Comment No	From Page	From Line	To Page	To Line	Comment	Response
24356	0	0	0	0	General comment on Chapter 4: While it is understood that Chapters 3 and 4 are related, their separated missions must be clear. There should be a clear distinction about the thematic discussions in Chapter 3 on “Desertification” and that in Chapter 4 on “Land Degradation” to minimize duplication and avoid redundancy, and most importantly, maximize what is important in each of them. [Barron Joseph Orr, Germany]	Taken into account - chapter 3 (desertification) and chapter 4 have been synchronised.
24358	0	0	0	0	General comment on Chapter 4: The discussion in Chapter 4 must highlight recent advances in the knowledge on “land degradation”. While the risks of soil erosion (by water and/or wind) may increase with the climate change, the data of erosion-included transport of carbon (organic and inorganic) by alluvial and aeolian processes need a critical discussion (e.g., decomposition, nitrification/denitrification, formation of secondary carbonates). A clear distinction must also be made between the processes, factors and causes of land degradation. The interactive effects of climate change on land degradation, how it affects and is in turn affected by climate change, must be critically discussed. Specific comments by members of UNCCD-SPI, which need to be systematically addressed include the followings: [Barron Joseph Orr, Germany]	taken into account - text revised
24360	0	0	0	0	General comment on Chapter 4: The structure approach taken in this chapter was to provide insight on the drivers of land degradation, one after the next. However many are inter-related. One consideration might be to emphasize the interlinkages, particularly between the biophysical and social factors that drive land degradation. [Barron Joseph Orr, Germany]	taken into account - in the revised section 4.10 (now 4.x) we have integrated biophysical and socio-economic considerations. We have also added a figure/matrix which links problems and solutions (Figure 4.x)
24362	0	0	0	0	General comment on Chapter 4: While chapter 2 deals with land and climate, one of the challenges for those making policy on land degradation is the interaction between climate change and land degradation. Would it be possible to look at past, current and future climate - land degradation interactions? This would ideally include status and trends. [Barron Joseph Orr, Germany]	taken into account - sectin 4.5 and 4.6 have been substantially revised
24364	0	0	0	0	General comment on Chapter 4: Are there projections of land degradation under the climate change? If so, this chapter could include a scenarios section, building off, for example, part 2 of the Global Land Outlook. See page 106: https://knowledge.unccd.int/sites/default/files/2018-06/GLO%20English_Full_Report_rev1.pdf and http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2017-exploring-future-changes-in-land-use-and-land-condition-2076.pdf. There is also discussion of scenarios in the recently published IPBES Assessment on Land Degradation and Restoration (https://www.ipbes.net/assessment-reports/ldr). [Barron Joseph Orr, Germany]	noted - we are cautious about projections of land degradation. Climateic drivers of LD can be projected but the actual LD is difficult to project because the uncertainty about responses.
24366	0	0	0	0	General comment on Chapter 4: The strong content of this chapter suggests an opportunity to capture some of the key ideas in a diagram in the second order draft. Something that would capture land degradtion drivers, how they interact with each other, how they interact with climate change. If this were done in map form, maybe the spatial extent of those drivers across biomes and/or UN regions could be captured. Perhaps the recently published World Atlas for Desertification (WAD) might provide ideas for something like this. (https://wad.jrc.ec.europa.eu/landproductivity) [Barron Joseph Orr, Germany]	taken into account - we have developed a figure/matrix to show this (Figure 4.x).

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3412	0	0	0	0	It should be noted with the possession of long-term climate information on the effects of climate change, as some of these changes throughout the Earth's life have occurred over and over again and have become a natural process with many different life spans. [Hanieh Zargarlellahi, Iran]	noted
25604	0	0	0	0	My comments are limited to forest degradation. The chapter will benefit from including literature on forest dgradation and regeneration/regrowth done by ecologists across the world. A paragraph on forest regrowth, drivers and implications would enrich the chapter. I understand the focus on degradation, but land transformation is dinamic and there is enough evidence of forest regenariton and regrownt and implications to the climate system. Works by Chazdon, Rudel and DeFries are important in providing context, definitions that are helpful at understanding forest regrowth in the context of deforestation and degradation. [Laura Schneider, United States of America]	same as 25706
20178	0	0	0	0	Relationships between land degradation derivers, affected variables, interlinkages and feedbacks may be conceptualized. Land degradation neutrality (LDN) may be conceptualized, using a conceptual diagram, and discussed. Benchmarking exercise may be applied to soils and vegetation to better evaluate their degradation. [Sabit Erşahin, Turkey]	noted
25794	0				please use IPCC calibrated uncertainty language to assess confidence in key statements [Hans Poertner and WGII TSU, Germany]	accepted
25814	0				Please ensure IPCC calibrated uncertainty language is applied to assess key messages and statements throughout the text [Hans Poertner and WGII TSU, Germany]	accepted
25832	0				please refer to IPCC style guide regarding use of acronyms [Hans Poertner and WGII TSU, Germany]	accepted
26164	0				High-level comments: This chapter reads like a literature review, not like an assessment. Vital information gets lost in the amount of text. To sharpen the messages that are to be conveyed, please: - be more specific, quantify information where possible, i.e., instead of saying "some regions / many people / large quantities" provide actual numbers / sizes / region names - use IPCC Uncertainty Language - synthesise the findings of various studies that provide results on similar approaches or consult review papers where available, and use your expert abilities provide an assessment - place background information in boxes, and assessment text in the main text to guide the reader - focus on findings since AR5 - condense text by placing less emphasis on authors of studies and more emphasis on the output; e.g., state what a study found and place the reference in brackets, rather than writing "Smith et al. found that XXX, whereas in the following year, Miller found YYY but then Beck found ZZZ". [Hans Poertner and WGII TSU, Germany]	taken into account - text is revised
26166	0				When introducing acronyms, state the full name of the term first, then the acronym in brackets. All acronyms should be written out in full at their first occurence in the text [Hans Poertner and WGII TSU, Germany]	accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26168	0				Is the term 'biome' used in this chapter as defined in AR5 WGII? If it is used only in this chapter then suggest including the definition here; if it is used extensively throughout the chapter and other chapters of SRCCL, suggest inclusion in the Glossary (currently not inclulded). [Hans Poertner and WGII TSU, Germany]	taken into acount - text is revised
26170	0				avoid using the verb 'may', it hints at needing permission, and is very vague. Replace with 'can' or 'might' here and throughout the text. [Hans Poertner and WGII TSU, Germany]	accepted
20522	0				1. The structural arrangement of Chapter 4 is not very reasonable. It should be carried out one by one from the concept connotation, the status quo and problems, the mechanism of action and the impact process, the comparison of governance programs and effects, policy recommendations and specific cases. [Huai Jianjun, China]	rejected, comment unclear
20524	0				2.Part 4.3.2 maybe should be replaced with part 4.5 [Huai Jianjun, China]	rejected, comment unclear
20526	0				3.Part 4.7 maybe should be moved after part 4.9,because bioenergy provision can be considered as the human response or adaptation to the land degradation related with climate change. [Huai Jianjun, China]	rejected - we treat large scale bioenergy provision as a potential driver of land degradation
558	0				The structure of the executive summary is helpful. It is suggested to use a similar approach also in other chapters, as appropriate and also in the SPM. [Klaus Radunsky, Austria]	noted
25706	0				My comments are limited to forest degradation. The chapter will benefit from including literature on forest dgradation and regeneration/regrowth done by ecologists across the world. A paragraph on forest regrowth, drivers and implications would enrich the chapter. I understand the focus on degradation, but land transformation is dinamic and there is enough evidence of forest regenariton and regrownt and implications to the climate system. Works by Chazdon, Rudel and DeFries are important in providing context, definitions that are helpful at understanding forest regrowth in the context of deforestation and degradation. [Laura Schneider, United States of America]	Accepted - these points are now addressed throughout the chapter.
9628	0				Chapter 4.10.1-4.10.3 unfortunately not yet ready for review. These are the chapters that will discuss responses to land degradation. This should be an important part of the report.The previous part of the report make it clear that the problem of land degradion is highly complex, therefore responses will need to designed to address this complexity Adressing this complexity will require linking local level interventions with interventions at higher policy level. It is very likely that only a multitude of response actions at different levels will allow to address the issue adequately. Furethermore, it should also become clear in this chapter the land based climate mitigation will not be able to counter the effect of massive CO2 emissions caused by combution of fossil fuels by other sectors, as other functions of the land systems (food security, poverty alleviation, biodiversity conservation) also need to be addressed, and many trade-offs exist. REF: Hurni, H., Giger, M., Liniger, H., Studer, R. M., Messerli, P., Portner, B., Breu, T. (2015). Soils, agriculture and food security: the interplay between ecosystem functioning and human well-being. Current Opinion in Environmental Sustainability, 15, 25-34. [Markus Giger, Switzerland]	taken into account - the section has been completed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8096	0				The chapter is well-written and concise. There are, however, at least 7 Placeholders indicating that the Chapter not yet complete and more work is to be done. [Muhammad Mohsin Iqbal, Pakistan]	taken into account - the chapter has been revised
324	0				Section 4.3.1. I thought the authors present an excellent overview to the conflicting concepts of "land degradation" held by natural vs social scientists. Whereas the former would consider an intact rain forest as the ideal state, the later would also consider the land's potential to benefit societal living standards. [Paul Glaser, United States of America]	noted
344	0				This section on coastal erosion can be expanded to give proper coverage to its importance. [Paul Glaser, United States of America]	accepted - text revised
14426	0				There should be a clear distinction about the thematic discussions in Chapter 3 on “Desertification” and that in Chapter 4 on “Land Degradation” to minimize duplication and avoid redundancy. The discussion in Chapter 4 must highlight recent advances in the knowledge on “land degradation”. While the risks of soil erosion (by water and/or wind) may increase with the climate change, the data of erosion-included transport of carbon (organic and inorganic) by alluvial and aeolian processes need a critical discussion (e.g., decomposition, nitrification/denitrification, formation of secondary carbonates). A clear distinction must also be made between the processes, factors and causes of land degradation. The interactive effects of climate change on land degradation, how it affects and is in turn affected by climate change, must be critically discussed. Specific comments by members of UNCCD-SPI, which need to be systematically addressed include the followings: [Rattan Lal, United States of America]	taken into account - chapter 3 (desertification) and chapter 4 have been synchronised.
14428	0				After having gone through the entire chapter, it is evident that the biodphysical and social factors that drive land degradation and influcence climate and that are affected by climate are generally discussed separatetly (one after the other). The chapter would benefit from a more balanced and integrated discussion of biophysical and socio-economic aspects. It would be very useful if the chapter, and especially the policy measure section (4.10), further develops its discussions regarding what is needed for decision-making to shape interactions between land degradation and climate change in order to ensure human-wellbeing and human livelihoods (incl. aspects regarding monetary and non-monetary values, participation (especially of vulnerable groups), the relevance of different knowledge forms on land management), land-based mitigation and land-based adaptation measures. [Rattan Lal, United States of America]	taken into account - in the revised section 4.10 we have integrated biophysical and socio-economic considerations. We have also added a figure/matrix which links problems and solutions (Figure 4.x)
14430	0				This chapter would be strengthened by a larger focus on the interaction of land degradation in the context of past, current, and future climate change. The IPBES LDRA examined the status and trends of land degradation in depth but only one small component of that work focused on climate change. The SRCCL has an opportunity to conduct an in-depth assessment of the interactions between land degradation and climate change. Section 4.5 should have stronger focus on the status and trends of land due to interactions between land degradation and climate change [Rattan Lal, United States of America]	taken into account - section 4.5 has been substantially revised
14432	0				The UNCCD definition of desertification is used in Chapter 3 is desertification = is degradation in drylands. In chapter 4 its not clear if degradation is the same as desertification (when in drylands). Is it that chapter 4 includes degradation that occurs outside of drylands. As such, its not clear what differentiates chapter 3 from chapter 4. This should be made clear in chapter 1, 3 and 4. [Rattan Lal, United States of America]	taken into account - the definitions are presented in chatper 1 and further discussed in chapter 4.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14434	0				Missing from this chapter is possible scenarios of land degradation under the climate change. Analysis should be provided. [Rattan Lal, United States of America]	taken into account - the section 4.6 has been revised
14436	0				In the second order draft, the authors should produce one figure that summarizes the threat of each of the drivers of land degradation and how those drivers interact with climate change and the spatial extent of those drivers across biomes and/or UN regions. [Rattan Lal, United States of America]	accepted - a figure has been developed wich shows this (Figure 4.x)
7006	0				Please check: The Executive Summary should be comprehesive and portray holistic interlinkages and feedbacks between the major issues as mentioned in the proposed outline of this chapter. This should be aligned in line with land degradation processes and drivers, linkages and feedbacks between land degradation and climate change: observed and projected status, impacts of climate change on land degradation and vice versa: response options, impacts of land degradation on natural and human systems and integrated higher-level responses and illustration of case studies/ hotspots. [Suvadip Neogi, India]	taken into account - the executive summary has been substantially revised
7008	0				Please check: The observed and projected impacts of land degradation on natural and human systems in a changing climate should include impacts on ecosyatem services and socio-ecological systems. In this context it is pertinent to illustrate discussion on the effects of land degradation on tropical agriculture, tropical forests, tropical-subtropical-temperate mangroves and tropical peatlands. These systems act as rich sources of soil carbon. Unfortunately due to land degradation (natural /anthropogenic) the soil carbon status is fast depleting and the unique ecosystems are deteriorating all inclusive of soil-vegetation-biodiversity-water components. This may pose risk and threat to the stakeholders. This will also have greater impacts on socio-ecological components (systems) viz. on livelihoods, food security, poverty, vulnerable communities and migration. Adopting reactive and proactive response options viz. land restoration, resilience for key socio-ecological systems and integrated higher-level responses towards sustainable land management can prove to be helpful for ecosystem sustenance. [Suvadip Neogi, India]	noted
6940	0				the report needs homogenization of writing style to improve English where it is weak. Some paragraphs look like authors did not review them after completion. [Talal Darwish, Lebanon]	taken into account - text revised
25670	1	1	63	45	As stated in the introduction, the text is mostly about causes and effects of land degradation, including for climate. These phenomenas are generally explained factor by factor. Thus, all explanations are uni-directional and reductionist. And many examples are rather self-evident. I would find more interest in a text exploring combined effects and interactions that seem to be the avenue to degradation or regeneration. More important, I would prefer to elaborate more in depth phenomena that seem capable of absorbing disturbances and stresses - and build resilience. Currently this is limited to 4.10.4 and some case studies in 4.11, whileand deserves more elaboration. [Jon Magnar Haugen, Norway]	taken into account - in the revised section 4.10 we have integrated biophysical and socio-economic considerations. We have also added a figure/matrix which links problems and solutions (Figure 4.x)
25682	1	1	63	45	The text is mostly focused on soil physical and chemical properties, while soil ecology and degradation of soil ecosystems should be more elaborate [Jon Magnar Haugen, Norway]	noted
5074	1		112		first, I want to congratulate the authors on a much more balanced chapter than in ZOD . [Gert-Jan Nabuurs, Netherlands]	noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5078	1		112		I am wondering: is it not possible to make global maps (quite detailed) of various types of land degradation ? A quantification would be highly appreciated. There are many global GIS layers of all sorts of degradation or drivers. Many of the DGVM modellers use them or develop them. [Gert-Jan Nabuurs, Netherlands]	rejected - we are not supposed to carry out new research. We are cautious about the scientific robustness of many global assessments of land degradation
5084	1		112		we learn a lot about land degadation in this chapter, but it all reads like a text book. What do we learn in terms of climate policy? What is the use of this chapter, its goals, etc? This is still unclear. [Gert-Jan Nabuurs, Netherlands]	taken into acccount - the chapter has been revised substantially to improve on this
9100	1	14			what is 1P check whole document [Amanullah Amanullah, Pakistan]	accepted - text removed
3090	2	8	2	8	Land cover has important role to sustainable land management. So it seems to be useful to categorize it in four sub-sectors: 1- Sustainable forest management (SFM), 2- Sustainable range management (SRM), 3- Sustainable agriculture management (SAM), and 4- Sustainable bare land and rocky mountain management. [Mostafa Jafari, Iran]	noted
1596	2	22	2	22	is section 4.7.1 rightly placed? Is this section necessary? [Rajesh Chintala, United States of America]	rejected - we treat large scale bioenergy provision as a potential driver of land degradation
14438	2	1	3	25	The chapter structure is confusing. Since the DPSIR structure is well recognized, a structural change that follows this format would be beneficial. [Rattan Lal, United States of America]	noted - the structure is compatible with the plenary approved outline
6754	2	2	3	25	Links should be in the table of contents so you can jump directly to the right section. [Idowu Owoeye, Nigeria]	editorial - copyedit to be completed
9102	3	2			complete it [Amanullah Amanullah, Pakistan]	noted
9104	3	14			(Crews, 2017). Put comma [Amanullah Amanullah, Pakistan]	editorial - copyedit to be completed
9106	3	21			(author et al., year) in whole document please. [Amanullah Amanullah, Pakistan]	comment unclear
9108	3	26			remove page number given [Amanullah Amanullah, Pakistan]	comment unclear
9110	3	27		30	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	editorial - copyedit to be completed
10938	4	1	4	40	There is high likelihood some people might only be interested in reading the executive summary without going through the entire chapter. It is therefore suggested that you consider avoiding the use of acronyms (or spell out in full the first time an acronym is used) in your executive summary to make it more accessible to your readers. [Debra Roberts, South Africa]	accepted
6756	4	2	4	14	I suggest 'What is the problem, potential solutions, what needs to be done? should be removed. The heading reads Executive summary which should normally include the problem, potential solutions, and recommendation. More so, other executive summaries do not have the headings either so these headings should be removed here. [Idowu Owoeye, Nigeria]	accepted
14444	4	2	4	15	Should include loss of organic carbon in terrestrial ecosystems (below- and aboveground); [Rattan Lal, United States of America]	taken into account - the executive summary has been substantially revised
5048	4	3	4	15	Currently the 'whats the problem' section focuses on climate drivers. For balance it would be nice to have a paragraph looking at human land-use drivers in the same way. This would also make interpretation of the complex interactions between these drivers easier to conceptualise. [Eamon Haughey, Ireland]	taken into account - the executive summary has been substantially revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14822	4	4	4	5	Two processes of degradation induced by climate should be added: drought and land salinization. [Florian Claeys, France]	taken into account - the executive summary has been substantially revised
17058	4	6	4	7	In all regions? Please clarify. [Lourdes Tibig, Philippines]	taken into account - the executive summary has been substantially revised
14442	4	6	4	7	The statement "Avoiding reducing and reversing land degradation…" needs traceability. [Rattan Lal, United States of America]	noted - comment unclear
17060	4	8	4	9	Again, please indicae which regions. [Lourdes Tibig, Philippines]	taken into account - the executive summary has been substantially revised
868	4	8	4	9	Combined heatwaves and reduction in rainfalls do not only drive fire frequency, but in general prolonged drougth seasons. This in turn implies that the degradation of forest ecosystems refers also to an increased vulnerability to external threats/disturbances (less adaptation and resilience, increased stress), such as for example insect outbreaks, windthrow, avalanches, floods, etc. In addition, more vulnerable forest ecosystems are prone to the invasion of alien species, which in turn reduces the potentiality of forest stands composed by native species to face climate change effects (i.e. drought). In this way, there is a degradation of original forest ecosystem structure (tree species composition) and processes (genepool distribution). Similarly, climate change orginates a shifting of the areal distribution of certain tree species, thus inducing a degradation or an improvement of lands which are recently abandoned or covered, respectively. [Matteo Vizzarri, Italy]	noted
14446	4	8	4	9	"Land degradation of forest ecosystems" : sounds confusing. Should be either degradation of forests or degradation of forest lands [Rattan Lal, United States of America]	taken into account - the executive summary has been substantially revised
9190	4	9	4	22	The diagram in figure 4.1 is misleading because the restoration arrow and the deterioration arrow are on the same level. The degradation is rapid, it often brings money, and employs low-skilled people (trades of agriculture, the industry and the building with low salaries) while the restoration is slow (> 10 years see many more), expensive (tertiary salaries) and requires a long-term investment to follow the path of the ecosystem restored to possibly intervene. Degradation can potentially affect all the ecosystems of the Earth, of course this will never be the case with restoration. [Alex Baumel, France]	taken into account - the figure has been revised
8022	4	12	4	12	I think it would be more correct to replace the "increasing wave actions" with "the erosive action from cross-shore and longshore currents created by waves) [Luca Castrucci, United States of America]	taken into account - the text has been revised
19070	4	12	4	14	salt water intrusions caused by sealevel rise [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	taken into account - the executive summary has been substantially revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3526	4	15	4	45	Introduction :- I have gone through the text. Notwithstanding, nor derogating any or all those are already enshrined in the report, I like to furnish my views as addition or amendment wherever applied and relates to. Since long past, it is held that, a burning gaseous extreme hot part had detached by any natural strongest force from the ever furnace Sun. That fraction in long course of time condensed and gave a shape of apple that revolved on its poles, called or named EARTH. After losing its temperature a solid state appeared is the land or the base. It was not smooth, but depressed and un-even somewhere. The condensed liquid in the name of water formed that took place in the depressed places, say ocean and the other invisible form took place in the vacuum called air. Thus these Land, Water and Air are the very primary Natural Resources. In course of times ,the first Kingdom came up and spread in the places both marine and non-marine is the Plant Kingdom followed by the another Kingdom – Animal Kingdome. In course of pass of times, the soil developed on the land/ parent rocks through many natural processes, an thumb rule is that ,for formation of only a 2.5 cm thick layer of arable soil took a long period of 800- 1000 years. The entire agriculture is the superstructure on the foundation soil. From Agriculture all the essential commodities are derived through a complex culture for the existence of civilization. If foundation of any building becomes weak, then the entire superstructure becomes weak and can collapse at any time. Similar is the role of soil on the land in relation to the Agriculture. [Prafulla Kumar Mabdal, India]	noted
4996	4	18	4	19	The term 'anthrome' is explained in more detail in Chapter 6 (and also mentioned in Chapter 3). It might strengthen the report if a reference is made in the text to the analysis done in the other chapters. [Renee van Diemen, United Kingdom (of Great Britain and Northern Ireland)]	accepted
25370	4	18	4	20	On which time scale? [Kaisa Kosonen, Finland]	taken into account - the executive summary has been substantially revised
21280	4	19	4	19	Please refrain to use new useless terms like anthromes. This make readers to learn new terms which gives no new idea. Confusing [Erhan Akca, Turkey]	rejected - anthromes is well described in the scientific literature
560	4	19	4	19	anthromes is a soecific term which should be further explained in the glossary. [Klaus Radunsky, Austria]	accepted
17064	4	21	4	23	We will look forward to seeing how indeed climate-induced land degradation will impact and threaten livelihoods, ecosystems and guman values. [Lourdes Tibig, Philippines]	noted
562	4	23	4	23	It would be very helpful to provide concrete examples of geographic settings in which land degradation threatened already human values and livehoods. However, only those examples seem to be relevant in the context of thois special report where climate change has been identified as a main driver according to scientific robust and sound analysis. [Klaus Radunsky, Austria]	taken into account - the executive summary has been substantially revised
14452	4	24	4	24	Add "bio-physical" besides socio-economic conditions as "bio-physical and socio-economic conditions and land management" [Rattan Lal, United States of America]	accepted
10422	4	26	4	26	"The following land management practices have been particularly successful in avoiding and preventing climate induced land degradation (still in progress)." WOCAT data base could be provide information to identify the most common and important ones [Zitouni Ould-Dada, Italy]	noted
17066	4	26	4	27	again, this will provide ainformation that should help policymakers/practitioners. [Lourdes Tibig, Philippines]	noted
564	4	26	4	30	These examples do not inform about the problem but already about potential solutions. Therefore they should be moved further down. [Klaus Radunsky, Austria]	taken into account - the executive summary has been substantially revised

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6612	4	27	4	27	forestry' should be replaced by 'forest exploitation'. Or even better 'unsustainable' should be added before 'agriculture' and 'forestry' [Cornelia Rumpel, France]	taken into account - the executive summary has been substantially revised
10424	4	28	4	28	"Future approaches with a potential to address both climate change and land degradation globally include the deployment of biochar as a soil additive, shifting from annual to perennial grain crops (in progress)." This list could include, slope shaping practices, water harvesting measures (runoff management) and enclosures (restoration) of degarded lands [Zitouni Ould-Dada, Italy]	taken into account - the executive summary has been substantially revised
27342	4	28	4	30	This statement does not belong in the executive summary. [Doreen Stabinsky, United States of America]	taken into account - the executive summary has been substantially revised
25672	4	30	4	30	Other examples "cover crops and other adjustments to avoid exposed soils, agroforestry, silvopastoralism, practices that are supportive for soil ecosystems. [Jon Magnar Haugen, Norway]	taken into account - the executive summary has been substantially revised
24368	4	31	4	35	Potential solutions should include Land Degradation Neutrality approaches, in line with SDG target 15.3. Actions to achieve LDN include sustainable land management approaches that avoid or reduce degradation, coupled with efforts to reverse degradation through restoration or rehabilitation of land that has lost productivity. [Barron Joseph Orr, Germany]	taken into account - LDN is discussed in section 4.10
14440	4	32	4	33	Need to have traceability to this statement "Deployment, adoption, and maintenance of methods for SLM have been slow and needs further attention and resources (high confidence)." [Rattan Lal, United States of America]	taken into account - the executive summary has been substantially revised
14448	4	32	4	33	"Sustainable Land Management (SLM) can reduce the risk of land degradation.." SLM can also add to the land restoration and rehabilitation [Rattan Lal, United States of America]	taken into account - the executive summary has been substantially revised
14454	4	33	4	34	Add "adaptation" besides "migigation" as "... mitigation and adaptation ..." [Rattan Lal, United States of America]	taken into account - the executive summary has been substantially revised
19072	4	37	4	37	this line is too negative. Adoption of some SLM methods has been quick eg of no-tell in Brazil [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	taken into account - the executive summary has been substantially revised
10426	4	38	4	38	"Particularly the social and economic conditions, including gender and other equity concerns." Land tenure security should be considered in this regard [Zitouni Ould-Dada, Italy]	taken into account - the executive summary has been substantially revised
2522	4	40	4	40	Perhaps authors could mention also the need for monitoring of land changes using Earth Observation. [William Lahoz, Norway]	taken into account - the executive summary has been substantially revised
10940	4	1	5	13	In the next draft, you should consider including the impacts (quantified where possible) of land degradation on the human and the ecosystem. [Debra Roberts, South Africa]	accepted
25368	4	1	5	13	The executive summary seems to contain mostly placeholders for now, which is understandable. It will be important to ensure that in the final version the headline findings don't remain on a general or conceptual level, but are as actionable and concrete as possible. [Kaisa Kosonen, Finland]	taken into account - the executive summary has been substantially revised
17056	4	1	5	13	I find the executive Summary a rich source of science-based knowledge.-congratulations to the chapter writing team! [Lourdes Tibig, Philippines]	noted
19760	4	1	5	13	It is would be better to define land degradation in a proper place here. Also, it would be wise to make a clear distinction between desertification and land degradation. These terms have been frequently used interchangeably. [Sabit Erşahin, Turkey]	taken into account - the definition is now included in the executive summary
6908	4	1	5	13	The Executive summary does not follow the IPCC traditional format [Wilfran Moufouma Okia, France]	taken into account - the executive summary has been substantially revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25860	4	2	5	9	Assuming the Executive Summary will be fleshed out in the SOD? [Hans Poertner and WGII TSU, Germany]	noted
21290	4	27	5	27	Is there any reference to say that at this point that forestry is responsible for degradation? [Souparna Lahiri, India]	taken into account - the executive summary has been substantially revised
5076	4		5		the exe summary remains rahter vague, with general messages. There are no clear policy guidelines. Not concrete enough [Gert-Jan Nabuurs, Netherlands]	taken into account - the executive summary has been substantially revised
6916	4	6	7		Intensification of hydrological cycleleads to more intensive rainfall which multiplies the risk of soil erosion [Talal Darwish, Lebanon]	rejected - increases is preferred over multiplies
21292	4	16	8	17	defining sustainable forest management needs more clarity since we are talking of decreasing biomass not increasing carbon sinks. This may also happen with plantations and trees but they are not forests! [Souparna Lahiri, India]	unclear what sections this refer to
21294	4	26	8	30	In terms of definition, we consider forest degradation as a phenomenon where natural forests are affected by logging, human intervention or any other climatic or geographic impact. It certainly alters the biodiversity value and emits carbon, but carbon stock wise, the number can increase while planting the same area with trees or plantations. [Souparna Lahiri, India]	noted
21296	4	16	29	28	this analysis promotes usage of wood products replacing products made out of other materials to reduce carbon emission and to store carbon. But, that also means promoting more felling of timber, either from natural forests or from plantations/tress/planted forests, more use of wood and usheing in bioeconomy and promoting bioenergy without carrying out extensive studies on how this will imapct on deforestation and degradation and affect the forest livelihoods of forest communities, their rights over forest resources and the net biodiversity loss. As such it is already been observed that various global institutions are promoting forest fuels as the next generation energy to replace fossil fuels. FAO has a programme of Suatainable Wood for Sutainable World. Should we simply promote such regime or wait for more deep studies? [Souparna Lahiri, India]	unclear what sections this refer to
11008	4	1	63	22	Overall, there was limited usage of uncertainty/confidence language in this chapter. This should be considered in subsequent drafts. In addition, linkage to previous IPCC products is not very evident. To show progression of knowledge in terms of the work of IPCC, it is important that this chapter be embedded in what has already been established and then build on that is already known. A further comment is stark similarly between some of the contents in this chapter and chapter 3 particularly in section 4.11.9 of this chapter. It is recommended that authors of this chapter work closely with chapter three to avoid repetition where this is not necessary. [Debra Roberts, South Africa]	taken into account - the chapter has been revised
10438	4	1	63	22	General comment on information on the extent and rates of land degradation. While the information / data provided in this section is informative, there is gap in information from regions such as Africa, the Near East and Asia. It is for sure there are research undertakings and assessments made in these parts of the world. it is recommended to review available literature for these regions and discuss on them. sources for this information could among others include: FAO, University of Bern, Wageningen University, ISRIC [Zitouni Ould-Dada, Italy]	taken into account - we have now a better geographical balance
25786	4	1			Please refer to previous IPCC reports for stvle of Executive Summary. This consists of bold statements (key messages) followed by supporting text (further detail). [Hans Poertner and WGII TSU, Germany]	taken into account - the executive summary has been substantially revised
17062	4	15			In which regions? [Lourdes Tibig, Philippines]	taken into account - the executive summary has been substantially revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9112	4	18			vegetation (IPCC AR5, also UNCCD Article 1). Correct [Amanullah Amanullah, Pakistan]	unclear what sections this refer to
25788	4	24			biome/anthrome - avoid using terms in executive summary which need definition. [Hans Poertner and WGII TSU, Germany]	accepted
5376	4	26			The following land management practices have been particularly successful in avoiding and preventing climate induced land degradation (still in progress). WOCAT data base could be used for information to identify the most common and important practices by region, countris etc [Daniel Danano Dale, Italy]	noted
14766	4	33			The inculsion of this statement appears to discredit the land degradation indices releated to ecosystem condition. I know of no ecological studies that would consider degradation a positive effect on ecosystems. While surely land degradation can result in positive effects on human systems, the point is how does it affect the ecosystem whcih in turn affects people. The statement is inconsisent with the body of literature on human ecological footprint analysis for instance. [Dominick DellaSala, United States of America]	noted - comment unclear
9114	4	35			change (UNEP, 2016) [Amanullah Amanullah, Pakistan]	editorial - copyedit to be completed
17068	4	36			I suggest you should not use "What needs to be done?" because IPCC reports should only be policy-relevant. This statement could be interpreted as policy-prescriptive [Lourdes Tibig, Philippines]	accepted - text removed
9116	4	38		39	(Orr et al. 2017; Cowie et al. 2018) adapted from McDonald, et need good and correct format [Amanullah Amanullah, Pakistan]	editorial - copyedit to be completed
11728	4	39			Avoid policy prescriptive language such as "must". [Debra Roberts, South Africa]	accepted
14768	4	39			I'm struggling with this - The Millennium Ecosystem Report 2005 showed 15 of 24 ecosystem services evaluated were in steep decline Barnosky et al 2012 shows how we are approaching a planetary state shift caused by consumption and population and leading to eventual ecosystem collapses planet wide. Barnosky et al. 2011 describes the 6th great extinction event that Nobel laureates like EO Wilson have published about. So how are these exaggerations? These trends are alarming and measurable - they are not a matter of perspective but a consequence of society's rapacious footprint related to population and consumption pressures (see Ehrlich's work on this issue too) [Dominick DellaSala, United States of America]	noted - comment unclear
9118	4	41			correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	editorial - copyedit to be completed
7102	4				General comment on chapter 4: After having gone through the entire chapter it becomes evident that the biodphysical and social factors that drive land degradation and influcence climate and that are affected by climate are generally discussed separetly (one after the other). The chapter would benefit from a more balanced and integrated discussion of biophysical and socio-economic aspects. It will therefore be very useful if the chapter and especially the policy measure section (4.10) further develops its discussions regarding what is needed for decision-making that shapes interactions between land degradation and climate change in order to ensure human-wellbeing and human livelihoods (incl. aspects regarding monetary and non-monetary values, participation (especially of vulnerable groups), the relevance of different knowledge forms on land management), land-based mitigation and land-based adaptation measures. [Mariam Akhtar-Schuster, Germany]	taken into account - in the revised section 4.10 we have integrated biophysical and socio-economic considerations. We have also added a figure/matrix which links problems and solutions

