when land are converted to agricultural use and offset any gains made from the practice. [Roland Hiederer, Italy]	Noted and accepted. A qualification ("provided no productivity or yield loss") was added to the statement in question [Yuping see edit in page 27 - line 3-4 - SOD-Final-V5]
22349	33	27	33	28	"without competition for land area" is contingent on the availability of significant amounts of unused biomass, which almost invariably implies an opportunity cost (lost sequestration in soil, lost value as a feedstock for bioenergy or other uses, etc.). [Anastasios Kentarchos, Belgium]	Noted. Sentence rephrased to allow for the qualification on available unused biomass [Yuping see edit in page 27 - line 3-4 - SOD-Final-V5]
24091	33	27	33	28	"without competition for land area" is contingent on the availability of significant amounts of unused biomass, which almost invariably implies an opportunity cost (lost sequestration in soil, lost value as a feedstock for bioenergy or other uses, etc.). [Zoltán Rakonczay, Belgium]	Noted. Sentence rephrased to allow for the qualification on available unused biomass [Yuping see edit in page 27 - line 3-4 - SOD-Final-V5]
25307	33	27	33	30	It clearly appears in this chapter that the potential of biochar to mitigate climate change at global scale is still to be explored. Please revise SOD accordingly. See GENERAL COMMENT ON BIOCHAR. [ , France]	Taken into account - combined with other comment. Noted. A reference to biochar "potential" for mitigation is added [Yuping - page 26-line 41-42]
30863	33		33		Fig 1.4 I'm not convinced the sub categories of land management are best. What about hydrological / coastl management as a category. NB Note afforestation is in targeted decarbonisation as well as forest management (where I think it belongs). [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. The sub-classes have been modified by Ch6 and the figure re-drawn
40445	33		33		does targeted decarbonisation mean CDR here? [Valerie Masson-Delmotte, France]	Accepted- text revised. Yes, and the wording has been changed
22343	33	5	41	13	The description of the response options could be significantly shortened. It should be possible without losing substance by drawing more explicitly on the relevant sections from other chapters. [Anastasios Kentarchos, Belgium]	Taken into account - combined with other comment. Taken into account - combined with other comment
22339	33	1			The figure is useful because it places practical examples in a coherent framework and appears to be the start of a systematic planning framework that could be useful to policymakers. However, it is also problematic because it does not address the interlinkages at lower categories (each example contributes to more than one 'sub-class'). This supports linear approaches when more integration and systems thinking would be necessary. Is it possible to elaborate on how this framework could be used in practice and in a manner that accommodates interlinkages (e.g. drawing diagonal lines between the categories and sub-categories)? Also, the figure's categorisation is also used unevenly in the following text (only three of the five land management categories are explored). [Anastasios Kentarchos, Belgium]	Accepted- text revised. The classification has been revised accordingly and the figure re-drawn

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25315	33	1			We suggest: • to add “material substitution” (as in section 6.3.2.10 page 6-38) in the value chain management option • to give in the caption the meaning of BECCS • to delete biochar from the soil management examples, and prefer a combination of low till system, land coverage, and crop rotations, with a far better potential. See GENERAL COMMENT ON BIOCHAR • to correct the mention “pollution service” (or explain). [, France]	Rejected - outside the scope of the chapter . An explanation of the various categories given within this figure is in Ch6
2491	33	1			Figure 1.4: Not sure if the expression "Enhancing pollution services" is a very good choice. Maybe rather "pollution reduction services"? [Sigrid Kusch-Brandt, Germany]	Accepted- text revised. This has been changed
3555	33	5			reconsider title... why not Sustainable Land Management (as this is the response option) [Cordula Ott, Switzerland]	Comment noted section totally updated and revised. This part of the text has been completely revised
28633	33	6		9	Sustainable land use management describes "the use of land resources for production of goods to meet changing human neexs while assuring the long-term productive potential of these and the maintenance of their environmental functions ". For the purpose of the drafts; Agriculture,forest and soil management in relation to land use management, i context; i recommend "Integrated sustainable land use management analysis, preventive measures and Adaptive response for the long term protection, productive and potential of the land resources and a consistent environmental maintenance functions in relation to land management, value chain management and Risk management. [Abiodun Adegoke, Nigeria]	Rejected. We seek to be coherent with chapter 6 in wording and structure
26859	33	6			This section on land management only comes late in this chapter, but starts with the definition on SLM. Please move to the beginning of the chapter and extend as the concept of SLM is central to the report. Please see also our suggest to devote a FAQ to the issue of SLM. [, Germany]	Noted, no action needed
5271	33	7			Insert the acronym "SLM" i.e. Sustainable land management (SLM) [Joseph Mutemi, Kenya]	Accepted- text revised.
3571	33	13			organic farming is only mentioned here (and one as organic production later). But the importance of organic farming is increasingly emphasised and acknowledged as importnat part of the solution. Hence, it should show up more prominently [Cordula Ott, Switzerland]	Rejected. We consider this too detailed for a framing chapter; see also chapter 5 and 6
23551	33				Whether the risk management in Figure 4 can be considered in combination with the management process, divided into pre-, post-, and post-event, reference risk chain theory [Huai Jianjun, China]	Accepted- text revised. The categories within this figure have been revised
14725	33				Figure 1.4 seems to have a very limited, odd definition of risk management. Risk management should include many of the bullet points that are already under the land management and value chain management categories, such as crop rotation. Maybe the divisions here are artificial? [Wu Felicia, United States of America]	Accepted- text revised. The categories within each of the higher level headings have now been revised
29407	34	11	13		The food losses figures should probably be caviated with low certainty descriptor, as the understanding of global food losses must be greatly improved. [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. added short statement on difficulty to quantify
25309	34	1	34	1	In value chain management options, on both supply management and demand management, supply chain sustainability management, including the topics of combating imported deforestation, and similar concepts about soil degradation, should be highlighted. See GENERAL COMMENT ON SUPPLY CHAIN SUSTAINABILITY MANAGEMENT. [, France]	Rejected - outside the scope of the chapter . due to word-limits we can introduce in this section only some pertinent examples; details on various ROs are provided in chapter 6

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

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22351	34	3	34	15	It is right to point out food losses, but it is not informative without giving an indication of potential savings or "optimal" losses. It is clear that losses of food (a perishable, organic substance) cannot be reduced to zero, and also that the marginal cost of reductions (including resource use and emissions from packaging, refrigeration, medical treatment after increased incidents of food poisoning, etc) will increase as losses are reduced. [Anastasios Kentarchos, Belgium]	Accepted- text revised. Although for word-limit reasons we cannot add here specific details on "optimal" losses.
23373	34	3	34	15	ADD. A majority of smallholder production in the global south is consumed at home, not transported. Second, discuss quality as well as quantity losses, and especially health threats such as aflatoxin. [John Dixon, Australia]	Rejected - outside the scope of the chapter . too detailed to include these points into a short introduction of the concept
24093	34	3	34	15	It is right to point out food losses, but it is not informative without giving an indication of potential savings or "optimal" losses. It is clear that losses of food (a perishable, organic substance) cannot be reduced to zero, and also that the marginal cost of reductions (including resource use and emissions from packaging, refrigeration, medical treatment after increased incidents of food poisoning, etc) will increase as losses are reduced. [Zoltán Rakonczay, Belgium]	Accepted- text revised. Although for word-limit reasons we cannot add here specific details on "optimal" losses.
5273	34	5	34	6	Authors improve on clarity of key message/s, for example on this Pg. Lines 5-6 "These losses combine losses on-farm and from farm to retailer ...", clearly this statement is meant to indicate express cumulative losses and should be re-written to bring out such message clearly. [Joseph Mutemi, Kenya]	Accepted- text revised.
26615	34	7	34	15	While not peer-reviewed, the APHLIS website presents important data on losses of different grains in different African countries ; www.aphlis.net [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	reference noted but point already covered by current used citations.
26863	34	9	34	13	Please clarify if these are annual values. Please also give a percentage after the "28kg per capita" as well as the "12 kg per capita" to give it more relativity. [, Germany]	Accepted- text revised. Percentage not available in the cited study.
31699	34	13	34	15	Could include the increase in produce shelf-life improvement technologies, both in local and global contexts, alongside the other value-chain management technologies [Elizabeth Migongo-Bake, Kenya]	Rejected. seems too detailed in the context of sentence which does not claim to list all options conclusively
31657	34	13	34	15	Not only advancing technologies should be considered, but in many cases, the effective adoption of already known good practices in the harvesting, storage, transportation, etc, can already make important difference. [, Brazil]	Rejected. seems too detailed in the context of sentence which does not claim to list all options conclusively
26117	34	13	34	15	Insert before "storage capacity" the following: "distributed energy generation to support refrigerated" [Reid Detchon, United States of America]	Rejected . seems too detailed in the context of sentence which does not claim to list all options conclusively
8625	34	13	34	15	It would be nice to have here some reference so the reader can go deeper into the matter if interested in this specific topic. [Vincenza Ferrara, Italy]	Noted no action needed.
8627	34	16	34	16	It would be interesting to mention also the aspect of food deserts - food accessibility in urban areas. [Vincenza Ferrara, Italy]	Noted. Text adjusted to reference food deserts and food accessibility by urban poor