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3528	5	1	5	13	The land resource – The total peripheral surface area of the Earth is 510.072 billion hectares. Out of this, total water area is 361.132 billion hectares, which is about 71% and the total land area is about 14.894 billion hectares which is about 29 % of the Earth's peripheral surface area. Of this land area about 33% is desert and about 24% is mountainous. Excluding this uninhabitable 57% (i.e. 8.46045024 billion hectares), available 6.38189258 billion hectare is the habitable land." (Feb 12, 2016). Agricultural land and its status. - Total agricultural land area of the world is about 4.924 billion hectares, out of this; 1.54 billion hectare is arable land. As per GLASOD estimates 1.216 Billion hectare is degraded land. [Prafulla Kumar Mabdal, India]	unclear what sections this refer to
3532	5	1	5	13	The progress and problems .-As consciousness rises with the awakening of the age, the gap between expectation and fulfilment becomes more yawning than before and more gruelling than generally realized. This dichotomy often causes aberration of one kind or the other. It is true that, the past decades were by no means wasted years in terms of development and laudable socio-economic transformations of which the countries can boast of many significant achievements. And yet the pace could not keep up with the march of times. [Prafulla Kumar Mabdal, India]	comment unclear
566	5	4	5	4	It would be very helpful to provide concrete examples of measures in which climate chnage was a main driver of land degradation and in measures to reverse the trend in land degradation.also had co-benfits reltaed to mitigation and/or adaptation. [Klaus Radunsky, Austria]	Accepted - examples are provided
10428	5	4	5	4	"Particular measures have proven effective in different contexts. (the analysis is in progress)." WOCAT-LADA database could be a good source. Additionaly, FAO databases such as landstat and waterstat could be a potential source for these [Zitouni Ould-Dada, Italy]	Taken into account - WOCAT has been used when relevant but not in the Executive Summary
19074	5	6	5	6	not just for ensuring food security but also for boosting resilience to climate change [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	taken into account - the executive summary has been substantially revised
14824	5	6	5	6	It should be added that combating land degradation is also urgent for other SDGs than food security. [Florian Claeys, France]	taken into account - the executive summary has been substantially revised
24370	5	6	5	7	Should read: "Avoiding, reducing and reversing land degradation (i.e. land degradation neutrality response hierarchy) is urgent for ensuring food security and improving human wellbeing." [Barron Joseph Orr, Germany]	taken into account - the executive summary has been substantially revised
568	5	10	5	10	It is very important that the matrix as well as the Land Degradation Neutrality concept are addressed in the underlying chapter 5, based on referenced literature. [Klaus Radunsky, Austria]	taken into account - LDN is discussed in the chapter
19762	5	18	5	18	Anthropocene (Lewis and Maslin, 2015). Here and throughout Chapter 4. The format of ciation should be consistent with one applied to Chapter 3. [Sabit Erşahin, Turkey]	Editorial - copyedit to be completed prior to publication
7892	5	19	5	21	Although Bill Ruddiman is an esteemed climatologist, the link between agriculture and the rise in GHG concentrations in the atmosphere remains highly controversial. I therefore appreciate the caution exercised by the authors. [Paul Glaser, United States of America]	Accepted - more references have been added to show the strength of the claims and we have changed the wording to express caution.
17072	5	28	5	32	Are there very limited studies on the human-caused emissions from land use? [Lourdes Tibig, Philippines]	Accepted - more references have been added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3196	5	31	5	32	The massages should be made consistent with chapter 2, also qoutes not accurate/adqequate [Karlheinz Erb, Austria]	Accepted
24372	5	33	5	33	There is something odd (or perhaps inadvertently negative with this statement. The results of human impact can be positive or negative -- maybe start from there? [Barron Joseph Orr, Germany]	Taken into account - text has been rvised
14456	5	33	5	33	"Not all human impacts on land are considered degradation": The impact cannot be a degradation, but the results of human impact can be positive or negative [Rattan Lal, United States of America]	Accepted
870	5	36	5	38	The concept expressed here is linked to that of Anthromes, i.e. the transformation of natural biomes in anthropogenic biomes. See for example: Ellis et al. 2010 (DOI:10.1111/j.1466-8238.2010.00540.x); Ellis 2013 (DOI:doi.org/10.1016/j.cosust.2013.07.002)). [Matteo Vizzarri, Italy]	Accepted - text is added to describe Anthromes and reference is made to later sections where Anthromes are used.
7898	5	16	6	13	This introduction is excellent. It is well reasoned and informative. [Paul Glaser, United States of America]	noted
6910	5	16	6	13	It might be worth reitarating the definition of land degradation used in this report or point to the glossary the way it is done for Desertification in Chapter 3 [Wilfran Moufouma Okia, France]	taken into account - the definition has been mentioined in the Exec Summary and will be discussed below
10942	5	16	6	14	A reviision of the introduction should be considered. Possibly include in the the introduction, the storyline being followed in the chapter. It could also be helpful to indicate the theoretical framing/approach that guides the chapter. [Debra Roberts, South Africa]	accepted - the section is revised
17578	5	39	6	2	In my opinion, the problem in defining land degradation is twofold as it basically put together two concepts: “Land” that can be understood in various ways (Landscape made of various habitats, ecosystems, living space for Humans, and Critcal zone [in a biogeogeochemical point of view], for example). When one speaks about degradation, then one can imagine to address one or a couple, of these aspects, what justify what you mention thereafter about the land users. [Guillaume Bertrand, France]	Noted - pls refer the next section
24374	5	45	6	10	One of the most compelling -- and useful -- aspects of the recently published IPBES Land Degradation and Restoration Assessment (https://www.ipbes.net/assessment-reports/ldr) is Chapter 2, which deals with concepts and perceptions of land degradation from a variety of worldviews. It would be work exploring this to enhance this section (and it will provide a wealth of relevant citations.) [Barron Joseph Orr, Germany]	Accepted - reference is made to the IPBES report
14450	5	45	6	10	An essential citation for this section is Chapter 2 of the IPBES Land Degradation and Restoration Assessment, which deals with concepts and perceptions of land degradation from a variety of worldviews. Once the IPBES LDRA chapters are available electronically, I would strongly recommend that this section be revised to build on this work. [Rattan Lal, United States of America]	Taken into account - reference to IPBES report has been included
7590	5	18	63	8	All the references like "(Lewis and Maslin 2015), should be corrected and be as (Lewis and Maslin, 2015). There is a lack of "," in the references in the text [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Editorial - copyedit to be completed prior to publication
9120	5	1		45	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	editorial - copyedit to be completed
5378	5	4			Particular measures have proven effective in different contexts. (the analysis is in progress). WOCAT-LADA database could be a good source. Additionaly, FAO databases such as landstat and aquastat could be a potential source for these [Daniel Danano Dale, Italy]	Taken into account - WOCAT has been used when relevant but not in the Executive Summary
17070	5	5			Same comment as above. [Lourdes Tibig, Philippines]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1526	5	20		21	Must note the strong debate around Ruddiman hypothesis as opposed to saying "there is evidence".. Maybe say" "While debate, a case can be made that…." [Billie Turner II, United States of America]	Accepted - more references have been added to show the strength of the claims and we have changed the wording to express caution.
320	5	23			I assume that the authors are aware that the atmospheric concentrations of greenhouse gases began to rise much earlier in the late-Glacial period. Thus the role of agricultural practices as a driver or amplifier for the continued rise in GHG after the mid-Holocene is a controversial topic among Earth scientists. I therefore appreciate the caution expressed in this reference while noting that it is still a very germane reference since Bill Rudiman is such an esteemed climate change scientist. [Paul Glaser, United States of America]	Accepted - more references have been added to show the strength of the claims and we have changed the wording to express caution.
1528	5	25		27	It is not clear tha "most scientists" would say that land change = degradation. Perhaps ecologists may favor this interpretation but not land system scientists or human-environment scientists. Many would point out land enhancement. What is much more accurate to say is this. "A significant proportion of ecosystems no longer function as they did before anthropogenic land changes." [Billie Turner II, United States of America]	Accepted
9122	5	28			(Johnson and Lewis 2007). Remove book [Amanullah Amanullah, Pakistan]	Rejected -unclear what sections this refer to
1530	5	31		31	I would think that Turner et al. 1990. The Earth as Transformed by Human action……wuld be cited [Billie Turner II, United States of America]	Accepted - more references have been added
1532	5	36			Surely this claim should be cited by the Millennial Ecosystem Assessment report [Billie Turner II, United States of America]	Accepted
1534	5	39		45	I am surprised and believe it somewhat disingenous to cite political ecology as the expert source on claims being made. The GLP and land system science have repeatedly made this claim; cultural ecologists and natural hazard folks have repeatedly made the claim. The stronger case for political ecology is its emphasis on dominant politics or explanatory perspectices as the sourcesmaking the claims about land degradation. It seems to me that here and on the next page a political ecologist is ignoring the many others who have shown challenged the claims because political ecologists typicaly ignore the other literature, unless it is to critique it. [Billie Turner II, United States of America]	Accepted - land change science has been added and referenced
21282	6	5	6	5	Having land users ideas is good but another issue is learning how long these people are there and will be there. Because for short trem land users the main target is earning as much as they can… [Erhan Akca, Turkey]	Noted
9188	6	6	6	6	Land degradation is oftent accompanied by a change of user, the new users do not have the same view than the former about degradation, it's why some level are depending of view and experiences when they are irreversible (e.g. urbanisation, artificilisation of surfaces). [Alex Baumel, France]	Noted
760	6	7	6	10	Please number the three reasons for including landusers' views. Also please don't use a stand-alone pronoun ("this") on line 8 because the antecedent for this pronoun is ambiguous. This problem can easily be alleviated by adding the appropriate word or words after "this" to clarify the intended antecedent. [Paul Glaser, United States of America]	Accepted
7894	6	7	6	10	Please number the three reasons for including landusers' views. [Paul Glaser, United States of America]	Accepted
7896	6	8	6	8	Please don't use a stand-alone pronoun ("this") with an ambiguous antecedent This problem can easily be alleviated by adding the appropriate word or words after "this" to clarify the intended antecedent. [Paul Glaser, United States of America]	Accepted
19764	6	12	6	13	Better to mercge with previous phragraph. [Sabit Erşahin, Turkey]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
762	6	15	6	43	I thought the authors present an excellent overview to the conflicting concepts of "land degradation" held by natural vs social scientists. Whereas the former would consider an intact rain forest as the ideal state, the later would also consider the land's potential to benefit societal living standards. [Paul Glaser, United States of America]	Noted
7900	6	16	6	46	I thought the authors present an excellent overview to the conflicting concepts of "land degradation" held by natural vs social scientists. Whereas the former would consider an intact rain forest as the ideal state, the later would also consider the land's potential to benefit societal living standards. [Paul Glaser, United States of America]	Noted
24376	6	32	6	33	The following sentence does not make sense: " Soil erosion is discussed as a possible mechnism for reducing the loss of terrestrial carbon". Please revise. [Barron Joseph Orr, Germany]	Accepted - the text is revised
17580	6	32	6	33	Yes, it is a major process from the “Critical zone point of view” [Guillaume Bertrand, France]	Noted
25790	6	36	6	36	please give full title for SREX [Hans Poertner and WGII TSU, Germany]	Accepted
1598	6	36	6	36	what is SREX? [Rajesh Chintala, United States of America]	Accepted - explanation provided
14458	6	44	7	2	As with the IPBES definition, this definition can see land transformation to agriculture as degradation (loss of ecological complexity). The "and/or" means this is not always the case. Firstly, this should be realised and explained. Secondly, it makes the setting of baselines critical - see figure IPBES LDR SPM 10 as to how it is explained in IPBES that the fact that land degradation can take place both in natural vegetation as well as in agricultural land - which is considered depends on what the land was used for at the baseline point. [Rattan Lal, United States of America]	Noted. The significance of the baseline is recognised, and discussed, as is the subjectivity of the interpretation of changes in land condition.
26176	6	44	7	4	this section is wordy and could be much reduced. Is it really necessary to cite all existing definitions of land and land degradation? Could this section perhaps simply state the SRCCL definitions, and explain the differences to other definitions while simply referring to their original sources? The reader who is interested in the other definitions could then look these up, but this discussion of various definitions is tedious to read. [Hans Poertner and WGII TSU, Germany]	Noted. Other comments express appreciation of this discussion on other definitions. The IPBES LDRA is topical as recently released; it is important to clarify exactly how the SRCCL differs from the IPBES LDRA definition, and why.
3198	6	45	7	2	The term "land condition" needs to be defined [Karlheinz Erb, Austria]	Reject - the remainder of the sentence states what aspects of land conditions are evaluated.
19766	6	45	7	2	I do not understant how land degradation is related to "human values" (and which human values?). Are moral values included? If so, are those living in the areas already experiencing land degradation having degraded moral values? I believe that the term "human values" needs mofifiers. [Sabit Erşahin, Turkey]	Noted. Changed to "value for humans".
17548	6	45	7	2	paragaph 4.3.1 Please consider integrating/amending the LD definition and compare what stated in the comment n. 4 above.Consider referring also to " disruption of ecosystem services ". [TURI FILECCIA, Italy]	Noted - but "integrate" with what?
6912	6	15	8	4	Section 4.3 can be merged within the introduction. Aternatively, the introduction section can be modified to clearly stress the focus of this Chapter [Wilfran Moufouma Okia, France]	Reject - we maintain the structure of the chapter but have revised extensively.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24378	6	44	8	4	IMPORTANT: The care taken in explaining the choosen definition for land degradation and how it fits with other recent efforts to define and assess land degradation (e.g., IPBES) is greatly appreciated and should make this chapter relevant -- and useful -- to the UNCCD and its country Parties. The specificity introduced in lines 15 -25 is both interesting and compelling, and yet is different enough from the UNCCD conventon text to warrent further inspection. With this in mind, the UNCCD secretariat would like to make a request of the authors of this entire section -- to determine whether this operational definition of land degradation is compatible with land degradation neutrality (LDN), and if it is, to confirm this directly in the text. The reason we request this is the definition is key to the entire chapter and influences the entire report -- and thus its compatibility with LDN is key to whether and how the UNCCD country Parties may consider the SRCCL in future policy decisions. If the authors choose to pursue this, the relevent information on LDN can be found in: Orr, B.J., A.L. Cowie, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron, G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton (2017). Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. http://www2.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality Cowie, A.L., Orr, B.J., Sanchez, V.M.C., Chasek, P., Crossman, N.D., Erlewein, A., Louwagie, G., Maron, M., Metternicht, G.I., Minelli, S. and Tengberg, A.E., (2018). Land in balance: The scientific conceptual framework for Land Degradation Neutrality. Environmental Science & Policy, 79, pp.25-35. https://doi.org/10.1016/j.envsci.2017.10.011 (NB: The LDN conceptual framework does not define land degradation, so the question here is not a comparision of definitions, but rather the operational compatibility of the SRCCL report and LDN.) [Barron Joseph Orr, Germany]	Accepted. Sentence added to confirm that the definition is consistent with the LDN concepts.
18870	6	44	8	4	The definition of desertification in chapter 3 has been introduced based on UNCCD ,the difference for the scope of land degradation in chapter 3 and chapter 4 should be given.there is no clear difference for land degradation scope between chapter 3 and chapter 4 , the confuse will be arised . [Jianguo Wu, China]	Accepted - the differences between desertification and land degradation are explained in other sections of the report.
16642	6	44	8	4	In the definition of land degredation the terms biological productivity, ecological complexity and human values are included. Hence these are very important terms that should be elaborated further (what are the definition/content of them). [Maria Kvalevag, Norway]	Rejected - these terms are standard terminology.
26178	6	45	8	4	please ensure that all definitions provided here are identical with those in the SRCCL Glossary [Hans Poertner and WGII TSU, Germany]	Accepted - Updated information has been sent to Glossary Team
17074	6	48	8	4	Definitions are too lengthy. [Lourdes Tibig, Philippines]	Noted
3200	6	6	9	15	One could add here that a simple accout of reduction in standing carbon is not adequate, because harvest sytemically leads to reduced stocks (at landscape scale: steady state stocks) which must not be labelled as degradation (Holtsmark B (2011) Harvesting in boreal forests and the biofuel carbon debt. Climatic Change 112:415–428. doi: 10.1007/s10584-011-0222-6) [Karlheinz Erb, Austria]	Accepted - Sentence added on this point. Also discussed later in the chapter.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6758	6	15	10	46	This is a well informed contribution but I think it should include other current knowledge including substantive findings or litrature and contribution on Land degration. This focus should not only be on reviewing previous IPCC reports. Also, the review of the definitions seen in 4.3.1 should be well stated and explained as reviews of various definitions.Please consult for this section the following report:.- Daniel Etongo Bau, University Of Helsinki. Deforestation and forest degradation in southern Burkina Faso:Understanding the drivers of change and options for revegetation.https://bit.ly/2v2fk5K [Idowu Owoeye, Nigeria]	Noted - this particular section deals with IPCC but other sections refer to a wide range of sources. The definitions section covers a review of other definitions already.
9124	6	1		47	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
322	6	7		10	Please number the three reasons for including landusers' views. Also please don't use a stand-alone pronoun ("this") on line 8 because the antecedent for this pronoun is ambiguous. This problem can easily be alleviated by adding the appropriate word or words after "this" to clarify the intended antecedent. Otherwise this introduction is excellent. It is well reasoned and informative. [Paul Glaser, United States of America]	Accepted
9126	6	13			(Bradshaw et al., 2007; Poff, 2002), romave capital letters and need proper format [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
26172	6	30			please capitalise and provide the acronym of this Report in brackets (SR-LULUCF) [Hans Poertner and WGII TSU, Germany]	Accepted
26174	6	36			write out in full: SREX (The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation) [Hans Poertner and WGII TSU, Germany]	Accepted
26180	6	45			why are the words "or persistent decline" not part of the Glossary definition but are mentioned here? This should be streamlined. If these words are needed here for clarification, they are just as important in the Glossary definition. [Hans Poertner and WGII TSU, Germany]	The words "persistent decline" were a tentative addition, not agreed by the whole chapter, so were not transferred to the glossary. The revised definition will be used in the glossary.
14770	6	46			this is difficult to measure - why not use ecological integrity - native species, processes, functions - e.g., high integrity is associated with intact areas, primary forests, etc. Those can be measured - complexity needs to be defined so it can be measured [Dominick DellaSala, United States of America]	Accepted - text revised to integrity.
3530	7	1	7	47	What is degraded land? The land that losses some degree of its natural productivity due to human-interference and natural forces under uncared condition. It is the areas with low carbon stocks. It is physically and chemically lost capability to afford agricultural productivity and economic potential. It is unprofitable to develop, abandoned that are devoid of human activity or not being used productively. It is also such land where the native vegetation has been altered by human activity resulting in a reduction in tree canopy cover, standing biomass or species diversity from which the system cannot recover unaided within a defined time period (Fairhurst and McLaughlin 2009). [Prafulla Kumar Mabdal, India]	Noted. Proposed change is not clear.
1600	7	3	7	3	SRCCL?? [Rajesh Chintala, United States of America]	Noted.
14460	7	3	7	12	This section seems to imply that this definition only applies to drylands - I am assuming the definition is universal (i.e. not just drylands). This needs to be made clear (either way). [Rattan Lal, United States of America]	Accepted. Sentence added to confirm this definition applies to all land.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17582	7	9	7	10	"(2) deterioration of the physical, chemical, biological, or economic properties of soil; and (3) long-term loss of natural vegetation" => it looks somehow contradictory, as economic properties of soil is valorized through degradation of some ecological properties...May be a main propety should be defined , before identifying its degradation? [Guillaume Bertrand, France]	Noted. This is a verbatim quote of the AR5/UNCCD definition. As we do not use this term in the SRCCL definition there is no need to discuss further.
17550	7	9	7	10	as rightly refered to in IPCC AR 5, the definition of desertification applies well also to LD (deterioration of the physical, chemical, biological, or economic properties of soil;). Also confirmed later at p. 11 lines 27-28. [TURI FILECCIA, Italy]	Noted.
1602	7	10	7	10	what are the economic properties of soil? [Rajesh Chintala, United States of America]	Noted. This definition from AR5 is quoted verbatim.
14466	7	15	7	16	Need to consider how to treat landslides as a degradation driver since they are a natural process that interacts with other anthropogenic drivers such as deforestation. Land slides and mud slides are important degradation drivers in some parts of the world. [Rattan Lal, United States of America]	Noted . Landslides are considered a process of land degradation.
19768	7	21	7	24	The content is confusing. As far as I do understand, the attributes themselves are not degraded while they constitute degradation. [Sabit Erşahin, Turkey]	noted. Proposal not clear.
24380	7	21	7	25	Cautionary note on the use of "and/or" -- does this not open this up to many possible combinations fo ecological complexity and human values? If so, is the claim that this defintion is more operational than its UNCCD and SRCCL source correct? [Barron Joseph Orr, Germany]	Accepted. "and/or" has been changed to "or"
14462	7	21	7	25	The use of and/or in the definition means there is no clear outcome. Using Boolean logic there are 5 possible ways the sentence can be read. (A + B or C ; A + C or B; B + C or A ; A + B + C ; A or B or C) were A, B and C are ecological complexity and human values, respectively. This get over the problem of 'land transformation' however, it means that there is no clear-cut definition and the decision will always be subjective (except where there is a situation of A + B + C). This makes it very difficult to use this definition in any formal monitoring process or assessment process. Further, it makes it near impossible to state if an area is degraded as it is subjective. For the SRCCL this can cause problems - for instance there could be extensive carbon loss from agricultural expansion, but productivity and human value has gone up. Is this land therefore excluded from the SRCCL impacts? Who makes this decision? Is the outcome made in different ways for different objectives. Further on Page 7 lines 38 to 39 it us suggested that loss of production potential is always degradation i.e. the logic is A + B or C ; A + B + C is the way the definition should be read. This is very ambiguous. [Rattan Lal, United States of America]	Accepted. "and/or" has been changed to "or"
17584	7	23	7	24	"Thus, a land transformation that reduces ecological complexity and enhances sustainable food production need not be classed as degradation". It depends where (eg peatland drainage) ant at which time scale (short term or long-term i e climate scale term i e 30 years) [Guillaume Bertrand, France]	Noted. The temporal trade-off is mentioned.
26184	7	26	7	31	provide correct reference - in this paragraph, the IPBES LDRA is cited twice but with different wording for the acronym. Is the reference 'IPBES 2018' identical with 'IPBES LDRA'? [Hans Poertner and WGII TSU, Germany]	Accepted.
17076	7	26	7	41	Is it necessary to discuss differences between definition by the LDRA and the SRCCL extensively to merit one whole paragraph? [Lourdes Tibig, Philippines]	Noted. This discussion is considered important. See comment 26176

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14470	7	27	7	28	The statement that "the IPBES LDRA definition appears to convey that all land altered by human management, compared with its natural condition, is considered degraded" is incorrect. The IPBES LDRA separates the "land degradation" as a process and "degraded land" as a state. Land degradation are the human caused processes that drive the decline or loss in biodiversity, ecosystem services, or ecosystem function. This statement does not address the state of the land. From the IPBES LDRA "degraded land" is defined as the state of land which results from the persistent decline or loss in biodiversity AND ecosystem functions AND services that cannot fully recover unaided within decadal time scales. [Rattan Lal, United States of America]	Accepted - text modified.
24382	7	34	7	36	The IPBES definitions have given the impression that the entire document emphasizes biodiversity impacts (Chapter 4). However Chapter 5 is more focused on ecosystem services and functions, and human well-being and good quality of life. See https://www.ipbes.net/assessment-reports/ldr [Barron Joseph Orr, Germany]	Accepted. Text adjusted to confirm that this discussion applies specifically to the IPBES LDRA definitions, not the whole document.
14468	7	34	7	36	The IPBES does not emphasize only biodiversity impacts. The IPBES LDRA assessment evaluates impacts to biodiversity (Chapter 4) and ecosystem services and functions, and human well-being and good quality of life (Chapter 5). [Rattan Lal, United States of America]	Noted. See comment 24382
2524	7	36	7	37	Maybe I am missing something, but it is not clear to me what are SPM1 and SPM10. [William Lahoz, Norway]	Accepted. These are sectiosn of the LDRA SPM but text now deleted.
10430	7	37	7	37	"that all land altered by human management, compared with its natural condition, is considered degraded." How about rehabilitataed or restored degraded lands? Therefore, we can not say all land altered by human management, [Zitouni Ould-Dada, Italy]	Noted. See comment 5382
24384	7	38	7	39	This suggests that loss in production potential is always degradation, however there are cases where productivity may fall and it may be determined it is not degradation. For example, the conversion of a high-input agricultural field into no-till organic farm providing local food, or when an agressive and high NPP invasive species is removed and native species are introduced. [Barron Joseph Orr, Germany]	Accepted. Point added.
14464	7	38	7	39	It is not clear how this is derived from the definition. If this is what is implied in the definition, then the definition is potentially ambiguous. [Rattan Lal, United States of America]	Noted. Not clear whether this point refers to the IPBES or SRCCL definition.
14472	7	41	7	41	The statement that "the LDRA discusses alternative baselines, but generally favours the natural state" is not an informative statement without the context. The LDRA baseline looked at land degradation trends since the early 1990s and the publication of the MEA to the present which was considered to be around 2013 +/- 3-4 years). The full discussion of the policy implications of the baseline that is chosen to assess land degradation is in Chapter 2 of the LDRA. From a policy perspective, the reasoning to favor a more natural state baseline is due to the fact that many developed countries transformed their natural ecosystems centuries ago, whereas developing countries may be in the midst of rapid land transformation. This statement in LDRA chapter 2 states that "Adopting natural state of ecosystems as the baseline against which to measure the extent and severity of degradation ensures a comparable assessment of land degradation in general, and a fair assessment of success in meeting the Aichi Biodiversity Targets across countries at different stages of economic and social development, in particular." [Rattan Lal, United States of America]	Accepted. Text added to acknowledge the context of the LDRA.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26186	7	42	7	43	vegetation is not one of several biota - a biome consists of vegetation and animals, and usually provides a range of habitats. This sentence could say, e.g., 'vegetation and other life forms', or 'terrestrial biomass', or similar. The term biome is used in different ways throughout the literature, and should be clearly defined for clarity throughout this chapter (and the entire report), e.g., using the definition from AR5 WGII Glossary. Suggest including its definition in the chapter, and/or in the SRCCL Glossary. [Hans Poertner and WGII TSU, Germany]	Rejected - the sentence is a quote from a widely used source. We have added one further reference
19770	7	45	7	45	either……. (adapted from FAO 2007; UNCCD 1994) or ……(adapted from (FAO 2007; UNCCD 1994)). [Sabit Erşahin, Turkey]	Accepted
24386	7	45	8	4	The definition of sustainable land management should be moved to the next section (if indeed it is not introduced much earlier in the SRCCL since SLM comes up in earlier chapters. (Please also check consistency so that it is used in a common way in all the other chapters.) [Barron Joseph Orr, Germany]	Taken into account - definition of SLM will appear in Ch 1 and is discussed further in Section 4.10
9128	7	1			table title need revision [Amanullah Amanullah, Pakistan]	Unclear what this refer to
1536	7	1			or its human values.. As stated this sentence says that "land condition' loses its human value, as if land is a self relfecting agent making the value!!! Restate. There is substantive issue here as well. Humans may lose value in land even if the land has not degraded. All land valued for provisioning services, such as agriculture, has enhanced value while the base ecosystem functions have changed, some of which are degraded. What must be clear here is that humans may lose value in the land when the services that they want from it decline or become to costly to upkeep. [Billie Turner II, United States of America]	Noted. Changed to "value for humans"
26182	7	1			what are 'human values' - how can land have human values, do you mean 'value for humans'? [Hans Poertner and WGII TSU, Germany]	Accepted
14772	7	5			please include wildfires too - these are natural proceeses with many species dependent on their reoccurence - flooding, insects are some additional examples [Dominick DellaSala, United States of America]	Noted. Proposal not clear. This line is a verbatim quote of the AR5/UNCCD definition. Fire is discussed elsewhere in the chapter.
11464	7	12			Perhaps point out that the new definition is not restrictive to dry areas, but acknowledges the possibility of land degradation in all biomes. [Debra Roberts, South Africa]	Accepted. Yes, and this is now made explicit.
14774	7	20			like my comment above - this statement appears to nullify the severity and magnitude of change caused by human activities - what you are saying here is that some may be fine with the collapse of ecosystems - it's just a matter of perspective - this is a social science perspective rather than an ecological perspective. When ecosystems breakdown, everyone (except maybe the rich) suffer - so why downplay the connection between imminent collapse of ecosystems and human strife just because some may find this a matter of perspective? [Dominick DellaSala, United States of America]	Noted. The need for fair consideration of all stakeholders' views, especially where trade-offs are likely, is discussed in Section 4.10
5382	7	37			that all land altered by human management, compared with its natural condition, is considered degraded. How about rehabilitataed or restored degraded lands? Therefore, we cannot say all land altered by human management could lad to land degradation. some even lead to conservation , [Daniel Danano Dale, Italy]	Noted. This text is commenting on the IPBES LDRA definition. The SRCCL makes the same point as this reviewer.
11466	7	40			Just to clarify: if the land was already degraded at the start of the assessment (which assessment?) and thereafter does not degrade further, does SRCCL not consider such land under land degradation? [Debra Roberts, South Africa]	Noted. Under the SRCCL definition, land degradation is a decline in land condition. If the land is already degraded and there is no further decline, then no (further) degradation has occurred. The land is considered degraded, stable.
10944	8	1	8	1	Year for the reference is required. [Debra Roberts, South Africa]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24388	8	5	8	5	We suggest to include a new section that introduces the agreed definition of land degradation neutrality “a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems” (decision 3/COP.12, UNCCD, 2015). Land degradation neutrality approaches encompass both sustainable land management and restoration/rehabilitation. So this new section should come before current section 4.3.2 on sustainable land and forest management. [Barron Joseph Orr, Germany]	Taken into consideration. LDN - the definition, and the concept, are covered in section 4.10 ,as one of the high level responses to LD.
14826	8	5	8	5	The discussion on the links between land degradation and forest associated concepts should deal with deforestation: how deforestation is included in land degradation? [Florian Claeys, France]	Accepted - deforestation and its link to degradation is now discussed in various places.
9630	8	5	8	5	It is not evident why there is a specific chapter entitled sustainable land and forest managment. This would call for other chapters such as sustainable land and cropland managment, or sustainable land and pasture managment. I suggest to treat this in a subchapter under 4.3.1. (The same also applies to the forest chapter 4.5.2.). I think there should not be overdue emphasis on forest compared to other biomes, even when this is of course very important. [Markus Giger, Switzerland]	Rejected - Commens on ZOD were critical of lack of forest coverage.
26188	8	6	8	7	this is currently not specified in the definitions themselves - suggest it should be included in those definitions in the previous paragraph (and in the Glossary if applicable) [Hans Poertner and WGII TSU, Germany]	Rejected. It would make the land degradation definition too wordy to include this explanation. Further, the expanded definition from AR5/UNCCD mentions forest, and other text also gives forest examples. We could add an extra sentence in the glossary stating that the definition applies to managed agricultural and forest land and also to natural land.
7084	8	9	8	10	Figure 4.1: The left column shows the potential transition from 'degraded land' to 'sustainable Agriculture'. Based on the definitions provided for 'restoration' and 'rehabilitation' on page 10 (lines 14-19) the term 'restoration' may have to be replaced with the term 'rehabilitation in this column? [Mariam Akhtar-Schuster, Germany]	see comment 14476
3092	8	9	8	10	Land cover has important role to sustainable land management. So it seems to be useful to categorize it in four sub-sectors: 1- Sustainable forest management (SFM), 2- Sustainable range management (SRM), 3- Sustainable agriculture management (SAM), and 4- Sustainable bare land and rocky mountain management. [Mostafa Jafari, Iran]	Rejected - the structure we have is appropriate
14476	8	9	8	10	Figure 4.1: The left column shows the potential transition from 'degraded land' to 'sustainable Agriculture'. Based on the definitions provided for 'restoration' and 'rehabilitation' on page 10 (lines 14-19) the term 'restoration' may have to be replaced with the term 'rehabilitation in this column? [Rattan Lal, United States of America]	Noted - good point to be kept in mind when the figure is revised in the next draft.
14480	8	9	8	10	Figure 1.1. missed other components of sustainable land and forest manamgment such as avoiding land and forest degradation. Would be good to take concepts from the LDN framework which considers avoiding, reducing and reversing land degradation [Rattan Lal, United States of America]	Noted - but adding another dimension would unneccesarily complicate this figure even further.
19772	8	10	8	10	Fig.4.1. Forest is land, too. So, I beliewe that the term "degraded forest" should be replaced with "degraded land". Also, Fig.4.1 ndicates that combined with sustainable land use, climate change always omplify the carbon sink in forests and agriculture, which I believe is not always the case. It is better to rethink. [Sabit Erşahin, Turkey]	Rejected - yes forests are land too - but there are specific attributes of forests, their carbon stocks and sinks that are highlighted here.
15992	8	10	8	10	I think that figure 4.1 is not necessary. It shows basic concepts so maybe it is just redundant. I would rather suggest to incorporate the caption of figure 4.1 in the main text [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - rather than deleting the figure, authors have revised itto further emphasise the assessment outcome highlighting the interaction of land management and climate change impacts in determining the un/sustainable outcomes.

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14478	8	10	8	22	The picture is very simple and does not bring any new knowledge or understanding. The underline is more complicated and should be visualized better [Rattan Lal, United States of America]	Accepted - authors have revised the figure to further emphasise the assessment outcome highlighting the interaction of land management and climate change impacts in determining the un/sustainable outcomes.
14484	8	11	8	18	This figure leaves no space for sustainable land management practices such as agroforestry [Rattan Lal, United States of America]	Noted - but adding another dimension would unneccesarily complicate this figure even further.
26190	8	11	8	22	Figure 4.1 is very conceptual and textbook-like; it does not convey an assessment-message - consider removing or replacing with one that entails key information from the assessment. [Hans Poertner and WGII TSU, Germany]	Accepted - authors have revised the figure to further emphasise the assessment outcome highlighting the interaction of land management and climate change impacts in determining the un/sustainable outcomes.
10946	8	17	8	17	Replace 'then' with 'than' [Debra Roberts, South Africa]	Accepted - text revised
19774	8	17	8	17	……..carbon density but can contribute to more persistent carbon sinks then natural forests……. [Sabit Erşahin, Turkey]	Rejected - it is the strength of the carbon sink that matters, which also implies that the sinks have to persit.
7300	8	23	8	27	It is rather strange that initial attempts are referred to with IPCC 2013, which according to the text then resulted in attempts dating a reference of 2003 (10 year prior to the reference on initial attempts) [Marieke Sandker, Italy]	Accepted - the IPCC 2013 citation should have read Penman et al. 2003 (Task 2 report of the IPCC).
7302	8	23	8	27	Suggest to add the following: Penman et al (2003) provided the following framework definition: "A direct, human-induced, long-term loss (persisting for X years or more) or at least Y% of forest carbon stocks [and forest values] since time T and not qualifying as deforestation", but the report was unable to provide the thresholds for carbon stock loss, minimum area affected and time period that would be needed to operationalize the definition. [Marieke Sandker, Italy]	Accepted with modification - the quote listed here is from the IPCC Task 2 report (not the 2003 GPG) and it specifically referred to a possible definition in the context of the KYOTO protocol, an accounting framework specific to GHG emissions and removals. We have now made further reference to the Task 2 report but we did not introduce this definition, as the threshold values have not been defined.
14936	8	23	8	30	Additional references on forest degradation: - Sasaki, N., & Putz, F. E. (2009). Critical need for new definitions of "forest" and "forest degradation" in global climate change agreements. Conservation Letters, 2(5), 226-232. - Ghazoul, J., Burivalova, Z., Garcia-Ulloa, J., & King, L. A. (2015). Conceptualizing forest degradation. Trends in ecology & evolution, 30(10), 622-632. [Florian Claeys, France]	Accepted - Sasaki and Putz cited
10948	8	27	8	27	Please check and confirm that 2003 is the correct year for Penman. It seems counterintuitive that attempt to improve the definition is made in a 2003 source while the definition problem was identified in a 2013 source. [Debra Roberts, South Africa]	Accepted - the IPCC 2013 citation should have read Penman et al. 2003 (Task 2 report of the IPCC).
7304	8	27	8	27	Why is the he IPCC Special Report on Definitions and Methodological Options to Inventory Emissions from Direct Human-Induced Degradation of Forests and De-vegetation of Other Vegetation Types referred to as Penman et al 2003, should this not be IPCC 2003? [Marieke Sandker, Italy]	Accepted - the IPCC 2013 citation should have read Penman et al. 2003 (Task 2 report of the IPCC).
7306	8	28	8	29	"both indicators that remote sensing or other forest inventory methods can measure more easily than reductions in productive capacity." > remote sensing is not a forest inventory method, forest inventory always refers to ground observations/measurements. The phrase also seems gramatically wrong. It is very challenging to assess reduciton in productive capacity with remote sensing. Forest inventories can assess it but these would necessitate repeated measurements which is very costly [Marieke Sandker, Italy]	Accepted - revised the wording to distinguish remote sensing from inventory methods. And yes, assessing degradation based on productivity is indeed difficult and expensive as explained elsewhere in this chapter.
7592	8	30	8	30	This " (fires, and insects) " should be " (fires and insects) [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Accepted - Editorial

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7082	8	5	9	31	As forest is part of land (cf glossary), the concept or relationship between "land degradation" and "forest degradation" is not clear. Figure 4.1 shows that degraded lands and degraded forests are treated in two different strands. This requires clarification, and possibly a more inclusive discussion land degradation that also includes forest degradation. [Mariam Akhtar-Schuster, Germany]	Taken into account - Agree, this is a bit confusing. LD covers all land, including forests. But we also need to discuss forest degradation separately to ensure it is clealry understood. We have tried to clarify as much as possible
14474	8	5	9	31	As forest is part of land (cf glossary), the concept or relationship between "land degradation" and "forest degradation" is not clear. Figure 4.1 shows that degraded lands and degraded forests are treated in two different strands. This requires clarification, and possibly a more inclusive discussion land degradation that also includes forest degradation. [Rattan Lal, United States of America]	Taken into account - Agree, this is a bit confusing. LD covers all land, including forests. But we also need to discuss forest degradation separately to ensure it is clealry understood. We have tried to clarify as much as possible
7318	8	23	9	5	Pg8 line 23-30 & Pg9 line 1-5 speak about the difficulties in defining forest degradation, this does not sit logical under the chapter “sustainable land and forest management”, I would expect this under the previous chapter “Definitions of land degradation and land management”. [Marieke Sandker, Italy]	Noted - the point that this is also covered here is because a reduction in forest C stocks - interpreted by some to be degradation - does not imply a reduction in productivity, i.e. land degradation as defined in the SRCCL.
14482	8	45	9	1	This definition was adopted verbatim by WOCAT from the UN Earth Summit, 1992 [Rattan Lal, United States of America]	Noted
16644	8	5	10	10	In the discussion on forest degradation and definition of this, there is very little reference to the "ecological complexity" (c.f. definition of land degradation). Please elaborate somewhat on the sigificance of ecological complexity in forests and how this may be degraded. [Maria Kvalevag, Norway]	Noted - we have changed the definition from "ecological coplexity" to "ecological integrity"
5050	8	5	10	19	The focus of this subsection (4.3.2) is currently on sustainable forest management, with little on sustainable land management. This is not reflective of the section title. It would be strengthened by having two sub sections, one on forestry (already present) and an additional one on land. [Eamon Haughey, Ireland]	Noted
7298	8	6	10	19	Suggested restructing of the chapter "Sustainable land and forest management": describe the difference between natural and human induced degradation in forest, describe the character of degradation (a dynamic process, to understand whether carbon is removed or emitted to the atmosphere we need to look at the landscape level), describe the difference between unsustainable wood extraction and SFM. The discussion on definition would fit better under the definition chapter and definition is closely inter-linked with assessment of degradation (not so much with land management) [Marieke Sandker, Italy]	Noted - this was considered but not implemented in the SOD. Could be considered further for the final draft
9130	8	1		47	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Accepted
9132	8	1		47	include missing references [Amanullah Amanullah, Pakistan]	Accepted
19558	8	10			Please, remember the source of the figure [Ibouraïma Yabi, Benin]	Noted - this figure was drawn by the authors and therefore no source is required.

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14776	8	17			please provide the evidence in support of this statemnt. Are you comparing the same age classes? Are you using stocks, carbon retention times, sequestration rates? This goes against the conventional wisdom of primary forests store more carbon than logged forests, have longer carbon retention times, and continue to sequester carbon for centuries (see studies by Mackey 2012, Mackey et al. 2014, Keith 2009, Luyassaert et al. 2009 and many others). Also degradation' should be defined to encompass reductions in average carbon stocks below their natural level (or natural carbon carrying capacity) as well as ongoing reductions in carbon storage in a forest, other natural landscape and agricultural landscapes. See Defining Forest Degradation for an Effective Mechanism to Reduce Emissions from Deforestation and Forest Degradation (REDD) Sean Cadman October 2008 and Mackey et al. (2008). Green Carbon: The role of natural forests in carbon storage. Part 1. A green carbon account of Australia's south-eastern Eucalypt forests, and policy implications. Australian National University Press, Canberra; p36; http://epress.anu.edu.au/green_carbon_citation.html [Dominick DellaSala, United States of America]	Noted - This statement is based on the fact that the managed forest would be on average younger, have lower C stocks but higher increments. What do you mean by "store" - if you refer to C stocks you are correct - if you are talking about net C uptake rates, than your statement is not supported by the literature.
14778	8	19			this is a blanket statement with no supporting evidence - see Law et al. 2018 (PNAS) for problems with substition and leakage issues with regard to wood vs steel and concrete. Please make sure you include a thorough review of the literature [Dominick DellaSala, United States of America]	Noted - and there are many other references that do not support what Law et al. state (in fact their interpretation of substition benefits is flawed).
26192	8	25			please cite adequately the IPCC Report (and if possible Chapter) where this was defined [Hans Poertner and WGII TSU, Germany]	Accepted - the IPCC 2013 citation should have read Penman et al. 2003 (Task 2 report of the IPCC).
154	8	27			Change (e.g. (Penman et al. 2003)) to (e.g., Penman et al. 2003). [Beth Middleton, United States of America]	Accepted - Editorial
7308	9	2	9	3	Also in the tropics there are forest types where natural distrubances are common (although more frequent and intensive as a cause of humans) i.e. fire in dryland/savannah forests, perhaps this could be rephrased as "In several forest types natural disturbances are common" [Marieke Sandker, Italy]	Accepted - text revised
14486	9	6	9	6	Should include function (e.g. climate, hyrology) in addition to productivity? [Rattan Lal, United States of America]	Noted but the definition used here is focussed on productivity
7310	9	6	9	15	When reference is made to baselines, in the UNFCCC context and forest degradation, one will think about forest reference levels. So far, 14 countries have proposed reference levels to the UNFCCC for assessing forest degradation and they do not typically use "intact" or "primary" forest to define their baseline so I find this text a little off-topic. I suggest to remove line 6-9. Baselines against which degradation can be assessed do not fit logically under "sustainable land and forest management" but I would expect this i.e. under section 4.4.4 "Approaches to assessing land degradation" [Marieke Sandker, Italy]	Rejected - baseline here refers to the condition against which degradation is assessed. And yes - baselines will also be discussed in section 4.4.4

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7312	9	9	9	15	"baseline carbon density or canopy cover" this is again confusing, reference levels (the only relevant baselines I can think of for forests in this context) are not expressed in carbon density or canopy cover, they are expressed in annual emissions (AD x EF). I also think it is not so much the natural variability but the dynamic character of the degradation process which can easily lead to over- or underestimations if not monitored at the landscape level. Therefore I suggest to rephrase as: Due to the dynamic character of degradation with regrowth occuring after the distrubance event, to avoid overestimation of reductions in carbon stock density forest degradation cannot be assessed at the stand level but requires a landscape level assessment that takes into consideration the stand age-class distribution of the landscape, which reflects disturbance regimes over past decades and also considers post-disturbance regrowth. [Marieke Sandker, Italy]	Accepted with modification - reference to baseline removed and accepted some but not all of the suggested wording.
7314	9	16	9	19	Stand-level degradation can have many causes, it is not clear why selective logging has been singled out in this paragraph, probably because you are working towards the distinction between SFM and unsustainable logging/extraction. I suggest to make this clear from the start, i.e. "Wood extraction from forest can be unsustainable and result in long-term reduction in forest stock etc but it can also be part of SFM where damage is reduced and the forest is left to recover etc etc. In many cases selective logging does not adversly affect subsequent forest recovery, I suggest to remove this phrase which also undermines the subsequent text which seeks to explain extraction can be SMF. [Marieke Sandker, Italy]	Accepted with modification - text revised to clarify.
156	9	20	9	22	Forest change can actually be the loss of forest health or the entire forest e.g. tidal baldcypress swamps in coastal swamps of the southesastern United States or Eucalyptus forests in Australia (Middleton and Souter, 2016); Middleton, B.A. and N. Souter. 2016. Functional integrity of wetlands, hydrologic alteration and freshwater availability. ESA Ecosystem Health and Sustainability 2(1):e01200.doi:10.1002/ ehs2.1200 [Beth Middleton, United States of America]	Noted
7316	9	20	9	22	I would put the references on how forest degradation is defined together where it is discussed at the beginning of this chapter. It is confusing that at this stage a new reference and yet other description is introduced [Marieke Sandker, Italy]	Noted but we are not introducing a new definition here but a general description of how degradation has been interpreted that we then discuss in the remainder of the paragraph.
128	9	22	9	25	The headline that Sustainably managed forest landscapes can have a lower biomass carbon density but can contribute stronger carbon sinks then natural forests seems to be based on a single ref Kurz et al 2013, which is about Canadian boreal forests. It is perfectly possible that the Indigenous management of parts of the Amazon tropical forest (which some would call "natural" forest, displays this characteristic, butu then why the "natural forest" comparator? Is this compatible with Ch2 p16 l 24? [Elizabeth Penelope Davies, United States of America]	Accepted with Modification - additional references added for other forest types, but we were not able to find a reference about indigenous management of Amazon tropical forests on productivity.
7320	9	22	9	25	The language in this sentence is imprecise, also unsustainable extraction can reduce average carbno stocks and increase removal rates, in fact even clear-cutting can do this. In explaining SFM I would suggest to include that this can temporarily reduce forest carbon stocks locally but result in net removals at the larger scale (e.g. this is what Malaysia assesses in their FRL submissions). [Marieke Sandker, Italy]	Noted but the point here is not to distinguish sustainable from unsustainable management but to state that a reduction in C stocks does not imply a reduction in productivity, at the landscape level.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25696	9	28	9	30	The argument that there may be trade-offs between productivity and diversity is probably valid also for other land management than forests. However, such "productivity" would generally be assessed in short-time economic/profitability terms, and not in total primary production. So don't narrow this down to only forests, and be precise what aspect of "productivity" [Jon Magnar Haugen, Norway]	Noted but this section is specific to forests - this statement does not preclude that the some observations holds true for other ecosystem types.
7322	9	32	9	37	This section refers back to challenges in defining forest degradation and assessing forest degradation. The beginning of the section explains how complicated it has been to define forest degradation, now this section suggests it is easily resolved. This is contradictory. Obviously "information on changes in specific forest characteristics" would be helpful but the challenge is exactly that, to obtain information on changes in specific forest characteristics at a large scale in a cost-effective manner with reasonable accuracy. I would finalize the discussion on defintion in one location without crossreferences on the topic in scattered locations which are not always consistent with the discussion on how to define degradation. A lot of this information is again referring to "assessment of degradation" and not logical under "sustainable land and forest management" [Marieke Sandker, Italy]	Noted - more work will be required to consolidate the chapter
3202	9	35	9	37	Maybe add: NPP and biomass stocks for potential and actual vegetation are also relevant and can also be assessed and quantified, Haberl H, Erb K-H, Krausmann F (2014) Human Appropriation of Net Primary Production: Patterns, Trends, and Planetary Boundaries. Annual Review of Environment and Resources 39:363–391. doi: 10.1146/annurev-environ-121912-094620, Erb K-H, Kastner T, Plutzar C, et al (2018) Unexpectedly large impact of forest management and grazing on global vegetation biomass. Nature 553:73–76. doi: 10.1038/nature25138, Erb K-H, Fetzel T, Plutzar C, et al (2016) Biomass turnover time in terrestrial ecosystems halved by land use. Nature Geosci 9:674–678. doi: 10.1038/ngeo2782 [Karlheinz Erb, Austria]	Noted - some of these references have been picked up and are discussed elsewhere in this chapter.
9192	9	36	9	40	Biodiversity is a very vague criteria that is difficult to estimate with relevance whereas productivity or albedo are more precise responses variables. Therefore here and anywhere in the document biodiversity must be alway associated to a precise target. For example for forest ecosytems and their degradation levels, the diversity and the general state of trophic chain is a good target : the species diversity at each level of the food chain as well as the diversity of interactions and the presence of superpredators are the criteria of a low degraded ecosystems. The target below the word "biodiversity" should be clearly stated. [Alex Baumel, France]	Accepted - added reference to the need to include targets when defining biodiversity.
11468	9	40	9	44	However, if we do not clearly acknowledge that any form of human impact is indeed negative on biodiversity and ecosystem function (with the understanding that humans need forests products, and that therefore human disturbance is inevitable), then we remove the incentive to set aside sizeable forests for pure conservation purposes, ensuring that at least some pockets of original forest ecosystems can be preserved intact. The need for SFM is heightened by this acknowledgement, not stifled. There is a need to highlight the need to find less destructive / degrading solutions.Insufficiently emphasising humanity's negative impact would be a mistake. [Debra Roberts, South Africa]	noted, the chapter is consistent with the definition and the rationale is explained in section 4.3.1
7324	9	40	9	44	This is the author's opinion, I would agree with it but it is still an opinion which could be strengthened with references [Marieke Sandker, Italy]	Noted - but we have not found any references that support (or reject) this view.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9134	9	1		45	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Accepted - Editorial
26194	9	15			this reference is 50 years old - could it be supplemented with a reference from the last 5 years? [Hans Poertner and WGII TSU, Germany]	Accepted - Although this is the seminal paper on the relationship between disturbance regimes and age-class distributions, an additional more recent paper has been added.
26196	9	17			Please clarify here that the remaining trees are not necessarily dysfunctional (i.e., damaged/diseased) - they are often merely smaller than the harvested trees. [Hans Poertner and WGII TSU, Germany]	Accepted - Yes - or they could be bigger … that depends on the type of partial cutting.
14784	9	25			this is site and regionally specific - its ar sweeping generalization Additionally, SFM or Reduce Impact Logging have been widely criticized in the tropics (Zimmerman and Kormos 2012; BioScience 62: 479–487. ISSN 0006-3568) [Dominick DellaSala, United States of America]	Accepted - added statement that questions remain about SFM in tropical systems.
14786	9	27			apples to oranges comparison - without life cycle analysis this is a general statement. When trees are removed from a forest, much of that carbon is released from decomposition of nonmerchantable materials (branches, root wads, leaves), transport and milling - you need to account also for the variability in wood product stores - paper vs. structure lumber is hugely different [Dominick DellaSala, United States of America]	Rejected - The sentence references on page 9/line 27 makes no reference to harvested wood products. Moreover, life cycle analyses have been conducted many time and these follow IPCC guidelines with different half lives (carbon retention times) for different forest products.
14788	9	41			not necessarily - just because an activity is undesirable doesn't mean you can flip it to desirable and that makes sustainability more likely! Call it what it is and then discuss sustainability potential [Dominick DellaSala, United States of America]	Reject - the text does not "flip" undesirable to desirable but instead calls for an assessment of the impact of the human activity on indicators of interest. Unless the indicators are adversely affected the human action may not be undesirable.
6918	9	46			enforcement mechanisms to eliminate deforestation and stop arson fires [Talal Darwish, Lebanon]	Accepted
24390	10	10	10	19	These definitions could be moved to the new section that introduces the agreed definition and concept of land degradation neutrality as suggested above. [Barron Joseph Orr, Germany]	Noted - LDN is now discussed elsewhere and for now these definitions remain here.
17708	10	10	10	19	put it as annex within glossary of terms [Sawsan Mustafa, Sudan]	Noted
19776	10	13	10	13	……environmental change (UNEP 2016). [Sabit Erşahin, Turkey]	unclear comment
19778	10	16	10	16	……(McDonald et al. 2016)). [Sabit Erşahin, Turkey]	unclear comment
19780	10	19	10	19	…….from (McDonald et al. 2016)). [Sabit Erşahin, Turkey]	unclear comment
19782	10	20	10	20	Do we distinguish forests from other land uses? What about grasslands? Shoul we use "grassland degradation" for that? [Sabit Erşahin, Turkey]	noted, the chapter is consistent with the definition and the rationale is explained in section 4.3.1
7594	10	23	10	23	this " Land users’ " should be " Land users " [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Editorial - copyedit to be completed prior to publication
7326	10	25	10	27	Inaccessible language, I would suggest reprhasing in case a broader not purely scientific audience is targeted. The terms "scientis" and "neo-Malthusian perspectives" are not readily understood [Marieke Sandker, Italy]	accepted - text is revised
17710	10	36	10	36	the starting sentence : Important aspects of these relationships will be highlighted throughout the chapter. : Important aspects of these relationships will be highlighted throughout the chapter is irrelvantirrelevant to followed gender demotion [Sawsan Mustafa, Sudan]	Rejected - gender issues are highly relevant

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18624	10	36	10	46	I do not think that a discussion regarding the impact on women is needed in this assessment on the climate change impacts on land. While this is an extremely important subject, the social impacts driving the issues are primarily due to population growth and not impacts to the land. The impact to the land will be the same regardless of who owns the land and the social implications would seem to be outside the scope of what is to be addressed in this document. [Henry Allen Torbert, United States of America]	rejected - there is a large body of literature on the gender aspects of land management and hence important for land degradation
19560	10	20	11	5	Land tenure status (landlord, tenant, borrower, etc.) and how to use the land (whether or not to practice long-term fallow, agroforestry, etc.) are aspects to consider in management sustainable land. [Ibouraïma Yabi, Benin]	noted
14938	10	36	11	5	An additionnal reference on the gender aspects in land right in a context of global change: - Rousseau, K., Gautier, D., & Wardell, D. A. (2017). Renegotiating access to shea trees in Burkina Faso: Challenging power relationships associated with demographic shifts and globalized trade. Journal of Agrarian Change, 17(3), 497-517. [Florian Claeys, France]	Rejected - the suggested reference is only marginally relevant for land degradation
9136	10	1		37	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Accepted
160	10	3			Add comma before ", which". [Beth Middleton, United States of America]	Editorial - copyedit to be completed prior to publication
14780	10	9			Mackey B., D. A. DellaSala, C. Kormos, D. Lindenmayer, N. Kumpel, B. Zimmerman; S. Hugh, V. Young, S. Foley, K. Arsenis, and J. Watson. 2014. Policy options for the world's primary forests in multilateral environmental agreements. Conservation Letters 8:139-147 DOI: 10.1111/conl.12120. [Dominick DellaSala, United States of America]	accepted
1538	10	11		13	When will ecologists get off of the notion of carrying capacity as inherent in land? Yes, different lands have different resposnes to land uses. But the capacity of the land to maintain its services is directly related to the techno-managerial stratigies employed. [Billie Turner II, United States of America]	Reject - this is an accepted UNEP definition
14782	10	13			this is a biased view of effects of fire on fire adapted systems - see DellaSala and Hanson 2015((The ecological importance of mixed severity fires: nature's phoenix, Elsevier: Boston) for a different view on for example the biodiversity importance of mixed-severity fire regimes (this is a global assessment of importance) [Dominick DellaSala, United States of America]	unclear what sections this refer to
1540	10	23		24	This sentence is verbatim a sentence above; again this paragraph has a decidedly political ecology orientation…always blaming science [Billie Turner II, United States of America]	rejected - political ecology is relevant
9000	10	24		37	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
158	10	31			Add comma "In this report," [Beth Middleton, United States of America]	Editorial - copyedit to be completed prior to publication
5384	10	39			The use and management of land is therefore highly gendered. BUT THIS TREND IS CHANGING IN MANY COUNTRIES AT PERESENT [Daniel Danano Dale, Italy]	Taken into account - the text has been revised and expounded

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25680	11	3	11	3	The sentence seems to compare private and communal land rights, and prefer private land rights where resources are prone to degradation. I miss that you explicitly make the point that communal land are efficient for other resources. This is already explained in chapter 1. [Jon Magnar Haugen, Norway]	noted - we don't agree that the text expresses any preference. We note that communal land rights may be in conflict with agricultural modernisation polices - because they often favour private property rights.
14828	11	5	11	5	A paragraph should be added on relationships with indigenous peoples and local communities in combating land degradation. [Florian Claeys, France]	accepted - text is revised
16646	11	6	11	25	It was slightly difficult to understand that the content of Ch 4.4 was only considering framework and general prosesses/drivers. Hence there is a need to clarify this in the beginning of the chapter, possibly also including the wording "processes and drivers" in the title of the chapter. There is also a need for giving a reference to ch 4.8. [Maria Kvalevag, Norway]	Taken into account - we have inserted a conceptual figure describting the terms using a DPSIR scheme
3534	11	6	11	25	General aggravation and concerns due to degradation of land.- Not withstanding and without derogating the enormous progress and development achieved and the steps being taken to combat the situation towards advancements , but making a simple exercise, the present days' negates and deep concerns being observed and apprehensions are:- (1) accelerated soil erosion in various forms like Splash, Sheet, Rill, Gully, Ravine, stream bank, hill slip, land slide and sand ladening on table land and high sediment yield thereby rendering these lands decreased fertility and productivity as well as decrease in area; (2) deposition of eroded and displaced soil and spoils in the surface water bodies decreasing water storage capacity in these. Deposition of eroded and transmitted materials in to the river bed reducing depth but increasing width by eating the table land, causing spate of flush water on the adjoining land ; (3) as per FAO's forecast , about 52% of land used for agriculture is degraded and nearly 2 billion hectares are seriously degraded, somewhere beyond the capacity of re-development. (4) decreasing arable land area, due to diversion to non-farming purposes, resulting less production; (5) urbanization and industrialization are encroaching the arable land and also over drafting the ground water to meet the demand; (6) brick making with the top soil of the arable land, is negating the productivity of the crops; (7) physiography of many lands are changing, degrading making these unfit for every kind of use less to speak of farming ; ((8) somewhere paddy lands are being converted exclusively for aquaculture large size fishery converting to vast water body filed with ground water in summer months round the years , which were under fish-cum-paddy culture in rainy season, which is one of the reasons for decrease of crop area and production of agricultural commodities and depletion of ground water with threat to environment; (9) land degradation reduce productivity and food security, disrupts vital functions of ecosystem , deteriorates biodiversity and quality of water resources , increases carbon emissions and vulnerability to climate change. Land degradation directly affects 1.5 billion people worldwide, with adverse impact on women, children poor people and it reduces the productivity of terrestrial land surface of the world by about 25% 2/7 (10) due to increasing overland flow of rain water (run off) to the Bay and Sea through the river systems ,the ground water recharge is decreasing;	Noted
25796	11	7	11	14	Complete the explanation of DPSIR framework with Impacts and Responses [Hans Poertner and WGII TSU, Germany]	Taken into account - we have inserted a conceptual figure describting the terms using a DPSIR scheme
7332	11	7	11	25	This entire section uses a single literature reference, other examples describing these terms are Smith et al. (2010) and Geist and Lambin (2001) [Marieke Sandker, Italy]	Rejected - the Tomich reference has synthezised several sources

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7328	11	8	11	10	It is stated that the distinction between drivers and processes is clear, yet in line 16-17 of this page "Processes of land degradation" are described as "similar to the notion of direct drivers". This does not seem clear at all. [Marieke Sandker, Italy]	accepted - text is revised
7086	11	10	11	10	Please provide refrences for further reading on the DPSIR framework because it is not clear how is being used in this context. In fact, please provide more accurate guidance on how it is linked to this context. [Mariam Akhtar-Schuster, Germany]	accepted - DPSIR is now described
7330	11	10	11	10	What is the DPSIR framework? Acronyms need to be spelled out at first use [Marieke Sandker, Italy]	accepted - DPSIR is now described
14488	11	10	11	10	Please provide refrences for further reading on the DPSIR framework because it is not clear how is being used in this context. In fact, please provide more accurate guidance on how it is linked to this context. [Rattan Lal, United States of America]	accepted - DPSIR is now described
7336	11	12	11	14	The example is helpful, I suggest to also add a driver in this example to get the full picture [Marieke Sandker, Italy]	accepted - DPSIR is now described
7334	11	16	11	21	The description of these concepts is vague, can it be improved? [Marieke Sandker, Italy]	accepted - DPSIR is now described
19786	11	19	11	25	Drought is an external or forcing variable resulting in fire and many other processes. The fire is influenced by both ecosystem variables and drought, which is kind of a state variable. Therefore, it would be better to name drought a “driver” and fire a “process”. [Sabit Erşahin, Turkey]	Noted - we consider fire a part of natural ecosytem dynamics. Fire can be come a process if the frequency or intensity is increasing due to human action or climate change
19784	11	21	11	21	…….the DPSIR framework (Tomich et al. 2010). [Sabit Erşahin, Turkey]	accepted - DPSIR is now described
3094	11	26	11	26	Processes of land degradation; In this sector related to the climate change factors four sub-sectors could be highlighted: 1- decreasing biomass and vegetation producing potential, 2- scarcity of water potential, 3- downwarding nutrient and supporting potential of soil, and 4- degradation in response of social and economic impacts. [Mostafa Jafari, Iran]	ACCEPTED: Table was modified. We agree on the fact that subgroups help, we are not following the exact grouping proposed here but a related one in which the "pressure points" of degradations processes are identifed and grouped as "soil", "water", "biota", and "fires"
7596	11	34	11	36	In the sentence " Hence, the influence of climate variability and change on land degradation can originate from its direct effects on any of these spatial scales and entry points. or from its indirect effects in the way humans use and treat the land." , there should have a ";" after "entry point" [Boyossoro Hélène Kouadio, Cote d'Ivoire]	ACCEPTED: text revised
19788	11	36	11	36	……..entry points or from its indirect…… [Sabit Erşahin, Turkey]	ACCEPTED: text revised
19076	11	40	11	44	deposition can have positive as well as negative aspects such as improved nutrient content of receiving lands and creation of flat lands suitable for crop cultivation eg on Loess Plateau of China [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	ACCEPTED: we highlight the positive effect of depoisiton as well in this version
17552	11	37	12	32	And table 4.1. It is suggested to put higher emphasis and larger discussion on tillage as the main LD driver because of its erosion impact [TURI FILECCIA, Italy]	ACCEPTED: Emphasis on tillage as a dominant driver is now highlighted in the text
25676	11	37	12	40	As mentioned, all examples are singular, uni-directional. Combinatory effects are generally more ibntereting, as when carbon depletion degrades soil structure which results in reduced water transport (capacity), which again may exacerbate droughts or water-logging. Water-logging complicates machine operations and heay machinery on water-logged soils lead to hardening. [Jon Magnar Haugen, Norway]	ACCEPTED: We are aware of the inmense complexity and interactivity of degradation processes and the new version highlights this early on in the text and makes more clear the fact that each process in the table is just a "pressure" or "entry" point in whcih degradation starts but then propagates to many of the other processes. This unidirectional presentation in the table is preferred in this section but this cautionary note is now more emphasised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19790	11	38	12	7	It would be better to mention nutrient leaching as a nutrient depleting process in proper place [Sabit Erşahin, Turkey]	ACCEPTED: nutrient leaching is included in the process of depletion in this version
6616	11	38	12	32	Contamination of soil with inorganic or organic pollutants should be mentioned as chemical soil degradation process. This contamination can occur during agricultural activities through extensive use of agrochemicals (pesticides, herbicides) and through industrial activities or waste disposal. [Cornelia Rumpel, France]	ACCEPTED: See new lines for soil biotic processes and pollutants in fomer table 1 (now box) and in the text
7768	11		17		section 4.4.2 and Table 4.4.1: The focus of this section and of the table is mostly on lands under some form of food production (i.e crops or grazing). Largely missing, however are considerations related to the degradation (loss of forest cover, shifts in species composition, lower productivity) of forets through climate-mediated disturbanes such as drought, fire and insect oubreaks when the disturbance regimes shift under a warming climate. See Gauthier et al, Science 2015 for example on the boreal forest, but also Allen et al already mentioned above. In tropical countries, drought in particular is adding an extra pressure on wooded lands already under pressure from logging and productio of charcoal. [Pierre Bernier, Canada]	Noted and taken into account
9138	11	2			correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Accepted - editorial
1130	11	2			"extraction" seems not appropriate, I would suggest crop uptake [Rosa Francaviglia, Italy]	Noted
26198	11	8			also refer to section 4.3.1 here, where details are provided [Hans Poertner and WGII TSU, Germany]	Rejected - since section 4.3.1 is the preceding section this is not necessary
162	11	10			lower case "drivers" [Beth Middleton, United States of America]	accepted
1542	11	16			land degradation is defined by land degradation? [Billie Turner II, United States of America]	accepted - DPSIR is now described
1132	11	17		32	add overgrazing effects. Some suggested readings. Conant RT, Paustian K, 2002. Potential soil carbon sequestration in overgrazed grassland ecosystems. Global Biogeochem. Cycles 16:1143. Soussana JF, Lemaire G, 2014. Coupling carbon and nitrogen cycles for environmentally sustainable intensification of grasslands and crop-livestock systems. Agric. Ecosyst. Environ. 190:9-17. Parton WJ, Schimel DS, Cole CV, Ojima DS, 1987. Analysis of factors controlling soil organic matter levels on grasslands. Soil Sci. Soc. Am. J. 51:1173-1179. Schnabel, R.R., Franzluebbers, A.J., Stout, W.L., Sanderson, M.A., Stuedemann, J.A. 2001. The effects of pasture management practices. In: RF Follett, JM Kimble and R Lal (eds.). The potential of US grazing lands to sequester carbon and mitigate the greenhouse effect. Lewis Publ., Boca Raton, FL, USA, pp. 291-322. [Rosa Francaviglia, Italy]	Rejected - overgrazing is to a large extent a drylands problem and is covered in Chapter 3
1544	11	19		21	Why is the MEA definition of drivers used and not the GLP/LUCC ones--the interntional program that examine land change?. Land degradation is generated by both direct or proximate and distal drivers. The definition used is odd to me? What are "indirect conditions" [Billie Turner II, United States of America]	Noted - we have used the DPSIR schema here because it is widely used in the literature
164	11	35			entry points. Change to comma "entry points," [Beth Middleton, United States of America]	ACCEPTED: text revised
6920	11	35			spatial scales and entry points. Replace point by comma [Talal Darwish, Lebanon]	ACCEPTED: text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11470	11	37			Not once are insects or other soil fauna mentioned in relation to the crucial role they play in soil quality and organic matter or C cycling, and the impact of insecticides (and possibly genetically modified crops) on soil fauna and therefore soils and carbon budgets, neither in this chapter nor the last. Insects are only mentioned as pests (and as “pollination services” later). This is a major gap. See https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/soil-macrofauna . This should be included in the Table on page 13ff and 25ff. Also page 25 line 16 [Debra Roberts, South Africa]	ACCEPTED: Now we include a broader family of biotic degradation process and include explicitly faunal changes and the specific case of soil macrofauna
25674	12	2	12	2	While nutrient depletion can be a problem, research indicated that nutrient shortage may mobilize plant - soil biome interactions where soil biome supplies nutrients in exchange for sugar, which is helful for soil ecosystems, soil carbon and thus soil health. See for instance https://doi.org/10.1016/j.tplants.2006.10.007 [Jon Magnar Haugen, Norway]	ACCEPTED: We included a note on the possibilities of soils to buffer nutrient depletion under natural vegetation and the limitation of this buffering under cultivation
6614	12	4	12	7	Soil organic matter is not lost by chemical processes, but by microbiological ones. Decomposition of soil organic matter is enhanced upon soil disturbance through tillage for example. Soil organic matter may also be lost though erosion processes, when soil is bare. Or when organic matter is exported through harvesting in the case of agricultural soils. [Cornelia Rumpel, France]	ACCEPTED: We have broaden the presentaiton of mechanisms leading to soil organic matter loss, including effects that alter soil biota, tillage ehnacing ouptuts, cultivation and diminished root production decreasing inputs
19434	12	9	12	11	Salinization is no provoqued by water table rise in arid and semiarid climates. [José João Souza, Brazil]	REJECTED: Many salinization cases throughtout the world take place after water table raises in semiarid places, particularly well known is the case of dryland salting in Australia, we clarify this point in the new version
7758	12	9	12	11	I would sugest replacing with "In the context of land degradation, salinisation is an increase in surface or near-surface soil salinity resulting from inadequate irigation practices". Usually, salinisation is caused by irrigation with brackish water, or with non-saturating irrigation of already salty soils. In both cases, evaporative demand causes the irigation waters ladden with salts to rise to the surface and evaporate, inreasing the concentration of salts near or at the soil surface. [Pierre Bernier, Canada]	REJECTED: Salinization can take place even when irrigation water with very low solute content is used. Salts already stored in the soil or in groundwater often emerge at the surface as a result of poor drainage practices. This point is now clarified
19792	12	23	12	23	In rangelands, selective……. [Sabit Erşahin, Turkey]	ACCEPTED: text revised
170	12	25	12	28	Illius and Foley et all need years for the citations [Beth Middleton, United States of America]	ACCEPTED: text revised
14940	12	26	12	28	The format of the used reference is invalid. Other references, more accurate, on forest degradation associated with logging : - Pearson, T. R., Brown, S., & Casarim, F. M. (2014). Carbon emissions from tropical forest degradation caused by logging. Environmental Research Letters, 9(3), 034017. - Pearson, T. R., Brown, S., Murray, L., & Sidman, G. (2017). Greenhouse gas emissions from tropical forest degradation: an underestimated source. Carbon balance and management, 12(1), 3. On forest fires: - Cochrane, M. A. (2003). Fire science for rainforests. Nature, 421(6926), 913. - Matricardi, E. A., Skole, D. L., Pedlowski, M. A., Chomentowski, W., & Fernandes, L. C. (2010). Assessment of tropical forest degradation by selective logging and fire using Landsat imagery. Remote Sensing of Environment, 114(5), 1117-1129. [Florian Claeys, France]	NOTED: the references are now used in section 4.8
10950	12	28	12	28	Add year of publication for Foley et al [Debra Roberts, South Africa]	ACCEPTED: text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25798	12	28	12	28	exotic is redundant with invasive [Hans Poertner and WGII TSU, Germany]	ACCEPTED: text revised
7760	12	28	12	28	Foley et al … missing reference year [Pierre Bernier, Canada]	REJECTED: Exotics are not necessarely invasive, and natives can be invasive; hence the use of both species attributes is required (Callaway & Aschehoug - 2000, Science for an example of this distinction)
19794	12	28	12	28	with other agents such as fires (Foley et al.???). [Sabit Erşahin, Turkey]	ACCEPTED: text revised
26200	12	28	12	32	missing is the argument of how invasive species can alter or degrade non-cultivated ecosystems, [Hans Poertner and WGII TSU, Germany]	ACCEPTED: The role of invasives pushing degradation in natural and seminatural systems is now highlighted
19796	12	30	12	30	In rangelands, invasive species…….. [Sabit Erşahin, Turkey]	ACCEPTED: The role of invasives pushing degradation in natural and seminatural systems is now highlighted
14942	12	30	12	32	On fire and invasive species: - Brooks, M. L., D'antonio, C. M., Richardson, D. M., Grace, J. B., Keeley, J. E., DiTomaso, J. M., ... & Pyke, D. (2004). Effects of invasive alien plants on fire regimes. AIBS Bulletin, 54(7), 677-688. [Florian Claeys, France]	ACCEPTED: reference included
18626	12	32	12	32	Invasive species can also be a problem in forest system. Also, problems associated with invasive species can be exasperated with elevated atmospheric CO2 due to the evasive species responding more positively to the CO2 fertilization compared to native species: Rogers, H.H., G.B. Runion, S.A. Prior, A.J. Price, H.A. Torbert and D.H. Gjerstad. 2008. Effects of elevated atmospheric CO2 on invasive plants: Comparison of purple and yellow nutsedge (Cyperus rotundus L. and C. esculentus L.). J. Environ. Qual. 37:395-400. Runion, G.B., A.J., Price, S.A. Prior, H.H. Rogers, H.A. Torbert, and D.H. Gjerstad. 2008. Effects of elevated atmospheric CO2 on a C3 and a C4 invasive weed. Botany Research J. 1(3):56-62. Price, A.J., G.B. Runion, S.A. Prior, H.H. Rogers, and H.A. Torbert. 2009. Tropical spiderwort (Commelina benghalensis L.) increases growth under elevated atmospheric CO2. J. Environ. Qual. 38:729–733.Runion, G.B., S.A. Prior, A.J. Price, and H.A. Torbert. 2014. Effects of elevated CO2 on biomass and fungi associated with two ecotypes of ragweed (Ambrosia artemisiifolia L.). Front. Plant Sci., doi: 10.3389/fpls.2014.00500. Runion, G.B., S.A. Prior, L.J. Capo-Chichi, H.A. Torbert, E. van-Santen. 2016. Varied growth responses of cogongrass ecotypes to elevated CO2. Front. Plant Sci. 6:1182 Doi:10.3389/fpls.2015.01182. [Henry Allen Torbert, United States of America]	ACCEPTED: The role of invasives pushing degradation in natural and seminatural systems is now highlighted including its links with elevated CO2
3332	12	3	62	8	Table 4.1, on page 15, Salinisation column 4, please replace, Sea level raise with 'Sea level rise' also in other places in this chapter. [Md Moazzem Hossain, Australia]	ACCEPTED: text revised
9142	12	10		22	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	ACCEPTED: text revised
9140	12	10			(O'Connell et al., 2015). C capital and add comma [Amanullah Amanullah, Pakistan]	ACCEPTED: text revised
168	12	14			This "what"? Change to "This process" (?) This chapter has many instances of "this" without a noun. [Beth Middleton, United States of America]	ACCEPTED: text revised
166	12	23			add comma "In rangelands," [Beth Middleton, United States of America]	ACCEPTED: text revised
2526	13	1	13	1	Perhaps include in the caption the meaning of the acronyms CC and LD. [William Lahoz, Norway]	ACCEPTED: text revised
1604	13		13		Table 4.1, LD and CC needs to explained in footnotes [Rajesh Chintala, United States of America]	ACCEPTED: text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19798	13	1	17	1	Table 4.1: Inconsistency and mistakes (e.g., (Guo et al. 2017) instead of (Guo, et al 2017)) in citing of literatures should be removed. In column headings the articles (OF, ON) should be lowercased. Column headings and line headings should be consistent in capitalization of the first letter of words. Some of the words, such as Fertilisation, Acid rain, etc should be lowecased. [Sabit Erşahin, Turkey]	ACCEPTED: text revised
26202	13	1	17	2	all acronyms used in the table should be provided in the legend so that it can be understood independently of the text. Most of the literature cited here is old (pre-AR5, back to the 1990s) - please include more recent literature [Hans Poertner and WGII TSU, Germany]	ACCEPTED: text revised
5080	13		17		Table 4.1.: deforestation and biomass degradation are lacking ! These are main forms of degadation ! [Gert-Jan Nabuurs, Netherlands]	ACCEPTED: deforestation was included
9144	13	1			correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	ACCEPTED: text revised
25800	13	1			This replicates cross chapter Box 3.1 given in Chapter 3 [Hans Poertner and WGII TSU, Germany]	ACCEPTED: yes, its will be a single box for both chapters
25678	14	0	14	0	Again: nutrient depletion shoukld be distinguished from nutrient shortage [Jon Magnar Haugen, Norway]	ACCEPTED: We included a note on the possibilities of soils to buffer nutrient depletion under natural vegetation and the limitation of this buffering under cultivation
19436	14	1	14	1	"C emission may be significantly increased globally" as "influence on climate change" [José João Souza, Brazil]	ACCEPTED: text revised
19438	14	1	14	1	Organic matter decline affects soil water retetion and cycling of nutrients [José João Souza, Brazil]	ACCEPTED: We are aware of the inmense complexity and interactivity of degradation processes and the new version highlights this early on in the text and makes more clear the fact that each process in the table is just a "pressure" or "entry" point in whcih degradation starts but then propagates to many of the other processes. This unidirectional presentation in the table is preferred in this section but this cautionary note is now more emphasised
10432	14	21	14	21	"An important finding from that database is that almost any erosion rate is possible under almost any climatic condition." Not clearly termed. What does any erosion rate mean? (maximum, minimum) [Zitouni Ould-Dada, Italy]	PROBLEM, wrong page
27344	14		14		Bond-Lamberty, B., Bailey, V. L., Chen, M., Gough, C. M., & Vargas, R. (2018). Globally rising soil heterotrophic respiration over recent decades. Nature, 560(7716), 80–83. [Doreen Stabinsky, United States of America]	Taken into account - However, out of scope of this section, which specifically deals with coastal degradation as the result of maladaptation. Please refer to the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), which includes a dedicated chapter on sea level rise, for further discussion of adaptation to sea level rise.
4270	14	1	16	1	in many regios with arid climates especially in Iran lack of rainfall has led to over pumping and excess withrawal from ground water,which in turn causes land degradation due to collapse of soil strucute and land subsidence. e.g."Tofigh et al.(2010) Prediction of future land subsidence in Kerman, Iran due to groundwater withdrawal" . This sould be added to the table. [Nozar Ghahreman, Iran]	ACCEPTED: within the "water-related" degradation process we have now included subsidence as a result of GW pumping
9146	14	13		44	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Editorial - copyediting to be completed
5388	14	21			An important finding from that database is that almost any erosion rate is possible under almost any climatic condition . Not clearly termed. What does any erosion rate mean? (maximum or severe) or what? [Daniel Danano Dale, Italy]	PROBLEM, wrong page