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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150	34	16	34	35	There should be one paragraph on land use embodied in international trade. 21-37% of land use is embodied in / implicated with international trade and the trend is rising, see: Wiedmann, T. and Lenzen, M. (2018) Environmental and social footprints of international trade. Nature Geoscience, 11, 314-321. <a href="https://doi.org/10.1038/s41561-018-0113-9">https://doi.org/10.1038/s41561-018-0113-9</a> . Other potentially relevant studies include: Chen, B., Han, M. Y., Peng, K., Zhou, S. L., Shao, L., Wu, X. F., Wei, W. D., Liu, S. Y., Li, Z., Li, J. S. and Chen, G. Q. (2018) Global land-water nexus: Agricultural land and freshwater use embodied in worldwide supply chains. Science of The Total Environment, 613–614, 931-943. <a href="https://doi.org/10.1016/j.scitotenv.2017.09.138">https://doi.org/10.1016/j.scitotenv.2017.09.138</a> Font Vivanco, D., Sprecher, B. and Hertwich, E. (2017a) Scarcity-weighted global land and metal footprints. Ecological Indicators, 83, 323-327. <a href="https://doi.org/10.1016/j.ecolind.2017.08.004">https://doi.org/10.1016/j.ecolind.2017.08.004</a> Font Vivanco, D., Wang, R. and Hertwich, E. (2017b) Nexus Strength: A Novel Metric for Assessing the Global Resource Nexus. Journal of Industrial Ecology, n/a-n/a. <a href="http://dx.doi.org/10.1111/jiec.12704">http://dx.doi.org/10.1111/jiec.12704</a> Wilting, H. C., Schipper, A. M., Bakkenes, M., Meijer, J. R. and Huijbregts, M. A. J. (2017) Quantifying Biodiversity Losses Due to Human Consumption: A Global-Scale Footprint Analysis. Environmental Science & Technology, 51, 3298–3306. <a href="http://dx.doi.org/10.1021/acs.est.6b05296">http://dx.doi.org/10.1021/acs.est.6b05296</a> Yu, Y., Feng, K. and Hubacek, K. (2013) Tele-connecting local consumption to global land use. Global Environmental Change, 23, 1178-1186. <a href="http://dx.doi.org/10.1016/j.gloenvcha.2013.04.006">http://dx.doi.org/10.1016/j.gloenvcha.2013.04.006</a> [Tommy Wiedmann, Australia]	Noted. A succinct reference to embodied trade and selected references was added
23375	34	20	34	22	ADD. Trade is only relevant if consumers have purchasing power -- remember the lessons from the devastating Bangladesh and Ethiopia famines (Sen) [John Dixon, Australia]	Rejected. The comment is valid only for luxury products but not necessarily for staple products. Trade can still be beneficial in cases if the consumer price (especially of essential products) is lower than domestically sourced goods. SO trade is not limited only to purchasing power. Even the poor need to buy essentials and if prices are reduced due to imports, then trade has a beneficial role here.
8629	34	26	34	28	I think it can be useful to add the perspective about short and long food chains which is in Schmitt et al. 2016. [Vincenza Ferrara, Italy]	Noted. Text corrected and relevant references added
32439	34	27	34	28	It is important to highlight that food trade per definition causes transport-related GHG emissions, even if its other environmental impacts are positive. The findings in Chapter 5 (5.4.5) should be properly highlighted in this respect. [Simone Lovera-Bilderbeek, Paraguay]	Noted. Text corrected and cross-chapter references introduced
18201	34	32	34	32	"other vital ecosystems like" -> "other vital resources like" [Julia Nabel, Germany]	Accepted- text revised.
26119	34	35	34	35	Add to the end of the sentence "and the benefits of ecosystem services such as carbon fixation and storage." [Reid Detton, United States of America]	Noted. Reference to ecosystem services in general without giving specific examples for lack of space
32729	34	36	34	36	The authors seem to be dancing around the most obvious point, and are not using all the best references here. The elephant in the room with food choices and greenhouse gases is the enteric fermentation issue - this is alluded to, mentioned incidentally, but never put in the greatest context. Study after study, none cited here, but published in Nature and Science, demonstrate the problems with land used for enteric fermenters. Why can't this be broadcast loud and proud? [Kate Lajtha, United States of America]	Noted. A reference on the importance of enteric fermentation contribution to emissions and the rising interest in lower animal-protein diets was added
8631	34	38	34	39	Suggested references: Martin et al. 2017, Rööös et al. 2015. [Vincenza Ferrara, Italy]	reference noted but point already covered by current used citations.
23377	34	42	34	42	WHAT reduction? [John Dixon, Australia]	Noted no action needed. Reduction of protein intake

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
40447	34		34		aspect linked with "eco-labels" introduced here but where else in the report? Check and use chapter 1 to introduce the rest of the report more. [Valerie Masson-Delmotte, France]	Comment noted section totally updated and revised. do we keep the ecolables/Aziz
1421	34	6	35	28	There could be more extensive discussion of the psychological factors underlying demand as well as the possibility for behavioral interventions based on psychological techniques. E.g., Klöckner, C. A. (2017). A stage model as an analysis framework for studying voluntary change in food choices—The case of beef consumption reduction in Norway. <i>Appetite</i> , 108, 434–449. Campbell-Arvai, V., Arvai, J., & Kalof, L. (2014). Motivating sustainable food choices: The role of nudges, value orientation, and information provision. <i>Environment and Behavior</i> , 46(4), 453–475. [Susan Clayton, United States of America]	Rejected - outside the scope of the chapter . due to word-limits we can introduce in this section only some pertinent examples; details on various ROs are provided in chapter 6
5353	34	36	35	27	Important analysis, and overall sound. Perhaps ch11 in IPCC-WGIII AR5 as well as the following papers could help to enrich this analysis: Smith, P.,et al., 2013. How much land based greenhouse gas mitigation can be achieved without compromising food security and environmental goals? <i>Global Change Biology</i> 19, 2285–2302. <a href="https://doi.org/10.1111/gcb.12160">https://doi.org/10.1111/gcb.12160</a> AND Creutzig, F., et al., 2016. Beyond Technology: Demand-Side Solutions for Climate Change Mitigation. <i>Annual Review of Environment and Resources</i> 41, 173–198. <a href="https://doi.org/10.1146/annurev-environ-110615-085428">https://doi.org/10.1146/annurev-environ-110615-085428</a> They give concrete numbers and potentials that are, as far as I know, still valid. There is even more literature out there, I am sure. [Helmut Haberl, Austria]	Noted no action needed. Thank you for the comment. A chapeau statement was added to the top of the section with a reference.
32441	34	37	35	4	These findings are important and should be more prominently reflected in the Summary for Policy Makers. As stated above, it is important to recognize high meat consumption patterns are not only predominant in industrialized countries, but also, especially, in Latin America [Simone Lovera-Bilderbeek, Paraguay]	Noted. Text revised to reflect the comment (in relation to the importance of enteric fermentation and the importance of alternative diets to meat)
26865	34	37	35	11	Dietary change is addressed in several other chapters across this report. What kind of information does of chapter 1 provide in comparison to these other chapters? This current version of the paragraph is not comprehensive: Please either provide the full assessment of the pros and cons of different diets in relation to climate change effects in the context of other objectives or provide references to these other chapters. [, Germany]	Accepted. Cross chapter references mostly from chapters 5 and 6 on diets are inserted in this paragraph
26617	34	42	35	1	This sentence says very little without a specification of the reduction [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Rejected . Reductions are specified
29399	34	38	39		Some earlier references such as Stehfest et al. 2009; Bajželj et al. 2014 and Hedenous et al. 2014 are missing. [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	reference noted but point already covered by current used citations. We provide examples only, details on the response options (with more extensive literature) are provided in chapter 6
26861	34	1			Section 1.4.2. seems to be about food, please change its title accordingly. [, Germany]	Rejected. Section heading corresponds with measures in chapter 6
23623	34	10			"28 kg per capita" - is this per year? Need a time frame included. [Kerri Finlay, Canada]	Accepted- text revised.
4379	34	19			LE 2016 should be Le 2016 [Mastura Mahmud, Malaysia]	Accepted- text revised.
8301	34	29			I don't understand what is meant by "when ecological footprint falls outside the market system". [Kaoru Kitajima, Japan]	Noted and accepted. Sentence rephrased to indicate "when ecological footprint is not valued through the market system" [Yuping see page 27-line 40 SOD-Final-V5]
26867	34	43			Please define these "coloured waters". [, Germany]	Accepted- text revised.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
29405	34				Losses from harvest to retailer. There are many more drivers to losses in supply chain, these include: contractual arrangements between different actors in supply chain (for example farmers over-planing to ensure they meet their contractual obligations), stringent crop specification, lack of processing technology that could preserve produce for longer (including drying), high cost of labour making second harvest uneconomical, etc. Might be worth cross checking these sections with corresponding sections in Ch 5 and 6, to ensure consistency sythesis best insights. [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. Agree with these points, but as the entrance section states, we provide here examples only, and cross-reference to the comprehensive treatment in chapter 6
29409	35	12	27		This section reads a bit unclear to me. It would be worth first giving an overview of the soruces of data, their quality and overall levels of waste. For example, while data on global level is very uncertain, individual countries such as UK, US, Germany, Norway udertook national food waste measurement. Next it would be good to outline where this waste occurs, (Current text gives an impression most of the waste happens at retailer, wheras it's most likely households followed by out-of-home food establishments that experience highest levels and volumes of waste). Then some overview of the drivers and solutions should be outlined, and finally, what would the benefit of the improvements be. Some key references are missing, from authors Parfitt J, Quested T., Kumnu. Care needs to be taken when other studies use Gustaffson data rather than present original estimates that these are not referenced, as this may falsly increase the perception of certainy. Bajzelj et al. 2014 and Springmann et al. 2018 are examples of studies that quantify how much lower food systems with lower food wastage could reduce emission compared to these staying at today's levels. [Bojana Bajzelj, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Section rewritten consistent with the comment outline
28961	35	1	35	4	Seems odd to mention a single study and its fidning here. I think it could be presented as an example, while the later chapters do the assessment. [Jan Fuglestvedt, Norway]	Rejected. Example is presented as "example" and cross reference to other chapters provided
15185	35	5	35	11	This text makes the common mistake of identifying diet as a cultural phenonmenon without redognizing the vast extent to which diets are driven by marketing and access, and that the influence of marketing in the past 50 years has been enormous. "The existence of major vested interests and centers of power makes the political economy of diet change highly challenging (H.C.J Godfray et al. 2018. Meat consumption, health, and the environment. Science 361. eeam5324. [Daniel Zarin, United States of America]	Rejected . There is no claim in the text that diets are exclusively an aspect of culture.
23379	35	5	35	11	Insert Columbia Uni evidence that diverse farming systems lead to diverse rural diets lead to reduced malnutrition (Fanzo 2016). [John Dixon, Australia]	reference noted but point already covered by current used citations.
33045	35	5	35	11	Changing dietary and consumption habits would access to fresh nutritious food, the economic means to secure it, the knowledge and the means to cook it for consumption and an enabling atmosphere including time for the meal makers- all these are intricate and most often 'missed' requirements that undermine transformations in dietary and consumption habits. [Neeraja Havaligi, United States of America]	Rejected - outside the scope of the chapter . Examples presented to introduce the challenge. Details on how to move along the potential pathways in chapter5, 6 and 7.
30465	35	7	35	9	The processes of urban expansion, urbanization and rurbanization of rural communities have transformed the notions of countryside and city and have produced hybrid forms, which involve interactions between these spaces and affect land use, food and energy production, access to food and its consumption patterns. [Angel Angel de la Vega Navarro, Mexico]	Noted no action needed. Access to food, changes in consumption etc covered also in chapter 5