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17124	14				Poor Tillage: If poor tillage means less soil plowing or soil harrowing then poor tillage can not be considered as a proximate driver os water erosion. Not in tropical and sub-tropical regions where intensive tillage with plowing and several harrowing leads to uncovered soil surface prone to crusting and also causing soil compaction at the plow sole thus promoting less water infiltration and increase in runoff and soil and water losses (Castro Filho et. al, 1991; Machado and Freitas, 2004). [Pedro Luiz Oliveira de Almeida Machado, Brazil]	ACCEPTED: We did not want to express lack of tillage, but badly managed tillage practices, it is now clarified
17126	14				Castro Filho, C., Heklain, J.C., Vieira, M.J., Casao, R. 1991. Tillage methods and soil and water conservation in southern Brazil. Soil Till Res, 20: 271-283. Machado, P.L.O.A.; FREITAS, P. L. . No-till farming in Brazil and its impact on food security and environmental quality. In: Rattan Lal; Peter H. Hobbs; Norman Uphoff; David O. Hansen. (Org.). Sustainable agriculture and the international rice-wheat system. New York: Marcel Dekker Inc., 2004, v. , p. 291-310. [Pedro Luiz Oliveira de Almeida Machado, Brazil]	ACCEPTED: text revised
17128	14				Organic matter decline: not soil cultivation, but intensive soil tillage and lack of crop rotation with cover crops are the proximate drivers of organic matter decline (Machado and Silva, 2001). Reference: Machado, P.L.O.A and Silva, C.A. Soil management under no-tillage systems in the tropics with special reference to Brazil. Nutr. Cycl. Agroecosyst. 61: 119-130. [Pedro Luiz Oliveira de Almeida Machado, Brazil]	ACCEPTED: text revised
19440	15	1	15	1	Sodification causes reducton of primary production and deforestation of new areas [José João Souza, Brazil]	ACCEPTED: text revised
982	15	1	15	1	In table 4.1 when talking about sodification, I sugggest to add also basification/alkalinistation, since soils with high Na content usually have a very high pH (i.e. >9). [Jose Luis Vicente Vicente, Germany]	ACCEPTED: text revised
7762	15		15		In the line on "salinisation", column 3 on "proximate drivers", I am not certain of "deforestation" being a proximate driver of salinisation. [Pierre Bernier, Canada]	REJECTED: One of the most outstanding salinizaiton processes globally is the "dryland salting" syndrome of Autralian dry forests that were cleared, we explain this more clearly in the text
9148	15	1		40	correct format (Author, year) and (author et al., year) in whole document please, [Amanullah Amanullah, Pakistan]	Accepted - editorial
9150	15	26			Huxman year missing [Amanullah Amanullah, Pakistan]	PROBLEM, wrong page
5052	16	1	16	1	Eutrophication of waterways due to intensive agriculture is mentioned here, but there does not seem to be a specific sub-section on this anywhere in the chapter. As this is a valid and important point, adding a specific section would be a great addition to the chapter. This is especially important given the definition of scope at the start of the chapter, which includes water. [Eamon Haughey, Ireland]	ACCEPTED: The section on eutrophication was added to the text with associated references
5054	16	1	16	1	Loss of soil biodiversity can lead to a loss of soil function and therefore impact on the potential to provide ecosystem services such as agricultural production, soil carbon storage, water quality etc. This is an issue not currently addressed in this table or chapter. (A pan European study looking at this Tsiafouli at al 2014, Global Change Biology, https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.12752). I note that soil microbial diversity is covered in section 4.4.4.3 Field Methods, some context as to how soil biodiversity interacts with both climate and land use drivers of degradation might be helpful. [Eamon Haughey, Ireland]	ACCEPTED: Now we have within the biotic process not just vegetaiton changes, but soil biotic changes as well
9152	16	1		7	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	ACCEPTED: text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
172	16				woody encroachment; see also: Middleton, B.A. 2013. Rediscovering traditional vegetation management in preserves: trading experiences between cultures and continents. Biological Conservation 158:271-279. [Beth Middleton, United States of America]	ACCEPTED: ref included
25684	17	0	17	0	Also mention degradation/decline in biological activity and soil ecosystems [Jon Magnar Haugen, Norway]	ACCEPTED: Now we have within the biotic process not just vegetaiton changes, but soil biotic changes as well
14830	17	2	17	2	The reduction of biomass and the shifts in floristic composition should be added in the most important land degradation processes [Florian Claeys, France]	ACCEPTED: We agree and the new version of has a more developed section on these "family of changes" in the table and the text as well. Previous version had "valued species loss" and is now "floristic changes"
1606	17		17		Table 4.1, what does valued species mean? Needs details in table footnotes [Rajesh Chintala, United States of America]	ACCEPTED: We restructured the section
9154	17	15		23	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	ACCEPTED: text revised
1546	17				Add Anadon et al. PNAS 2010 on woddy encoriachment [Billie Turner II, United States of America]	ACCEPTED: ref included
1548	17				In reference to table. Perhaps another degrading element can be added. Land change can create feedbacks that amplify drought. GCTE had a lot of work on this. See RA Pielke [Billie Turner II, United States of America]	ACCEPTED: text revised
17130	17				Insect outbreaks: the lack of forest reserv or set-aside areas in agricultural lands and the lack of riverine forests may lead to insec outbreaks as agricultural land cause species concentration with diminution of natural enemies. [Pedro Luiz Oliveira de Almeida Machado, Brazil]	Noted
14490	18	1	18	1	Add more points on forest degradation. This section is soil heavy [Rattan Lal, United States of America]	accepted - text is revised
3520	18	1	18	21	In this chapter, section 4.4.2 displays the drivers of land degradation using the nice synthetic diagram on figure 4.2. On the left side (human drivers), one would think that the size of the concerned human pooulation deserves to be mentioned ; otherwise, what would be the purpose of mentioning migrations, the effect of which is to modify the repartition of human population ? The legend says that the figure is only a starting point. Hence there is room for improvements ! [Philippe Waldteufel, France]	Accepted - the illustration has been changed
19802	18	5	18	6	For Figure 4.2: The land degradation may be conceptualized as: external (forcing) and internal (state) variables should be distinguished, first. The human and climate are the external variables, while vegetation, water, and soil are the state variables. Direct and indirect relations and feedbacks among the variables should be sketched, second. In sketching the relations, direct and indirect relations or influences should be depicted. For example, climate (e.g. changed drought index) may affect soil directly and indirectly via vegetation and water, and vice versa. Direct and indirect relations among the affecting and affected variables should be included in such conceptualization. The forcing and state variables may further be disaggregated into their components (e.g., for climate, aridity index, annual precipitation, seasonality of rainfall and so on; vegetation cover percentage, net primary productivity and so on for vegetation) to describe more detailed inter-variable relations and feedbacks. [Sabit Erşahin, Turkey]	Noted - the figure has been revised
25802	18	6	18	8	Climate change and feedbacks to are not highlighted in this box [Hans Poertner and WGII TSU, Germany]	Accepted - the figure has been revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9194	18	15	18	21	This is the critical point of the document, soil erosion, salinization of soils by excess of irrigation, etc… are irreversible if considering the time scale of human societies. This is not suggested, but his is facts ! All Mediterranean civilizations experencied this irreversibility, the process of degrdation from forest to agriculture fields and finally arid lands or desert is no more an hypothesis. [Alex Baumel, France]	Noted - salinization is primarily covered in Ch 3
17554	18	16	18	18	ibidem, tillage causes erosion, and LD. [TURI FILECCIA, Italy]	comment unclear
6770	18	1	20	2	Drivers of Degradation should be more clearly stated and simply explained. Please consult for this section the following report by:.- Oliver K. Kirui and Alisher Mirzabaev Drivers of land degradation and adoption of multiple sustainable land management practices in Eastern Africa University of Bonn IAAE https://bit.ly/2KgDz4N [Idowu Owoeye, Nigeria]	Noted - but we have explained drivers better in Section 4.4 using a DPSIR schema
19080	18	17	44	18	I think it would be more balanced to say that erosion rates at the field or local level can be 1-2 orders of magnitude greater than the rate of soil generation but at the county or provincial they ofter do not exceed rates that can be sustained by sound SLM. [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	rejected - we don't think that statement can be substantiated
9156	18	3		35	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
1550	18	9		10	Will all readers know what slow variables are [Billie Turner II, United States of America]	noted - explained in the next sentence
6922	18	11			(Please add "soil") ecosystem services such as soil water holding capacity. [Talal Darwish, Lebanon]	Rejected - we also include water holding capacity in plants and the entire ecosystem
7764	19	1	19	40	No mention of trees which are "canaries in the coal mine" because of their long lifespan (drought-induced tree mortality can only be related to extreme drought events). See global review of tree mortality and drought by Allen et al https://doi.org/10.1016/j.foreco.2009.09.001 [Pierre Bernier, Canada]	accepted - text is revised
2528	19	4	19	4	Perhaps authors could mention also the use of Earth Observation to study the gradual and planetary changes that can cause land degradation/improvement. [William Lahoz, Norway]	accepted
25804	19	4	19	8	under which scenarios and by which time periods, what is the confidence in these statements? [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
984	19	5	19	8	Until When is that 16%? I mean what is the period of time of that increase of 16%? [Jose Luis Vicente Vicente, Germany]	Taken into account - the text has been revised to better reflect this concern.
17320	19	9	19	12	Please, include information about Amazon-Andes region where rainfall also modulates the forest photosyntesis (e.g. Espinoza et al., 2016; doi: 10.1002/2016WR019305). [Jhan Carlo Espinoza, France]	Taken into account - the text has been revised to better reflect this concern.
25686	19	9	19	12	Not very insightful to say that reduced rainfall may degrade vegetatiion. This is an example of the self-evident, reductionist cause-effect relations. [Jon Magnar Haugen, Norway]	Taken into account - the text has been revised to better reflect this concern.
17078	19	9	19	28	This Report is a synthesis, not a literature review. It is suggested that since the factors that affect land degradation being described are weather/climate-related, a synthesis be presented according to how each impacts on the land, not according to regions. Include confidence levels in these findings, please. [Lourdes Tibig, Philippines]	Taken into account - the text has been revised to better reflect this concern.
25806	19	13	19	18	Also see information in chp 14 AR5 WGI and and WGII chp 27 [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
17318	19	13	19	18	This comment is not limited to Brazil. Please include literature for western Amazon and Andean countries (e.g. Espinoza et al 2009; Espinoza et al., 2011. Geophys. Res. Lett. 38(13): L13406; Fernandes et al., 2011. doi:10.1029/2011GL047392; Meade et al 2015. doi:10.1002/2015GL065252, Molina-Carpio et al., 2017.doi: 10.1080/02626667.2016.126786, etc). [Jhan Carlo Espinoza, France]	Taken into account - the text has been revised to better reflect this concern.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7598	19	15	19	15	In the the sensente " Barbosa and Lakshmi Kumar, (Barbosa et al. 2015)…." the "," should be deleted [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Taken into account - the text has been revised to better reflect this concern.
15994	19	15	19	16	"used the Sea Surface Temperatures of Nino 3.4 region and Atlantic Dipole". The terms used here should be explained. Furthermore, I guess that the authors meat Niño. In case, please, correct it [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - the text has been revised to better reflect this concern.
26206	19	15	19	18	revise sentence structure and explain, what are the Nino 3.4 regions / Atlantic Dipole? Is there any literature on such effects in the last 15 years? [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
15996	19	17	19	17	Again "El Nino" should be substituted with El Niño [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - the text has been revised to better reflect this concern.
19800	19	19	19	19	For example coffee is expected [Sabit Erşahin, Turkey]	Taken into account - the text has been revised to better reflect this concern.
6534	19	19	19	28	Is it possible to draw examples from case studies in African countries that grow more of arabica coffee to understand how climate change is affecting yields [Ojong.E nee Enokenwa Baa, South Africa]	Taken into account - the text has been revised to better reflect this concern.
25808	19	23	19	27	under which scenarios and in which timeframe? [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
26212	19	29	19	38	this entire pragraph should be revised and turned into an assessment using IPCC Uncertainty Language [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
986	19	29	19	38	I think that the "other drivers" (e.g. political and economy or changes of consumption patterns and dietary preferences) are not sufficiently addressed in the paragraph, since they could be explained a bit deeply by the authors. For example, in Mediterranean crops in Southern spain the land degradation is mainly due to the consequences of the Common Agricultural Policy (CAP) of the European Union, [Jose Luis Vicente Vicente, Germany]	Taken into account - the text has been revised to better reflect this concern.
26214	19	31	19	33	revise sentence - incorrect syntax [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
11472	19	35	19	38	Is there really a balance between studies that find positive and negative correlations between population density and land degradation? The way this sentence is written suggests so. This is where critical assessment comes in. [Debra Roberts, South Africa]	Taken into account - the text has been revised to better reflect this concern.
5056	19	35	19	38	Many local examples' quoted, are there any references to support this from other biomes/geographical regions? Or is this point specific to sub-Saharan / West Africa? [Eamon Haughey, Ireland]	Taken into account - the text has been revised to better reflect this concern.
26218	19	39	19	40	is this all there is to say about this interaction? Exactly how can wildlife interact with degradation? Please be more specific, or refer to a section in this Chapter where this is discussed in more detail. [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
17080	19	39	19	40	Describe the indirect impacts,please. [Lourdes Tibig, Philippines]	Taken into account - the text has been revised to better reflect this concern.
18872	19	41	22	24	Two aspects are crucial to attribute the land degradition, first, the extent and severity of land degradition over the past years should be given, second, over the past years,what factors have driven the change in land degradition extent and severity at global and regional scale, climate change or human activity or both can drive the land degradition over the past years. this section in this chapter should be rewrited.current version, only climate change over the past year has been reviewed, there is no attribution of land degradition. [Jianguo Wu, China]	Taken into account - the text has been revised to better reflect this concern.
9158	19	3		40	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication

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1552	19	9			lots of work on land change and feedbacks to climate; the one reference makes it appear to be unsual finding; see RA Pielke [Billie Turner II, United States of America]	Taken into account - the text has been revised to better reflect this concern.
26204	19	10			can you be more specific - which regions are affected? [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
26208	19	22			"Some studies paint a very bleak picture" this personal opinion is not necessary. Rather emphasise how many studies there were (currently only 1 study is cited), and under which scenarios exactly [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
26210	19	23			"some studies" - please provide more than one reference to support this statement [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
26216	19	35			"some" but only 1 reference provided [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised to better reflect this concern.
14790	19	37			this is a very limited review of perhaps hundreds of studies many of which show a correlation between human population density and land degradation (see many of the works of Ehrlich and associates over the years) - this section needs a more substantive literature foundation before general statements like this can be supported [Dominick DellaSala, United States of America]	Taken into account - the text has been revised to better reflect this concern.
14832	20	3	20	3	Further elements should be provided about the impacts of climate change on plant ecophysiology and the consequences induced in terms of land degradation (and perhaps also land improvement through the fertilisation effect of CO2). [Florian Claeys, France]	Accepted - a section has been added
764	20	4	20	7	I thought the authors present an excellent overview to the conflicting concepts of "land degradation" held by natural vs social scientists. Whereas the former would consider an intact rain forest as the ideal state, the later would also consider the land's potential to benefit societal living standards. [Paul Glaser, United States of America]	Noted
7902	20	7	20	7	What about the seasonality of precipitation and also extreme climatic shifts related to ENSO, Monsoons, or the PDO? Paleoclimatic reconstructions indicate that these cycles have changed dramatically during the Holocene. [Paul Glaser, United States of America]	Noted - same as 326
25810	20	9	20	10	Also see AR5 WGI eg Annex 1 Atlas and related chapters [Hans Poertner and WGII TSU, Germany]	Accepted
17586	20	10	20	11	Figure 4.3 does not consider precipitation decrease , which enhance aridity risk. Do not yout think this aspect should be appended to the figure? By the way, I felt that this paragraph never adresses this aspect. Is it in other part? Or isn'nt it relevant? Then p35 (L25-27) you wrote : "Climate change is considered to exacerbate land degradation and potentially accelerate it due to heat stress, drought, changes to evapotranspiration rates and biodiversit...." [Guillaume Bertrand, France]	Noted - the figure has been removed
4274	20	10	20	11	The table might be somewhat correct in context of chapter subject, but this fact should not be ignored that climate change does not necessarily means global warming and increased temperature. Minor cooling effects of aerosol and resulted evaporation paradox i.e. observed reduction in pan evaporation should be considered . I suggest to revise the elements of this table and whole paragraph. [Nozar Ghahreman, Iran]	Noted - the figure has been removed
21284	20	11	20	11	Do we really need Figure 4.3. What is special in this Figure [Erhan Akca, Turkey]	Noted - the figure has been removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15998	20	11	20	11	In figure 4.3 there is a yellow lline. Should it connect something with something else? If yes, some parts of the arrow are missing. If not, it should be deleted. Furthermore, each connection in figure 4.3 should be extensively explained [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Noted - the figure has been removed
19804	20	12	20	13	Fig.4.3: This figure may be organized better to cover climate-land degradation relations more comprehensively. Aridity index may be used, since its included effect of evapotranspiration, which is important variable affecting soil water. The figure may be started with increasing AI and decreasing AI instead of increasing temperature and decreasing temperature. Also, It would be better if the climate condition is specified (e.g., arid, semi-arid, semi-humid, etc.). I think this figure is confusing rather than informative. [Sabit Erşahin, Turkey]	Noted - the figure has been removed
26224	20	16	20	18	provide which report this is (WG I / II / III)? [Hans Poertner and WGII TSU, Germany]	Accepted
17082	20	16	20	20	Can the authors add to these examples of threefold increase in widespread extreme rain events in India inasmuch as increases in the 21st century are likely to very likely. [Lourdes Tibig, Philippines]	Noted - text has been clarified
758	20	19	20	21	Page 4-5, Line 21: I assume that the authors are aware that the atmospheric concentrations of greenhouse gases began to rise much earlier in the late-Glacial period. Thus the role of agricultural practices as a driver or amplifier for the continued rise in GHG after the mid-Holocene is a controversial topic among Earth scientists. I therefore appreciate the caution expressed in this reference while noting that it is still a very germane reference since Bill Rudiman is such an esteemed climate change scientist [Paul Glaser, United States of America]	Noted
1608	20		20		Figure 4.3 needs footnotes which explains the different colors of lines and any indications [Rajesh Chintala, United States of America]	Noted - the figure has been removed
17558	20	4	21	46	Consider including in the discussion the relationship btween LD, erosion, loss of Soil Organic Carbon, and its impact on Climate Change. This is hinted in following paragraph 4.6: "Land degradation will be affected by climate change in both direct and indirect ways, and land degradation will to some extent also feed back into the climate. " [TURI FILECCIA, Italy]	Taken into account - that discussion is found in Section 4.8
26220	20	4	22	24	this section can be shortened by 50 % throuhg revising wordiness and condensing statements to key information [Hans Poertner and WGII TSU, Germany]	Noted
9162	20	3		46	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
9160	20	3			Altieri et al. (2017) add dot [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
326	20	4		7	What about the seasonality of precipitation and also extreme climatic shifts related to cycle such as ENSO, Monsoons, or the PDO? Paleoclimatic reconstructions indicate that these cycles have changed dramatically during the Holocene. [Paul Glaser, United States of America]	Accepted - references to monsoons and ENSO added
1134	20	8		10	Precipitation involves local processes of larger complexity than temperature and projections are usually less robust than those for temperature. See also Giorgi, F., Lionello, P., 2008. Climate change projections for the Mediterranean region. Glob. Planet. Change 63, 90–104. [Rosa Francaviglia, Italy]	Accepted
26222	20	10			This reference will be 15 years old once SRCCL is published - please use more recent literature to support this statement [Hans Poertner and WGII TSU, Germany]	Accepted
19562	20	11			Please, provide a legend to explain the colors and the directions of the arrows [Ibouraïma Yabi, Benin]	Noted - the figure has been removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19442	21	3	21	3	Precious paragraph indicates vegeation cover as a key factor which determines soil erosion. I think that effects of increase of heavy rainfall events above vegetation cover should be considered. [José João Souza, Brazil]	Accepted - sentence clarified
26226	21	3	21	4	what does this mean? Please do not imply and make the reader guess, be specific [Hans Poertner and WGII TSU, Germany]	Noted - the comment is unclear
26228	21	3	21	12	why use such old studies? [Hans Poertner and WGII TSU, Germany]	Noted - these are key references, still relevant
17084	21	3	21	41	The whole discussion is on how the various variables affect soil erosion.. A synthesis of the finding is expected (possibly, with confidence levels). It is suggeested that the literature review is transformed into one. [Lourdes Tibig, Philippines]	Accepted - a synthesis provided a the end
7904	21	6	21	6	Please avoid using a stand-alone pronoun (e.g. "this") without clarifying its intended antecedent. [Paul Glaser, United States of America]	Accepted
7906	21	7	21	7	change to "increase the intensity and erosive capacity of rainfall" [Paul Glaser, United States of America]	Accepted
25812	21	13	21	14	can you comment on the geographical spread of entries? [Hans Poertner and WGII TSU, Germany]	Accepted
10952	21	13	21	30	What is the explanation for the regional differences? Rainfall intensity? Soil composition?...etc. [Debra Roberts, South Africa]	Noted - the explanation comes in next sentence
10956	21	13	21	30	This should be linked to the special report on oceans and the cryosphere where this linkage has been discussed extensively. [Debra Roberts, South Africa]	Rejected - outside the scope of the chapter
25688	21	16	21	16	Stating that land management is important to control emissions does not give any insights. What exactly makes soils withstand erosion? [Jon Magnar Haugen, Norway]	Accepted - explanations inserted and text revised
19444	21	25	21	26	Is a paragraph of only two lines? [José João Souza, Brazil]	Accepted
19806	21	25	21	26	This pharagraph may be merged with the next pharagraph. [Sabit Erşahin, Turkey]	Accepted
19446	21	27	21	28	Dry areas? [José João Souza, Brazil]	comment unclear
7766	21	27	21	28	poor sentence structure [Pierre Bernier, Canada]	Accepted - text revised
26230	21	35	21	38	revise syntax, the last sentence of this paragraph is incorrect; if portioning and partitioning are used as synonyms here please choose one of the two to improve clarity. [Hans Poertner and WGII TSU, Germany]	Accepted
10954	21	37	21	37	Delete 'of' [Debra Roberts, South Africa]	Accepted
130	21	39	21	41	This needs to be balanced by an example from the tropics. There is increasing wind intensity in the western Amazon with implications for soil erosion. [Elizabeth Penelope Davies, United States of America]	Rejected - little scientific evidence of wind strength increases due to climate change (might be because changes to surface roughness but not climate change per se)
19448	21	42	21	42	"Fristly, melting of frozen water in permafrost leads CH4 emission and sea level increase ..." [José João Souza, Brazil]	Rejected - the ordering of effects is scientifically appropriate
484	21	42	21	46	There are some works, for instance in Antartica, where sensitivity of soil CO2 emission (or C-CO2) to soil temperature is presented. One of them, the increase of 1 oC in temperature on that region would result in and increase of around 7% in soil CO2 emission (La Scala et al. 2010, Polar Science), and there are many other works presenting those numbers (Carvalho et al. 2013, Antartic Science) in polar regions, where soil C stock is huge. If there are those sensitivities published (or Q10...) this should be placed in the chapter, relating increases in soil C-CO2 emission with soil temperature. Those numbers are important (% increase of C-CO2 loss with increase of temperature) [Newton La Scala Jr., Brazil]	Noted - some of these mechanisms are covered in Chapter 2 because they are less relevant for a chapter on Land Degradation. See also the case study on Peat Soils later in this chapter
328	21	6			Please avoid using a stand-alone pronoun (e.g. "this") without clarifying its intended antecedent. [Paul Glaser, United States of America]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9164	21	7		15	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
330	21	7			change to "increase the intensity and erosive capacity of rainfall" [Paul Glaser, United States of America]	Accepted
5390	21	39			Wind erosion is a serious problem in agricultural regions, but studies in Europe suggest that climate change will not alter wind patterns in a way that can significantly affect the risk of wind erosion (Pryor and Barthelmie 2010). If climate change increses aridity as it was mentioned in the preceding chapters, how come climate change will not alter wind patterns under any conditions? [Daniel Danano Dale, Italy]	Noted - text has been clarified
14834	22	1	22	1	Additional elements should be provided to document the indirect impact of climate change on land, through increased pest outbreaks and increased fires. [Florian Claeys, France]	Noted - some text added but also reference to Ch 5. Increasing Fires mentioned and references to Section 4.5 added
19810	22	1	22	1	Increased frequency of extreme events, such as heat waves, droughts, extreme temperatures (minimum and maximum) and their likely impact on land degradation may be mentioned under the subtitle 4.4.4.2 [Sabit Erşahin, Turkey]	Rejected - Section 4.4.4.2 has been substantially revised
18630	22	1	22	24	This section completely ignores the potential improved plant growth and water use efficiency from elevates atmospheric CO2 fertilization of plants as described in Chapter 2. The increased plant growth will have a potential indirect effect on soil degradation. The increased SOC can potentially improve soil quality. This could result in the indirect reduction in soil degradation. For example, studies have show that elevated atmospheric CO2 can improved soil physical conditions (Caplan, et al., 2017, Global Change Biology 23:1585-1597; doi: 10.1111/gcb.13496), which could improve soil infiltration and reduce soil erosion. Likewise, increased plant growth and longer growing season could reduce soil the time that soil is exposed to rainfall damage. This chapter should include the these potential land degradation factors as well. [Henry Allen Torbert, United States of America]	taken into account - text was added on this topic to the preceeding section, and links to Ch 2.
26232	22	9	22	11	indicate direction of change [Hans Poertner and WGII TSU, Germany]	Rejected - the changes have different implications in different regions and different farming systems. The change itself (regardless of direction) is potenitally a problem
26234	22	12	22	24	More important is what the results of these studies show - where in the section are those data assessed? [Hans Poertner and WGII TSU, Germany]	Noted - in this section we outline potential for attributing LD to climate change by discussing theoretical links between climate change and LD
10958	22	20	22	24	It might be helpful to summarise the key findings of these studies then provide your assessment of the findings. [Debra Roberts, South Africa]	Accepted - text is provided
14492	22	25	22	25	Add more points on forest degradation [Rattan Lal, United States of America]	taken into account - the entire section has been substantially revised
21986	22	26	22	28	The phrase is a fraction. What is meant with it? Is this yet another definition of degradation? If so, then it may be clearer to discuss this in the chapter dedicated to definitions? [Marieke Sandker, Italy]	taken into account - the entire section has been substantially revised
7600	22	29	22	30	The reference " (Gibbs and Salmon 2015) " should be " Gibbs and Salmon (2015) " [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Accepted
27346	22	29	22	31	Some problematization of how "marginal" lands are defined and who gets to define them is warranted, particularly in the context of high-value, high-demand uses of land such as bioenergy. This comment is also relevant for section 4.7. [Doreen Stabinsky, United States of America]	Noted - this is partly covered in Section 4.7
19082	22	29	22	37	are made at the national level and this should be reflected in the text [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Noted - the entire section has been substantially revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21988	22	32	22	33	"satellite derived trends of vegetation greenness (NDVI) (Yengoh et al. 2015; Bai et al. 2008c)" >> there is a much broader scale of analyses of satellite derived data to assess (forest) degradation most of which use a combination of ground obsertvations and RS data (eg Bahamóndez et al. 2009). Most assessment methods come with challenges (i.e. most variation detected tends to correspond to "noise" in the imagery rather then representing degradation), it would be great if those challenges could be briefly summarized in this chapter. One method which seems to have great potential for assessing degradation is dense time series analysis using break detection (BFAST type of approach, or LandTrendR). The following text and references could be useful here: The Breaks for Additive Seasonal and Trend (BFAST) method enables to analyze the dynamics of satellite dense time series and overcome the major challenge to distinguish land-cover change from seasonal phenological variations. Verbesselt et al. (2010), Dutrieux et al. (2015) and DeVries et al. (2015) used this approach to demonstrate that time series can be decomposed into trend, seasonal, and remainder components and that the time and number of changes can be detected at high temporal resolution (i.e., 16 days), enabling detection of tree cover change and separation from phenology signal. [Marieke Sandker, Italy]	taken into account - the entire section has been substantially revised
14836	22	35	22	37	It should be indicated that satellite monitoring must also be accompanied by measurements in the field, in particular through permanent observation devices and networks. [Florian Claeys, France]	Accepted
3204	22	35	22	37	Add: conceptual intricacies. For instance, Bai et al., 2008 does not filter for land use, but land use changes NPP and NDVI etc. which is not necessarily degradation (change of a forest to a cropland is not a degradation phenomenon from the farmers perspective. [Karlheinz Erb, Austria]	Noted - the entire section has been substantially revised
7338	22	35	22	37	"There is, however, a strong consensus that satellite based remote sensing is the only affordable and practical way to assess and monitor land degradation even if there are still knowledge gaps to be filled (Wessels et al. 2007, 2004; Prince 2016)." >> I would argue there is no such concensus for forestry where timber extraction statistics in combination with ground inventory data, if available and of quality, provide an affordable and practical way to assess and monitor land degradation, so the use of "strong consensus" seems inappropriate. RS has major difficulties assessing degradation with acceptable precision. [Marieke Sandker, Italy]	taken into account - the entire section has been substantially revised
17712	22	36	22	37	what is evidence that :satellite based remote sensing is the only affordable and practical way to assess and monitor land degradation [Sawsan Mustafa, Sudan]	taken into account - the entire section has been substantially revised
1610	22	38	22	38	what does LO mean? [Rajesh Chintala, United States of America]	Accepted - text deleted
16034	22	38	22	38	What stands for LO? It should be explained [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text deleted
10960	22	40	22	41	Open and close parenthesis [Debra Roberts, South Africa]	Accepted - text revised
10962	22	40	22	41	Replace 'at' with 'in' [Debra Roberts, South Africa]	Accepted - text revised
19084	22	43	22	45	it might be appropriate to point out that RUSLE and EPIC have important limations for assessing water erosion on steep slopes [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised
17714	22	43	22	45	need some elobration on :several indexes that have been used to assess land conditions and monitoring the changes of land condition including magnitudes and levels [Sawsan Mustafa, Sudan]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21990	22	26	26	2	The main challenge in developing countries to analyse remote sensing data for their national assessments of degradation (and deforestation) is internet speed and computing power. Therefore, it may be useful to add the following information and references: Accessing and processing satellite data is often obstructed in developing countries due to poor internet connections and low computing power or storage space on local computers. To overcome this barrier, FAO, through a partnership agreement with Norway, has developed a System for Earth Observation Data Access, Processing and Analysis for Land Monitoring (SEPAL), which helps countries access and process satellite data for use in forest resources monitoring. SEPAL (https://sepal.io) is a big-data processing platform that combines super-computing power, open-source geospatial data processing software and modern geospatial data infrastructures like Google's Earth Engine. SEPAL overcomes earlier mentioned barriers of poor internet connections and low computing power and can also connect to and use data and outputs from FAO's Open FORIS. Open FORIS (www.openforis.org) is a set of free and open-source software tools that facilitate flexible and efficient data collection, analysis and reporting. In addition to forest inventories, they can be used for a wide variety of purposes including socio-economic surveys, biodiversity assessment and detecting desertification. [Marieke Sandker, Italy]	Noted - some of these concerns are covered in the section on barriers to implementation
174	22	2			Interactions of landuse and climate change are a criticial problem. For example, the extraction of freshwater along coastal rivers is leading to salinification and vegetation death in worldwide coastal estuaries during drought years related to climate change. [Beth Middleton, United States of America]	Noted
18628	22	3			I do not agree with this blanket statement. It completely ignores a large body of literature that elevated atmospheric CO2 results in a fertilization affect and improves water use efficiency. This statement does not even agree with the discussion from Chapter 2. In fact, studies have shown that a large part of the improved yields in agriculture that has been observed over the last few decades can be contributed to this CO2 fertilization effect (Mayeux et al. 1997 Global Change Biology 3, 269–278). [Henry Allen Torbert, United States of America]	Rejected - the reference suggested is outdated. We have added reference to AR5 WGII, chapter on food production systems
9166	22	9			Barbier (20000 [Amanullah Amanullah, Pakistan]	rejected - unclear
9168	22	22		43	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
26236	22	23			which new climate regime? Please be specific - what scenario? [Hans Poertner and WGII TSU, Germany]	Accepted - text revised
176	22	24			CO2 does not change the photosynthesis pattern of many species. Aquatic species growing in water often don't respond to additional CO2. This statement is too generalized. [Beth Middleton, United States of America]	unclear what sections this refer to
1136	22	26		28	Something is missing in the sentence structure [Rosa Francaviglia, Italy]	taken into account - the entire section has been substantially revised
1554	22	35		37	While remote sensing is most cost effective way to address land degradation globally, it also requires simplifications that lead to over or under estimation of results [Billie Turner II, United States of America]	taken into account - the entire section has been substantially revised
5058	23	10	23	11	aral extent = areal extent ? [Eamon Haughey, Ireland]	Accepted - text revised
2530	23	11	23	11	Typo: aral -> areal. [William Lahoz, Norway]	Accepted - text revised
19808	23	13	23	13	……measurements (Sedano et al. 2016; Brandt et al. 2018b; Turner 2014). [Sabit Erşahin, Turkey]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2532	23	13	23	13	The Sentinel-1 satellites provide information on, e.g., soil moisture, at very high spatial resolution (order, 50-100 metres) – Bousbih et al., 2017, Sensors; Gao et al., 2017, Sensors. The authors could mention the possibility of using these data of relatively high spatial resolution to understand the processes discussed. [William Lahoz, Norway]	Accepted - text revised
2534	23	13	23	13	S. Bousbih, et al., Sensors 2017, 17(11), 2617; https://doi.org/10.3390/s17112617. [William Lahoz, Norway]	Accepted - text revised
2536	23	13	23	13	Q. Gao et al., Sensors 2017, 17(9), 1966; https://doi.org/10.3390/s17091966. [William Lahoz, Norway]	Accepted - text revised
14498	23	14	23	43	The text about satellite-based indices should be harmonized with the same in Ch. 3 [Rattan Lal, United States of America]	Accepted - text revised
16036	23	19	23	19	"Moreover, there are major factors confounding the relationship between NDVI (NPP) trend and human-induced land degradation". The role of NPP in this sentence is not clear. The sentence should be rephrased [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised
26240	23	27	23	29	revise sentence, it currently does not make sense [Hans Poertner and WGII TSU, Germany]	Accepted - text revised
10964	23	29	23	29	Consider replacing 'are' with 'might' [Debra Roberts, South Africa]	Accepted - text revised
7090	23	44	23	45	Work on the degradation of grazing lands in the Sahel among others, show the relevance of ground truthing/ground observatons that needs to accompany assessment by remote sensing in order to support disentangling the effects between human-induced land degradation/improvement and the effects of climate variation on plant species composition, etc... The evaluation of the status of the grazing lands purely on the basis of information provided by remote sensing can falsify the interpretation. this concern needs to be included in the discussions of this section. [Mariam Akhtar-Schuster, Germany]	Accepted - text revised
14496	23	44	23	45	Work on the degradation of grazing lands in the Sahel among others, show the relevance of ground truth/ground observatons that needs to accompany assessment by remote sensing in order to support disentangling the effects between human-induced land degradation/improvement and the effects of climate variation on plant species composition, etc. The evaluation of the status of the grazing lands purely on the basis of information provided by remote sensing can falsify the interpretation. This concern needs to be included in the discussions of this section. [Rattan Lal, United States of America]	Accepted - text revised
26238	23	1	24	35	interesting but more review / textbook style. This section should be turned into an assessment and its length reduced by at least 30% [Hans Poertner and WGII TSU, Germany]	Accepted - text revised
17560	23	1	24	35	the study cited above in comment 15 but also comment n. 10 all confirm the importance of remote sensing information [TURI FILECCIA, Italy]	Accepted - text revised
3206	23	44	24	35	It should be mentioned here that society purposefully as well as unintendedly alters NPP of ecosystems, see the HANPP concept (Haberl H, Erb K-H, Krausmann F (2014) Human Appropriation of Net Primary Production: Patterns, Trends, and Planetary Boundaries. Annual Review of Environment and Resources 39:363–391, Krausmann F, Erb K-H, Gingrich S, et al (2013) Global human appropriation of net primary production doubled in the 20th century. PNAS 110:10324–10329. doi: 10.1073/pnas.1211349110, Pritchard R, Ryan CM, Grundy I, van der Horst D (2018) Human Appropriation of Net Primary Productivity and Rural Livelihoods: Findings From Six Villages in Zimbabwe. Ecological Economics 146:115–124. doi: 10.1016/j.ecolecon.2017.10.003 etc.) [Karlheinz Erb, Austria]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7088	23	1	25	29	The section 4.4.4.2 on "assessment by remote sensing" is a bit long, and would benefit from shortening. Also, some technical details, such as on NDVI (p. 23, lines 18-31) could be provided in a box. It would also be very useful to include other vegetation indices to enable a more inclusive discussion. [Mariam Akhtar-Schuster, Germany]	Accepted - text revised
14494	23	1	25	29	The section 4.4.4.2 on "assessment by remote sensing" is a bit long, and would benefit from shortening. Also, some technical details, such as on NDVI (p. 23, lines 18-31) [Rattan Lal, United States of America]	Accepted - text revised
9170	23	1		33	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Accepted - text revised
14792	23	34			also it could be the result of type conversion of native forest to plantation with NDVI increasing as plantations add biomass - if NDVI was estimated during biomass build up in plantations (e.g., 10-30 yrs old) that misses the original values present in the older native forests [Dominick DellaSala, United States of America]	Accepted - text revised
18632	24	3	24	35	There is no discussion regarding the potential change in plant response to due to improved water use efficiency due to elevated atmospheric CO2 fertilization. Some of this is described in Chapter 2 and should be included in this chapter as well. [Henry Allen Torbert, United States of America]	Accepted - text revised
15952	24	3	24	35	The description of the use of RUE seems to partly miss the point on the challenges of using RUE from remote sensing data. RUE measures the efficiency of the vegetation-rainfall relationship (VRR) expressed as the amount of output (vegetation productivity) produced by a unit amount of input (rainfall) (Le Houerou, 1984). A requirement for the adequate functionality of RUE is that the intercept of the VRR is zero (which in reality is seldom the case when applying remote sensing based proxies for NPP and plant water availability), as otherwise the normalization for interannual rainfall variability does not work for simple mathematical reasons (Verón et al., 2005). Thus, in most of the cases, trends in RUE reflect nothing more than a trend in rainfall. For a detailed explanation is referred to: book chapter: Fensholt, R., Horion, S., Tagesson, T., Ehammer, A., Grogan, K., Tian, F., Huber, S., Verbesselt, J., Prince, S.P., Tucker, C.J. and Rasmussen, K. (2014). Assessing drivers of Vegetation changes in Drylands from Time Series of Earth Observation data. Remote Sensing Time Series revealing Land Surface Dynamics, Springer Book, Remote Sensing Time Series, Remote Sensing and Digital Image Processing. The relevance of the statement line 11-12 (the difference between using plant productivity and annual plant productivity for assessing RUE) is not clear to me. I assume this is to say that there is a difference in using an annual/seasonal vegetation metric (like the seasonal integral of e.g. NDVI) as a proxy for vegetation productivity and an instantaneous measure of vegetation productivity. Why is that important? The concept of productivity (as opposed to production) implies a ratio of production over an input (rainfall, fertilizer…) and therefore is difficult to relate to an instantaneous measure and most remote sensing based analyses based on seasonal integrals do that also to minimize the influence from noisy data. [Rasmus Fensholt, Denmark]	Accepted - text revised
19812	24	4	24	4	….above-ground net primary productivity…… [Sabit Erşahin, Turkey]	Accepted - text revised
7602	24	4	24	7	In the this sentence " The most commonly quoted source of the concept Rain Use Efficiency is Le Houerou who worked extensively on methods and theories for estimating range productivity in drylands (Le Houérou 1996; Le Houerou 1984; Houerou and Hoste 1977). ", the name of the author Le Houerou should be corected [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10966	24	8	24	8	What mm of rainfall? [Debra Roberts, South Africa]	Accepted - text revised
10434	24	14	24	14	"In a study of LTER sites across the US and Latin America, Huxman et al. (2004) found that ANPP was more strongly correlated with the maximum temperature and the ANPP the previous year than with annual rainfall for the most productive sites." Was this for climatic conditions or for specific climatic conditions of perhaps temprate? But in dry conditions the annual rainfall must be more reponsive than the temprature [Zitouni Ould-Dada, Italy]	Accepted - text revised
26242	24	26	24	27	provide reference to support this statement [Hans Poertner and WGII TSU, Germany]	Accepted - text revised
2538	24	39	24	39	Do the authors mean, “scattered”, when they write, “scatted”? [William Lahoz, Norway]	Accepted - text revised
9172	24	1		44	add refernces, please [Amanullah Amanullah, Pakistan]	Accepted - text revised
5392	24	14			In a study of LTER sites across the US and Latin America, Huxman et al. (2004) found that ANPP was more strongly correlated with the maximum temperature and the ANPP the previous year than with annual rainfall for the most productive sites. Was this for all climatic conditions or for specific climatic conditions of perhaps temprate? But in dry conditions the annual rainfall must be more reponsive than the temprature for atleast the tropical Latin America [Daniel Danano Dale, Italy]	Accepted - text revised
178	24	32			Cypress tree growth is higher in settings (and years) with higher precipitation. This paper is an excellent one to show vegetation production/growth response to precipitation (Stahle et al., 2012); Stahle, D.W., Burnette, D.J., Villanueva, J. Cerano, J., Fye, F.K., Griffin, R.D., Cleaveland, M.K., Stahle, D.K., Edmondson, J.R., Wolff, K.P. 2012. Tree-ring analysis of ancient baldcypress trees and subfossil wood. Quaternary Science Reviews, v. 34, p. 1—15. [Beth Middleton, United States of America]	Accepted - text revised
180	24	39			Change "scatted" to "scattered" [Beth Middleton, United States of America]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18634	25	7	25	15	There are many studies that show increased SOC levels under elevated atmospheric CO2 conditions. For example: Wood, C.W., H.A. Torbert, H.H. Rogers, G.B. Runion, and S.A. Prior. 1994. Free-air CO2 enrichment effects on soil carbon and nitrogen. Agric. For. Meteorol. 70:103-116. Torbert, H.A., S.A. Prior, and H.H. Rogers. 1995. Elevated atmospheric carbon dioxide effects on cotton plant residue decomposition. Soil Sci. Soc. Am. J. 59:1321-1328. Prior, S.A., H.A. Torbert, G.B. Runion, H.H. Rogers, C.W. Wood, B.A. Kimball, R.L. Lamorte, P.J. Pinter, and G.W. Wall. 1997. Free-air CO2 enrichment of wheat: Soil carbon and nitrogen dynamics. J. Environ. Qual. 26:1161-1166. Torbert, H.A., H.H. Rogers, S.A. Prior, W.H. Schlesinger, and G.B. Runion. 1997. Effects of elevated atmospheric CO2 in agro-ecosystems on soil carbon storage. Global Change Biol. 3:513-521. Torbert, H.A., S.A. Prior, H.H. Rogers, and G.B. Runion. 1998. Crop residue decomposition as affected by growth under elevated atmospheric CO2. Soil Sci. 163:412-419. Booker, F.L., S.A. Prior, H.A. Torbert, E.L. Fiscus, W.A. Pursley, and S. Hu. 2005. Decomposition of soybean grown under elevated concentrations of CO2 and O3. Global Change Biol. 11:685–698. Prior, S.A., G.B. Runion, H.H. Rogers, H.A. Torbert, and D.W. Reeves. 2005. Elevated atmospheric CO2 effects on biomass production and soil carbon in conventional and conservation cropping systems. Global Change Biol. 11:657-665. Prior, S.A., H.A. Torbert, G.B. Runion, H.H. Rogers, D.R. Ort, and R.L. Nelson. 2006. Free-air carbon dioxide enrichment of soybean: Influence of crop variety on residue decomposition. J. Environ. Qual. 35:1470-1477. Prior, S.A., H.A. Torbert, G.B. Runion, H.H. Rogers, and B.A. Kimball. 2008. Free-air CO2 enrichment of sorghum: Soil carbon and nitrogen dynamics. J. Environ. Qual. 37:753-758. [Henry Allen Torbert, United States of America]	Accepted - text revised
26244	25	16	25	29	it is not clear what the message of this paragraph is, because it states that microbial activity will be affected but barely indicates direction of change. Please be more concise and specific [Hans Poertner and WGII TSU, Germany]	Accepted - text revised
6618	25	29	25	29	add: uner future climate change, soil C and nutirent dynamics may be impacted by extreme events, such as drought through their effects on the whole plant-soil system (Sanaullah et al., 2011, 1012, 2014)Sanaullah, M., Blagodatskaya, E., Chabbi, A., Rumpel, C., Kuzyakov, Y., 2011: Drought effects on microbial biomass and enzyme activities in the rhizosphere of grasses depend on plant community composition. Applied Soil Ecology, 48, 38-44.; Sanaullah, M., Chabbi, A., Rumpel, C., Kuzyakov, Y., 2012 : Carbon allocation in grassland communities under drought stress followed by 14C pulse labelling. Soil Biology and Biochemistry, 55, 132-139.; Sanaullah, M., Chabbi, A., Girardin, C., Durand, J.L., Poirier, M., Rumpel, C., 2014 : Effects of drought and elevated temperature on biochemical composition of forage plants and their impact on carbon storage in grassland soil. Plant and Soil, 374, 767-778. [Cornelia Rumpel, France]	Accepted - text revised
19814	25	30	25	31	Table 4.2: The far right hand column head is confusing; it does not represent the column content, adequately. [Sabit Erşahin, Turkey]	Accepted - text revised
19450	25	31	25	31	Bulk density is a good indicator of land degratation. It is related to root grown and water infiltration. [José João Souza, Brazil]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24392	25	30	26	1	Three indicators have been proposed to estimate the "proportion of land that is degraded over total land area" (i.e. SDG 15.3.1 indicator) and land degradation neutrality: land cover, land productivity and carbon stocks, particularly soil organic carbon stocks. They should be added to this table.Please refer to: Orr et al 2017 https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf Cowie et al 2018 https://www.sciencedirect.com/science/article/pii/S1462901117308146?via%3Dihub Sims et al 2017 https://www.unccd.int/sites/default/files/relevant-links/2017-10/Good%20Practice%20Guidance_SDG%20Indicator%2015.3.1_Version%201.0.pdf [Barron Joseph Orr, Germany]	Accepted - text revised
3208	25	30	26	1	Table: sorry, I had a hard time to understand the meaning/relevance of the table, the types seem to overlap (vegetation and management), the meaning of the landscape scale is unclear to me. Maybe improve caption? [Karlheinz Erb, Austria]	Accepted - text revised
1612	25		26		The items (Type category) not properly aligned with other columns in Table 4.2 [Rajesh Chintala, United States of America]	Accepted - text revised
9174	25	1		46	add refernces, please [Amanullah Amanullah, Pakistan]	Accepted - text revised
9176	25	1		46	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Accepted - text revised
11474	25	16			It is not only microfauna but very importantly also soil macrofauna, see comment page 11 line 37 [Debra Roberts, South Africa]	Accepted - text revised
26246	25	22			what kind of consequences? [Hans Poertner and WGII TSU, Germany]	Accepted - text revised
19452	26	1	26	1	I suggest change "soil organic carbon" to "soil carbon content" or even "light soil carbon content" [José João Souza, Brazil]	Accepted - text revised
19454	26	1	26	1	pH is not a good indicator of soil salinization. Maybe "Na+ saturation" could be a better indicator. [José João Souza, Brazil]	Accepted - text revised
19456	26	1	26	1	I sggest change "soil respiration" to "q-CO2" [José João Souza, Brazil]	Accepted - text revised
19458	26	1	26	1	I suggest change "microbial biomass C and N" to C:N ration [José João Souza, Brazil]	Accepted - text revised
5060	26	3	26	3	The heading for section 4.5: not clear why this section should not be called 'status and trends of land degradation'. Also as the title contains 'trends' this give the impression that the section may give projections of current land conditions - which overlaps with the scope of section 4.6 [Eamon Haughey, Ireland]	Accepted - the headings have changed
14500	26	3	26	3	Section 4.5 Status and Trends of Land Condition should really address status, current trends and future projections of land degradation linked to climate change, globally and regionally based on the scoping report. [Rattan Lal, United States of America]	Accepted - the headings have changed
14502	26	4	26	4	Land is more than soils but the section is soil heavy? [Rattan Lal, United States of America]	Taken into account - we have expanded the treatment of forests
2540	26	5	26	5	The authors could mention the potential for monitoring land degradation provided by, e.g., the 30+ years soil moisture dataset provided by the ESA CCI for soil moisture (www.esa-soilmoisture-cci.org). [William Lahoz, Norway]	Rejected - sometimes these data are used in combination with remote sensing data (see section on assessing LD). We assess the scientific literature, not particular datasets

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10436	26	5	26	7	"the global net median rate of soil formation - formation minus erosion) is about 0.004 mm yr-1 compared with the median net rate of soil loss in agricultural fields, 1.52 mm yr-1 in tilled fields and 0.065 mm yr-1 in no-till fields (Montgomery 2007a)." This data may be good for global mitigation strategy and policy or program developement. since soil formation rates vary very considerably under vaying climatic conditions. since these variations are too be a generalised information such as this shoudl be carefully used. In adittion to such global level crude estimation of soil formation and soil losses it will be helpful to provide more rgional and subregional level estimates provided in a box [Zitouni Ould-Dada, Italy]	Noted - this assessment is primarily global
24394	26	10	26	13	Reference to more recent publications could be added, especially World Atlas of Desertication (https://wad.jrc.ec.europa.eu/landproductivity) and/or UNCCD 2017 Global Land Outlook. According to these publications, between 1999 and 2013, approximately 20.4 % of the Earth's vegetated land surface showed persistent declining trends in land productivity. Africa, Australia and South America show, proportionally, declines or stressed productivity dynamics for larger areas that the rest of the globe. The vegetated continental land surface that shows a decline or unstable land productivity reaches approximately 22 % in Africa, 37 % in Australia and Oceania and 27 % in South America. These studies also indicate that 20 % of the world's croplands show declining or stressed land productivity. [Barron Joseph Orr, Germany]	Accepted
294	26	12	26	13	Refer to the sentence in lines 12 and 13 (These studies indicated that between 22% and 24% of the global land area was subject to a downward trend, while about 16% showed an increasing trend.): It is necessary to specify the time during which downward trend was observed. [Santosh Kumar Mishra, India]	Accepted
6760	26	5	28	43	The status and trends on land conditions should focus more on various trends in various continents of the world. Please consult for this section the following report:.- Van der Esch S et al. Exploring future changes in land use and land condition and the impacts on food, water, climate change and biodiversity: Scenarios for the Global Land Outlook. www.pbl.nl/en [Idowu Owoeye, Nigeria]	Noted - this section deals with current conditions, future changes are dealt with in a later section
10974	26	5	28	47	What is your assessment of information presented in this sub-section? [Debra Roberts, South Africa]	Taken into account - we have provided assessment sentences towards the end of the section
18882	26	3	29	48	the section 4.5 Status and trends of land conditions should be put before the section 4.4.3 Attribution in the case of land degradation,because Status and trends of land degradtion change should be know before Attribution of land degradation [Jianguo Wu, China]	Accepted - the headings have changed
25704	26	5	29	48	1) Degradation and Recovery in Changing Forest Landscapes: A Multiscale Conceptual Framework. Jaboury Ghazoul and Robin Chazdon. Home Annual Review of Environment and Resources Volume 42, 2017 pp 161-188. 2)Thomas K. Rudel, Sean Sloan, Robin Chazdon, Ricardo Grau,The drivers of tree cover expansion: Global, temperate, and tropical zone analyses, Land Use Policy, Volume 58,2016,Pages 502-513,https://doi.org/10.1016/j.landusepol.2016.08.024. 3)Beyond Deforestation: Restoring Forests and Ecosystem Services on Degraded Lands. Robin L. Chazdon.Science 2008, 320, 1458-1460. [Laura Schneider, United States of America]	Taken into account - these references have been used

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1556	26	5		8	4.5.1: Agreed to sentence but why not refer to the total land area in which human interference has taken place given that, ecologically, land degradation = changes in services or ecosystem functioning…maybe use Ellis and Ramakutty [Billie Turner II, United States of America]	Accepted
5394	26	5			the global net median rate of soil formation - formation minus erosion) is about 0.004 mm yr-1 compared with the median net rate of soil loss in agricultural fields, 1.52 mm yr-1 in tilled fields and 0.065 mm yr-1 in no-till fields (Montgomery 2007a). this data may be good for global mitigation strategy and policy or program developement. since soil formation rates vary very considerably under vaying climatic conditions. since these variations are too be a generalised information such as this shoudl be carefully used. In adittion to such global level crude estimation of soil formation and soil losses it will be helpful to provide more regional and subregional level estimates provided in a box . Such generalised information will either give under estimated or overmphsized estimates for comparing [Daniel Danano Dale, Italy]	Noted - this assessment is primarily global
11476	26	5			A critical assessment of this study is missing. This study is based on NDVI trends, and this is a major problem. See comment on Chapter 3 page 18 line 42 . It may not be a good idea to start this section with this particular study. The evidence is too weak. [Debra Roberts, South Africa]	rejected - we have provided justification in the previous section on assessing LD. Ecological footprint is not a measure of land degradation. We have modifeid the sentence to avoid misinterpretations of the sentence.
14794	26	5			I don't understand this - there's an entire field and groups dedicated to footprint analysis (see https://www.footprintnetwork.org/?utm_source=Global+Footprint+Network+Salesforce+List&utm_campaign=07714b7719-EMAIL_CAMPAIGN_2018_05_16_COPY_01&utm_medium=email&utm_term=0_433c98aef3-07714b7719-249053753) Also - see some of the publications of Oscar Venter at Univ of N. BC https://www.nature.com/articles/ncomms12558 This statement dismisses the entire field and I don't get why [Dominick DellaSala, United States of America]	rejected - we have provided justification in the previous section on assessing LD. Ecological footprint is not a measure of land degradation. We have modifeid the sentence to avoid misinterpretations of the sentence.
9178	26	8			Beringer et al. (2015) showed [Amanullah Amanullah, Pakistan]	unclear what sections this refer to
14796	26	9			of course it is an ongoing process - a gradient of land use - with one end point being intact areas (highest integrity) and the other a large city with little naturalness - even if there isn't a definitive endpoint there is a gradient of use which is defined using relative indices - so your statement is not supported [Dominick DellaSala, United States of America]	Accepted
9180	26	17		25	correct format (Author, year) and (author et al., year) in whole document please [Amanullah Amanullah, Pakistan]	Editorial - copyedit to be completed prior to publication
19086	27	1	27	3	and drylands make a small contribution to global foood security but may be vital at the national or sub-nation level [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - not relevant in this context
19088	27	8	27	9	these extreme rates of loss are not consistent with case studies on the losses from the key croplands that are vital to global and national food security [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Noted - this assessment is primarily global, there are examples of both more and less extreme values locally
10968	27	8	27	10	calibarted uncertainty language required [Debra Roberts, South Africa]	Accepted
5062	27	11	27	13	Syntax - should this be a single sentence? [Eamon Haughey, Ireland]	Accepted
11730	27	11	27	46	Overly long pararaph makes reading difficult. [Debra Roberts, South Africa]	Taken into account - the text has been revised substantially

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14838	27	11	27	46	This paragraph is seriously lacking of structure and clarity. Furthermore, some uses of references. In addition, the references used are sometimes very anecdotal, relating to very specific case studies, where major publications giving significant elements on a global or regional scale would be much better advised. [Florian Claeys, France]	Accepted - text is revised
7604	27	16	27	18	In this sentence "Recurring droughts coinciding with high temperatures, heat waves, is conducive to bush-fires which have tremendous impact on land degradation Watkins (2005) and the recent example from California). " , the last ")" should be deleted [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Taken into account - the text has been revised substantially
26248	27	16	27	18	revise sentence, it currently does not make much sense [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised substantially
14740	27	20	27	20	Please add the location of these drylands to place it on the map. [Paul Glaser, United States of America]	Taken into account - the text has been revised substantially
19816	27	21	27	21	Schulz et al. (2011) reported that the…… [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
10972	27	23	27	23	Consider replacing ' is mainly emerge from the' with 'emerges mainly from' [Debra Roberts, South Africa]	Taken into account - the text has been revised substantially
10970	27	25	27	25	Replace 'interested' with 'interesting' [Debra Roberts, South Africa]	Taken into account - the text has been revised substantially
14506	27	25	27	26	Republic of Srpska (Bosnia and Herzegovina) also reported abandoned cropland as a main driver of land degradation for the last 25 years due to depopulation and post conflict environment (Kapović Solomun, 2018). Reference: Kapović Solomun, M. 2018. Final report on Land Degradation Neutrality Target Setting Program in the Republic of Srpska, Banja Luka, Republic of Srpska, Bosnia and Herzegovina. [Rattan Lal, United States of America]	Noted - the section has been substantially revised and reduced.
14944	27	26	27	27	Dimobe et al. (2015) only concerns a case study, from which it is a priori difficult to draw generalities. On the drivers of forest degradation or deforestation, the State of Forest Resources by FAO should be mentioned as well as some associated scientific global studies such as Keenan et al. (2015) or Sloan and Sayer (2015). Other studies such as Hosonuma et al. 2012 should also be preferred. References quoted in this comment: - Hosonuma, N., Herold, M., De Sy, V., De Fries, R. S., Brockhaus, M., Verchot, L., ... & Romijn, E. (2012). An assessment of deforestation and forest degradation drivers in developing countries. Environmental Research Letters, 7(4), 044009. - Keenan, R. J., Reams, G. A., Achard, F., de Freitas, J. V., Grainger, A., & Lindquist, E. (2015). Dynamics of global forest area: Results from the FAO Global Forest Resources Assessment 2015. Forest Ecology and Management, 352, 9-20. - Sloan, S., & Sayer, J. A. (2015). Forest Resources Assessment of 2015 shows positive global trends but forest loss and degradation persist in poor tropical countries. Forest Ecology and Management, 352, 134-145. [Florian Claeys, France]	Taken into account - forest degradation is covered in the next section
24398	27	29	27	37	This observation would fit better in Chapter 3 [Barron Joseph Orr, Germany]	Taken into account - the text has been revised substantially
19818	27	34	27	34	Huber-Sannwald et al. (2012) reported…… [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
19820	27	34	27	35	the overuse of land for several……. [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
7606	27	41	27	41	In theis sentence " (Madhu et al. 2015) used the Standardised Difference Vegetation Index (SDVI) to study… ", the reference should be " Madhu et al. (2015) [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Taken into account - the text has been revised substantially
19822	27	41	27	41	Madhu et al. (2015) used the Standardised…….. [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24396	27	11	28	43	This section is unclear (to the point that specific recommendations are difficult to provide). It should be thoroughly revised . [Barron Joseph Orr, Germany]	Taken into account - the text has been revised substantially
17086	27	11	28	43	The discussion is more of a literature review.. It is recommended that a synthesis of the research findings be made and if possible, confidence levels be given. [Lourdes Tibig, Philippines]	Taken into account - the text has been revised substantially
26250	27	47	28	7	revise sentence, it currently does not make much sense [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised substantially
7092	27	47	28	43	It may facilitate reading if the regional examples (New South Wales/Australia, North America, South America, and from Africa) could be illustrated in boxes. In fact, it would also be useful to explain, why these detailed regional examples are needed. [Mariam Akhtar-Schuster, Germany]	Taken into account - the text has been revised substantially
14508	27	47	28	43	It may facilitate reading if the regional examples (New South Wales/Australia, North America, South America, and from Africa) could be illustrated in boxes. In fact, it would also be useful to explain, why these detailed regional examples are needed. [Rattan Lal, United States of America]	Taken into account - the text has been revised substantially
14798	27	1			again this is dismissive of footprint analysis (see Oscar Venter's work - Univ N British Columbia work) and considerable work of Ehrlich and colleagues - the literature you provide is skewed and not comprehensive [Dominick DellaSala, United States of America]	Taken into account - footprint analysis (even if it does not mean degradation) have been mentioned.
9182	27	6			(Singh et al., 2015; Wang et al., 2016). Remove extra brackets [Amanullah Amanullah, Pakistan]	unclear what sections this refer to
6926	27	12			combination with unfavorable climatic resources (replace resources by conditions) [Talal Darwish, Lebanon]	Taken into account - the text has been revised substantially
6928	27	18			the recent example from California and Greece [Talal Darwish, Lebanon]	Taken into account - the text has been revised substantially
332	27	20			Please add the location of these drylands to place it on the map. [Paul Glaser, United States of America]	Taken into account - the text has been revised substantially
6930	27	23			is mainly emerging [Talal Darwish, Lebanon]	Taken into account - the text has been revised substantially
6932	27	25			It is also interesting to note [Talal Darwish, Lebanon]	Taken into account - the text has been revised substantially
4126	28	0	28	0	For historical deforestation over Brazil, I suggest the following references: Ometto JP, Sousa-Neto ER, Tejada G. Land Use, Land Cover and Land Use Change in the Brazilian Amazon (1960–2013). In: Springer, Berlin, Heidelberg; 2016:369-383. doi:10.1007/978-3-662-49902-3_15; Lapola DM, Martinelli LA, Peres CA, et al. Pervasive transition of the Brazilian land-use system. Nat Clim Chang. 2014;4(1):27-35. doi:10.1038/nclimate2056. [Renata Libonati, Brazil]	Taken into account - the text has been revised substantially

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3536	28	1	28	43	World Soil erosion information- Soil erosion is the accelerated detachment and removal of top soil from the land surface by rain , run-off water and wind . So far information available, about 75 billion tons of soil is eroded and displaced , that costs globally each year On a global scale the annual loss of 75 billion tons of soil costs US$400 billion of the world annually. Water erosion ;- It starts by the rain drop impact on the land surface which detaches soil particles in the form of splash followed by runoff when overland flow entrains leading to scraping the surface known sheet, then small elongate channels as rills , gullies and ends to ravine erosion. Tillage up and down the slope causes soil erosion with ruf off water in direct down-slope movement. The figures published for water erosion during last decade range to the magnitude of 20 to 50 gigaton per year, adjusting the wide gap, most likely the range of global soil erosion by water is 20–30 gigaton per year , while tillage erosion quantity maybe 5 gigaton per year . The soil erosion in croplands under conventional practice and orchards without additional soil cover in Hills in temperate climate zones is up to 10-20 tonnes per hectare per year , average quantity is often about 10 tonnes . During high-intensity rainfall events, the soil erosion may be 100 tonnes per ha per year, that leads to formation of muddy flooding in downstream areas. Soil erosion quantity on hilly croplands in tropical and subtropical areas may be up to 50-100 tonnes per ha per year. These high quantity is due to the combination of an erosive high intensity rainfall and higher slope generally steeper than those on cultivated land . Soil erosion is the cause of direct, negative and adverse action for global agriculture. Soil erosion by rain water induces annual removal of 23-42 Megatons (megaton) N and 14.6 - 26.4 Megatons P off agricultural land. This is annual fertilizer equivalent to 112 teragram for N and 18 teragram of P. These nutrient removed need to be added with the soil through 3/7 fertilizers at a significant economic cost. Annual economic cost amonts to US$ 33-60 billion for N and US$ 77-140 billion for P . Compensation due to soil erosion-induced nutrient losses requires a huge investment in fertilizer use. Wind erosion :- It occurs by wind blow velocity pushed up dry, loose, bare soil as suspension in the air, surface creep and saltation. Finer particles (< 80 µm) are pushed to l great distances, the finest particles enter in global circulation (Shao, 2000).Estimates of the yearly total wind erosion quantity of dust on arable land ,that is mobilized on land, places an upper limit at 2 gigaton . Wind mobilizes coarser soil particles (sand) including, much higher total wind erosion quantity . About 430 million ha of dry lands, that spread over 40 percent of the	Taken into account - the text has been revised substantially
7608	28	6	28	6	In this sentence "(Koch et al. 2015)" reported that … ", the reference should be " Koch et al. (2015) " [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Taken into account - the text has been revised substantially
19824	28	6	28	6	Australian agricultural soils…… [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
19826	28	8	28	9	It is also reported that soil acidification and compaction also affected the soil degradation in Australia (Lal 2001). [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially

Comment No	From Page	From Line	To Page	To Line	Comment	Response
184	28	14	28	22	Many errors: llion ha (Nickerson et al. 2011) by the year 2007. Baumhardt et al. (2015) found that the human induced causes to the soil degradation in North America are mainly viz a viz industrial dislocation through mining and urban sprawl. The study pointed out that the continued expansion of infrastructure such as highway development, construction of housing etc. Decomposition of soil organic carbon is another threat to land degradation. The decomposition lead to loss of C from CO2 and other nutrients which will be insufficient to plant growth. (Baumhardt et al. 2015) found that in North America, the forests were being converted to farm lands and as a result, the soil organic carbon content is only at present. Ausubel et al. (2013) reported that the land capable of producing crops was declined by 65% during the period 1961 to 2009 whereas the global population has been doubled during the same period. Romero-Sanchez et al. (2016 [Beth Middleton, United States of America]	Taken into account - the text has been revised substantially
19828	28	16	28	17	The sentence is not complete [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
19830	28	17	28	17	.....such as highway development..... [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
2542	28	17	28	17	Typo: hi-way -> highway. [William Lahoz, Norway]	Taken into account - the text has been revised substantially
6620	28	18	28	21	This sentence should be deleted, as soil organic matter decomposition was already introduced as a soil degradation process. [Cornelia Rumpel, France]	Taken into account - the text has been revised substantially
19832	28	19	28	19	Baumhardt et al. (2015) found that..... [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
988	28	21	28	21	505? Please, clarify it. [Jose Luis Vicente Vicente, Germany]	Taken into account - the text has been revised substantially
18658	28	21	28	21	What are the units for the figure 505. Express soil C content as a percentage. [Julius Daka, Zambia]	Taken into account - the text has been revised substantially
1614	28	21	28	21	what is 505 mean? [Rajesh Chintala, United States of America]	Taken into account - the text has been revised substantially
19834	28	21	28	21	.....only 505??? at present..... [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
26254	28	22	28	25	revise sentences, they currently do not make much sense and grammar is used incorrectly [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised substantially
7610	28	25	28	25	In this sentence " (Barbosa and Kumar 2012) also used Normalised ... ", the reference should be " Barbosa and Kumar (2012) " [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Taken into account - the text has been revised substantially
19836	28	25	28	25	Barbosa and Kumar (2012) also used..... [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
7612	28	28	28	28	In this sentence " Santibañez and Santibáñez 2007) found that 45% of the crop lands in South America... ", the reference should be " Santibañez and Santibáñez (2007) " [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Taken into account - the text has been revised substantially
4124	28	32	28	32	The major threat is on the biomes of Catnaga, Brazil. I think Catnaga is a typo, maybe it is Caatinga. [Renata Libonati, Brazil]	Taken into account - the text has been revised substantially
19838	28	32	28	33	Check the sentence structure [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
990	28	34	28	34	Please, correct with "Venezuela" [Jose Luis Vicente Vicente, Germany]	Taken into account - the text has been revised substantially
19840	28	34	28	34	remove the underline from FAO (2010) [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
24400	28	34	28	39	This observation would fit better in section 4.5.2 on Forests [Barron Joseph Orr, Germany]	Taken into account - the text has been revised substantially
3210	28	34	28	39	para seems to be off topic [Karlheinz Erb, Austria]	Taken into account - the text has been revised substantially

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7774	28	34	28	39	This paragraph is clearly incomplete in its treatment of forest land degradation. Cropland expansion, especially for soybean, is a major driver of deforestation in the Brazilian amazon (https://doi.org/10.1073/pnas.0606377103). In south-east Asia, exoansion of palm oil plantation and logging activities are the main drivers of deforestation (https://doi.org/10.1073/pnas.1412514112). See also excellent meta-analysis of deforestation drivers: http://iopscience.iop.org/article/10.1088/1748-9326/7/4/044009/meta [Pierre Bernier, Canada]	Taken into account - the text has been revised substantially
19842	28	36	28	36	This overuse of……. [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
19844	28	37	28	39	Remove the underline from (Williarts et al, 2014) and (IPCC, 2014B). [Sabit Erşahin, Turkey]	Taken into account - the text has been revised substantially
7908	28	40	28	40	Please specify the location for Mount Elgon (East Africa). [Paul Glaser, United States of America]	Taken into account - the text has been revised substantially
26256	28	40	28	43	what are the directions of trends? revise syntax [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised substantially
14840	28	44	28	44	It is surprising that forests are distinguished from land, without any other category of land being treated in this way (wetlands, croplands, grasslands, …) [Florian Claeys, France]	Noted - but forests do play a much more important role in the carbon cycle and the implementation of the Paris Agreement than any other land category
17088	28	44	29	15	Revise into a synthesis; in its present form, it is a literature review. [Lourdes Tibig, Philippines]	Accepted - the text is revised
3214	28	44	29	47	I would suggest to include reference not only to forests, but also (and in particular) to other wooded land, the intricacies related to quantify their extent and carbon stocks, as well as to isolate the impact of degradation. A discussion and details can be found in Searchinger TD, Estes L, Thornton PK, et al (2015) High carbon and biodiversity costs from converting Africa's wet savannahs to cropland. Nature Clim Change 5:481–486. doi: 10.1038/nclimate2584; Erb et al., 2018 doi 10.1038/nature25138) [Karlheinz Erb, Austria]	Taken into account
26258	28	44	29	48	section needs condensing, shortening, revision to turn it from a literature review into a critical assessment [Hans Poertner and WGII TSU, Germany]	Noted - but other reviewers want the section to be expanded. Revised the text but did not shorten
25606	28	44	29	48	Definitions on forest, and forest degradation are available. See: Chazdon, R.L., Brancalion, P.H.S., Laestadius, L. et al. Ambio (2016) 45: 538. https://doi.org/10.1007/s13280-016-0772-y. When is a forest a forest? Forest concepts and definitions in the era of forest and landscape restoration [Laura Schneider, United States of America]	Noted
16648	28	44	29	48	Please consider including something about the status of "ecological complexity" and "human values" in forests, cf. the definition of land degradation. [Maria Kvalevag, Norway]	Takein into account
10978	28	45	29	47	While it is important to explore methodological approaches/difficulties in quantifying forest degradation, your assessment of these is what is most important. [Debra Roberts, South Africa]	Noted
3212	28	47	29	1	These two figures are hardly comparable, why do it then. Erb et al., 2018 10.1038/nature25138 find the following reduction of biomass stocks in forests: tropical 23-38%, temperate 32-34%, boreal 21-25%). These figures are stock-derived, thus the net balance of all gains and losses. Their strenght is that they relate to current conditions, not a comparison of historic and actual conditions. [Karlheinz Erb, Austria]	Taken into account - figures are changed
182	28	4			Capitalize "Dust Bowl" [Beth Middleton, United States of America]	Taken into account - the text has been revised substantially
9184	28	6			(O'Connor et al., 2018; Peng et al., 2017) [Amanullah Amanullah, Pakistan]	Taken into account - the text has been revised substantially