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30467	35	7	35	9	In terms of environment, the transformation of the standards of urban life is related to an increase in the ecological footprint of the city; depending on multiple factors, in particular of the size and density of the population, its size, the type of housing, patterns of energy consumption and mobility, the supply of food and its origin (Global Footprint Network, 2015). Baabou et al. (2017) compare the Ecological footprint of 19 Mediterranean cities by activity sectors. While the ecological footprint associated with the food production of these cities is relatively low compared to other activities and varies little (between 0.9 and 1.4 global hectares), uses a large part of the 1.7 hectares / capita theoretically available to achieve a transition towards sustainability (WWF, 2016). [Angel Angel de la Vega Navarro, Mexico]	Noted no action needed. Too detailed to be discussed in an introduction chapter. Part of these comments addressed in chapters 5, 6, 7.
30469	35	7	35	9	For those 2 precedents comments, see: A. Cristina de la Vega-Leinert, "Ciudades y consumo de bienes agrícolas. Transformaciones del consumo alimentario en el contexto de cambios en el comercio agrícola y las cadenas comerciales", Estudios Demográficos y Urbanos, vol. 34, núm. 1 (100), enero-abril, 2019, pp. 213-219 ISSN 0186-7210; e ISSN 2448-6515; doi: <a href="http://dx.doi.org/10.24201/edu.v34i1.1859">http://dx.doi.org/10.24201/edu.v34i1.1859</a> [Angel Angel de la Vega Navarro, Mexico]	reference noted but point already covered by current used citations.
4089	35	9	35	37	how much consent is there on this (these) statement(s) ? One perceives the intention to promote top down / directive-induced changes [Turi Fileccia, Italy]	Rejected -outside scope. Examples presented to introduce the challenge. Details on how to move along the potential pathways in chapter 6 and 7.
30625	35	11	35	11	Please, add a reference at the end of the paragraph to (FAO 2018b), A full section (pp.144 onward) of this FAO report is dedicated to demand-side policies to reduce land and other natural resource use. [Lorenzo Giovanni Bellù, Italy]	Accepted- text revised.
31701	35	12	35	14	Waste is also brought about by the offering of subsidies to farmers in Europe and covering them for sale losses e.g. dairy produce in Germany, for farmers to produce as usual even when this involves wastage when all the producedoes not find a market, and in this example a lot of milk and butter, is has been thown away in the past [Elizabeth Migongo-Bake, Kenya]	Noted. The role of policies and subsidies as causes for food waste are highlighted
3313	35	12	35	27	Here and elsewhere there is an over emphasis on the work of the chapter authors (I count 6 different citations of Alexander et al. alone). For instance, there are many recent studies on food waste and associated GHG emissions (e.g. Popp et al, Godfray et al. Garnett et al. and others) that seem to be overlooked here when they might help make the points more clearly (including dietary change, meat substitutes, and global food waste trends and how all these relate to GHG emissions). I would recommend the authors move a bit more beyond their own work in such sections instead of simply repeating the same references. [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Citations were expanded in the revised text
1545	35	12	35	27	It would be interesting, to discuss the concept of food waste, not only from house hold/ individual consumer perspective, but also from sectoral views,e.g food waste in tourism sector. For instance, the soaring amount of food waste, of which 40% is from hotels, restaurants, tourism, conferences and events. [Lucy Atieno, Kenya]	Rejected . Outside the scope of the chapter as lack of space prevent going into detail for particular sectors. More details on food waste is covered in chapter 5.
8713	35	12	35	27	Please include a reference to the prevention side in relation to food waste in the context of the SDG 12 "Ensure sustainable consumption and production patterns" that is mentioning among other to "halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains by 2030". [Mihaela Stefanescu, Romania]	Noted. Reference to SDG 12 added.

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
31659	35	15	35	15	(...) including overeating and overbuying. (...) (comment: in many cases, especially considering food waste, there is a larger amount of food that is not adequately used, and stored, or even bought within a more conscientious housekeeping strategy, leading to waste." [ , Brazil]	Noted. Text revised.
26871	35	22	35	27	Please use non-policy prescriptive language and add confidence statements. (Instead of "requires a combination of responses..." please consider language such as "can be reduced by..." [ , Germany]	Noted. Text revised and prescriptive language corrected [Yuping see additional edits - page 29-Line 3; page 31-line 31];
30865	35	22	35	27	this paragraph is very prescriptive considering it says there isn't enough data. Suggest deletion. [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account with section revised. The section was revised and supported by more references
21683	35	30	35	31	This definition of risk relates to environmental change only, which is too narrow. Risks can equally arise in the policy domain in the form of financial risks, political risks, market risks etc, and risks can be mediated in multiple ways not only the environmental domain. Please expand this definition (note there is work underway to revise the risk definition in the glossary to ensure that the policy and financial domains are also covered, which are critical to risk management). [Andy Reisinger, New Zealand]	Taken into account - combined with other comment. The various categories and their explanation are given in Ch6. The categories have been updated in light of various comments
30867	35	31	35	34	not specific to climate change - delete this sentence? [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - not supported by the peer-reviewed published literature or no scientific evidence/publication provided to support changes suggested by the reviewer.
23381	35	32	35	34	ADD. Most obvious and significant response to risk is improved farming practices such as conservation agriculture and fodder banks including fodder shrubs [John Dixon, Australia]	Accepted- text revised. The text has been revised
31661	35	34	35	34	Early warning systems need to be accompanied by contingency plans that will support decision making within the timeframe available, to adequately face possible forthcoming impacts. [ , Brazil]	Accepted- text revised. Yes, good point, and this is discussed in detail in Ch6
26121	35	34	35	34	Add to the end of the sentence "as well as the adaptation measures discussed below." [Reid Detchon, United States of America]	Rejected . We do not think that this addition adds anything useful to the sentence.
3557	35	29	36	2	as sustainable land management is already discussed, it would be possible to also mention it here. As SLM is considered a major risk minimizing option [Cordula Ott, Switzerland]	Rejected. SLM is discussed elsewhere in the chapter
13171	35	30	36	2	Add referre to genetic diversity includeing diversuty of crops and varieties [David Cooper, Canada]	Rejected. It's not clear to which sentence this comment refers?
26619	35	30	36	2	This section should at least mention index-based insurance models and their advantages in lower transaction costs and potential scaleability [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - outside the scope of the chapter . These methods are discussed in more details in Ch7
26869	35	18			Please clarify if these values are per year. Please provide percentages as well. [ , Germany]	Noted and accepted. Text revised [Yuping see page 28 - lines 36-37 SOD-final-v5]
11763	35	29			Refer here also to Chapter 7. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised.
26873	35	43			Please add the reference to the UNFCCC decision in addition to the science paper analysing this decision. [ , Germany]	Rejected. The citation provides full details of the UNFCCC decision.
28963	36	1	36	43	References to what SR1.5 says about these issues would be useful. [Jan Fuglestedt, Norway]	Accepted- text revised . 1.5 has been referred to where necessary.
6807	36	4	36	43	This section mentions the trade-offs and synergies between adaptation and mitigation measures adopted in response to climate change and has the potential to achieve a win-win situation. However, the cross-cutting of different policies in the policy implementation process often increases the unpredictability of implementation effects. This has not been considered, and it is recommended to add. [Changke Wang, China]	Comment noted section totally updated and revised. trade off and synergies have been captured in the chapter.
5447	36	5	36	8	Additionally disassociation of mitigation and adaptation strategies can lead to maladaptation. [ , Hungary]	Comment noted section totally updated and revised. maladaptation is referenced in the chapter

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13267	36	5	36	43	<p>The section on 'Adaptation measures and scope for co-benefits with mitigation' would also benefit from including references to the positive role of well designed Protected Areas and the key role protecting and restoring ecosystem integrity would play in protecting and enhancing all ecosystem services (including carbon sequestration and storage), maximizing adaptive capacity and the stability of ecosystems (FEBA 2017).</p> <p>• FEBA (Friends of Ecosystem-based Adaptation). (2017). Making Ecosystem-based Adaptation Effective: A Framework for Defining Qualification Criteria and Quality Standards (FEBA technical paper developed for UNFCCC-SBSTA 46). Bertram, M., Barrow, E., Blackwood, K., Rizvi, A.R., Reid, H., and von Scheliha-Dawid, S. (authors). GIZ, Bonn, Germany, IIED, London, UK, and IUCN, Gland, Switzerland. [Aila Keto, Australia]</p>	Comment noted section totally updated and revised. maladaptation is referenced in the chapter
30869	36	15	36	28	this paragraph is largely just a list - tur into a table or bullet points or delete [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Rejected.
23383	36	20	36	20	ADD 'such as conservation agriculture' after sustainable cropping practices [John Dixon, Australia]	Comment noted section totally updated and revised.
31663	36	24	36	24	...2016), among other possible practices. These (...) [, Brazil]	Comment noted section totally updated and revised.
22353	36	29	36	30	Delete from "through" to "degradation)". Mentioning REDD does not add value of the text, reforestation is not the most typical of REDD activities, and it can be practiced in other frameworks. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
1435	36	29	36	30	REDD+ is reducing emissions from deforestation and forest degradation, as well as conservation, sustainable management of forests and enhancement of forest carbon stock. See relevant UNFCCC decisions. [Henry Scheyvens, Japan]	Comment noted section totally updated and revised.
24095	36	29	36	30	Delete from "through" to "degradation)". Mentioning REDD does not add value of the text, reforestation is not the most typical of REDD activities, and it can be practiced in other frameworks. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
25311	36	29	36	32	The meaning of the REDD+ acronym should be completed: "reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries". [, France]	Comment noted section totally updated and revised.
13173	36	29	36	43	Broaden beyond reforestation to restoration more broadly (see for exampl, chapter 6 and KM of SROCC coastal ecosystems) [David Cooper, Canada]	Comment noted section totally updated and revised.
22355	36	37	36	37	Explain "permeability" or replace it with "permanence" (if that is what was intended...). [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised.
24097	36	37	36	37	Explain "permeability" or replace it with "permanence" (if that is what was intended...). [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised.
22357	36	41	36	43	<p>It would be pertinent to add references to risks/benefits associated with afforestation. For example:</p> <p>David Ellison, Cindy E. Morris, Bruno Locatelli, Douglas Sheil, Jane Cohen, Daniel Murdiyarso, Victoria Gutierrez, Meine van Noordwijk, Irena F. Creed, Jan Pokorny, David Gaveau, Dominick V. Spracklen, Aida Bargués Tobella, Ulrik Ilstedt, Adriaan J. Teuling, Solomon Gebreyohannis Gebrehiwot, David C. Sands, Bart Muys, Bruno Verbist, Elaine Springgay, Yulia Sugandi, Caroline A. Sullivan, Trees, forests and water: Cool insights for a hot world, Global Environmental Change, Volume 43, 2017, Pages 51-61. [Anastasios Kentarchos, Belgium]</p>	Comment noted section totally updated and revised. afforestation also discussed in the cross-chapter box

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

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24099	36	41	36	43	It would be pertinent to add references to risks/benefits associated with afforestation. For example:  David Ellison, Cindy E. Morris, Bruno Locatelli, Douglas Sheil, Jane Cohen, Daniel Murdiyarso, Victoria Gutierrez, Meine van Noordwijk, Irena F. Creed, Jan Pokorny, David Gaveau, Dominick V. Spracklen, Aida Bargaúes Tobella, Ulrik Ilstedt, Adriaan J. Teuling, Solomon Gebreyohannis Gebrehiwot, David C. Sands, Bart Muys, Bruno Verbist, Elaine Springgay, Yulia Sugandi, Caroline A. Sullivan, Trees, forests and water: Cool insights for a hot world, Global Environmental Change, Volume 43, 2017, Pages 51-61. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. afforestation also discussed in the cross-chapter box
26875	36	8			Is this a new definition of adaptation? Please see the glossary and harmonize. Please make clear if adaptation only aims at reducing vulnerability or if it also aims at reducing exposure. [, Germany]	Comment noted section totally updated and revised. this section has been revised - not a new definition - simply discussion other attributes of adaptation
8303	36	9			I don't understand what "biophysical vulnerability" means. [Kaoru Kitajima, Japan]	Noted no action needed. commonly known terminology
7453	36	15		28	The objective of the paragraph is to indicate the adaptation measures, however, the adaptation measures are mixed with the improvements that would favor those measures. For example: 'improving land productivity' is a benefit, 'agroforestry' is an adaptation measure. I think it would be necessary to clarify these extremes. Also, the measure 'sustainable cropping practices' (line 20) is a generic package of adaptation measures: it would be necessary to specify and detail the measures. [Rafael Blanco-Sepulveda, Spain]	Rejected . the qualification is not necessary
8293	36	29			This paragraph and in the rest of the chapter, this chapter, forests need to be discussed in greater depth and clearer nuances. Before discussing "reforestation and afforestation", forests conservation need to be framed properly. Terms like "degraded forests" and "secondary forests" have been used to justify conversion of forests to agricultural crops and monoculture tree planatation (c.f., Chazdon 2016 ab in the citation). In addition to discussion "reforestation", sustainable management of natural forests (including those after selective logging of the most valuable timbers) must be discussed. Otherwise, it might result in excuse for governments (under lobbying influence of corporations interested in economic profits) to implement policies that result in in perverted conversion of biodiversity-rich forests that support the livelihood of indigenous people. A recent book by CIFOR (Angelsen et al. 2018 Transforming REDD+ ...) may have relevent recent references about REDD+. [Kaoru Kitajima, Japan]	Comment noted section totally updated and revised.
26621	37	5	37	12	As this stands, the second category, farmers and foresters, do not sound like "governance actors" at all. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. The text has been revised
3559	37	11	37	12	Farmers and foresters (at least) show up in one sentence.. But a general picture on who they are... or who is using the land for farming is mssing throuout Chapter 1. .... percentages of large scale farming; in the North; in the South; small scale farmers... [Cordula Ott, Switzerland]	Rejected - outside the scope of the chapter . These details are more relevant to (and discussed in) Ch6
3563	37	11	37	12	The IAASTD 2009 Report gives an understanding on the imporntrance of small scale farmers on a global scale... As small scale farmers (espacially in ten South) are also a big part opf the solution, more information on such issues is helpful. [Cordula Ott, Switzerland]	Rejected - outside the scope of the chapter . Such details are discussed further in Ch5, and are beyond the scope of the introductory chapter

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
22359	37	17	37	17	"the risks of anthropogenic climate forcing through mitigation" should be replaced with the "risk of perverse outcomes of actions intended for mitigation", or something similar. If an action causes (additional) "anthropogenic forcing", then the action cannot be considered "mitigation", regardless whether it was intended for for mitigation. A case in point is bioenergy, which is generally (and wrongly) referred to as "mitigation", regardless of its actual forcing impact, which can be counterproductive. [Anastasios Kentarchos, Belgium]	Accepted- text revised. The text has been revised accordingly
24101	37	17	37	17	"the risks of anthropogenic climate forcing through mitigation" should be replaced with the "risk of perverse outcomes of actions intended for mitigation", or something similar. If an action causes (additional) "anthropogenic forcing", then the action cannot be considered "mitigation", regardless whether it was intended for for mitigation. A case in point is bioenergy, which is generally (and wrongly) referred to as "mitigation", regardless of its actual forcing impact, which can be counterproductive. [Zoltán Rakonczay, Belgium]	Accepted- text revised. The text has been revised accordingly
24103	37	19	37	22	It is useful to highlight the need for coherent, systemic ways of thinking. Unfortunately, it is not well reflected even in this section: E.g., the inherent linkages between bioenergy (and its representation in climate models and policies) and land use (and its representation in climate models and policy) are not fully recognised or explored. Bioenergy could be an important case in point to exemplify the failures resulting from the lack of systemic thinking. [Zoltán Rakonczay, Belgium]	The assessment now included a cross-chapter box on Bioenergy, which addresses these types of issues.
32443	37	19	37	31	It is a misunderstanding that policy coherence and multi-scale governance by itself will lead to policies and actions that are more aligned with climate change mitigation and resilience goals. Only if all actors are fully aware of the scientific implications of certain economic or social policies, and governance structures enable the prioritization of long-term societal needs over short-term private interests, the outcomes will be more aligned with climate ambitions. This also requires a more profound analysis of power imbalances and perverse incentives in governance structures, which is currently lacking, both in Chapter 1 and in the Summary for Policy Makers, even though it is discussed in Chapter 7 (7.5.7). [Simone Lovera-Bilderbeek, Paraguay]	Rejected - outside the scope of the chapter . Agreed, but Ch1 has the purpose of introducing the assessment, not in doing analysis. Further discussion of these issues can be found throughout the technical report, especially in Chapter 7.
31665	37	24	37	24	Replace the word 'nexus' by "integrative approaches". In other parts of the document there is already a comment that there is not clarity on the concept of 'nexus'; better to use terms that are already consolidated. [, Brazil]	Rejected . The nexus approach may not always be used consistently throughout the literature, but it is still common terminology and therefore appropriate to be used here (since we need to assess the literature)
30627	37	24	37	24	Please, refer here to the FAO report (FAO 2017) "The future of food and agriculture - Trends and challenges" where the multiple environmental and socio-economic challenges facing food and agricultural systems are portrayed and analysed. [Lorenzo Giovanni Bellù, Italy]	reference noted but point already covered by current used citations. We don't see the point of introducing this reference at this juncture. Ch5 discusses this study in more details.
6595	37	32	37	35	We recommend to mention in the section of several attributes of adaptation or resilience pathways the relevance of capacity strengthening focus in literacy in develop countries. [, Mexico]	Rejected - outside the scope of the chapter . This is rather too specific a point for an introductory chapter
23385	37	32	37	42	ADD discussion of key role of social capital, especially in relation to local governance [John Dixon, Australia]	Rejected - outside the scope of the chapter . This would require too much detail for an introductory chapter. Further discussion of these issues can be found throughout the technical report, especially in Chapters 6 and 7.
31667	37	32	37	43	Reinforcing former comments on ILK, consider balance with other sources of knowledge. [, Brazil]	Accepted- text revised. The text on ILK has been re-written

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11767	37	41	37	43	This sentence seems to refer explicitly to 'indigenous knowledge' and not to 'local knowledge'. Therefore, the combined acronym ILK can be avoided here, to avoid confusion and misinterpretation. Generally, it is advised that where possible indigenous knowledge and local knowledge should be referred to separately, rather than always mixing them (especially in cases where the evidence cited is only dealing with one of the two sorts of knowledge systems). [Hans Poertner and WGII TSU, Germany]	Rejected. Point taken, although the acronym ILK is commonly used when referring to either indigenous or local knowledge. Chapter 7 of this report has a fuller discussion of ILK issues.
13269	37	1	38	11	The section on Governance should, when referring to synergies (lines 13-22) include reference to the CBD call for better integration between international Conventions and policy instruments (CBD/COP/DEC 14/30). Also, in this section greater elaboration is warranted on the role of indigenous communities and the importance of enhancing their rights (Missing Pathways report) including of the potential role of Indigenous Protected Areas, as discussed above. [Aila Keto, Australia]	Accepted- text revised. The section on ILK has been developed further
1311	37	1	38	11	Anything to tell about governance risks e.g. fears of losing national sovereignty over land? [Oswaldo Lucon, Brazil]	Rejected. This section is about enabling the response (of various options) rather than the attendant risks
21981	37	1	38	11	Is it possible to mention law and legal options that could enable the response? Either at domestic, or international level? [Petra Minnerop, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. These are discussed as policy options in Section 1.5.3
30871	37	1	38	12	this paragraph should be much shorter and more clearly related to the IPCC role [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised. The text has been revised
3577	37	32	38	4	The discussion of Indigenous and local knowledge is limited. Local actors have own knowledge systems, composed by world views, interests, values, social strategies.... Most of all, local knowledge systems reflect the socio-political, economic and ecological context. This context knowledge is important! Only it also solutions that are also contextualized. The issue of knowledge and co-production is better described in Chapter 3, page 9: 'Knowledge production' [Cordula Ott, Switzerland]	Rejected - outside the scope of the chapter. We only have a limited amount of space to introduce many concepts in this introductory chapter. We have as far as possible referred the reader to additional literature providing more discussion. Further discussion of ILK can be found throughout the technical report, especially in Chapter 7.
11765	37	32	38	4	The description of the relevance of ILK merits its own subheading under 1.5. [Hans Poertner and WGII TSU, Germany]	Accepted. The section on ILK has been developed further
13047	37	32	38	4	When discussing ILK, there should be some narrative around the protection of that knowledge. Consideration should be given to the United Nations Convention on Biodiversity and Declaration on the Rights of Indigenous People (UNDRIP). While protection of ILK is discussed in Chapter 7, respect and protection from exploitation should be mentioned in Chapter 1. [Kristi Tabaj, United States of America]	Rejected - outside the scope of the chapter. This is a good point, but somewhat out of the scope for the introductory chapter on land and climate change. Further discussion of ILK can be found throughout the technical report, especially in Chapter 7.
32445	37	32	38	4	This is an important finding that should be better reflected in the Summary for Policy Makers [Simone Lovera-Bilderbeek, Paraguay]	Rejected. The content and the writing of the SPM is based on a collective decision of the authorship team and not Ch1 in isolation. ILK has been highlighted within the SPM.
29765	37	32	38	4	It is positive to see acknowledgement of traditional, indigenous and local knowledge here. [Tanya Smith, Canada]	Thank you for the positive comment.