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11478	28	10			This section (also following pages) contains too many 'the'. Eg line 13: "mining causes .. soil degradation and .. mining has been drastically increased" or line 15 "that .. human induced causes to .. soil degradation" etc. [Debra Roberts, South Africa]	Taken into account - the text has been revised substantially
26252	28	21			please provide a unit, and information on what carbon content would be expected in non-converted soil [Hans Poertner and WGII TSU, Germany]	Taken into account - the text has been revised substantially
1138	28	21			is only 50% at present [Rosa Francaviglia, Italy]	Taken into account - the text has been revised substantially
6934	28	21			is only 505 at present. [Talal Darwish, Lebanon]	Taken into account - the text has been revised substantially
1140	28	34			Venezuela [Rosa Francaviglia, Italy]	Taken into account - the text has been revised substantially
334	28	40			Please add the location for Mount Elgon (East Africa on border between Uganda and Kenya). [Paul Glaser, United States of America]	Taken into account - the text has been revised substantially
14800	28	45			There are numerous studies of forest degradation in the literature and it can be quantified using for instance intactness and conversely fragmentation indices - there's an entire field of conservation biology that uses remote sensing and fragmentation indices to monitor - see the work by World Resources Institute (Global Forest Watch -https://www.globalforestwatch.org/) and https://glad.umd.edu/ to name just 2 of many such organizations [Dominick DellaSala, United States of America]	Taken into account
7342	29	1	29	1	Baccini et al (2017) assessed degradation using RS, it is well-known that RS is biased and better at capturing abrupt disturbances like deforestation and degradation whereas it tends to under-estimate slow and for RS often invisible processes like growth. This should be kept in mind when using the Baccini reference [Marieke Sandker, Italy]	Taken into account
3216	29	1	29	15	The passage should reflect on the issue that c-stock reduction effects are not (exclusively) degradation, they are simple the effect of harvest. I see now, this is done below- maybe the passages should be better integrated? [Karlheinz Erb, Austria]	Noted
7340	29	2	29	3	Under the IPCC landuse categories degradation would be forest land remaining forest land, it is therefore unclear how the 10% degradation estimate refers to "emissions from land-use change" [Marieke Sandker, Italy]	Noted
24402	29	3	29	3	While the importance of forests is clear, the logic of spliting this section on "land" and "forests" is less clearly. For the UNCCD, considering country Parties deal with land degradation in a full range of biomes, might it be more logical to break this up in major land use and biome categories (something like agriculture, grasslands, forests perhaps?)? [Barron Joseph Orr, Germany]	Noted
14504	29	3	29	3	It's not clear the choice of subsections as "Land" and "Forests" in section 4.5 and why forest biomes are pulled out as a special category. It would make more sense to have land use and biome categories (forests, grassland, agriculture) that are easily recognizable [Rattan Lal, United States of America]	Noted
7614	29	4	29	4	The sentence " Asner et al. (Asner et al. 2004) estimated emissions from… ", should be " Asner et al. (2004) estimated emissions from…." [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Accepted
19846	29	4	29	4	Asner et al. (2004) estimated……. [Sabit Erşahin, Turkey]	Accepted
10976	29	4	29	5	What were the actual estimations? [Debra Roberts, South Africa]	taken into account - text is revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14842	29	4	29	5	The case of Amazonia should be complemented by elements about Central Africa (Ernst et al. 2013, De Wasseige et al. 2015) and South-East Asia (Miettinen et al. 2014). - De Wasseige, C., Tadoum, M., Atyi, E. A., & Doumenge, C. (2015). The forests of the Congo Basin-Forests and climate change. - Ernst, C., Mayaux, P., Verhegghen, A., Bodart, C., Christophe, M., & Defourny, P. (2013). National forest cover change in Congo Basin: deforestation, reforestation, degradation and regeneration for the years 1990, 2000 and 2005. Global change biology, 19(4), 1173-1187. - Miettinen, J., Stibig, H. J., & Achard, F. (2014). Remote sensing of forest degradation in Southeast Asia—Aiming for a regional view through 5–30 m satellite data. Global Ecology and Conservation, 2, 24-36. [Florian Claeys, France]	Noted
7344	29	5	29	7	Add: Pearson et al (2017) found that degradation account for 25% of total forest emissions. It can be added that the difference between Baccini and Pearson is likely due to the assessment method, RS based by Baccini, extraction statistics based by Pearson. See previous comments on the bias with RS [Marieke Sandker, Italy]	Noted
7616	29	6	29	6	The sentence " Pearson et al. (Pearson et al. 2017) defined… ", should be " Pearson et al. (2017) defined…." [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Accepted
19848	29	6	29	6	Pearson et al. (2017)…… [Sabit Erşahin, Turkey]	Accepted
7346	29	10	29	10	If these numbers (global annual emission from forest) are to be provided here, you should provide a comprehensive range of different studies. Studies vary quite a lot when estimating gross annual emissions from forest land, singling out one citation gives a distorted perception. [Marieke Sandker, Italy]	Noted - but we have not yet compiled additional global estimates
19850	29	11	29	11	……..and 17% from forest fire. [Sabit Erşahin, Turkey]	Unclear comment?
6536	29	12	29	15	what about alluding to the fact that developing countries are trying to meet up with developmental agendas but are cut in the web of forest harvest for timber and fuel wood. [Ojong.E nee Enokenwa Baa, South Africa]	Noted but that is not the point of this sentence
7910	29	14	29	14	I suggest changing " contribute gross emissions" to "contribute to carbon emissions" [Paul Glaser, United States of America]	Rejected - the point here is that we need to distinguish between gross and net emissions (i.e. also consider removals)
14844	29	16	29	28	This paragraph should mentioned REDD+ and international initiatives such as the Bonn Challenge, or the New York Declaration of Forests. [Florian Claeys, France]	Noted - these are addressed later in the chapter.
14946	29	16	29	28	- Griscom, B. W., & Cortez, R. (2013). The case for improved forest management (IFM) as a priority REDD+ strategy in the tropics. Tropical Conservation Science, 6(3), 409-425. - Houghton, R. A., & Nassikas, A. A. (2018). Negative emissions from stopping deforestation and forest degradation, globally. Global change biology, 24(1), 350-359. [Florian Claeys, France]	Noted but added a more recent Griscom et al reference instead
7914	29	16	29	28	Governmental forestry departments keep records of timber harvests that could easily be converted into carbon mass. Most of these agencies also keep accurate estimates of woody biomass in the forests under their jurisdiction. [Paul Glaser, United States of America]	Noted - and while such data do exist in some countries - few are evaluating outcomes of forest management activiites on ecosystems, harvested wood products and substitution effects.
7912	29	18	29	18	Has GHG been defined previously in the text? If not I suggest defining it here. So many abbreviations and acronyms are used in this and the other chapters that I hope the main editors decide to include a list of all terms, symbols, and abbreviations used in the book. So far the glossary only includes a select few terms. [Paul Glaser, United States of America]	rejected - greenhouse gases (GHG) will be in the glossary
3218	29	18	29	24	redundant with chapter 2 - maybe distill here and focus on degradation [Karlheinz Erb, Austria]	Reject - as long as we only look at C stock changes in the forest we cannot measure progress towards Paris Goals.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7348	29	19	29	19	the changes >> changes (delete the) [Marieke Sandker, Italy]	Accepted - Editorial
7772	29	24	29	24	"Werner" likely refers to "Kurz" [Pierre Bernier, Canada]	rejected - the reference is correct and refers to Frank Werner et al. …
24618	29	24	29	28	Please stop acting like the unbelievably exploitative gutting of forests that happens with biomass harvesting somehow helps carbon balance. I can't even wrap my head around the lunacy of this sentence: "Definitions of forest degradation, which focus only on reductions in forest ecosystem C stocks can lead to conclusions about forest management impacts on the atmosphere that are incomplete because they do not quantify increases in C stocks in harvested wood products or reductions of emissions in other sectors, that result from the use of wood products and bioenergy (Nabuurs et al. 2007; Lemprière et al. 2013; Kurz et al. 2016)." NO. INCORRECT. Forest degradation is forest degradation. It has NOTHING to do with the ultimate fate of the forest products that are removed. [Mary Booth, United States of America]	Accepted with modifiction - text modified to state more clearly that the reduction in carbon stocks in the forest is not a measure of increases in carbon stocks in the atmosphere, and decreasing carbon stocks in the atmosphere is the goal of mitigation efforts.
7350	29	31	29	31	model-bases >> model-based [Marieke Sandker, Italy]	Accepted - Editorial
19852	29	34	29	34	…….other carbon pools, for example, windthrow may…….. [Sabit Erşahin, Turkey]	Accepted - Editorial
3220	29	37	29	37	You could add the numbers (-21--38%), or "significant carbon reductions). The qoute should be Erb et al. (2018) [Karlheinz Erb, Austria]	Accepted
3222	29	37	29	44	Reference to Campioli M, Vicca S, Luyssaert S, et al (2015) Biomass production efficiency controlled by management in temperate and boreal ecosystems. Nature Geosci 8:843–846. doi: 10.1038/ngeo2553 could be made. Noormets A, Epron D, Domec JC, et al (2015) Effects of forest management on productivity and carbon sequestration: A review and hypothesis. Forest Ecology and Management 355:124–140. doi: 10.1016/j.foreco.2015.05.019 show that NPP in forests is not strongly affected by management. But as biomass stocks are affected (more) strongly, the turnover rate is accelerated (Erb K-H, Fetzel T, Plutzar C, et al (2016) Biomass turnover time in terrestrial ecosystems halved by land use. Nature Geosci 9:674–678. doi: 10.1038/ngeo2782). Management can only result in increased stocks from increased growth if the turnover rate is not proportionally accelerated (Malhi Y, Doughty C, Galbraith D (2011) The allocation of ecosystem net primary productivity in tropical forests. Philosophical Transactions of the Royal Society of London B: Biological Sciences 366:3225–3245. doi: 10.1098/rstb.2011.0062) [Karlheinz Erb, Austria]	Accepted with modifications - two of the suggested references have been added to the text.
14948	29	37	29	47	IPCC AR5 should be quoted (Ciais et al. 2014). See also Le Quéré et al. (2017). - Le Quéré, C., Andrew, R. M., Friedlingstein, P., Sitch, S., Pongratz, J., Manning, A. C., ... & Boden, T. A. (2017). Global carbon budget 2017. Earth System Science Data Discussions, 1-79. [Florian Claeys, France]	Noted - but not cited here
14846	29	45	29	47	Beyond forest management and the fight against deforestation, all natural climate solutions should be exposed. - Griscom, B. W., Adams, J., Ellis, P. W., Houghton, R. A., Lomax, G., Miteva, D. A., ... & Woodbury, P. (2017). Natural climate solutions. Proceedings of the National Academy of Sciences, 114(44), 11645-11650. [Florian Claeys, France]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3224	29	45	29	47	The strong links between the forest transition and the socioeconomic energy system needs to be discussed here. The forest transition does not come for "free", but it is a result of the industrialization processes (including leakage effects enabled by transport capacities). See, for instance: Gingrich S, Niedertscheider M, Kastner T, et al (2015) Exploring long-term trends in land use change and aboveground human appropriation of net primary production in nine European countries. Land Use Policy 47:426–438. doi: 10.1016/j.landusepol.2015.04.027, Gingrich S, Niedertscheider M, Kastner T, et al (2015) Exploring long-term trends in land use change and aboveground human appropriation of net primary production in nine European countries. Land Use Policy 47:426–438. doi: 10.1016/j.landusepol.2015.04.027, Erb K-H, Gingrich S, Krausmann F, Haberl H (2008) Industrialization, Fossil Fuels, and the Transformation of Land Use. Journal of Industrial Ecology 12:686–703. doi: 10.1111/j.1530-9290.2008.00076.x, Erb K-H, Gingrich S, Krausmann F, Haberl H (2008) Industrialization, Fossil Fuels, and the Transformation of Land Use. Journal of Industrial Ecology 12:686–703. doi: 10.1111/j.1530-9290.2008.00076.x , etc.) [Karlheinz Erb, Austria]	Accepted - text revised
872	29	45	29	47	I would add the "forest restoration" (assist regeneration, favouring species mixture, improve fertilization of forest soils) as a feasible option to reduce forest degradation. [Matteo Vizzarri, Italy]	Accepted - text revised
9186	29		35		refernces should be according to one standard format. No need of writing the word "co-authors". [Amanullah Amanullah, Pakistan]	Accepted - will be dealt with during final edits
186	29	4			Change to: Asner et al. (2004) and Pearson et al. (2017) [Beth Middleton, United States of America]	Accepted
11480	29	13			Is this statement true for developing countries only? Is it not true for all countries? Check out current deforestation in N-America, Europe and Russia for instance. https://www.globalforestwatch.org/map/4/57.16/-124.54/ALL/grayscale/forest2000,loss?tab=analysis-tab&begin=2001-01-01&end=2018-01-01&threshold=30&dont_analyze=true or historical forest clearing in Europe https://www.wsl.ch/staff/niklaus.zimmermann/papers/QuatSciRev_Kaplan_2009.pdf [Debra Roberts, South Africa]	Accepted - revised the statement that forest activities and land use change conribute to GROSS carbon emissions.
336	29	14			I suggest changing to "contribute to carbon emissions" [Paul Glaser, United States of America]	Rejected - the point here is that we need to distinguish between gross and net emissions (i.e. also consider removals)
766	29	14			I suggest changing "contribute gross emissions" to "contribute to carbon emissions" [Paul Glaser, United States of America]	Rejected - the point here is that we need to distinguish between gross and net emissions (i.e. also consider removals)
25708	29	15			Carbon sequestration potential of second-growth forest regeneration in the Latin American tropics. 2016. Science Advancements, 1-10 [Laura Schneider, United States of America]	Accepted
340	29	16		28	Governmental forestry departments keep records of timber harvests that could easily be converted into carbon mass. Most also keep accurate estimates of woody biomass in the forests under their jurisdiction. [Paul Glaser, United States of America]	Noted - and while such data do exist in some countries - few are evaluating outcomes of forest management activiites on ecosystems, harvested wood products and substitution effects.
338	29	18			Has GHG been defined previously in the text? If not I suggest defining it here. So many abbreviations and acronyms are used in this and the other chapters that I hope the main editors decide to include a list of all terms and abbreviations used in the book. So far the glossary only includes a select few. [Paul Glaser, United States of America]	rejected - greenhouse gases (GHG) will be in the glossary

Comment No	From Page	From Line	To Page	To Line	Comment	Response
768	29	18			Has GHG been defined previously in the text? If not I suggest defining it here. So many abbreviations and acronyms are used in this and the other chapters that I hope the main editors decide to include a list of all terms and abbreviations used in the book. So far the glossary only includes a select few [Paul Glaser, United States of America]	rejected - greenhouse gases (GHG) will be in the glossary
14802	29	28			this is incomplete - see work by Krankina et al. 2012 (Forest Ecology and Management 286 (2012) 171–182) Contents and Law et al. 2018 (www.pnas.org/cgi/doi/10.1073/pnas.1720064115) for Pacific NW forests - they show C stocks on federal lands are much higher than nonfed lands because of differences in logging levels. So while both fed and nonfed are acting as current sinks, the former is much more so than the later - this distinction should be noted. Also see work by Mackey 2013 and Mackey et al 2014 for primary forest relative value in long C retention times and C stocks - the point is even with a sink it's critical to the climate to reduce flux from harvest regardless of whether its a net positive - increase the stocks through additionality should be a necessity [Dominick DellaSala, United States of America]	Noted - A larger C stock is not indicative of a larger sink - with lower disturbance rates, forests on federal lands are on average older and therefore store more C. Note that Law et al did not assess the differences in sink strength of private or federal lands. And Krankina et al 2012 did not include substitution effects, dismissing these as likely not occuring because of unwillingness to not use softwood lumber - which means that leakage occurs - and it was also not evaluated by Krankina et al.
19854	30	3	30	3	.....some extent also feedback into the climate.....or.....some extent also feed-back into the climate..... [Sabit Erşahin, Turkey]	accepted
19090	30	4	30	5	there is extensive evidence that increasing rainfall intensity will rather than may exacerbate soil erosion [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	taken into account - the text has been revised
5064	30	10	30	15	This opening paragraph for section 4.6.1 focuses on how changes in precipitation will affect rates of land degradation. What about changes to temperature, solar radiation, CO2 concentration etc. The subsections do deal with these and other effects. May need to clarify to reflect better the subsections in 4.6.1 which do not exclusively examine precipitation effects. [Eamon Haughey, Ireland]	taken into account - the text here has been revised (rainfall is only used as ONE example), and other climate drivers have been included later in the section
14848	30	13	30	14	Uncertainties related to the vegetation changes are not only the result of rainfall changes but also temperature changes (Hüve et al. 2011) and atmospheric CO2 concentration rise (Swann et al. 2016). - Hüve, K., Bichele, I., Rasulov, B., & Niinemets, U. (2011). When it is too hot for photosynthesis: heat-induced instability of photosynthesis in relation to respiratory burst, cell permeability changes and H_2O_2 formation. Plant, cell & environment, 34(1), 113-126. - Swann, A. L., Hoffman, F. M., Koven, C. D., & Randerson, J. T. (2016). Plant responses to increasing CO2 reduce estimates of climate impacts on drought severity. Proceedings of the National Academy of Sciences, 113(36), 10019-10024. [Florian Claeys, France]	Accepted
19856	30	25	30	25	.....Li and Fang (2016) summarised..... [Sabit Erşahin, Turkey]	Editorial - copyedit to be completed prior to publication
19858	30	34	30	34	.....ability to represent MCS Prein et al. (2017) were able to.... [Sabit Erşahin, Turkey]	Editorial - copyedit to be completed prior to publication
19860	30	42	30	42	.....approach Serpa et al. (2015) studied..... [Sabit Erşahin, Turkey]	Editorial - copyedit to be completed prior to publication
26260	30	16	31	14	much of the information here could be condensed and presented in a table [Hans Poertner and WGII TSU, Germany]	Noted - we will consider this for the next version
19566	30	16	31	14	The examples cited did not take into account tropical countries or mountain or steep highlands regions. [Ibouraïma Yabi, Benin]	Noted - in the literature we have surveyd there many studies from such regions.
17090	30	42	31	4	Can you combine these studies into a synthesis and include confidence levels? [Lourdes Tibig, Philippines]	Taken ito account - instead a synthesising sentence has been added with confidence level.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19862	30	44	31	1	Climate change projections showed, on the one hand, decreased rainfall and streamflow for both catchments whereas sediment export decreased only for the humid catchment; projected land use change, from traditional to more profitable, on the other hand, resulted in increase in streamflow. [Sabit Erşahin, Turkey]	accepted
3538	30	1	32	35	The adverse effect of land degradation- The direct negative effects of soil erosion in addition to agriculture, is the pollution of water of streams, surface water bodies with sediments and nutrients, thereby degrading the water quality. [Prafulla Kumar Mabdal, India]	Noted
5398	30	2			Land degradation will be affected by climate change in both direct and indirect ways, and land degradation will to some extent also feed back into the climate. The exprssion here to some extent would lessen the impact of land degardation on climate change. For example, in the Near East and the Saharan Africa, SubSahahran Africa and other dessert areas where land degradation is very severe, the incidence and frequency of climnate change is much more prevalent than the other regions [Daniel Danano Dale, Italy]	Noted - the examples mentioned are relevant for chapter 3 (desertification)
19564	30	20		21	There are also the topography, the nature of the soil that should be taken into account [Ibouraïma Yabi, Benin]	Accepted
1558	30				Section 4.6 I am not sure the broader community understands direct and indirect impacts as those terms are used here, reflecting my comments above. [Billie Turner II, United States of America]	Noted - the terms have been explained earlier and text has been added here
14854	31	45	21	45	Additional elements should be also provided for climate induced vegetation changes on croplands and wetlands. [Florian Claeys, France]	Noted
19864	31	6	31	6	A study of future erosion rates in Northern Ireland, using [Sabit Erşahin, Turkey]	Accepted
5066	31	6	31	14	The large difference between scenario outputs in the Mullan et al 2012 paper may indicate the high uncertainties associated with the models used. Therefore, suggest adding the mean outputs (" large soil erosion increases between 481% (3.5 t/ha) for the 2080s and 628% (4.4 t/ha) for the 2020s are projected ") to qualify the range already quoted. [Eamon Haughey, Ireland]	Noted - unclear what it means
17588	31	6	31	14	So it means that land management is probably a key factor (more than climate variability) in constraining future land degradation. I guess that this point should be outlined. [Guillaume Bertrand, France]	Noted - it is one of the key messages from the chapter
14510	31	15	31	15	https://scinapse.io/papers/2079281520 is a relevant reference to this section [Rattan Lal, United States of America]	Accepted
14950	31	21	31	22	Eisenbies et al. 2007 is a study too specific to the Appalachians. Other references, more recent and with a broader scope, should be preferred such as: - Luo, P., Zhou, M., Deng, H., Lyu, J., Cao, W., Takara, K., ... & Schladow, S. G. (2018). Impact of forest maintenance on water shortages: Hydrologic modeling and effects of climate change. Science of the Total Environment, 615, 1355-1363. - Zhang, M., Liu, N., Harper, R., Li, Q., Liu, K., Wei, X., ... & Liu, S. (2017). A global review on hydrological responses to forest change across multiple spatial scales: Importance of scale, climate, forest type and hydrological regime. Journal of hydrology, 546, 44-59. [Florian Claeys, France]	Accepted
14952	31	23	31	31	Trumbore, S., Brando, P., & Hartmann, H. (2015). Forest health and global change. Science, 349(6250), 814-818. [Florian Claeys, France]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7776	31	23	31	31	Very poor reference base for high-latitude forests in this section with a single dated reference to Bonan et al (2008). I would suggest two more recent texts: 1- historical growth trends for Canada's forests (10% of the world's forests… https://doi.org/10.1073/pnas.1610156113), 2- a review of climate change impacts on the circumboreal forests (doi:10.1126/science.aaa9092) [Pierre Bernier, Canada]	Accepted
14850	31	25	31	25	Some references are not used correctly and others are missing. Allen et al. (2010) don't deal with CO2 and growth but with drought and mortality. About CO2 fertilisation effect see Zhang et al. 2013. - Zhang, Z., Jiang, H., Liu, J., Ju, W., & Zhang, X. (2013). Effect of heterogeneous atmospheric CO 2 on simulated global carbon budget. Global and planetary change, 101, 33-51. [Florian Claeys, France]	Accepted with modification - replaced Allen et al 2010 with Norby et al. 2010
7778	31	32	31	37	The link between inceased WUE and increasing runoff is very hypothetical at present. As far as I know, it is supported only by modelling analysis (e.g. Keenan et al, op. cit.) but lacks support from empirical evidence from manipulative studies like the "Tre-FACE" experiments. An increased WUE may simply mean a better growth rate of trees for a given level water availability. [Pierre Bernier, Canada]	Noted
7780	31	32	31	37	I would also suggest adding to the Keenan et al reference the following: "https://doi.org/10.1111/nph.12044" wwhich summarises empirical results from three FACE experiments on trees. [Pierre Bernier, Canada]	Accepted
14852	31	38	31	45	The paragraph is limited to the North American rangelands where it would be more appropriate to examine the degradation of grasslands/rangelands at global level (Gang et al. 2014) or in developing countries (Dong et al. 2012). - Gang, C., Zhou, W., Chen, Y., Wang, Z., Sun, Z., Li, J., ... & Odeh, I. (2014). Quantitative assessment of the contributions of climate change and human activities on global grassland degradation. Environmental earth sciences, 72(11), 4273-4282. - Dong, S., Lassoie, J. P., Wen, L., Zhu, L., Li, X., Li, J., & Li, Y. (2012). Degradation of rangeland ecosystems in the developing world: tragedy of breaking coupled human-natural systems. International Journal of Sustainable Society, 4(4), 357-371. [Florian Claeys, France]	taken into account - text is revised
19866	31	42	31	42	Studies over the North American rangelands suggest, for example, that warmer and……. [Sabit Erşahin, Turkey]	Noted
14804	31	24			for what species? Doubtful its the same species mix as current - if the climate envelope is changing, so too will the species distributions especially those with narrow climate tolerances [Dominick DellaSala, United States of America]	Taken into account - we have added that this is valid for boral forests where there is scientific support for the statement
5068	32	2	32	3	Request the addition of further information regarding the extent of the regions projected to be affected by reduced snow fall and clarification if this is based on a specific RCP scenario? (Uncertainty language could add impact). [Eamon Haughey, Ireland]	Noted
11732	32	10	32	27	This section must be aligned with outcomes of SROCC assessment Chapter 4 [Debra Roberts, South Africa]	Taken into account - we have a case study on this at the end of the chapter which we refer to.
770	32	10	32	27	This section on coastal eroision can be expanded to give proper coverage to its importance. [Paul Glaser, United States of America]	Noted - we will coordinate with SROCC in the next draft
7916	32	16	32	17	Please change the awkward wording of this sentence. I suggest beginning with: "In different regions of the world, a relationship has been found between...." [Paul Glaser, United States of America]	Accepted
19868	32	23	32	24	……less important than other climate factors…… [Sabit Erşahin, Turkey]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17562	32	34	32	35	It is trongly recommended that Conservation Agriculture practices are given highest hierarchical order as globally changing agricultural practices versus land degradation, erosion and loss of soil/land ecosystem services. [TURI FILECCIA, Italy]	Taken into account - this will be covered in the section on responses to land degradation
14856	32	35	32	35	In the section about indirect impacts on land degradation, subsections should be dedicated to fires or natural hazards, biological invasions and pests outbreaks. [Florian Claeys, France]	Accepted
14858	32	36	32	36	Section 4.7 should not be limited to bioenergy provision but should include all land-based NETs, including natural climate solution (Griscom et al. 2017). Consistency should also be considered with the NETs sections from the SR15. [Florian Claeys, France]	Accepted - added Afforestation, Reforestation and sustainable land management to the section
5086	32	38	32	39	they state that bioenergy is going to be the most profound driver of land use change . This is very strange an bold remark. Not supported by refs. There will be many other drivers of land use change. Bioenergy is not amongst the top. For now most (commercial) bioenergy comes from side products. Bioenergy can also be part of the full chain of sustainable forest managment [Gert-Jan Nabuurs, Netherlands]	Accepted - we have now referenced SR1.5 (which we were not able to cite in the FOD).
26726	32	38	32	39	"provision of bioenergy" should be specified to "provision of biocrops for bioenergy". 2nd generation biomasses are per se waste, and a significant destinction should be resflected in conclusions between 1st generation (crops) and 2nd generation biomasses (waste). [Knud Christensen, Denmark]	Rejected -BECCS scenarios in SR1.5 do not rely on "waste" but require large areas for purpose grown bioenergy crops, including woody biomass.
24620	32	42	32	44	Saying that modeling is “insensitive to a wide range of real-world constraints” is an extraordinarily weak way of saying the modeling simply doesn’t take real-world factors into account. Why not just say it directly? The giant elephant in the room is that the idea that BECCS will offer real mitigation is based on a huge number of extraordinarily unrealistic modeling assumptions. This report needs to take every opportunity to explain to policymakers that BECCS is not coming to save them. BE CLEAR THAT BECCS IS A FANTASY. Re-iterate it at every opportunity. By the way, way you’ve talked about the conclusions of Mander et al 2017 does not even begin to do justice to the stunning takedown of BECCS in that paper. That paper should be required reading for everyone. [Mary Booth, United States of America]	Accepted with modification. The statement has been removed - the focus here is on impacts of NET on land degradation. The challenges for BECCS to achieve net negative emissions will be addressed in other chapters of the report.
18874	32	36	33	12	the sections should be combined section 4.6 Projections of land degradation 1 in a changing climate, beceuse projection of land degradation will include projecte the land degradation driven by climate change and humand activity in future . [Jianguo Wu, China]	taken into account - text is revised
1616	32	37	33	10	don't see the purpose of this section at this location. Especially the perennial/grass species of bioenergy crops have positive impacts on soil health. Some cases the biochar from the bioenergy production process can serve as a great ammendment and sequester carbon in soil as well. This kind of published information may need to be considered during revisions [Rajesh Chintala, United States of America]	Rejected - biochar benefits are addressed elsewhere in the chapter.
342	32	16		17	Please change to "a relationship has been found between..." to avoid an awkward construction. [Paul Glaser, United States of America]	Accepted
772	32	16			Please change "it has been found a relation between" to "a relationship has been found between..." to avoid an awkward construction. [Paul Glaser, United States of America]	Accepted
6622	32	33			add: Decreased agricultural yields also impact soil organic matter storage (Wiesmeier et al., 2015; Wiesmeier, M, Hübner, R., Kögel-Knabner, I., 2015. Stagnating crop yields: An overlooked risk for the carbon balance of agricultural soils? The Science of the Total Environment, 536, 1045-1051), leading to further soil degradation. [Cornelia Rumpel, France]	Rejected - this reference is not relevant for this section (it has probably been misplaced)

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6936	32	33			will exert strong pressure on agricultural lands and food security. [Talal Darwish, Lebanon]	Accepted
10354	32	38			Very strong statement in which bioenergy is viewed to be the main future driver of land degradation. Would adivce to present a more balanced view. Also would it not be "agriculture" when considering food demand? [Zitouni Ould-Dada, Italy]	Accepted with modification. We have identified that the additional drivers of land degradation will be climate change impacts and NET land demand. Food production is a convential driver of land degradation.
3540	33	1	33	44	Basic needs for advancing and sustaining agriculture on land. -It is very general for all the purposes, particularly for advancing and sustaining the agriculture and allied sectors that - (1) if land is available, then every kind of utilization (Agriculture &Non-Agriculture) is possible and can be accommodated, (2) if Arable land with productive soil exists, then sustained output from farming is possible and can be expected. If this is available, then only farming can be remunerative, (3) if there is stock of water in the earth surface and under-ground aquifer, then water for irrigation as well as for all other purposes can be possible and will be available. [Prafulla Kumar Mabdal, India]	taken into account - text is revised
992	33	3	33	7	In 2018 a systematic review on negative emission technologies (NETs) was published. It includes some land-based negative emission technologies (biochar, soil carbon sequestration, afforestation and reforestation and bioenergy crops). The revision in divided into three parts. Please, check the references. Part 1: Jan C Minx et al 2018 Environ. Res. Lett. 13 063001. Part 2: Sabine Fuss et al 2018 Environ. Res. Lett. 13 063002. Part 3: Gregory F Nemet et al 2018 Environ. Res. Lett. 13 063003. I suggest the authors reading this systematic review in order to complete this section. [Jose Luis Vicente Vicente, Germany]	Accepted - thanks for the references - they have been read and are now referenced in the chapter. They do not specifically address land degradation processes but are important for context.
25816	33	3	33	10	link to Special Report on Global Warming of 1.5C in SOD [Hans Poertner and WGII TSU, Germany]	Accepted - we have now referenced SR1.5 (which we were not able to cite in the FOD).
10440	33	6	33	7	"The direct C-sequestration benefits of no-till practices (i.e. tillage elimination favoring crop residue retention in the soil surface) appear uncertain after recent assessments (VandenBygaart 2016)." Why is this uncertain? it needs explanation. In conservation agriculture mulching and the plant residue left should increase carbon sequetraion in the soils. [Zitouni Ould-Dada, Italy]	Rejected - because nothing in the page/line referenced by the reviewer mentions uncertainties related to no-till practices. Same comment as next.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7352	33	12	33	12	Elements which need to be addressed in this section: difficulty to assess degradation, definition degradation and potential overlap between deforestation/degradation (both in terms of definition as well as subsequent processes), leakage between deforestation and degradation. Some text is offered here that may help build the section: In many countries, forest degradation is likely to be a significant contributor of greenhouse gas emissions from forestry (Pearson et al 2017). However, quantifying emissions from forest degradation in an accurate and precise manner is proving very difficult: of the forest reference emission levels submitted to date to the UNFCCC, 36 include deforestation while only 14 included degradation (http://www.fao.org/3/CA0176EN/ca0176en.pdf or directly refer to UNFCCC). In particular, measuring degradation consistently over time to assess change in emissions from degradation (monitoring) is challenging. Estimates of degradation will likely be imprecise (i.e. with wide-ranging confidence intervals) as the nature of the disturbance is more difficult to measure than deforestation. Forest degradation is a term often ill-defined or defined in multiple ways which makes it difficult to understand. Precise measurements and monitoring of forest degradation, especially by remotely sensed data, necessitates a definition related to detectable biophysical properties of vegetation such as canopy cover. When using remote sensing for mapping forest degradation, degradation must be defined in relation to some pre-defined minimum unit of area or mapping unit. At very high spatial resolution, even a single tree can equal 'deforestation'. In addition, an understanding of different types of degradation, e.g. based on different drivers, may help in determining the most appropriate data source and methodology to assess it. For example, forest degradation as a result of commercial logging may be assessed in a different way than forest degradation resulting from fire. Forest degradation is typically a process with a dynamic character making it difficult to assess the associated net emissions over time. For example, emissions from selective wood harvesting may be (partially) compensated by removals from post-harvest regrowth resulting in no or lower net emissions over time than the emissions caused at the time of harvesting. Again in this case it is important to define forest degradation, e.g. a country may consider sustainable wood extraction (e.g. through reduced impact logging) to be degradation but this may also be considered sustainable management of forest resulting in no net emissions over time. One solution to monitor a dynamic situation (e.g. with enhancements happening in one location and degradation in another) may be to assess it at a larger spatial scale to understand	Accepted with modification. We thank the reviewer with the suggestions with which we are in general agreement. While the suggested text was not used directly, some of the suggestions are now reflected in the revised text.
16650	33	13	33	25	Please consider i.e. somewhere in Ch 4. to include a short chapter to acknowledge and describe that there are also impacts of land degradation on effects of climate change - i.e. ecosystembased adaptation. There is a chapter 4.8 on the impacts of degraded land on CC and there is a ch. 4.9 on impacts of climate related land degradation, but there is missing at short chapter describing possible differences between degraded and intact land systems. Some information is now included in Ch 4.9.6 (p 41, lines 20-35), but as this chapter deals with "only" impacts of climate related land degradation, not land degradation per se, the more general information is lacking. More information and examples are included in Ch 4.11 Hot Spots and case studies, but again not the general description of the processes of concern. [Maria Kvalevag, Norway]	NOTED: As we understand from this comment, a more general discussion of the importance of CC induced degradation is needed. We restructured section 4.4.1.1 in order to clarify the ppoint at its start.
7618	33	32	33	34	This sentence " However, a substantial fraction of the eroded material may preserve its organic C load in field conditions and, in occasions, even favor C sequestration through the burial of both the transported material and the surface soils at the deposition location and or the (Quinton et al. 2010). " is not completed, something is wrong at the end of the sentence [Boyossoro Hélène Kouadio, Cote d'Ivoire]	ACCEPTED: text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26264	33	32	33	34	sentence incomplete [Hans Poertner and WGII TSU, Germany]	ACCEPTED: text revised
19870	33	32	33	34	The sentence is not complete. [Sabit Erşahin, Turkey]	ACCEPTED: text revised
10980	33	34	33	34	Complete sentence [Debra Roberts, South Africa]	ACCEPTED: text revised
8098	33	34	33	34	The sentence is incomplete. [Muhammad Mohsin Iqbal, Pakistan]	ACCEPTED: text revised
19872	33	35	33	35	…….this regard, the “side-effects” of erosion…….. [Sabit Erşahin, Turkey]	ACCEPTED: text revised
19874	33	38	33	38	……effects (see table 4.3.1) (van de Koppel et al. 1997). Insert a space between two pharanthesis. [Sabit Erşahin, Turkey]	ACCEPTED: text revised
8150	33	39	33	39	Please see if the word 'on' after 'C storage' can be replaced with 'in'? [Muhammad Mohsin Iqbal, Pakistan]	ACCEPTED: text revised
14860	33	40	33	44	“Blue carbon” should be mentioned when using Pendleton et al. 2012 reference. Some elements should be provided on peatlands. [Florian Claeys, France]	Rejected - we refer to the appropriate ecosystem types (mangroves, seagrass) without reference to "blue carbon". Peatlands are now covered in more detail.
8100	33	41	33	41	The phrase '- -a typical deposition location' is suggested to be changed to '- - typical deposition locations'. [Muhammad Mohsin Iqbal, Pakistan]	ACCEPTED: text revised
8102	33	42	33	42	The last word 'what' is auggested to be changed to 'which'. [Muhammad Mohsin Iqbal, Pakistan]	ACCEPTED: text revised
5090	33		33		the section on reducing ddeforestation does not seem to fit under header of section 4.7: bioenergy [Gert-Jan Nabuurs, Netherlands]	Noted - but it has not been moved.
5092	33		34		section 4.8.1. does not give a complete picture of impacts of land degrdation on CO2 emissions. It is liek a mix of various statements . Should this not give gross emisisons fluxes? [Gert-Jan Nabuurs, Netherlands]	Noted - the text does refer to both changes in emissions and removals and we decided to keep the "net" emissions in the section heading. The text is focussing on degradation (e.g. erosion, land cover change etc.) related processes only.
18876	33	13	35	16	the section should be linked to chapter 2 [Jianguo Wu, China]	Accepted
26262	33	13	35	17	this entire section is still very vague and wordy. It is unclear what message or key information is supposed to be conveyed. Please turn it from a literature review into an expert assessment [Hans Poertner and WGII TSU, Germany]	ACCEPTED: We restructured text, conserving references and main topics in order to provide an assessment-like presentation
774	33	32	43	34	This sentence is overly long and awkard. Please revise and remove and revise or delete the hanging clause at the end ("and or the") [Paul Glaser, United States of America]	ACCEPTED: text revised
5400	33	6			The direct C-sequestration benefits of no-till practices (i.e. tillage elimination favoring crop residue retention in the soil surface) appear uncertain after recent assessments (VandenBygaart 2016). Why is this uncertain? it needs explanation. In conservation agriculture mulching and the plant residue left should otherwise increase carbon sequetraion in the soils [Daniel Danano Dale, Italy]	Rejected - because nothing in the page/line referenced by the reviewer mentions uncertainties related to no-till practices. Same comment as previous.
6624	33	7			It should be indicated that negative emission technologies such as biochar and soil carbon sequestration will have a positive effect on restoring degraded soils (Smith, 2016; Paustrien et al., 2016, Chabbi et al., 2017) and shoudl therefore be privilidged as compared to bioenergy solutions. [Cornelia Rumpel, France]	Accepted - benefits of biochar are now mentioned in various parts of the report and we have added a new section 4.7.3 Potential contributions of land-based NETs to land restoration

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10356	33	8			Note that the links between bioenergy and land and bioenergy and land use very much depend on the type of bioenergy considered (eg liquid biofuels for transport, crop residues for heating, etc.) and on the location (eg low yields, etc..). For example when considering livestock residues and the production of biogas, the link to land degradation could be positive when considering the use of the digestate as soil fertilized. Crop residues for combustion and generation of electricity could also have zero land degradation impact is the sustainable amount of crop residues is used (this could also reduce the problem of crop residue burning). In terms of crops for biodiesel and ethanol, this very much depends on the locations and yields. Second generation would not solve the land competition problem (in addition bioenergy crops on degraded land has generally proven non economical). [Zitouni Ould-Dada, Italy]	Accepted - we have refined the discussion and focus in particular on land-based NETs as those that have potential negative (4.7.2) and positive (4.7.3) impacts on land degradation.
346	33	34			Please delete or complete this incomplete phrase. [Paul Glaser, United States of America]	ACCEPTED: text revised
1142	33	34			and or the (Quinton et al. 2010). Delete "and or the" [Rosa Francaviglia, Italy]	ACCEPTED: text revised
482	34	4	34	4	"with the onset of cultivation..." not exactly cultivation but "management practices" (especially tillage) could trigger higher emissions in beggining, with a exponential-like decay in time after management. [Newton La Scala Jr., Brazil]	ACCEPTED: text revised
994	34	6	34	7	Could you explain a bit, please, the reason why it is not clear? You can mention the meta-analysis from Poeplau and Don (2015) about the C sequestration in agricultural soils by implementing cover crops (https://www.sciencedirect.com/science/article/pii/S0167880914004873) [Jose Luis Vicente Vicente, Germany]	ACCEPTED: We clarify now that uncertainty refers to the effects of no-till practices but not cover crops. The reference was included
5070	34	8	34	9	Clearly the use of lime needs to be balanced with its potential to cause CO2 loss, but that loss is likely to be soil specific. In the context of sustainable fertiliser use lime may be required to allow more efficient N and P use by agriculture (see Wall et al 2018, Effect of soil type, lime and phosphorus fertiliser application on grass yield and quality, Grassland Science in Europe, and Alemu et al 2017 https://doi.org/10.5897/AJAR2017.12562). Efficient use of N and P fertiliser could reduce their nutirent loss - and associated N2O losses. [Eamon Haughey, Ireland]	ACCEPTED: The soil/context specificity of lime-derived emissions is now discussed
776	34	9	34	13	Please begin a new sentence here by changing "yet" to "However." Otherwise this already overly long sentence will seemingly runs on forever. The authors would be wise to shorten (by breaking up) some of these overly long sentences to streamline the text and improve its readability. [Paul Glaser, United States of America]	ACCEPTED: text restructured
7918	34	11	34	11	Please begin a new sentence by changing "yet" to "However." and beginning a new sentence. [Paul Glaser, United States of America]	ACCEPTED: text revised
7620	34	13	34	13	The words "error Reference source not foungr" should be canceled, It's need to be corrected [Boyossoro Hélène Kouadio, Cote d'Ivoire]	ACCEPTED: text revised
10982	34	13	34	13	Check and correct reference. Endnote seems to have malfunctioned. [Debra Roberts, South Africa]	ACCEPTED: text revised
2544	34	13	34	13	Reference source not found. [William Lahoz, Norway]	ACCEPTED: text revised
2546	34	20	34	20	In which section? There are only a few more lines in Sect. 4.8.1. [William Lahoz, Norway]	ACCEPTED: all subheadings have been corrected/completed
14512	34	24	34	40	The content of this section is poor and provides a lack of data. There is much research describing at least the impact of different land-use practices on N2O and CH4 emissions. [Rattan Lal, United States of America]	ACCEPTED: we now expand our revision of the topic and include recent reviews that identify the major land cover/uses responsible of CH4 and N2O emissions. We connect these reviews with our identification of main degradation processes as possible drivers of CH4 and N2O emissions