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30543	37	32	38	11	While the IPCC report rightly cites science on the role and potential of traditional, indigenous and local knowledge in climate and land governance and SLM, it nowhere cites actual works and studies done by local traditional knowledge holders explaining their use and management of the land and their customary laws for sustainable land use and the care of land and resources. The IPCC team and editors would do well to cite some examples of this local knowledge production in the report or at least in a box, which would demonstrate IPCC openness to non-peer reviewed sources. See, for example, the works of the Wapichan people in southern Guyana (South America) - David, B., P. Isaacs, A. Johnny, L. Johnson, M. Pugsley, C. Amacindo, G. Winter and Y. Winter G (2006) Wa Wiizi – Wa Kaduzu / Our territory – Our Custom: Customary Use of Biological Resources and Related Traditional Practices within Wapichan Territory in Guyana (an indigenous case study). SRDC Georgetown. The Wapichan people have also developed their own management plan for sustainable land use and community development - see South Rupununi District Council (2012) Baokopa'o wa di'tinpan wadauniinao ati'o nii - Thinking together for those coming behind us: an outline plan for the care of Wapichan territory in Guyana South Rupununi District Council, Georgetown <a href="http://www.forestpeoples.org/sites/fpp/files/publication/2012/05/wapichan-mp-22may12lowresnomarks.pdf">http://www.forestpeoples.org/sites/fpp/files/publication/2012/05/wapichan-mp-22may12lowresnomarks.pdf</a> See also Forest Peoples Programme, International Indigenous Forum on Biodiversity and CBD Secretariat (2016) Local Biodiversity Outlooks: Indigenous Peoples' and Local Communities' Contributions to the Implementation of the CBD Strategic Plan for Biodiversity (2011-2020) – complement to the fourth edition of the Global Biodiversity Outlook, FPP, Moreton in Marsh. [Thomas Griffiths, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - outside the scope of the chapter . This is an important point, but the introductory chapter cannot go into so much detail. However these issues are taken up in several places through the full technical report.
26877	37	32			Please use non-policy prescriptive language and add confidence statements. [, Germany]	Accepted- text revised. Updated throughout
32447	38	5	38	11	The statement is too generic and misses a more explicit conclusion based on the findings about the impacts of different governance modes. More detail is required. [Simone Lovera-Bilderbeek, Paraguay]	Taken into account . This section has been re-written. The reader is now referred to Ch7 where there is a much more detailed description of governance modes
32519	38	13	38	13	The term 'gender agency' in the title of section 1.5.2 is not commonly used in substantive discussions on the issue. It would be more appropriate to rephrase the title as Women's agency as a critical factor in climate and land sustainability outcomes' [Hanna Paulose, United States of America]	Comment noted section totally updated and revised. this section has been revised.
26623	38	13	38	13	"agency" seems unnecessary in the sub-section title [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
13049	38	13	38	13	This introductory chapter needs earlier references to gender. Apart from a handful of mentions about women prior to page 37, the paragraph on this page is the first mention of gender issues. Also, the mistake is made of equating women with gender. Gender includes men, women, boys, and girls as well as those who identify as non-binary. Gender norms play a large role in decision making in climate change mitigation and adaptation. More intentional detail is needed to acknowledge this throughout the document. Also, please be sure to not perpetuate gender myths. For more information, see Doss, Meinzen-Dick, Quisumbing, and Thies, 2018: <a href="https://www.sciencedirect.com/science/article/pii/S2211912417300779?via%3Dihub">https://www.sciencedirect.com/science/article/pii/S2211912417300779?via%3Dihub</a> [Kristi Tabaj, United States of America]	Taken into account . gender references have been introduced in the ES

**IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3561	38	13	38	26	This paragraph does not provide the necessary insight into gender as a key issue in land and agriculture. Gender is also not women! A better description of the problem of gender (and other) inequalities is necessary. This could also be linked with the comment above.. The vulnerability and the role that small holders - their families- play in agriculture and in all M and A. [Cordula Ott, Switzerland]	Comment noted section totally updated and revised.
3565	38	13	38	26	Reference: 'UN Contribution to the High Level Political Forum on Sustainable Development _ Submission from the UNCCD' provides many info on gender and on SLM [Cordula Ott, Switzerland]	Comment noted section totally updated and revised. this section has been revised.
31703	38	13	38	26	This section misses completely, and needs to include text on, improvement of gender equity and support of gender based entrepreneurship in the whole food-value chain, including business financial support, and not just knowledge and role at the indigenous/rural community level [Elizabeth Migongo-Bake, Kenya]	Comment noted section totally updated and revised. new revisions
32449	38	13	38	26	This is an important, though rather concise, finding which should be better reflected in the Summary for Policy Makers, which is rather gender blind at the moment. Nowadays there is a comprehensive body of literature highlighting the role, rights, needs and aspirations of women in land use. [Simone Lovera-Bilderbeek, Paraguay]	Taken into account . gender references have been introduced in the ES
1423	38	13	38	26	I am glad to see gender included but this paragraph provides very little context about why we should care about gender disparities. Can you include something about how increasing empowerment of women can enhance adaptation and resilience? Here is an example: Bhattarai, B., Beilin, R., & Ford, R. (2015). Gender, agrobiodiversity, and climate change: A study of adaptation practices in the Nepal Himalayas. World Development, 70, 122-132. [Susan Clayton, United States of America]	Comment noted section totally updated and revised. this section has been revised.
23387	38	14	38	26	EXPAND analysis of gender here (and ELSEWHERE through the chapter), including in particular the role in decision making. For example, in NW Cambodia practically 100% of farm household budgets are managed by women, and also most marketing of surplus production. [John Dixon, Australia]	Comment noted section totally updated and revised. revisions on this section done
26625	38	16	38	16	the sentence is unclear with the two uses of "between" [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. section revised.
13051	38	19	38	19	Men also have valuable indigenous knowledge. The information between men and women may be distinct and should be respectively utilized. [Kristi Tabaj, United States of America]	Noted no action needed. We consider this too detailed for a framing chapter; see also X-chapter box on ILK.
20989	38	23	38	26	What is meant by 'respecting countries with unique social values'? what makes a unique social value and does uniqueness necessarily mean it should command respect? [, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised.
4035	38	23	38	26	The sentence "...respecting countries with unique social values, cultures and institutional mechanisms and, in turn, identify the ways in which these social norms play a role in women's social and economic empowerment..." seems a bit strange. What if the social values, cultures and institutional mechanisms actively fight the empowerment of women? Should they still be respected? The issue should be approached with the understanding that multiple goals (respecting cultures + empowering women) may come with conflicts, and these should be resolved. [Vassilis Daoglou, Netherlands]	Comment noted section totally updated and revised.
13053	38	25	38	25	Men, girls, boys, and other genders should be included when discussing social norms. [Kristi Tabaj, United States of America]	Comment noted section totally updated and revised.

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
40449	38		38		aspect linked with gender introduced here but addressed in x places in the report. Check and use chapter 1 to introduce the rest of the report more. Chapter 1 to express why it is relevant and where to find relevant information in other chapters. [Valerie Masson-Delmotte, France]	Accepted- text revised. This section has been re-written.
1313	38	28	41	13	Compliance with climate change financing commitments could be mentioned here. Liaise with 7.5.4 [Oswaldo Lucon, Brazil]	Taken into account . This is discussed in Ch7
1315	38	28	41	13	No mention to historical responsibilities, past liabilities, restoring degraded land in developed countries [Oswaldo Lucon, Brazil]	Rejected - outside the scope of the chapter . This is too detailed a discussion for an introductory chapter. However, these issues as they relate to land degradation and restoration are addressed in chapter 4 of this report.
209	38	28	41	13	The policy instruments section needs work. It goes through a wide range of policy instruments and often says "they have not always been effective." There is no discussion of why they are not effective. There is not discussion of what it would take to make them effective. It is not clear what the section contributes ifit only enumerates a number of policy options, says they have problems, and stops. [Wallace Tyner, United States of America]	Accepted- text revised. The policy instrument section has been substantially re-written also taking account of this point.
31669	38	29	41	13	A general comment: practicaly all the presented policy instruments are related to market aspects. While market is an important instrument, as it influences decions making in many instances, and finances are an important element to individuals, groups, institutions, nations, there is a whole gamut of instruments beyond markets that public policy can consider, regarding the creation of a positive environment to enabling good decision making. [, Brazil]	Taken into account . We agree with the point about the importance of non-market policy options, but disagree that it is not addressed in this section, which explores a wide range of non-market options.
5449	38	29	41	14	The whole chapter is rather a desription and introduction of tools, but not fully comprehensive. E.g. tax relieves are mentioned only in the table, there is no detailed description in the text part. Similar can be told about norms, charges or fees. [, Hungary]	Taken into account - combined with other comment. The section has been re-written to accommodate this and other comments. However, the role of Ch1 is to introduce these concepts rather than to go into them in detail or to 'assess' the literature.
11769	38	13			Add a cross-reference to Cross-chapter box 6 on gender. [Hans Poertner and WGII TSU, Germany]	Accepted- text revised . chapter has made cross references with chapter 6 and 7.
22361	39	1	39	3	The column on "legislation" misses the most important types of legislation, namely laws regulating land use (soil protection laws, laws restricting land-use changes, forest codes, nature conservation laws etc) and other ordinances like on zoning. [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. The figure has been deleted
26627	39	1	39	3	The table does not work, in that it subsumes property rights under human rights. Many sorts of policy instruments to maintain or amend property rights (titling initiatives, changes in commercial law as applied to land, teancy reform, compulsory purchase/eminent domain, maintenance of cadastres etc.) do not fit under human rights or under the three bullets of collective rights, heritage or indigenous peoples, but may still address the land challenges. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. The figure has been deleted
24105	39	1	39	3	The column on "legislation" misses the most important types of legislation, namely laws regulating land use (soil protection laws, laws restricting land-use changes, forest codes, nature conservation laws etc) and other ordinances like on zoning. [Zoltán Rakonczay, Belgium]	Comment noted section totally updated and revised. The figure has been deleted
22363	39	4	39	12	Section 1.5.3.1 should consider the most important hard policy istruments, namely laws regulating land use (soil protection laws, laws restricting land-use changes, forest codes, nature conservation laws, etc) and other ordinances like local zoning rules affecting urban sprawl and green areas. [Anastasios Kentarchos, Belgium]	Taken into account . All of these options are considered in the section, but at a more generic level, e.g. regulatory instruments. Word limits prevent a more detailed description fo these specific opions. However, further discussion of these policy instruments can be found in chapters 6 and 7 of this report

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5451	39	4	39	12	The concrete introduction of the situation is lacking regarding the concrete application of these measures and tools and the territorial differences between regions and continents regarding this issue. It would be interesting to know which macroregion rely on which tool the most and which tools are the most preferred. [, Hungary]	Rejected - outside the scope of the chapter . This would require considerable analysis that is beyond the scope of this introductory chapter. However, additional discussion of these measures and tools can be found in chapters 6 and 7 of the full technical report.
30545	39	4	39	12	This section is perfunctory and truncated: it could be expanded to better report the potential of legal regulation, legal reform and law enforcement in addressing land degradation and climate damage. As noted in comments regarding Chapter 6 (below), the IPCC report should explicitly address legal regulation of companies, investors via binding laws that require companies and financiers to exercise and ensure robust due diligence in their business operations, supply chains and investments which may feature risks of harmful impacts on carbon stocks, communities, their land and resource rights and the climate. Examples of legal instruments in importer and financing countries for the regulation specific commodities and investments already exist. There is literature documenting emerging lessons learned. Such instruments include the EU Timber Regulation (2013), EU Directive on Conflict Minerals (2017), the US Lacey Act (2008) and the French Loi d'vigilance (2017). This latter law places binding obligations on larger companies to do human rights and environmental impact assessments for their supply chains in third countries, and to develop action plans to address risks and potential harmful impacts on land, people and the environment identified by due diligence studies. [Thomas Griffiths, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - outside the scope of the chapter . We have limited space to discuss these various policy instruments, and hence the text is short in what is intended to be an introductory chapter. Ch7 explores these issues in considerably more detail.
24107	39	4	39	12	Section 1.5.3.1 should consider the most important hard policy instruments, namely laws regulating land use (soil protection laws, laws restricting land-use changes, forest codes, nature conservation laws, etc) and other ordinances like local zoning rules affecting urban sprawl and green areas. [Zoltán Rakonczay, Belgium]	Taken into account . All of these options are considered in the section, but at a more generic level, e.g. regulatory instruments. Word limits prevent a more detailed description fo these specific options. However, further discussion of these policy instruments can be found in chapters 6 and 7 of this report
23389	39	5	39	12	ADD land, water and forest tenure in all its manifestations (Dilinger, various years) Keep in mind LIVESTOCK through this policy section. [John Dixon, Australia]	Taken into account . Tenure issues are discussed more comprehensively in the sub-section on Rights-based Instruments and Customary Norms.
5453	39	13	39	30	The concrete introduction of the situation is lacking regarding the concrete application of these measures and tools and the territorial differences between regions and continents regarding this issue. It would be interesting to know which macroregion rely on which tool the most and which tools are the most preferred. [, Hungary]	Noted. Text revised and references to regional specificities added where appropriate
32451	39	17	39	19	This is a rather controversial statement that lacks scientific foundation. The scientific literature on the impact of trading mechanisms is very divided about the possible positive or negative impacts and effectiveness of trading schemes and environmental markets in general, as described in the rest of the chapter. The findings about the dubious effectiveness of market-based mechanisms like PES should also be more appropriately reflected in the Summary for Policy Makers. [Simone Lovera-Bilderbeek, Paraguay]	Noted. Section and framing revised
29767	39	18	39	18	It is noteworthy that Tsleil-Waututh Nation does not support habitat banking. It typically is an imperfect habitat replacement option in quantity and quality. It is often used to justify development before the true habitat cost of a developmen project is understood. [Tanya Smith, Canada]	Noted. References to indigenous consumption practices added in section 1.5.3.4

IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
30629	39	23	39	23	Fully accounting for emission costs and food price increases. Please, note that fully accounting emissions (and other environmental costs) may imply an increase of food prices, with food security implications for low-income layers of societies. This issue cannot be neglected as it creates a fundamental (apparent) trade-off between environmental concerns and food security concerns. This apparent trade off can be solved only if in future income (purchasing power) and income earning opportunities are more equitably distributed to preserve and enhance the real income (actual purchasing power) of poor layers of societies, despite food price increases. This issue is thoroughly dealt with in FAO 2018b. Please, consider adding the following sentence (or the like) to line 23: "However, fully accounting emissions (and other environmental costs such as land degradation, water pollution etc, is very likely to imply an increase of food prices, thus affecting low-income layers of societies with implications for the achievement of food security and nutrition targets. This trade-off can only be solved if the real income (actual purchasing power) is more equitably distributed by means of a mix of socio-economic policies aimed at implementing the 2030 agenda, which ensure: pro-poor growth that increases income-earning opportunities for poor people (SDG 8); reduced inequalities within and between countries (SDG 10); ab; provision of good health services (SDG 3) and quality education (SDG 4) more equitable and effective fiscal systems, peace, strong institutions and improved governance at all levels (SDG 16) (FAO 2018b)". [Lorenzo Giovanni Bellù, Italy]	Noted. Text revised to focus on accounting (removed full accounting).
26879	39	23	39	25	There is a rich discussion on the effectiveness of market-based policies (for example found in chapter 7.5.4.4) which is not properly reflected in this one sentence supported by only one reference. Please revise and provide a comprehensive assessment of this issue either in chapter 1, or provide references to relevant remaining SRCL-chapters. [ , Germany]	reference noted but point already covered by current used citations. Accepted. Section revised and cross-chapter reference to 7.5.4.4 referenced
30499	39		40		add cultural heritage under 'social and cultural' and 'legal and regulatory' sections to table of policy areas that are relevant. Also to text - cultural heritage legal and regulatory frameworks can affect landuse policies and practice. Cultural heritage is a central component of cultural and social governance frameworks. [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - combined with other comment. Text corrected in table
3569	39	16			delete 'affect' once [Cordula Ott, Switzerland]	Taken into account - combined with other comment. corrected
23553	39				In Table 1.2, does the challenge of land-related policies include policy norms for grassroots and non-profit organizations? [Huai Jianjun, China]	Taken into account - combined with other comment. Table edited. Reference to grass roots and non-profit organizations added
30873	40	3	40	8	PES cannot be said to 'have not worked as effectively as originally theorised' as they have not been widely implemented. I would say 'have not been widely adopted and have not yet been demonstrated to deliver as originally hoped'. Arguably there are some success stories e.g. around protecting water quality but not necessary to go into details here [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This is a contested issue with differing perspectives on the effectiveness of PES. Text revised to reflect the comment
26123	40	19	40	20	Add to the end of the sentence "or supply chain incentives for sustainable land management practices." [Reid Detchon, United States of America]	Taken into account - combined with other comment.
771	40	21	40	21	It should be 'complement' instead of 'compliment'. [Edson Leite, Brazil]	Taken into account - combined with other comment. Text corrected
5455	40	26	40	42	The concrete introduction of the situation is lacking regarding the concrete application of these measures and tools and the territorial differences between regions and continents regarding this issue. It would be interesting to know which macroregion rely on which tool the most and which tools are the most preferred. [ , Hungary]	Noted no action needed.

**IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26629	40	26	40	42	Please see above comment on Table 1.2. The section overemphasises common-prperty systems (which are valuable and relevant) at the expense of many other policy instruments directed at property rights [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Comment noted section totally updated and revised. section has been revised
32453	40	26	40	42	These important findings should be better reflected in the summary for policy makers. It would also be good to refer more explicitly to the importance of ICCAs (Indigenous Peoples and local communities' territories and areas) and other collective actions, which is described in more contemporary research (see Kothari, 2012 for an overview). [Simone Lovera-Bilderbeek, Paraguay]	Comment noted section totally updated and revised.
32505	40	26	40	42	Kothari, Ashish with Corrigan, Colleen, Jonas, Harry, Neumann, Aurélie, and Shrumm, Holly. (eds). 2012. Recognising and Supporting Territories and Areas Conserved By Indigenous Peoples And Local Communities: Global Overview and National Case Studies. Secretariat of the Convention on Biological Diversity, ICCA Consortium, Kalpavriksh, and Natural Justice, Montreal, Canada. Technical Series no. 64, 160 pp. at comment 41 [Simone Lovera-Bilderbeek, Paraguay]	Comment noted section totally updated and revised.
1425	41	1	41	13	there is more that could be said about the use of cultural and social instruments to promote resilience. Here is an example: Dennings, K., & Tabanico, J. (2017). Research into Woodland owners' use of sustainable forest management to inform campaign marketing mix. Social Marketing Quarterly, 23(2), 185–199. [Susan Clayton, United States of America]	Accepted. Text revised and relevent references added
29771	41	1	41	13	It would be interesting to add an Indigenous cultural instrument example here to balance the current emphasis on conventional consumption. Tsleil-Waututh for example, has explicitly engaged community youth in a group art project based on oral histories of climate adaptation; in relaying and working with these stories, climate and land management awareness is raised and worked on. [Tanya Smith, Canada]	Accepted. References to Inuit and Tsleil-Waututh Nation were given as examples of indigenous practices
5457	41	1	41	14	The concrete introduction of the situation is lacking regarding the concrete application of these measures and tools and the territorial differences between regions and continents regarding this issue. It would be interesting to know which macroregion rely on which tool the most and which tools are the most preferred. [, Hungary]	Noted. Text revised and references to regional specificities added where appropriate
5459	41	1	41	14	"Communication of knowledge is important in deed, but not only about improved land management as the text mentioned, but either about conscious consumption patterns, resource effective ways of life, etc. [, Hungary]	Taken into account - combined with other comment.
16953	41	16	41	16	The document goes to some length explaining that land use is not just an environmental challenge, but much more. <u>Suggest to rephrase the sentence.</u> [Roland Hiederer, Italy]	Accepted- text revised.
279	41	16	41	19	Land use itself is not an environmental challenge - how, where and how much you allocate land to various uses is an environmental challenge [Mahak Agrawal, India]	Accepted- text revised.
28965	41	25	41	25	Figure 1.5 is potentially useful. The circle in the box with synergies etc is a bit confusing for the eye and some design improvement could help here. I also wonder if the link between the block of ch1-5 and ch7 could be made more elegant. [Jan Fuglestedt, Norway]	Accepted- text revised. Figure revised
773	41	30	41	30	I would add '...Sustainable Land Management (SLM)...'. [Edson Leite, Brazil]	Rejected. SLM defined previously in the chapter