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2548	34	29	34	30	Garbled text. Reword. [William Lahoz, Norway]	ACCEPTED: text revised
17590	34	38	34	40	"Both wetlands rewetting/restoration and artificial creation can produce intense pulses of CH4 release (Altor and Mitsch 2006; Fenner et al. 2011).". It is interesting (even if not polittically useful) to outline that the restoration/rewetting may have kind of "adverse" effect on GHG. [Guillaume Bertrand, France]	ACCEPTED: new version highlights this unexpected effects
14954	34	43	34	45	- Sturm, M., Douglas, T., Racine, C., & Liston, G. E. (2005). Changing snow and shrub conditions affect albedo with global implications. Journal of Geophysical Research: Biogeosciences, 110(G1). [Florian Claeys, France]	ACCEPTED: ref included
19876	34	45	34	45	In boreal forests, the removal…… [Sabit Erşahin, Turkey]	ACCEPTED: Uncertainty statement added
26270	34	45	34	47	by how much can it exceed the net effect? [Hans Poertner and WGII TSU, Germany]	ACCEPTED: the few well quantified cases are now shown
7920	34	46	34	46	Please change "what" to "which" (although "that" is the more appropriate pronoun to introduce this restrictive clause). [Paul Glaser, United States of America]	ACCEPTED: text revised
2550	34	46	34	47	Clumsy wording. Reword. [William Lahoz, Norway]	ACCEPTED: text restructured
26268	34	41	35	11	this section is hard to understand. please revise and proofread [Hans Poertner and WGII TSU, Germany]	NOTED: Text was revised and improved
348	34	11			Please begin a new sentence here by changing "yet" to "However." Otherwise this already overly long sentence will seemingly run on forever. The authors would be wise to shorten (by breaking up) some of these overly long sentences to streamline the text and improve its readability. [Paul Glaser, United States of America]	ACCEPTED: text revised
26266	34	39			"intense" can this be quantified? [Hans Poertner and WGII TSU, Germany]	ACCEPTED: text revised
350	34	46			Please change "what" to "which" (although "that" is the more appropriate pronoun to introduce this restrictive clause). [Paul Glaser, United States of America]	ACCEPTED: text revised
778	34	46			Please change "what" to "that" (although "that" is the more appropriate pronoun to introduce this non-restrictive clause). [Paul Glaser, United States of America]	ACCEPTED: text revised
10984	35	8	35	8	Change 'join' to 'joint' [Debra Roberts, South Africa]	ACCEPTED: text revised
10986	35	9	35	9	Delete 'global' after 'Besides' [Debra Roberts, South Africa]	ACCEPTED: text revised
19878	35	9	35	9	Besides the net global effects……. [Sabit Erşahin, Turkey]	ACCEPTED: text revised
2552	35	9	35	9	Garbled text. Reword. [William Lahoz, Norway]	ACCEPTED: text revised
14514	35	12	35	14	Suggests to also describe the impact on micro-climate through sub-regional or local schemes. For example, changes in micro-climate of irrigation lands (over big areas), changes in conditions of drying deltas, changes as a result of drainage of peatlands and wetlands in general, etc. [Rattan Lal, United States of America]	ACCEPTED: microclimatic effects are now included with particular reference to oasis effects and forest/crop patchiness impacts on convective activity
14956	35	12	35	15	- Perugini, L., Caporaso, L., Marconi, S., Cescatti, A., Quesada, B., de Noblet-Ducoudre, N., ... & Arneth, A. (2017). Biophysical effects on temperature and precipitation due to land cover change. Environmental Research Letters, 12(5), 053002. [Florian Claeys, France]	ACCEPTED: ref included
296	35	12	35	16	Detailed edscription of facts/information under section 4.8.4(Other biophysical impacts) and 4.8.5 (Integrating multiple global impacts) ARE NOT given. This portion of Chapter-2 is INCOMPLETE. [Santosh Kumar Mishra, India]	NOTED: Now completed
8104	35	22	35	22	The word 'within' is suggested to be changed to 'in'. [Muhammad Mohsin Iqbal, Pakistan]	accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17716	35	23	35	23	After land degradation add : however , the assessment report on land degradation and restoration (2018) mentioned that Land degradation negatively impacts 3.2 billion people, and represents an economic loss in the order of 10% of annual global gross product IPBES (2018) . IPBES (2018): Summary for policymakers of the assessment report on land degradation and restoration of the Intergovernmental SciencePolicy Platform on Biodiversity and Ecosystem Services. R. Scholes, L. Montanarella, A. Brainich, N. Barger, B. ten Brink, M. Cantele, B. Erasmus, J. Fisher, T. Gardner, T. G. Holland, F. Kohler, J. S. Kotiaho, G. Von Maltitz, G. Nangendo, R. Pandit, J. Parrotta, M. D. Potts, S. Prince, M. Sankaran and L. Willemen (eds.). IPBES secretariat, Bonn, Germany. 44 pages [Sawsan Mustafa, Sudan]	accepted and edited accordingly
19880	35	28	35	28	In general terms, the…… [Sabit Erşahin, Turkey]	edit accepted
8106	35	30	35	30	The phrase 'with land degradation then leaving livelihood more sensitive' is suggested to be changed to 'with livelihood being more sensitive'. [Muhammad Mohsin Iqbal, Pakistan]	accepted- text revised with edits to grammar
6538	35	31	35	33	add the fact that sometimes responses to adapt to climate change might be negative and could lead to maladaptation [Ojong.E nee Enokenwa Baa, South Africa]	accepted
19882	35	37	35	37	…….exacerbate poverty (Eriksen et al. 2007). [Sabit Erşahin, Turkey]	Editorial - seems to be an issue with the reference editing software
6540	35	38	35	41	Add that vulnerability could be further exacerbated by gender inequalities [Ojong.E nee Enokenwa Baa, South Africa]	Text revised
21298	35	34	37	11	This section needs to have more clarity in linking poverty, vulnerability to land degradation and climate change. Some communities are more prone to poverty and vulnerability within the contours of land degardation nd climate change merges from the fact that these communities lack access to natural resources and assets coupled with governmental, political and institutional support. Subsistence agriculture, food and other produces gathering from forests can also make the communities resilient and not vulnerable, hekp them to live with dignity and not in poverty when the State and the governments recognise their right over natural resources, make legislative and policy provisions for secured land tenure and community governance, recognise their participation in decision making, their traditional knowlwdge and practice will always help them to be resilient from land degradation and climate change. The governments, the world over have to recognise that these communities, being protecting and conserving the natural resources around them, have better knowledge and know how to cope with down turns, disasters and changes in the ecological cycles and systems. They have to only provide them with support systems. [Souparna Lahiri, India]	accepted- text revised accordingly in part, retaining the focus of the section.
17592	35	35	37	22	Paragraphs 4 9 1 and 4 9 2. Except if I missed it, the economic aspects is not really treated, excepted may be through this sentence "Such socio-economic factors are especially important if we look at demand side issues too, which include lack of purchasing power, competition in appropriation of supplies and changes to per capita food consumption (Stringer et al. 2011)". In my opinion, this should be better highlighed that land degradation, by impacting negatively sustainability of agricultural land management (balance between long-term productivity and long-term good status of the land), impacts access to food security by both the local people (producers and consumers) and the remote consumers. [Guillaume Bertrand, France]	accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26272	35	18	41	41	This entire section ist still very conceptual and its take-home-message is unclear - revise, leave in only relevant information, sharpen the message, quantify data where possible, provide directions of changes and of correlations, shorten text [Hans Poertner and WGII TSU, Germany]	Accepted - text revised though note few quantiative data exist for many of these relationships we are discussing here
6762	35	18	41	41	Section 4.9 is confusing, is it the impact of land degradation on people on nature? Or the impact of climate change on land degradation, people and nature?Please consult for this section the following report:.- Climate Change and Land Degradation Prof Eric O. Odada, University of Nairobi http://www.wamis.org/agm/pubs/clddvd/Odada.pdf [Idowu Owoeye, Nigeria]	Accepted - text revised and rephrased to match the scoping phrasing of "impacts of climate related land degradation on natural and human systems". Reference consulted but not added as seems to be a non-peer reviewed presentation
18878	35	18	41	41	the section should be different from chapter 3 [Jianguo Wu, China]	Taken into account - sections facing drylands have been moved to ch3
14516	35	18	41	41	The chapter section 4.9 is a bit confusing because it is devoted to the impacts of CLIMATE-RELATED land degradation on different matters. In many case it is difficult to differetiate climate-related and human-induced land degradation, so it is better to speak about complicated situations and underline those of them where climate does play a vital role on people and nature. [Rattan Lal, United States of America]	Taken into account and complexity already mentioned and highlighted in the chapter executive summary
1144	35	9			Besides global the net global effects. Delete the first "global" [Rosa Francaviglia, Italy]	ACCEPTED: text revised
11482	35	20			Add “natural” or “biophysical” factors or say “anthropogenic and natural” factors [Debra Roberts, South Africa]	Taken into account
6542	36	8	36	9	I am thinking if possible the idea that marginalised/minority communities such as indigenous groups could become more vulnerable [Ojong.E nee Enokenwa Baa, South Africa]	accepted - text revised accordingly
19884	36	13	36	13	Altieri and Nicholls (2017) however note that due…… [Sabit Erşahin, Turkey]	Accepted
20528	36	20	36	20	4. "depending the on internal and external stressors" should be "depending on the internal and ecternal stressors" [Huai Jianjun, China]	accepted with typo in suggestion amended
6938	36	20	36	20	depending the on internal and external stressors [Talal Darwish, Lebanon]	accepted
6544	36	27	36	29	After stating the impacts of environmental and social changes taking place, I will suggest that you add, cultural changes occuring such as the shifting of gender roles with all of these producing varied livelihood outcomes [Ojong.E nee Enokenwa Baa, South Africa]	accepted - text revised and signposting provided to section on gender where this is considered in more detail
6546	36	36	36	40	Is there a possibility if indicating that life history narratives as a methodological tool remains important in climate change research as a way of understanding timeline and event trends. Considering that this has not been considered and used more often in climate science [Ojong.E nee Enokenwa Baa, South Africa]	accepted - text revised accordingly
1560	36	27			Turner et al. 2003, PNAS is the most cited reference on the subject of this sentence [Billie Turner II, United States of America]	reference added
26274	37	1	37	3	this figure needs to be able to stand alone without the reader having to refer to the text to understand it, but that is currently not yet possible due to limited information provided in the legend. What do the arrows and lightning symbols indicate? What is the HH questionnaire and who was included in it? [Hans Poertner and WGII TSU, Germany]	Accepted and amended. HH is household questionnaire
20530	37	1	37	3	5. I can not understand the Figure 4.3 where there is no necessary labal or others [Huai Jianjun, China]	Accepted - key provided. Also editorial - maybe redrawn if retained in second order draft
19886	37	5	37	5	….Scherr (2000) observes……. [Sabit Erşahin, Turkey]	accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7094	37	10	37	11	The aspect of participatory approaches in the process of developing solutions needs to be further expanded. This aspect would need to include a broader analyses of different values which exist side by side in societies because identifying and considering the broad range of values associated with "land" and its resources can play a vital role in developing solutions that are also accepted (see also chp. 7 on risk management and Decision Making (e.g. page 8, lines 3-5)). [Mariam Akhtar-Schuster, Germany]	noted - this will be dealt with in the section on responses rather than here, as well as in ch 7
14518	37	10	37	11	The aspect of participatory approaches in the process of developing solutions needs to be further expanded. This aspect would need to include a broader analyses of different values which exist side by side in societies because identifying and considering the broad range of values associated with "land" and its resources can play a vital role in developing solutions that are also accepted. [Rattan Lal, United States of America]	noted - this will be dealt with in the section on responses rather than here, as well as in ch 7
25690	37	13	37	14	The "crux" indicated is not evident to me. Is the point that some places ("where") which are important for food supply and security, may produce less? [Jon Magnar Haugen, Norway]	Accepted - yes, this has been clarified now
19888	37	21	37	21	Along with socio-economic drivers, climate change accelerates land degradation..... [Sabit Erşahin, Turkey]	accepted
26276	37	23	37	25	add cross-reference to Section where this was discussed [Hans Poertner and WGII TSU, Germany]	accepted
1618	37		37		In Figure 4.4, what is HH questionaire?? [Rajesh Chintala, United States of America]	Accepted
21300	37	12	38	22	Food security has to be understood in the context of market realities and demands and consumption pattern. Beyond susbsistence agriculture and food gathering, it is basically the market which drives the change in cropping pattern which ranges from edible crops to non edible cash crops which have markets and in turn satisfy the current consumption pattern. Consumption pattern is also subjected to market supplies and value chains. The producers, who also have to compete on food security parameters, are at the bottom of this pyramid and the most vulnerable. The producers, who cannot survive on or consume things which they produce, simply because it does not suit their consumption pattern, or are not edible and have to buy from the market, eventually suffer from food security; but the consumers also fall in the same trap of suffering from food security in the long term where the changes driven by the market not only leads to changes in the cropping pattern - from edible produce to non edible produce, cash crops - but also induce transfer of food producing lands/farms to non food producing farms/lands leading to food insecurity [Souparna Lahiri, India]	noted - no change made here as these aspects are covered in much more depth in ch 5
10988	37	13	38	23	This sub-section needs to be further unbacked. Consider, for example, the total crop loss in the current, near and long term (if possible, include the difference RCP scenarios). It will be helpful to further drill down to regional differences in terms of food security. Furthermore, your assessment of the information will also enhance the point being made in the sub-section [Debra Roberts, South Africa]	taken into account - text is revised
19092	38	5	38	8	the transport infrastructure problem is more gneral and longer standing than implied here, eg. disruption of food deliveries by flooding and land slides eg Mozambique in early 2000s [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	accepted - text revised to mention this
8108	38	7	38	7	The first word 'siting' is not clear. [Muhammad Mohsin Iqbal, Pakistan]	accepted and amended though is the correct word to use

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14958	38	13	38	15	Steward et al. 2018 focused only on maize-based conservation agriculture and only in tropical and subtropical environments. A better reference, with a more general scope could be Altieri et al. 2015. - Altieri, M. A., Nicholls, C. I., Henao, A., & Lana, M. A. (2015). Agroecology and the design of climate change-resilient farming systems. Agronomy for sustainable development, 35(3), 869-890. [Florian Claeys, France]	accepted
25692	38	15	38	16	The sentence seems to give a definition of "food security". However, standard definitions of food security are: availability, access and quality [Jon Magnar Haugen, Norway]	Noted - we do not aim to give a definition as this is provided in chapter 5. We have added a cross reference for clarification
14862	38	23	38	23	This section should include some considerations on the impacts of climate change in terms of refugees and asylum. I strongly suggest to mention Missiran & Schlenker (2017) who had recently published a study highly regarded in North America and Europe. Missirian, A., & Schlenker, W. (2017). Asylum applications respond to temperature fluctuations. Science, 358(6370), 1610-1614. [Florian Claeys, France]	Rejected - The study of Missirian and Schlenker (2017) has been highly critized (particularily regarding the applied method and assumptions made) by numerious scholars working in the field of climate change, migration and conflict and study findings are not supported by other peer-reviewed published literature.
17314	38	36	38	39	In several region of the humid tropics climate variability is also a major factor of land degradation, for instance in southern Amazonia, where recent extreme droughts have produced severs impacts on vegetation (Brienen et al., 2015. doi:10.1038/nature14283; Maeda et al., 2015. doi:10.1002/2015GL065252, Marengo and Espinoza, 2016. doi:10.1002/joc.4420.) including forest fires (Fernandes et al., 2011. doi:10.1029/2011GL047392; Fu et al 2013. Doi: 10.1073/pnas.1302584110). This could shift the southern Amazon toward a climate more appropriate to seasonal forests or savannah rather than tropical rain forests (e.g. Salazar et al., 2007. doi:10.1029/2007GL029695; De Faria et al., 2017. Env. Res. Lett. 12 095005; Nobre et al., 2016. http://doi.org/10.1073/ pnas. 1605516113). This point must be explained here. [Jhan Carlo Espinoza, France]	accepted -we integrated this aspect in section 4.9.6 Impacts of climate related land degradation on natural systems where we feel it fits much better
8110	38	40	38	43	The phrase and sentence 'likely because increased land production was - - - - a broad socio-ecological embedding' is not clear. [Muhammad Mohsin Iqbal, Pakistan]	Accepted - reworded
7096	38	44	38	46	It may be useful to briefly expand on mobile land use systems (e.g. nomadism), whose mobility has been a response to climate variability. Surely other examples of mobile land use systems also exist: Or is this aspect being discussed in the desertification chapter? If this is the case then it would be useful to provide a reference here to chapter 4. [Mariam Akhtar-Schuster, Germany]	Noted - but this is normally a dryland response, so see ch 3
14520	38	44	38	46	It may be useful to briefly expand on mobile land use systems (e.g. nomadism), whose mobility has been a response to climate variability. Surely other examples of mobile land use systems also exist. If this is discussed in Chapter 4, it would be useful to provide a reference here to that chapter. [Rattan Lal, United States of America]	Noted - but this is normally a dryland response, so see ch 3
8112	38	48	38	48	The financial support in the form of remittances helps tide oer the suffering first rather than to increase wealth. [Muhammad Mohsin Iqbal, Pakistan]	accpeted - text revised
17564	38	23	39	14	Extremely important paragraph! [TURI FILECCIA, Italy]	Noted
27542	38	48	39	5	Tiffen, Mortimer and Gichuki 1994 "More People, Less Erosion: Environmental Recovery in Kenya [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	noted but no action taken

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5402	38	35			with migration being an important adaptation strategy (Morrissey 2013). This is true in the case of most African countries specially those suffering from severe land degardation and also the poor countries in the Near East region. In relation to this, migration within the country and outside could be differenciated. Out migration may have other causitive factors in addition to land degradation [Daniel Danano Dale, Italy]	noted - the multicausality of migration is indicated in the first paragraph of this section. Text refering to Africa was moved to chapter 3
7622	39	8	39	8	The sentence " For example, Barbier (Barbier 2000) notes that wetlands…." should be " For example, Barbier (2000) notes that wetlands…" [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Noted - text moved to chapter 3 for integration there
19890	39	8	39	8	Barbier (2000) notes that….. [Sabit Erşahin, Turkey]	Noted - text moved to ch 3 for integration and editing there
7922	39	16	39	39	This subsection is exceptionally important particularly with regard to the current conflict in Syria. I commend the authors for highlighting it as well as their unbiased assessment of this emotionally charged issue. Many hydrologists, however, are convinced that the roots of this civil war were sown by a persistent regional drought that destroyed the agricultural base of an important segment of the Syrian society. [Paul Glaser, United States of America]	Noted - text moved to ch3
7624	39	22	39	23	The sentence " For example, Val Percival & Homer-Dixon (Percival and Homer-Dixon 1995) identified …." should be " For example, Val Percival and Homer-Dixon (1995)…" [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Accepted
19892	39	23	39	23	Percival and Homer-Dixon (1995) identified…….. [Sabit Erşahin, Turkey]	Accepted
19894	39	29	39	29	……Raleigh and Urdal (2007) found…….. [Sabit Erşahin, Turkey]	Editorial due to reference software but moved to chapter 3 as dryland focused
352	39	0			subsection: Impacts of climate related land degradation on conflict This subsection is exceptionally important particularly with regard to the current conflict in Syria. I commend the authors for highlighting it as well as their unbiased treatment of this emotionally charged issue. Many hydrologists, however, are convinced that the roots of this civil war were sown by a persistent regional drought that destroyed the agricultural base of an important segment of the Syrian society. [Paul Glaser, United States of America]	noted - the text related to Syria moved to Chapter 3
780	39	15			This subsection is exceptionally important particularly with regard to the current conflict in Syria. I commend the authors for highlighting it as well as their unbiased treatment of this emotionally charged issue. Many hydrologists, however, are convinced that the roots of this civil war were sown by a persistent regional drought that destroyed the agricultural base of an important segment of the Syrian society. [Paul Glaser, United States of America]	Noted - text moved to ch 3
1562	39				section 4.9.4. every chapter misses the debates in the PNAS on Africa conflict, climate, and land. Review see Haiang and Meng 2014. [Billie Turner II, United States of America]	accepted - the controversy between Burke et al. 2009, Buhaug et al. 2010 and Hsiang and Meng 2014 is added as references, yet not explicitely emphasized since the focus of this debate is on climate as potential cause of conflict rather than on land degradation
19896	40	9	40	9	In Australia, the increasing……. [Sabit Erşahin, Turkey]	Accepted
19898	40	13	40	13	……undertaking for example, revegetation….. [Sabit Erşahin, Turkey]	Accepted-text revised
19900	40	17	40	17	……..example, in terms of commercialisation),…….. [Sabit Erşahin, Turkey]	Editorial-copyedit to be completed prior to publication (reviewer wants a comma, I don't think it is necessary!)
8114	40	21	40	21	'- - development world' shouldactually be '- - developing world'. [Muhammad Mohsin Iqbal, Pakistan]	Accepted-text revised
19902	40	21	40	21	……..in the developing world… [Sabit Erşahin, Turkey]	Accepted-text revised
19904	40	21	40	21	……(e.g. (Agarwal 2003)). [Sabit Erşahin, Turkey]	Accepted-text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8152	40	31	40	31	The last words 'preference men' is suggested to be replaced with 'prefer men'. [Muhammad Mohsin Iqbal, Pakistan]	Rejected-replacing "preferences" with "prefers" changes the meaning of the sentence to make it incorrect (editorial)
3226	40	37	40	37	the term "nature" is ambiguous,what is really meant here? On natural processes? On [Karlheinz Erb, Austria]	Accepted. Nature removed to avoid ambiguity in meaning
782	40	38	40	41	This sentence is overly complicated but can be greatly clarified by beginning with a simple (i.e. few words) subject and verb. For example, the sentence could begin with: "One example of climate interacting with human activities comes from the Aral Sea region in Central Asia where other stressors combine to deliver..... [Paul Glaser, United States of America]	Noted- section moved to chapter 3 for incorporation and edits there
7924	40	39	40	39	Please change "which" to "that" to introduce the restrictive clause. [Paul Glaser, United States of America]	Noted - section moved to chapter 3 for incorporation and edits there
7926	40	39	40	41	This sentence is overly complicated but can be clarified by beginning with a simple (i.e. few words) subject and verb. I suggest changing the beginning of this sentence to: "One example of climate interacting with human activities comes from the Aral Sea region in Central Asia where other stressors combine to deliver....." [Paul Glaser, United States of America]	Noted - section moved to chapter 3 for incorporation and edits there
8154	40	48	40	48	The word 'and' after Aral Sea is suggested to be replaced with 'by'. [Muhammad Mohsin Iqbal, Pakistan]	Noted - section moved to chapter 3 for incorporation and edits there
26278	40	20			be more specific - what exactly are the gender differences in land tenure? [Hans Poertner and WGII TSU, Germany]	Accepted-text revised. Have clarified that gender differences in land ownership persist, despite efforts to enable security of tenure
26280	40	22			provide more detail - how is age related to land access? do older or younger people have greater access? Is the relationship linear? is the relationship dependent or independent of gender? [Hans Poertner and WGII TSU, Germany]	Accepted-text revised to highlight intersectionality
356	40	39		41	This sentence is overly complicated but can be greatly clarified by beginning with a simple (i.e. few words) subject and verb. For example, the sentence could begin with: "One example of climate interacting with human activities comes from the Aral Sea region in Central Asia where other stressors combine to deliver....." [Paul Glaser, United States of America]	Noted - section moved to chapter 3 for incorporation and edits there
354	40	39			Please change "which" to "that" to introduce the restrictive clause. [Paul Glaser, United States of America]	Noted - section moved to ch3 for incorporation there
8156	41	1	41	2	'Land next to larger water bodies is usually warmer in winter and cooler in summer than land farther away' seems to be the impact of climate rather than cause of it. [Muhammad Mohsin Iqbal, Pakistan]	Noted - section removed and passed to chapter 3
27530	41	13	41	13	add flooding [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
7928	41	20	41	20	change "lots of" to "abundant" [Paul Glaser, United States of America]	Accepted
18636	41	20	41	41	This section discusses the positive effects of biodiversity on helping mitigate the effects of climate change on land degradation. Specifically it address improved organic matter and plant growth resulting in bettter soil conditions and reduces land degradation. These same factors will result from imprved plant growth and increased SOC that can result from elevated atmospheric CO2 fertilization and should be included somewhere in this chapter. [Henry Allen Torbert, United States of America]	Accepted with modification - the potentially beneficial aspects of climate change impacts on plant productivity, as well as the land management effects on land restoration and their co-benefits such as biodiversity are now addressed in the chapter.
786	41	21	41	31	I suggest breaking up this overly long sentence into 2 or more sentences. [Paul Glaser, United States of America]	noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11484	41	25	41	35	This section is important in terms of adaptation options for policy makers. It should be highlighted, expanded, accompanied with a table (showing multiple co-benefits) or diagram. This information ought to be easy to find, cross-referenced elsewhere and must be reflected at a high level in the summary to policy makers. As a more general comment on the report: any similar findings, that have major implications in terms of adaptation and mitigation, and solutions to the many problems discussed, showing multiple co-benefits, should be given highest priority. [Debra Roberts, South Africa]	noted - no action taken as such a diagram is already being developed in ch6
7930	41	27	41	27	Please don't begin a sentence with a stand-alone pronoun (e.g. "this) with an ambiguous antecedent. See my comments above [Paul Glaser, United States of America]	accepted
7932	41	28	41	28	change "which" to "that" [Paul Glaser, United States of America]	accepted
7934	41	28	41	28	Insert "by" after "biodiversity" [Paul Glaser, United States of America]	accepted
7936	41	30	41	30	Please begin a new sentence before "while" to keep this sentence from running on too long. [Paul Glaser, United States of America]	accepted
7938	41	31	41	31	Please avoid beginning sentences with a stand-alone pronoun with an ambiguous antecedent. [Paul Glaser, United States of America]	accepted
9196	41	36	41	41	A good example of adavantage of sustaining biuodiversity within agricultural systems is the in situ conservation of geentic ressources for fruit trees and more generally perrenial crop plants. Gene exchanges between domesticated fruit trees and their wild relatives living in forest vegetation are important aspect to conserv evolving gene pools in the contect of climate changes. Current Mediterranean forest and mattoral vegetationfor example are conserving the genetic ressources for olive trees, almond trees and others. [Alex Baumel, France]	Noted - we have a section on agroforestry and farming system diversity, howver the Mediterranean basin is considered drylands, hence covered in Ch 3.
3060	41	42	41	42	There is need to propose ways and means in SRCCL to encourage the communities to change the land use of shifting cultivation for restoring such lands to forest vegetation or tree cultivation, or tree or perennial shrub-based horticulture. This could also in a small way contribute to NET through increase in carbon sequestration for which farmers could be paid financial incentives. To wean away the farmers and local communities from shifting cultivation, alternative or additional avenues of earnings suitable in rural landscape that would strengthen the socio-economic status would need to be provided to the rural communities including shifting cultivators (To be added to sub-section 4.10.1 Actions on the ground to address land degradation.....p/4-41) [Jagdish Kishwan, India]	Taken in to account - section 4.10 covers these aspects. NET is covered in Section 4.7
3050	41	42	41	44	Shifting Cultivation: [Jagdish Kishwan, India]	Noted
3056	41	42	41	44	Land degradation is a result of traditional land overuse compounded by negative impacts of climate change. [Jagdish Kishwan, India]	Rejected - traditional land use cannot per se be blamed for land degradation.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3058	41	42	41	44	In India and some south east Asian countries, shifting cultivation is practiced as subsistence agriculture. This kind of farming has resulted in change of natural land use of forest to agriculture. With increasing population, and shrinking land availability, the productivity of shifting cultivation has fallen down substantially with cultivation cycle reducing in time. Low productivity and reduced shifting cultivation cycle have led to a vicious circle of low productivity-poverty-reduced farming cycle. One will argue that this situation perpetuates poverty and low agricultural productivity. Presently, with rising industrial and economic growth, interest and investment in abysmal productivity from shifting cultivation is low, but the local communities still practice shifting cultivation not for reaping the benefits of the agricultural harvest, but to assert their tenurial right on shifting cultivation land. [Jagdish Kishwan, India]	Noted
3542	41	42	41	44	Water conservation and Irrigation. Often water conservation is confused with the irrigation. If fresh water is stored in in-land (surface water bodies and aquifer) , then irrigation can be possible. Hence, water conservation is the precursor. Soil and water Conservation.- The main source of useable fresh water is the rainfall. If that water after its touch to the ground/earth surface is retained for prolonged period in all the Altitudes and is released gradually through out the year, particularly when no rainfall as per demand, can be available and its flow in the river-net works uniformly will be possible. This will also reduce flood devastation-vis-a-vis combating drought incidence . In perspective of such alarm, the Central and State/Provincial Govts. of the world should be attentive to use the land with adequate conservation and management measures and then harvesting crops from there . Due to negligence in care and protection of land and soil , the consequences are very much spectacular. If soil conservation measures are done effectively, then automatically, there is water conservation or storage in inland that reduces flood and drought intensity. All these indispensable basic needs for actuation should invariably be included in official instruction, recommendation, plan. The measures need. There is nothing alternative of food and other essential agricultural commodities which are produced on the land and fertile soil with optimum fresh water for the survival of the mankind and animals. Along with the increase of population the demand of the cereals, oil seeds, pulses, vegetables, sugar, commercial crops, fodder& forage , fruits, medicinal plants, flowers ,raw materials of agri-based industries, structural materials, spices and condiments, plantation crops. Wood and timbers etc many others are in the rise day by day. Food (Cereals and Pulses) is the prime importance, which are produced on prime farm land having good soil. Only an inch (2.5 cm) thick layer of soil is formed from the parent rock by natural processes in a long span of 800- 1000 years. Arable soil on the land is the foundation and entire agriculture is the superstructure on it. If the foundation becomes week and inadequate, the entire superstructure becomes fragile, threatened and may collapses at any time. Almost similar in case of agriculture. The land area is confined, non-expandable. Lands should be protected from accelerated degradation, degraded lands and soil on it should be upgraded by reclamation, Rain water should be retained in all the elevations i.e. altitudes so that it can not rush down by devastating the lower reaches, but is compelled to retain in situ and surplussing in walking velocity as well as recharge to the ground water aquifer. As such, soil and rain water conservation is the crux of the day to combat the situation and the only	Noted - soil and water conservation is covered in Section 4.10
14522	41	44	41	44	Since this sub-capter 4.10.1. is not yet finished, but will address actions on the ground, I recommend land degradation neutrality target setting process examples one from each region or some specific countries in this regard. [Rattan Lal, United States of America]	taken into account - LDN is discussed in this section

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6764	41	42	45	1	It will be diffcult to review 4.10 since majority of the sub endings are still missing. Please consult for this section the following report:.-UNFCC, Reducing vulnerability to climate change, climate variability and extremes, land degradation and loss of biodiversity. unfccc.int/resource/docs/publications/ldc_reducingvulnerability.pdf [Idowu Owoeye, Nigeria]	Noted - Section 4.10 has been written primarily based on the peer reviewed literature.
1690	41	42	45	3	It is important this Chapter address demand-side measures that can be taken as well, like the reduction of meat and dairy consumption. [Simone Lovera-Bilderbeek, Paraguay]	Rejected - changing diets is primarily dealt wiht in Ch 5
5094	41		45		section 4.10 will be important to come with policy messages. Clearly this is in beginning stages. [Gert-Jan Nabuurs, Netherlands]	Noted - section to be further elaborated
358	41	20			change "lots of" to "abundant" [Paul Glaser, United States of America]	Accepted
360	41	27			Please don't begin a sentence with a stand-alone pronoun (e.g. "this) with an ambiguous antecedent. see comments above [Paul Glaser, United States of America]	accepted
784	41	27			Please add the appropriate word after "This" to clarify its antecendent [Paul Glaser, United States of America]	accepted
362	41	28			change "which" to "that" [Paul Glaser, United States of America]	accepted
364	41	30			Please begin a new sentence before "while" or combine this clause with the preceding one. [Paul Glaser, United States of America]	accepted
366	41	31			Please avoid beginning sentences with stand-alone pronouns with ambiguous antecedents. [Paul Glaser, United States of America]	accepted
5404	41	43			4.10.1 Actions on the ground to address land degradation and 4.10.2 Contributions of land restoration and rehabilitation to mitigation of climate change Placeholder. Section in progress. These sections of the documents are very important. When will these be available for review? the options for interventions will be provided on regional bases and even sub regional bases [Daniel Danano Dale, Italy]	Noted
24404	42	1	42	2	This section, yet to be developed, should engage with land degradation neutrality as a high level response to land degradation and review available scientific literature deadling with this approach. (See https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf and https://doi.org/10.1016/j.envsci.2017.10.011). "Higher-level responses to land degradation". This would open up opportunities to also discuss the interaction between agricultural land and non-used ecosystems, how they interact, and the interaction of climate change and land degradation trends. [Barron Joseph Orr, Germany]	Accepted - LDN is discussed in the new text
7098	42	1	42	2	It will be relevant to include the concept of Land Degradation Neutrality in section 4.10.2 on "Higher-level responses to land degradation", and thereby also discuss the interaction between agricultural ares and non-used ecosystems, and their interrelationschops in light of climate change and land degradation. [Mariam Akhtar-Schuster, Germany]	Accepted - LDN is discussed in the new text
14524	42	1	42	2	It will be relevant to include the concept of Land Degradation Neutrality in section 4.10.2 on "Higher-level responses to land degradation", and thereby also discuss the interaction between agricultural ares and non-used ecosystems, and their interrelationschops in light of climate change and land degradation. [Rattan Lal, United States of America]	Accepted - LDN is discussed in the new text
6626	42	5			in this chapter the contribution increasing soil organic matter to restore soils and contribute to climate change mitigation and food security should be mentioned. [Cornelia Rumpel, France]	Accepted - this is discussed in the new text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1564	42	8			Section 4.10.4. Why is resilience givne so much attention and vulnerability in which Coping capacity constitutes resilience is not? See Turner et al 2003 PNAS; S L Cutter has several articles in which she combines vulnerability and resilience; as written, this section shows strong ecosystem-resilience bias to me [Billie Turner II, United States of America]	Noted. Due to space limits we can't expand the discussion on the theroretical relationships between resilience and vulnerability.
27348	42	9			Is resilience a good thing if the farming system provided barely subsistence livelihoods? [Doreen Stabinsky, United States of America]	Noted. The need to consider the desirability of the current state is mentioned, and it is suggested that if in an undesirable state, adapation or transformation are required.
20532	43	1	43	1	6. Figure 4.5 was used to compare the difference between resilience, adaptation and vulnerability, which is not enough to reflect some keys. Here, we should add more information on the vulnerability including adaptive capacity and resilience including adaptive capacity, so that we really understand the interactions between resilience-building and adaptations. [Huai Jianjun, China]	Noted. Due to space limits we can't expand the discussion on the theroretical relationships between resilience and vulnerability.
6548	43	1	43	2	I would suggest that a box be added after that of adaptation and coined maladaptation to emphasise on the negative responses from community. [Ojong.E nee Enokenwa Baa, South Africa]	Noted. Limits to adaptation are covered in section 4.11.8
19906	43	3	43	3	…….resilience communities. Source: (O'Connell et al. 2016). [Sabit Erşahin, Turkey]	Accepted
7626	43	7	43	7	The colour of the number of the "Box 4.1 " should be in black [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Noted - editorial
10990	43	9	43	15	This sounds somewhat prescriptive. It will be helpful to present what the literature says then assess these literature. [Debra Roberts, South Africa]	the text summarises recommendations and guidance from recent literature. It is now placed in a box.
19908	43	17	43	17	…….are (adapted from (O'Connell et al. 2016; Simonsen et al. 2014)): [Sabit Erşahin, Turkey]	Accepted
17122	43	4		7	There is mention here to low productivity pastures and referring to the Box 4.1. Pasture degradation is present in at least 50 M ha in Brazil. Lack of good management practices is the main cause. In contrast to Chapter 6, this chapter is not clear on this matter. Apparently because pasture is part of agriculture. However, "Livestock" and "pastures" are expressions used throughout the text. [Pedro Luiz Oliveira de Almeida Machado, Brazil]	Noted. Proposal not clear.
996	44	18	44	21	I miss a lot a comment about the use of agroecology techniques to improve the resilience of the ecosystem. The agroecology techniques have been used by the indigenous people for centruries [Jose Luis Vicente Vicente, Germany]	Accepted. Sentence added.
19078	44		44		Table 4.1 is too simplistic [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Table revised
26496	44	22			IPCC Uncertainty Language should be italicised throughout (Box 4.1) [Hans Poertner and WGII TSU, Germany]	Noted - editorial
3054	45	1	45	3	Finance: [Jagdish Kishwan, India]	Takein into account - finance is discussed in the new text
3064	45	1	45	3	Adoption of best practices in AFOLU to address land degradation requires an essential input of finance from public, private, market and non-market sources. Finance being key element needs to be dealt with in a separate section in Chapter 4. All good suggestions of adopting best practices to check land degradation will fail in absence of any indication of possible sources of supportive finance (To be preferably added as a separate section in Chapter 4, or prominently under sub-section 4.10.5 Barriers to implementation and …..p/4-45) [Jagdish Kishwan, India]	Taken into account - some of these issues are discussed in the new text
24934	45	4	45	45	Maybe add also the food production from urban agriculture, as discussed in another part of the report [Valerie Dermaux, France]	Accepted - text revised and urban agriculture now explicitly mentioned as an UGI
7940	45	11	45	11	Please avoid beginning sentences with stand-alone pronouns with ambiguous antecedents. Clarity will be improved by adding the appropriate word(s) after "this." [Paul Glaser, United States of America]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
790	45	16	45	19	Also concentrated sources of contaminants to the air and groundwater. [Paul Glaser, United States of America]	Accepted
10442	45	18	45	18	"Urbanisation, land degradation and climate change are therefore strongly related." Urbanization if properly planned may not pose such a big threat. The large amount of runoff produced from the cities could also be harvetsed in dams, which is another opprtunity for green energy production. people who leave the rural areas are coming mostly from the rural areas giving awy their lands. this presnts opprtunity for more agaricualtuarl land under SLM to be available [Zitouni Ould-Dada, Italy]	Rejected - no scientific evidence/publication provided to support changes suggested by the reviewer
7942	45	18	45	19	Urban regions are also concentrated sources of contaminant pollution to the air and groundwater. [Paul Glaser, United States of America]	Accepted - text revised
10444	45	31	45	32	"Sustainable intensification may be achieved through a wide variety of means; from improved nutrient and water use efficiency via plant and animal breeding programs, to the implementation of integrated soil and pest management practices." Agroecological approaches would help in addressing sustainable intensification. Agroecoloical approaches and practices will be helpful if included and discussed here [Zitouni Ould-Dada, Italy]	Noted - no changes made to this contribution as comment is out of scope
6772	45	5	46	16	Please check the publication of Shikha Ranjha, DLGS-IOER-TU Dresden, Brief for GSDR. https://bit.ly/2LHC7Ov, as it may contain useful information for this section. [Idowu Owoeye, Nigeria]	Noted - additional topic and reference included
3052	45	5	46	16	Reducing pressure of agriculture on land to address land degradation: [Jagdish Kishwan, India]	Accepted - text revised
3062	45	5	46	16	If agricultural lands are to be used for promoting NETs, even if in moderate proportion, alternative and innovative ways of producing traditional agricultural crops would need to be developed. In this regard, vertical agriculture, indoor farming, controlled environment agriculture (CEA) could be encouraged as an alternative to traditional land farming to meet agricultural products needs of urban areas (To be added suitably in sub-section 4.11.1 The role of urban green…..p/4-45) [Jagdish Kishwan, India]	Accepted - text revised
14526	45	4	51	18	The case studies in this chapter are confusing. I think they should be better arranged to make clear the isuue of what has been considered as a central idea of the chapter: either there are climate change adaptation cases or response to CC, or mitigation issues? [Rattan Lal, United States of America]	Noted - no changes made to this contribution.
1628	45		62		livestock manure (or compost) is the largest soil amendment that farmers (irrespecite small or large farm holdings) apply intend to improve their soil characteristics across the world. This fact emphasizes the need to have a case study in this chapter with observed positive soil rehabilitation impacts. Especially the small farm holdings (e.g.Asia) depend on manure or compost for crop nutrients and reduce the purchase of fertlizers to improve farm economics. [Rajesh Chintala, United States of America]	Noted - soil rehabilitation is relevant in several case studies, but there is not particular focussing on this. We have to keep the focus on climate change and land degradataion
26282	45	4	63	8	provide quantifications and turn section and its subsections into an assessment. See examples in Section 4.11.11 [Hans Poertner and WGII TSU, Germany]	Noted - no changes made to this contribution
5406	45	1			4.10.5 Barriers to implementation and “limits to adaptation” Placeholder. Section in progress. This is again another very important section of the document. Experience of FAO and other organizations that have been supporting country efforts in sustainable land management could useful will be usefull in eneriching this section. Field gained experince needs to be cited here [Daniel Danano Dale, Italy]	Noted - limits to adaptation is discussed inthe new text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5408	45	8			This rapid urbanisation is a severe threat to land and the provision of ecosystem services (Seto et al. 2012). It poses sever threat in certain cases but could also present opprtunity in the other cases (developeieng countries). As urbanization increases, the prospect for smallholders to leave their small plots, which in many cases are hiderances to SLM would be an opprtunity to consolidate the to bigger plots presents opportunities for SLM investment and enahncing land productivity . [Daniel Danano Dale, Italy]	Rejected - beyond the scope of the contribution
368	45	11			Please avoid beginning sentences with stand-alone pronouns with ambiguous antecedents. Clarity will be improved by adding the appropriate word(s) after "this." [Paul Glaser, United States of America]	Accepted
788	45	11			Please avoid begiining sentences with stand-alone pronouns with ambiguous antecedents. Clarity will be improved by adding the appropriate word(s) after "this" [Paul Glaser, United States of America]	accepted
370	45	18		19	Urban regions are also concentrated sources of contaminant pollution to the air and groundwater. [Paul Glaser, United States of America]	Accepted - text revised
5410	45	18			Urbanisation, land degradation and climate change are therefore strongly related. Urbanization if properly planned may not pose such a big threat. The large amount of runoff produced from the cities could be harvetsed /stored/ in dams, which is another opprtunity for clean / green / energy production. people who leave the rural areas are giving away their lands and this presents opprtunity for more agaricualtuarl land under SLM to be available. more sustainable agricultural production with conducive conditions for LDN [Daniel Danano Dale, Italy]	Rejected - no scientific evidence/publication provided to support changes suggested by the reviewer
11734	45	23			The definition of UGI should also include areas of indigenous ecosystems as a number of cities in the global South still have lare areas of the original ecosystems included in their municipal boundary. [Debra Roberts, South Africa]	Accepted - text revised
6628	45	29			add: Bioswales constructed with mineral and organic materials are especially efficient UGIs to capture stormwater runoff. [Cornelia Rumpel, France]	Accepted - text revised
5412	45	31			Sustainable intensification may be achieved through a wide variety of means; from improved nutrient and water use efficiency via plant and animal breeding programs, to the implementation of integrated soil and pest management practices. Agroecological approaches would help in addressing sustainable intensification. Agroecoloical approaches and practices will be helpful if included and discussed here [Daniel Danano Dale, Italy]	Noted - no changes made to this contribution as comment is out of scope
1566	45				Section 4.11.1.. There is a large literature on green spaces and consequences in urban climatology and in land system architecture, as might be found in Landscape and Urban Planning. It is omitted here. [Billie Turner II, United States of America]	Noted - relevant but has not been covered specifically due to space limitation.
8158	46	8	46	8	The word 'against' after UGI to mitigate is suggested to be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Accepted
8160	46	8	46	8	The words 'more generally' are suggested to be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Accepted
14528	46	17	46	17	Add integrated soil fertility management including fertilizer use in this section? [Rattan Lal, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
6766	46	17	46	19	The heading 4.11.2 has a long title that should be reduced, the words in brackets should be removed for the title to be catchy, clear and explanatory. [Idowu Owoeye, Nigeria]	Noted - the section has been substantially revised and shifted into a cross chapter box