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8295	41		41		Figure 1.5 is a very nice way to frame the entire report. Can this - as well as the overview of the entire report - be brought up more forward? It may be more effective in contextualizing other elements of the Chapter 1, including explanations of scenarios and uncertainties, etc., that are important shared components with the rest of the report. Also - Chapter 2 goes beyond dynamics of natural system per se, even though it tends to focus ecosystem processes). [Kaoru Kitajima, Japan]	Rejected. Thanks for the encouragement regarding the Figure. We discussed placement several time in chapter team, but in the end decided that we find this structure more logical.
40451	41		41		"reversibility" (line 30) : under which conditions is that possible? Does not appear consistent with other chapters (rehabilitation vs restoration). Is it possible to reverse trends under high population growth, large climate change? This is the final section of the chapter that should be expanded to guide the reader more to the other chapters (where to find what, narrative, logical flow of information), especially the risk framework covered in 7. [Valerie Masson-Delmotte, France]	Accepted- text revised.
22365	41	15	42	7	The purpose of the report and of each chapter (i.e. this section, including the SDG framing) should be at the start of the chapter not at the end. It should be merged with 1.2.1 (or at least screened for duplication) and should include this chapter (Ch1) in its overview of the chapters (i.e. an explanation of why we should read Ch1 rather than jump straight to the other chapters). [Anastasios Kentarchos, Belgium]	Comment noted section totally updated and revised. Section 1.6 merged w section 1.2
3567	41	15	42	7	This should come at the beginning (1.2.1) where goals and structure of the report should be presenetd, before the key terms get some clarification; followed by status and dynamics and then indepth interlinkeages.... [Cordula Ott, Switzerland]	Comment noted section totally updated and revised. Section 1.6 merged w section 1.2
26881	41	15	42	7	This section would be better placed in the introductory part of the Chapter, as it is helpful to get an overview of the entire report. The structure of the SRCL with its many themes is quite complex and exceptionally difficult to understand, in particular the difference between chapters 3, 6 and 7. Therefore, it is important to provide guidance to the reader and we urge the authors to improve the presentation of the report in chapter 1. Please see also our suggestions to improve the usefulness of chapter 1 to understand and navigate the structure of the report (comment on entire chapter 1). [, Germany]	Rejected . Was discussed several time in chapter team, but in the end decided that we find this structure more logical.
4381	41	24			Fig 5.1 The background colour is too dark against the black font for to be legible [Mastura Mahmud, Malaysia]	Accepted- text revised. now Fig. 1.1
26631	42	6	42	7	This seems a very vague characterisation of the content of Chapter 7. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted- text revised.
22367	42	9	42	9	It is odd to start the questions with the role of technology. It may give the reader the idea that technology is a central question of land-based mitigation, which may be debatable. It would be useful to add at least one FAQ related to bioenergy, specifically the nexus between bioenergy (and its GHG performance and promotion) and its land use impacts. [Anastasios Kentarchos, Belgium]	Accepted chapter restructured. This FAQ has been deleted
24109	42	9	42	9	It is odd to start the questions with the role of technology. It may give the reader the idea that technology is a central question of land-based mitigation, which may be debatable. It would be useful to add at least one FAQ related to bioenergy, specifically the nexus between bioenergy (and its GHG performance and promotion) and its land use impacts. [Zoltán Rakonczay, Belgium]	Accepted chapter restructured. This FAQ has been deleted
25313	42	10	42	11	This section should explain the differences between technology-based solutions and nature-based solutions/natural climate solutions (see also Griscom et al. 2017). [, France]	Accepted chapter restructured. This FAQ has been deleted

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26885	42	10	42	24	The answer to this question does not seem comprehensive: - the link to food security is missing - the negative side effects of technology are not addressed - the criticism of CSA/CSF is not mentioned [Germany]	Accepted chapter restructured. This FAQ has been deleted
11771	42	15	42	15	FAQ 1.1: Suggest to specify what kind of sensor networks are referred to or give examples to help readers understand why these are useful in agricultural management. [Hans Poertner and WGII TSU, Germany]	Accepted chapter restructured. This FAQ has been deleted
11773	42	15	42	16	FAQ 1.1: Suggest to explain how space observations and aerial digital imaging can support farm operations or give examples. Readers might have an idea of existing imagery or instruments such as drones, but might not be able to imagine how these could be used in farming. [Hans Poertner and WGII TSU, Germany]	Accepted chapter restructured. This FAQ has been deleted
1743	42	17	42	17	Perhaps the authors could mention the, I understand, increasing use of smartphones for citizen science purposes, both in urban and rural areas, including remote areas. [William Lahoz, Norway]	Accepted chapter restructured. This FAQ has been deleted
11775	42	22	42	42	FAQ1.1: Can be said more clearly why implementation is lagging behind, where the major hurdles are or what would have to happen? [Hans Poertner and WGII TSU, Germany]	Accepted chapter restructured. This FAQ has been deleted
11777	42	23	42	24	FAQ1.1: The last sentence makes me wonder why this FAQ addresses the role of technology and innovation if they are less important than managerial or institutional innovations. Would it be possible to rephrase the question? [Hans Poertner and WGII TSU, Germany]	Accepted chapter restructured. This FAQ has been deleted
15581	42	26	42	26	Change "impact" to "impacts". [Annika Herbert, South Africa]	Accepted- text revised.
23391	42	26	42	40	Differences between regions is a crude approach. The best approach to such differences to capture different land types and climate differences and farming patterns and livelihoods would be to recognise and incorporate the FAO/World Bank Farming Systems and Poverty classification and map of 72 farming systems in the 6 developing regions (Dixon, Gulliver, Gibbon 2001 Farming Systems and Poverty, also on FAO website in multiple languages. This recommendation applies to other parts of the report. [John Dixon, Australia]	Noted no action needed. The general concept of region diversity as inclusive of biophysical, socio-economic and farming systems is already in the text. Usually FAQ do not contain reference language
3809	42	34	42	37	replace " The overall responses in terms of adaptation or mitigation capacities to avoid and reduce vulnerabilities and enhance adaptive capacity, depend on institutional arrangements, socio-economic conditions, and implementation of policies, many of them having definite regional features." by " The overall responses in terms of adaptation or mitigation capacities to avoid and reduce vulnerabilities and enhance adaptive capacity, depend on institutional arrangements, population pressure, socio-economic conditions, and implementation of policies, many of them having definite regional features." [Philippe Waldteufel, France]	Accepted- text revised.
13175	42	9	43	11	KM 1 and 2 seem mismatched with chapter contents. KM 3 is too little too late. Need this definition up front. [David Cooper, Canada]	Accepted chapter restructured. FAQ 1.1 has been deleted and replaced with " What are the approaches to study the interactions between land and climate? "

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26883	42	9	43	11	There are a number of relevant questions that could be asked beyond these three. In addition, question FAQ1.2 could probably be answered by anyone who has an approximate knowledge of the subject, although not so detailed. We suggest replacing this question by one of these: - Why land, climate change and food interact (as background information to better understand the SPM and without anticipating its findings)? - What is sustainable land and forest management? - How much land has already been altered by human influence and how, and what trends are projected? We strongly suggest adding at least one question regarding the potential amount of CO2 Land can remove from the atmosphere to the report, either to this chapter or the chapter 2. [, Germany]	Accepted chapter restructured. FAQ 1.1 has been deleted and replaced with "What are the approaches to study the interactions between land and climate?"
40455	42		43		Why is FAQ1 here as technologies not described in this chapter? For FAQ2, second sentence to reconsider (regional aspects of climate change). "suffering" not assessment language. More on feedback loops. [Valerie Masson-Delmotte, France]	Noted no action needed. FAQ 1 is deleted, FAQs usually does not contain assessment language
23393	43	1	43	10	MERGE chapters and sections on Desertification and Degradation (or limit latter to humid zones only) [John Dixon, Australia]	Noted no action needed. covered in ch 3 and 4
2771	43	4	43	4	remove space in "long-term" [Bettina Weber, Germany]	Accepted- text revised.
1745	43	8	43	8	Perhaps the authors could provide examples of desertification that is not associated to expansion of deserts. [William Lahoz, Norway]	Noted no action needed. FAQs due to limited space are not supposed to present articulated examples, however the definition of desertification (see also Glossary) refer to persistent loss of functions from land exposed to human and environmental processes. One example is the permanent degradation of overgrazed land, deforested land which is not able to recover etc. More information and specific cases are presented in ch3 and ch4
6681	44	2	44	4	Please move in the list of references at its right place (following the alphabetical order) [Sylvain Ouillon, France]	Accepted- text revised.
4383	54	8			FAO, 2018a This reference is not in the text of Chapter 1 [Mastura Mahmud, Malaysia]	Accepted- text revised.
4385	62	12			Reference should be in sentence case. Le, T. T. H., 2016: Effects of climate change on rice yield and rice market in Vietnam. [Mastura Mahmud, Malaysia]	Accepted- text revised.
23833	63	24	63	24	This reference may further strengthen the statement. Kesar et al. (2016) Aerosol Optical Depth and Black Carbon Aerosol on the Foothills of Glaciers, Northwestern Himalaya, India, Journal of Climate Change, 2:1: 35-42, DOI 10.3233/JCC-160004 [, India]	Accepted- text revised.
3573	74	30	74	33	delete both Ssmith-References! (double-s!!) ... References are under Smith... [Cordula Ott, Switzerland]	Accepted- text revised.
22371	80	2	80	3	If the Supplement is retained, it would be important to amend the part on "biomass measurements" (p.81). When it comes to biomass, measuring the biomass stock is generally less important (less relevant to climate policy) than measuring (or otherwise estimating) biomass stock changes (i.e., the first derivative of stocks) and (in the context of policies aimed at changing practices) the changes in the rates of changes (i.e., the second derivative of biomass stocks). For example, forest standing stocks matter little, increments determine long-term yields, and increasing biomass supply would require an increase of increments. These aspects should be addressed in the table, as addressing only the estimation of stocks gives a false sense of accuracy/control. [Anastasios Kentarchos, Belgium]	Noted no action needed. The table is intended to provide a review based on recent knowledge of primary observation data that are used in several assessment which broadly address land and climate relations but not necessary only carbon sequestration. For what concern in specific the question of stock changes its derivation is based on consecutive biomass estimates, therefore we have maintained the criteria to present uncertainty at primary data. A detailed analysis of stock changes uncertainty in the context of climate mitigation is carried out in the IPCC guidelines as referenced in the text..

IPCC SRCCL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24113	80	2	80	3	If the Supplement is retained (not recommended), it would be important to amend the part on "biomass measurements" (p.81). When it comes to biomass, measuring the biomass stock is generally less important (less relevant to climate policy) than measuring (or otherwise estimating) biomass stock changes (i.e., the first derivative of stocks) and (in the context of policies aimed at changing practices) the changes in the rates of changes (i.e., the second derivative of biomass stocks). For example, forest standing stocks matter little, increments determine long-term yields, and increasing biomass supply would require an increase of increments. These aspects should be addressed in the table, as addressing only the estimation of stocks gives a false sense of accuracy/control. [Zoltán Rakonczay, Belgium]	Noted no action needed. see comment 24111
26887	80	3	80	3	Please make sure that the content of the cells of Table S 1 is aligned in a way that it is clear what the content in a specific column refers to. This is not an editorial issue, as the content cannot be assessed properly. [, Germany]	Accepted- text revised.
1747	80	2	82	1	Perhaps the authors could also mention in Table S1 in situ measurements (e.g., ground-based), not least owing to their role in validation of satellite data (the entry on satellite data mentions the need for its validation). [William Lahoz, Norway]	Noted no action needed. in the table several in situ measurements are presented, that can be used for satellite products validation
22369	80	1	87	20	The added value of the supplement is not convincing. Given the excessive length of the draft, it may be preferable to drop it. [Anastasios Kentarchos, Belgium]	Noted no action needed. see comment 24111
24111	80	1	87	20	The added value of the supplement is not convincing. Given the excessive length of the draft, it may be preferable to drop it. [Zoltán Rakonczay, Belgium]	Noted no action needed. we decided to keep it since it can be useful for framing the other chapters of the report
16955	81	11	81	20	Soil carbon point measurements: - as point measurements they do not cover an area of up to 1ha; - uncertainty of a measurement very much depends on the method, e.g. whether repetitions are taken at a site; - the differences in the analysis between laboratories should not exceed 10%; but these are systematic differences and not present when samples are analysed by the same laboratory; - detection limit frequently 0.2% soil organic carbon and 0.1% for carbonates, which one may consider as low, not high; - "needs high number for upscaling" is a qualitative statement and not generally correct. [Roland Hiederer, Italy]	Accepted- text revised. Thanks for the comment. Soil sampling is point measurements but generally a number of points scale to an area. However for clarity we dropped the term point measurements in the table. Uncertainties of course depend from analytical methods, sampling (paired repetition or averages etc.) and soil types. Here we report uncertainties as the coefficient of variation of random samples, using reference literature. Yes there was a mistake in using the world detection limit, we have dropped this term. Compared with other variables the number of samples to upscale estimate soil organic carbon at reasonable spatial scale (>10 ha) can be relatively large and labour consuming.
16957	82	7	82	16	Satellite data provide land cover, not land use. A significant pro is their spatial coverage. This is more important than the increase in the number of platforms available. [Roland Hiederer, Italy]	Accepted- text revised. Thanks for the comment text is revised accordingly. Land use detection can be a limitation
38629	83	2	83	2	Under column, "Understanding the uncertainties," "games" could use more explanation. [, United States of America]	Accepted- text revised.
16961	83	2	83	2	It may be argued that ensemble approaches reduce uncertainties, and that they necessarily lead to a better understanding of uncertainties. They tend to reduce variability, but only through "safety in numbers". [Roland Hiederer, Italy]	Noted no action needed. thanks for the comment. Section has been shortened, but hopefully point made by the reviewer has been retained.
16959	83	2	83	3	Missing from the type of uncertainties are: - data uncertainty; - decision rule uncertainty. These come before on e can consider the uncertainty of the consequences (decision risk). [Roland Hiederer, Italy]	Rejected - outside the scope of the chapter . Chapter one provides an introduction to some of the main concepts covered in the report; unfortunately page constraints necessitate that some aspects need to be incomplete. Data uncertainty is highlighted in teh table in the Annex.
7469		32		33	The authors should consider having a chart to show the synergies between policy makers, private actors, and land managers. [Onema Adojoh, United States of America]	Rejected . The Figure is purely meant to provide a visual of how the various chapters are interlinked

IPCC SRCLL Second Order Draft Review Comments and Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
110					wetlands were not even mentioned once in the chapter. Ironic, IPCC stated wetlands are the most vulnerable landscap feature subject to climate change. [Brian Huberty, United States of America]	Accepted- text revised. Valid point; we refer in teh revised text of the chapter repeatedly to wetlands. However, in this particular, short sub-section here it seems too detailed to mention different ecosystems
3521					Is title correct? Framing and context of what? Of the report? The subchapters seem at least partially to summarize the following chapters.. There is not much 'framing' left compared to the first draft (that included also Vision, mission...) [Cordula Ott, Switzerland]	Noted no action needed. The chapter title was given through the government outline
38631					Wetlands are not mentioned at all. Previous IPCC reports highlight wetlands as the most significant landscape type subject to climate change. [, United States of America]	Accepted- text revised . Wetlands now mentioned in the chapter, as well as in revised Fig. 1. Wetlands are also given plenty of splace in chapter 4.
38633					Units for land area in Chapter 1 are a mix of million hectares (Mha) and million square kilometers (Mkm2). Given that they vary by a factor of 100, their combined use is confusing, and it would be best to standardize on one unit. Million hectares is the most common unit in the literature of managed land systems, especially cropland and managed forests, and that seems the best choice for a common unit. [, United States of America]	Accepted- text revised. Units will be standardised; the IPCC styleguide asks us to use mio sq.km
38635					Chapter 1 only briefly mentions the recent IPCC 1.5°C Special Report. This occurs in Box 1.1 on page 1-7, and in Section 1.3.2 on page 1-18. The 1.5°C SR, especially Figure SPM.3b, provides a range of potential mitigation approaches that vary widely in the trade-off between carbon emissions mitigation from energy systems and from land. Chapter 1 could be improved by placing its assessment of land-based mitigation options in the context of the 1.5°C SR. In particular, Chapter 1 could address the trade-off between energy system mitigation and negative emissions from BECCS. [, United States of America]	Comment noted section totally updated and revised. More effort made to refer to 1.5
38637					The chapter (and the entire report) use both GtC a-1 and GtCO2 a-1. The report should standardize units and report everything in GtCO2 a-1. [, United States of America]	Accepted- text revised.
38639					This chapter omits any dedicated discussion or overview of GHG emissions and sequestration recent estimates and potential trends related to land use, forestry and agriculture. In order to adequately identify and discuss the potential roles of mitigation and adaptation opportunities, there needs to be a foundational discussion on the current/BAU of emissions/sequestration and related mitigation activities (which is also lacking here) against which future additional mitigation and adaptation activities can be benchmarked. Using estimates from Chapter 2, page 5, of this draft report would be useful here or even from established reports from global entities like FAO ( <a href="http://www.fao.org/docrep/019/i3671e/i3671e.pdf">http://www.fao.org/docrep/019/i3671e/i3671e.pdf</a> ) and IPCC ( <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf</a> ). [, United States of America]	Comment noted section totally updated and revised. More effort made to refer to 1.5
38641					Should refer to Chapter 2 for LU-related emissions estimates (like those starting on page 38) for consistency. [, United States of America]	Accepted- text revised . references made to chapter 2 and others
38643					This chapter focuses almost entirely on IAMs and how they represent land-use interactions. It omits land management, especially in forestry, where there are important interactions between forest management and the atmosphere. Various tools and studies have evaluated this aspect of LU and should be integrated into this chapter, including but not limited to: Sohngen and Mendelsohn (American Journal of Agricultural Economics, 2003); Bosetti et al. (Energy Policy, 2007); Favero et al. (Climatic Change, 2017); Tian et al. (Land Economics, 2018). IAMs do not have the level of forestry represented in these models/studies. [, United States of America]	Rejected - outside the scope of the chapter. Chapter 1 is introductory and thus cannot capture all important aspects. Forestry is mentioned but only briefly, however, cross-reference to e.g. chapters 4 and 6 provided where these aspects are covered in moredetail

**IPCC SRCL Second Order Draft Review Comments and Responses - Chapter 1**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21989					Comment: The chapters cover essential aspects backed with thorough review, I am pleased to take even tiny part in this [Hala Abayazid, Egypt]	Thank you for the positive comment.
12403					adaptation and adaptation capacity, as well as limits to adaptation, risk reduction by adaptation, have not been addressed in the ES, [Hans Poertner and WGII TSU, Germany]	Comment noted section totally updated and revised.
18019					I think it is a great summary of the structure of the report. The current challenges, opportunities, possible solutions/responses are clearly structured. I think current state of the report is mature and ready to be published. [Jian Peng, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for the positive comment.
8289					Overall, very nice introduction to the whole report. It is heavy in policy relevance, often reading more policy prescriptive in places. Perhaps, it can use more reference to later chapters (which I recognize is very difficult at SOD). It is great that it states the importance of food systems (importance of food supply chains, including consumer behaviours) from the onset, but comparatively speaking, the coverage on forest conservation and management are weak. [Kaoru Kitajima, Japan]	Accepted- text revised. cross referencing to chapters improved and comment on forest noted.
40341					Congratulations to the authors for a well-written and fairly short chapter. In isolation from the rest of the report, the chapter is succinct and tells almost the full story of the SRCL. That "in isolation" issue is also one of the key challenges for the next draft of the chapter. In other IPCC assessment cycles, the opening chapter traditionally sets the scene and lays out some of the key concepts and framing issues for the overall report. Chapter 1 dives right into evidence, and it would provide a better opening to SRCL if it rather frames the special report, introduce key things that are new (land literature, idea of interacting systems rather than "myopically" focusing only on climate because these will affect the options for addressing challenges that get in the way of sustainable development. [Koko Warner, Germany]	Thank you for the positive comment. In the revisions we focussed more on the "setting the scene".
4111					Provide a balanced region assessment. [Noureddine Yassaa, Algeria]	Noted no action needed. We attempt to highlight regional aspects throughout the chapter but there is no space in an introductory chapter to cover regional aspects comprehensively
1321					Liaise with tipping points of Box 7.3 [Oswaldo Lucon, Brazil]	Accepted- text revised. cross referencing to chapter 7 included