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17566	46	17	46	40	Highly suggested to give some space to biotechnologies as a means for sustainable ag. Intensification. Similarly Conservation Agriculture is a very important intensificaiton technology. Some reference should be made also to "Pasture Cropping" , an Australian technology that is slowly expanding in other places where it is feasible. (http://www.pasturecropping.com/pasture-cropping) also https://www.bing.com/search?q=pasture+cropping&form=EDGEAR&qs=PF&cvid=6174f862e72541f2ad98433faa773bdd&cc=IT&setlang=en-US&PC=LSJS [TURI FILECCIA, Italy]	Noted - the section has been substantially revised and shifted into a cross chapter box
14932	46	20	46	40	Considering the challenges associated with sustainable intensification. I think there is a need to point out or explain the trade-offs in the means suggested to achieve a sustainable land use intensification to minimize land degradation especially in dryland areas [Barnabas Msongaleli, United Republic of Tanzania]	Noted - the section has been substantially revised and shifted into a cross chapter box
3228	46	23	46	24	The review by Erb K-H, Haberl H, Jepsen MR, et al (2013) A conceptual framework for analysing and measuring land-use intensity. Current Opinion in Environmental Sustainability 5:464–470. doi: 10.1016/j.cosust.2013.07.010 should be discussed here. [Karlheinz Erb, Austria]	Noted - the section has been substantially revised and shifted into a cross chapter box
8162	46	29	46	29	The phrase 'and while also' is suggested to be replaced with 'simultaneously'. [Muhammad Mohsin Iqbal, Pakistan]	Noted - the section has been substantially revised and shifted into a cross chapter box
3230	46	32	46	40	The passge is somewhat vague and generic [Karlheinz Erb, Austria]	Noted - the section has been substantially revised and shifted into a cross chapter box
1620	46	42	46	42	section 4.11.2.1 is incomplete [Rajesh Chintala, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
18638	46	42	46	45	In this section discussion could also be included which addresses the potential for breeding to reduce heat stress on plant and animals. [Henry Allen Torbert, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
1568	46	41			4.11.2.1. Should examine this reference: Critical Role of Animal Science Research in Food Security and Sustainability. National Research Council, National Academies Press: Washington, D.C. 2015. [Billie Turner II, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
17132	46	42			Advancements in the zebu breeding together with forage grasses in Brazil enabled increased productivity of both beef and dairy while favouring less land degradation (Jank et al. 2017; Martha et al. 2012). References: Jank, L., Barrios, S.C., Valle, C.B., Simeao, R.M., Alves, G. The value of improved pastures to Brazilian beef production. Crop and Pasture Science, 65: 1132-1137. Martha, G.B., Alves, E., Contini, E. Land-savings approach and beef production growth in Brazil. Agric. Systems 110: 173-177. [Pedro Luiz Oliveira de Almeida Machado, Brazil]	Noted - the section has been substantially revised and shifted into a cross chapter box
14530	47	1	47	1	Add points on "digital soil-agronomy" as part of precision agriculture [Rattan Lal, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
26284	47	1	47	18	how efficient is this method? please provide quantitative data [Hans Poertner and WGII TSU, Germany]	Noted - the section has been substantially revised and shifted into a cross chapter box
24938	47	1	47	18	it could be added to be clearer that what IPPC is defining is high tech precision Ag (line 5 to 9) and low tech precision ag (line 14 to 18), so those concept could be used in other parts of the report, to be more precise. Both low and high tech precision agriculture can be used in the north, using "skilled eye of an experienced farmer" is also a principle of agroecology. [Valerie Dermaux, France]	Noted - the section has been substantially revised and shifted into a cross chapter box

Comment No	From Page	From Line	To Page	To Line	Comment	Response
998	47	2	47	18	My experience is that the precision agriculture is used mainly in comercial crops (i.e. big monocultures), in order to obtein the highest economic benefits. On the other hand, in the Global South (especially farmers in Latinamerica, Asia and Africa) usually apply the agroecology techniques, based on centuries of experience rather than the precision agriculture. [Jose Luis Vicente Vicente, Germany]	Noted - the section has been substantially revised and shifted into a cross chapter box
10992	47	12	47	12	Consider replacing 'at' with 'as' [Debra Roberts, South Africa]	Noted - the section has been substantially revised and shifted into a cross chapter box
10994	47	12	47	12	Insert 'as' after 'such' [Debra Roberts, South Africa]	Noted - the section has been substantially revised and shifted into a cross chapter box
27532	47	14	47	15	precision farming does have a role but the rates of adoption are generally very slow [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Noted - the section has been substantially revised and shifted into a cross chapter box
8164	47	29	47	29	The word 'as' may be added after 'such'. [Muhammad Mohsin Iqbal, Pakistan]	Noted - the section has been substantially revised and shifted into a cross chapter box
18434	47	37	47	37	Add new subsection 4.11.2.4 Agroslivipasture production Improving regional integrated sustainable food security, agroslivipasture can provide additional ecosystem services when compared with monoculture crop systems, rebuilding land productivity in rangelands through integrated schemes that combine newly adapted species (plants and animals) with conservation agriculture, sustainable grazing techniques, and water harvesting. Adaptable and practical payment schemes for environmental services will support the adoption of technological packages under rangeland conditions (Elbehri etal , 2017) Elbehri etal , 2017: Elbehri, A., Challinor, A., Verchot, L., Angelsen, A., Hess, T., Ouled Belgacem, A., Clark, H., Badraoui, M., Cowie, A., De Silva, S., Erickson, J. Joar Hegland, S., Iglesias, A., Inouye, D., Jarvis, A., Mansur, E., Mirzabaev, A., Montanarella, L., Murdiyarso, D., Notenbaert, A., Obersteiner, M., Paustian, K., Pennock, D., Reisinger, A., Soto, D., Soussana, J-F., Thomas, R., Vargas, R., Van Wijk, M. & Walker, R.FAO-IPCC Expert Meeting on Climate Change, Land Use and Food Security: Final Meeting Report; January 23-25, 2017 FAO HQ Rome. FAO and IPCC, 2017 [Sawsan Mustafa, Sudan]	Noted - the section has been substantially revised and shifted into a cross chapter box
11486	47	9			Pease define “traditional” in this context (large-scale monoculture?). [Debra Roberts, South Africa]	Noted - the section has been substantially revised and shifted into a cross chapter box
27350	47	19			Sustainable land management, and its constituent practices, should be the foundation for considering various agricultural practices included in the assessment. Chapter 3 provides a useful overview of SLM technologies and practices. Various other terms are used to group sets of practices -- climate-smart agriculture, sustainable intensification, conservation agriculture. The use of multiple different aggregate packages of practices is confusing, confounding, and undermines the analytical potential of the assessment. Understanding potential contributions of the constituent practices is extremely important. It is almost meaningless to talk about the contribution of "climate-smart agriculture" or "sustainable intensification" without knowing which constituent practices are or are not included in the assessment / analysis. The term "sustainable intensification" suffers in particular from tautological thinking. Measures to increase productivity, that are sustainable, are labelled sustainable intensification. It is really not a useful term, particularly in a scientific assessment which should be able to clearly explain the contributions of particular practices. [Doreen Stabinsky, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9198	48	1	48	6	A sustainable intesification is wishful thinking which is in fact only a very confused and dangerous prayer without specifying the necessary societal, economic and political conditions. It seems very doubtful that a natural resource can be exploited in a reasonable way, that is without exhausting it in a self-regulating liberal economy. The association of sustainable and intensification, as sustainable development before, seems to be a new oxymoron in the field of "green whashing". [Alex Baumel, France]	Noted - the section has been substantially revised and shifted into a cross chapter box
14532	48	7	48	7	This section is shallow which needs major revision? [Rattan Lal, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
10996	48	25	48	25	Since other sub-sections do not have a concluding sub-section, you might want to consider removing the sub-heading (4.11.2.5) for consistency across the chapter and the entire report. The concluding points should remain. [Debra Roberts, South Africa]	Noted - the section has been substantially revised and shifted into a cross chapter box
14864	48	25	48	31	In link with the combination of land sparing and sharing options of land management, this section should present “landscape approaches” to address inter-connected multi-dimensional challenges such as land degradation by focussing on integrated solutions at landscape scales. Some useful references: - DeFries, R., & Rosenzweig, C. (2010). Toward a whole-landscape approach for sustainable land use in the tropics. Proceedings of the National Academy of Sciences, 107(46), 19627-19632. - Reed, J., Van Vianen, J., Deakin, E. L., Barlow, J., & Sunderland, T. (2016). Integrated landscape approaches to managing social and environmental issues in the tropics: learning from the past to guide the future. Global change biology, 22(7), 2540-2554. - Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J. L., Sheil, D., Meijaard, E., ... & van Oosten, C. (2013). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. Proceedings of the national academy of sciences, 110(21), 8349-8356. [Florian Claeys, France]	Noted - the section has been substantially revised and shifted into a cross chapter box
14934	48	30	48	31	I totally agree with the third conclusion, but I continue asking myself "where is the balance" to overcome this enemity between short-term and long-term in implementing intensification [Barnabas Msongaleli, United Republic of Tanzania]	Noted - the section has been substantially revised and shifted into a cross chapter box
1622	48		48		There is no description found in the text about Figure 4.6 [Rajesh Chintala, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
18640	48	7			The potential in extended growing season due to global warming could also facto into this discussion. [Henry Allen Torbert, United States of America]	Noted - the section has been substantially revised and shifted into a cross chapter box
6630	48	20			add after functional traits: or legumes (Crème et al., 2016; Crème, A., Rumpel, C., Gastal, F., Mora, M.-L., Chabbi, A., 2016 : Effect of grasses and a legume grown in monoculture or mixture on soil organic matter and phosphorus forms. Plant and Soil, 402, 117-128. [Cornelia Rumpel, France]	Noted - the section has been substantially revised and shifted into a cross chapter box
6632	48	31			add: agricultural systems have to be diversified in order to reach sustainability [Cornelia Rumpel, France]	Noted - the section has been substantially revised and shifted into a cross chapter box

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14960	49	3	49	3	- Soussana, J. F., Loiseau, P., Vuichard, N., Ceschia, E., Balesdent, J., Chevallier, T., & Arrouays, D. (2004). Carbon cycling and sequestration opportunities in temperate grasslands. Soil use and management, 20(2), 219-230. - Tubiello, F. N., Soussana, J. F., & Howden, S. M. (2007). Crop and pasture response to climate change. Proceedings of the National Academy of Sciences, 104(50), 19686-19690. - Soussana, J. F., & Lemaire, G. (2014). Coupling carbon and nitrogen cycles for environmentally sustainable intensification of grasslands and crop-livestock systems. Agriculture, Ecosystems & Environment, 190, 9-17. [Florian Claeys, France]	Accepted
7944	49	4	49	4	See my comments above with regard to stand-alone pronouns. For example, the authors intention can be clarified by changing "this" to "this deficiency" [Paul Glaser, United States of America]	Accepted
25694	49	26	49	27	To "deter" bacteria and fungi seems like shady business. I think the effects of aggregates and other helpful components are twofold: to protect organic compounds from decompostition and channel/recycle compounds into new use. [Jon Magnar Haugen, Norway]	Accepted
478	49	27	49	30	Tillage promotes breaking of soil aggregates, exposing once protected SOM to microbes. But it is also important to mention that tillage breaks the soil structure introducing in soil much more O2 (oxygen) than in understurbed soil. The increase of oxygen plays an important role in the increase of microbial activity (aerobic), and on the subsequent soil CO2 emission. Keeping or not crop residues on soil surface has probably also an effect on oxygen content inside soil, reducing microbial activity and emission. Avoiding tillage and keeping soil cover on soil surface keeps soil oxygen content at lower concentrations, two options to avoid losses through soil C-CO2 emission. [Newton La Scala Jr., Brazil]	Accepted
18642	49	3			This section of the chapter is very interesting, but seems to be out of place for this chapter. This discussion is a potential climate change mitigation strategy and not a discussion on land degradation. [Henry Allen Torbert, United States of America]	Taken into account - the section has been revised and includes a thorough discussion about land degration
372	49	4			See my comments above with regard to stand-alone pronouns. In the authors intention can be clarified by changing "this" to "this deficiency" [Paul Glaser, United States of America]	Accepted
792	49	4			see my comments above with regard to stand-alone pronouns. If the authors intention can be clarified by changing "this" to "this deficiency" [Paul Glaser, United States of America]	Accepted
26286	49	46			italicise species names [Hans Poertner and WGII TSU, Germany]	Accepted
10998	50	8	50	8	First time usage; write acronym in full. [Debra Roberts, South Africa]	Accepted
480	50	20	50	22	I suggest refering to some other works performed in south-central Brazil, annual crops converted from conventional to no-till. Please see La Scala et al. 2012, Braz. J. Biology, where a list of some other works are cited. [Newton La Scala Jr., Brazil]	Accepted
25824	50	24	50	27	Figure not needed, concentrate on figures that are policy relevant or provide conceptual or mechanistic understanding [Hans Poertner and WGII TSU, Germany]	Rejected - the figure provides empirical evidence of the difference beween perennial and annual grain crops
26288	51	9	51	18	"large", "several" please be specific, quantify [Hans Poertner and WGII TSU, Germany]	Noted - specificity has been increased where possible

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7100	51	19	53	4	Clarificaton required: Based on the definitions provided for "restoration" and "rehabilitation" on page 10 (lines 14-19), the very interesting reforestation study from South Korea may not be purely a "restoration" initiative but rather a mix of restoration and rehabilitation measures? [Mariam Akhtar-Schuster, Germany]	Accepted - both terms are added to the section title
14534	51	19	53	4	Clarificaton required: Based on the definitions provided for "restoration" and "rehabilitation" on page 10 (lines 14-19), the very interesting reforestation study from South Korea may not be purely a "restoration" initiative but rather a mix of restoration and rehabilitation measures? [Rattan Lal, United States of America]	Accepted - both terms are added to the section title (Same comment as above?)
6768	51	19	53	16	The title mentions China and South Korea, however the case study is only about South Korea – where is the China case study? [Idowu Owoeye, Nigeria]	Accepted - China Case study has been added.
26290	51	21	53	16	case study could form a box [Hans Poertner and WGII TSU, Germany]	Noted - we considered this but with both Korea and China now included the text is too long for a box and there is a cross-chapter box on the general issue.
16066	51	24	54	11	IPCC needs to better integrate and coordinate across IPCC Working Groups, as well as enhance interaction between scientist and policy makers [Youssouph Sane, Senegal]	Noted - no comment provided that can be addressed in the context of this text.
26292	52	1	52	6	please provide years in which the photos were taken [Hans Poertner and WGII TSU, Germany]	Accepted - we are trying to get this information but have not yet succeeded. If possible the years will be included in the Final Draft.
25822	52	2	52	6	Figure not needed, concentrate on figures that are policy relevant or provide conceptual or mechanistic understanding [Hans Poertner and WGII TSU, Germany]	Rejected - Authors feel that an illustrative example is useful for the readers. If space is limiting in the Final Draft the Figure can still be removed.
19568	52	1		6	It would be necessary to announce the figure (4.8) and to envisage a legend of explanation [Ibouraïma Yabi, Benin]	Accepted - Figure is no referenced in the text.
8166	53	3	53	3	The word 'avoid' is suggested to be changed to 'avoided'. [Muhammad Mohsin Iqbal, Pakistan]	Accepted - text corrected
2554	53	3	53	3	Reword sentence: "…importance of avoiding…". The authors should check the text of this chapter carefully. [William Lahoz, Norway]	Accepted - text corrected
8168	53	6	53	6	The phrase 'the fact that' is suggested to be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Rejected - no reason provided why this should be deleted.
8170	53	7	53	7	Please see if the word 'forestation' is actually 'reforestation'. [Muhammad Mohsin Iqbal, Pakistan]	Accepted - text corrected
14742	53	20	53	20	Here I suggest adding the seminal reference on this subject by Eville Gorham (Gorham, E. (1991) Northern Peatlands: Role in the Carbon Cycle and Probable Responses to Climatic Warming. Ecological Applications 1:182-195). [Paul Glaser, United States of America]	Rejected: The objective of the SR is to assess new information since AR5. We are not providing a conpreheniseve literature review.
14744	53	22	53	22	Here I suggest adding the seminal reference on this subject by Eville Gorham (Gorham, E. (1991) Northern Peatlands: Role in the Carbon Cycle and Probable Responses to Climatic Warming. Ecological Applications 1:182-195). [Paul Glaser, United States of America]	Rejected: The paper is irrelevant to the point being made.
7946	53	31	53	32	I urge the authors to refrain from using "validation" ("the model needs further validation") with regard to a mathematical models since no model simulation can be validated (see Konikow and Brederhoef (1992) and Oreskes et al. (1994). [Paul Glaser, United States of America]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7948	53	31	53	32	Simply put, no model calibration is unique since multiple calibrations of the same model (or different models governed by different equations) can produce the same result. I suggest changing "validation" to "ground truth" or by avoiding jargon altogether "field verification." See:(Konikow, L.F. and J.D.Bredehoft. 1992. Ground-water models cannot be validated. Advances in Water Resources 15: 75-83: Oreskes, N. K. Shrader-Frechette, and K. Belitz (1994). Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences Science, 263 (5147): 641-646 [Paul Glaser, United States of America]	Accepted
14746	53	31	53	32	I would strongly urge the authors to cite the seminal papers by Dommain that are based on actual field surveys (Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32). [Paul Glaser, United States of America]	Accepted
14748	53	31	53	32	I urge the authors to refrain from using "validation" ("the model needs further validation") with regard to a mathematical models since no model simulation can be validated (see Konikow and Brederhoef (1992) and Oreskes et al. (1994). Simply put, no model calibration is unique since multiple calibrations of the same model (or different models governed by different equations) can produce the same result. I suggest changing "validation" to "ground truth" or by avoiding jargon altogether "field verification." See:(Konikow, L.F. and J.D.Bredehoft. 1992. Ground-water models cannot be validated. Advances in Water Resources 15: 75-83: Oreskes, N. K. Shrader-Frechette, and K. Belitz (1994). Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences Science, 263 (5147): 641-646 [Paul Glaser, United States of America]	Accepted
14750	53	38	53	38	I would urge the authors to also use a more up to date and better documented paper by the same lead author: (Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32; Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32. [Paul Glaser, United States of America]	Accepted
7950	53	43	53	43	Insert "lowlands" before "peatlands to acknowledge that carbon accumulation rates are also available for sites at higher elevations in the altiplano. [Paul Glaser, United States of America]	Accepted
5088	53		55		this tropical peat soil section is a clear example of a nice overview. But what do we learn from this. What can a policy maker do based on this [Gert-Jan Nabuurs, Netherlands]	Noted: IPCC is not policy prescriptive.
11488	53	8			“recovered the forest ecosystems” should be evaluated critically in terms of exotic monoculture versus indigenous mixed forests. Reforestation has the most co-benefits if local biodiversity is enhanced. [Debra Roberts, South Africa]	Noted - and when the first and last photo in the time series are compared - denuded hills with very little vegatation vs. restored forest ecosystems (planted often with native species) surely the biodiversity has been enhanced through this program.
374	53	20			Here I suggest adding the seminal reference on this subject by Eville Gorham: Gorham, E. (1991) Northern Peatlands: Role in the Carbon Cycle and Probable Responses to Climatic Warming. Ecological Applications 1:182-195. [Paul Glaser, United States of America]	Rejected: The objective of the SR is to assess new information since AR5. We are not providing a conpreheniseve literature review.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
794	53	20			Here I suggest adding the seminal reference on this subject by Eville Gorham: Gorham, E. (1991) Northern Peatlands: Role in the Carbon Cycle and Probable Responses to Climatic Warming. Ecological Applications 1:182-195. [Paul Glaser, United States of America]	Rejected: The objective of the SR is to assess new information since AR5. We are not providing a conpreheniseve literature review.
376	53	22			I would strongly urge the authors to cite the seminal papers by Dommain that are based on actual field surveys: Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32 [Paul Glaser, United States of America]	Rejected: The paper is irrelevant to the point being made.
796	53	22			I would strongly urge the authors to cite the seminal papers by Dommain that are based on actual field surveys: Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32. [Paul Glaser, United States of America]	Rejected: The objective of the SR is to assess new information since AR5. We are not providing a conpreheniseve literature review.
378	53	31		32	"the model needs further validation" I urge the authors to refrain from using "validation" with regard to a mathematical models since no model simulation can be validated (see Konikow and Brederhoef (1992) and Oreskes et al. (1994). Simply put, no model calibration is unique since multiple calibrations of the same model (or different models governed by different equations) can produce the same result. I suggest changing "validation" to "ground truth" or by avoiding jargon altogether "field verification" See: Konikow, L.F. and J.D. Bredehoft. 1992. Ground-water models cannot be validated. Advances in Water Resources 15: 75-83. Oreskes, N. K. Shrader-Frechette, and K. Belitz (1994). Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences Science, 263 (5147): 641-646 [Paul Glaser, United States of America]	Accepted
798	53	32			Please refrain from using the controversial term "Model Validation" since it is impossible to validate any mathematical model Simply put, no model calibration is unique since multiple calibrations of the same model (or different models governed by different equations) can produce the same result. I suggest changing "validation" to "ground truth" or by avoiding jargon altogether. See: Konikow, L.F. and J.D. Bredehoft. 1992. Ground-water models cannot be validated. Advances in Water Resources 15: 75-83.....Oreskes, N. K. Shrader-Frechette, and K. Belitz (1994). Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences Science, 263 (5147): 641-646.....I therefore suggest substituting "ground-truth" in place of :validation" which confers a false sense of certainty. [Paul Glaser, United States of America]	Accepted
380	53	38			I would urge the authors to also use a more up to date and better documented paper by the same lead author: Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32. paper by the same authors: Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32. [Paul Glaser, United States of America]	Accepted

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800	53	38			I would urge the authors to also use a more up to date and better documented paper by the same lead author: Dommain, R., Couwenberg, J., Glaser, P.H., & Suryadiputra, I. N. N. (2014). Carbon storage and release in Indonesian peatlands since the last deglaciation. Quaternary Science Reviews, 97, 1–32. [Paul Glaser, United States of America]	Accepted
382	53	43			insert "lowlands" before "peatlands to acknowledge that carbon accumulation rates are available for sites in the altiplano. [Paul Glaser, United States of America]	Accepted
802	53	43			insert "lowlands" before "peatlands to acknowledge that carbon accumulation rates are avaliable for sites in the altiplano. [Paul Glaser, United States of America]	Accepted
188	53				Land degradation related to salinification of freshwater areas in estuaries can be reversed via freshwater remediation. See: Middleton, B.A. and N. Souter. 2016. Functional integrity of wetlands, hydrologic alteration and freshwater availability. ESA Ecosystem Health and Sustainability 2(1):e01200.doi:10.1002/ ehs2.1200 [Beth Middleton, United States of America]	Accepted
804	54	1	54	6	Here the authors may wish to cite Dommain et al (in press, Global Change Biology), which quantifies the impact of of peatland growth and conversion on the radiative balance of the global climate system both before and after their conversion to agricultural plantations Dommain, R., S. Frolking, A. Jeltsch-Thömmes, F. Joos, J. Couwenberg, and P. Glaser (in press). A radiative forcing analysis of tropical peatlands before and after their conversion to agricultural plantations. Global Change Biology [Paul Glaser, United States of America]	Accepted
14752	54	1	54	6	Here the authors may wish to cite Dommain et al (in press, Global Change Biology), which quantifies the impact of of tropical peatland on the radiative balance of the global climate system both before and after their conversion to agricultural plantations: (Dommain, R., S. Frolking, A. Jeltsch-Thömmes, F. Joos, J. Couwenberg, and P. Glaser (in press). A radiative forcing analysis of tropical peatlands before and after their conversion to agricultural plantations. Global Change Biology). [Paul Glaser, United States of America]	Accepted
17316	54	9	54	17	A similar explanation needs to be provided for tropical South America, where El Niño and warm conditions en tropical north atlantic produce drought and consequently impacts in foerst (e.g. Espinoza et al., 2011. Geophys. Res. Lett. 38(13): L13406; Marengo et al 2011.Geophys. Res. Lett. 38: 1–5 ; Fernandes et al., 2011; Espinoza et al 2016. doi: 10.1002/2016WR019305, Muñoz-Jimenez, 2016. doi:10.1038/srep33130). [Jhan Carlo Espinoza, France]	Rejected: We agree in principle, but this section is about peat fires, not El Nino. At the moment, SA peatlands are not burning.
14754	54	9	54	17	Here I also suggest including a reference to Page et al, which specifically addresses the role of fire and carbon fluxes in SE Asian peatlands. (Page, S. E., Rieley, J. O., & Banks, C. J. (2011). Global and regional importance of the tropical peatland carbon pool. Global Change Biology, 17, 798–818). [Paul Glaser, United States of America]	Rejected: The objective of the SR is to assess new information since AR5. We are not providing a comprehensive literature review.
7952	54	27	54	27	Would it be possible to add the areal extent of these valuations (e.g. USD $3,835 and $9,630) per ha?????)? [Paul Glaser, United States of America]	Accepted
7954	54	37	54	37	But Line Rochfort (University of Laval Quebec) and Jonathon Price (University of Waterloo, Ontario) present a more optimistic outlook for restoration in North America, despite the irreversible hydrologic changes that are induced by peatland conversion. One of the more important problems that Dr. Rochfort encountered was preventing blocked ditches from flooding small cutover raised bogs in eastern Canada. [Paul Glaser, United States of America]	Accepted

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384	54	1		6	Here the authors may wish to cite Dommain et al (in press, Global Change Biology), which quantifies the impact of of tropical peatland on the radiative balance of the global climate system both before and after their conversion to agricultural plantations. Dommain, R., S. Frolking, A. Jeltsch-Thömmes, F. Joos, J. Couwenberg, and P. Glaser (in press). A radiative forcing analysis of tropical peatlands before and after their conversion to agricultural plantations. Global Change Biology [Paul Glaser, United States of America]	Accepted
392	54	2			The authors may also wish to refer to the recent review by Dommain: Dommain, R., Dittrich, I., Giesen, W., Joosten, H., Rais, D. S., Silvius, M., & Wibisono, I. T. C. (2016). Ecosystem services, degradation and restoration of peat swamps in the Southeast Asian tropics. In Bonn, A., Allott, T., Evans, M., Joosten, H., & Stoneman, R. (Eds.) Peatland Restoration and Ecosystem Services: Science, Policy and Practice (pp. 253–288). Cambridge: Cambridge University Press. [Paul Glaser, United States of America]	Rejected: The objective of the SR is to assess new information since AR5. We are not providing a comprehensive literature review.
386	54	9		17	Here I also suggest including a reference to Page et al, which specifically addresses the role of fire and carbon fluxes in SE Asian peatlands. Page, S. E., Rieley, J. O., & Banks, C. J. (2011). Global and regional importance of the tropical peatland carbon pool. Global Change Biology, 17, 798–818. [Paul Glaser, United States of America]	Rejected: The objective of the SR is to assess new information since AR5. We are not providing a conpreheniseve literature review.
806	54	17			Here I also suggest including a reference to which specifically addresses the role of fire and carbon fluxes in SE Asian peatlands. Page,S.E. F. Siegert, J. O. Rieley, H.-Di. V. Boehm, A. Jayak and S. Limink (2002). The amount of carbon released from peat and forest fires in Indonesia during 1997. Nature 420: 61-65. Page S. et al. (2009) Tropical peatland fires in Southeast Asia. In: Tropical Fire Ecology. Springer Praxis Books. Springer, Berlin, Heidelberg [Paul Glaser, United States of America]	Accepted
388	54	27			Would it be possible to add the areal extent of these valuations (e.g. USD 3,835 and 9,630) per ha?????)? [Paul Glaser, United States of America]	Accepted
390	54	37			But Line Rochfort (University of Laval Quebec) and Jonathon Price (University of Waterloo, Ontario) present a more optimistic outlook for restoration in North America, despite the irreversible hydrologic changes that are induced by peatland conversion. One of the more important problems that Dr. Rochfort encountered was preventing blocked ditches from flooding small raised bogs in eastern Canada. [Paul Glaser, United States of America]	Accepted: I have added references, but all optimism that I find is qualified.
808	54	37			But Line Rochfort (U. Laval, Quebec) and Jon Price (Uof Waterloo, Ontario) and their research groups present a more optimistic view on peatland restoration in Canada. [Paul Glaser, United States of America]	Rejected: This is grey literature
14756	55	2	55	2	The authors may also wish to refer to the recent review by Dommain (Dommain, R., Dittrich, I., Giesen, W., Joosten, H., Rais, D. S., Silvius, M., & Wibisono, I. T. C. (2016). Ecosystem services, degradation and restoration of peat swamps in the Southeast Asian tropics. In Bonn, A., Allott, T., Evans, M., Joosten, H., & Stoneman, R. (Eds.) Peatland Restoration and Ecosystem Services: Science, Policy and Practice (pp. 253–288). Cambridge: Cambridge University Press). [Paul Glaser, United States of America]	Rejected: This is grey literature
19912	55	25	55	26	……forests (Flannigan et al. 2005a; Flannigan et al. 2005b, 2009; Balshi et al. 2009; Enright et al. 2015). [Sabit Erşahin, Turkey]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
8172	55	31	55	31	The word 'moister' is suggested to be replaced with 'moist'. [Muhammad Mohsin Iqbal, Pakistan]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19914	55	36	55	37	Merge to previous pharagraph [Sabit Erşahin, Turkey]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
19916	55	46	55	47	Merge to previous pharagraph [Sabit Erşahin, Turkey]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
26294	55	3	56	36	good idea to place this information in a box and link with other chapters. Also consider Chapter 3 here. Condense text to essential information [Hans Poertner and WGII TSU, Germany]	Accepted - this has been moved to a cross chapter box
7628	55	6	56	36	In this text, sometimes it's writen "wildfire ", and sometimes, it's writen " wild fires ". That should be corrected [Boyossoro Hélène Kouadio, Cote d'Ivoire]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
14536	55	6	56	36	Chapter "4.11.7 Increasing frequencies and intensities of woodlands forest fires" shows great examples from different parts of the world. It would be usefull to have some examples from East-South Europe which is very vulnerable on this phenomena. [Rattan Lal, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
810	55	2			The authors may also wish to refer to the recent review by Dommain: Dommain, R., Dittrich, I., Giesen, W., Joosten, H., Rais, D. S., Silvius, M., & Wibisono, I. T. C. (2016). Ecosystem services, degradation and restoration of peat swamps in the Southeast Asian tropics. In Bonn, A., Allott, T., Evans, M., Joosten, H., & Stoneman, R. (Eds.) Peatland Restoration and Ecosystem Services: Science, Policy and Practice (pp. 253–288). Cambridge: Cambridge University Press. [Paul Glaser, United States of America]	Rejected: This is grey literature
14806	55	18			this needs to be expanded - fire regimes are incredibly variable in temperate systems they are not predominately low to moderate - see DellaSala and Hanson 2015 for a global review - The ecological importance of high severity fires: nature's phoenix (Elsevier) [Dominick DellaSala, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
14808	55	23			this is too general misses the mark on regional specificity of fire regimes - there are numerous studies in western USA that show no increases in high severity fires - see work by Baker 2015 (PLOS ONE | DOI:10.1371/journal.pone.0136147 September 9, 2015), Law and Waring 2015 (http://dx.doi.org/10.1016/j.foreco.2014.11.023), Parks et al. 2016 f(Volume 6(12) v Article 275). Importantly, this fire section misses the mark on the link between logging and uncharacteristically severe fires - here are two examples: Bradley et al. 2016 (western USA: October 2016 v Volume 7(10) v Article e01492) and Hidden collapse is driven by fire and logging in a socioecological forest ecosystem David B. Lindenmayera,b,1 and Chloe Satoa (www.pnas.org/cgi/doi/10.1073/pnas.1721738115) [Dominick DellaSala, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
14810	55	25			there is uncertainty that needs to be accounted for in this - see Parks et al. 2016 (Environ. Res. Lett. 11 (2016) 035002 doi:10.1088/1748-9326/11/3/035002) for climate-fire model that shows a mid century western US decline in fire activity as biomass is consumed initially and fire suppression increases [Dominick DellaSala, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
14812	55	33			this is incredibly oversimplied - Russia has a substantial amount of boreal forests that burn in high severities. Russia has coastal rainforests on very long fire return intervals. This section on fire is incredibly general and incorrect overall [Dominick DellaSala, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
14814	55	36			I know of no situation where ground fires "weaken" a forest - please provide citations and regional specifiicty [Dominick DellaSala, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
11490	55				Section 4.11.7 contains various grammatical errors. Please proof. [Debra Roberts, South Africa]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19918	56	6	56	6	Esteves et al. (2012) have used the PESERA model to..... [Sabit Erşahin, Turkey]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
19920	56	12	56	12	....fire behavior (e.g., (Sullivan 2010; Matthews et al. 2012)),..... [Sabit Erşahin, Turkey]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
19922	56	25	56	25	Merge to previous pharagraph [Sabit Erşahin, Turkey]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
11000	56	26	56	32	The study which Price et al. 2013 relied on was more than 15 years ago. Has there been no recent studies of a similar nature? [Debra Roberts, South Africa]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
19924	56	33	56	36	Merge these two paragraphs into a single paragraph. [Sabit Erşahin, Turkey]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
14816	56	1			incomplete sentence and not sure what point is being made here - see DellaSala and Hanson 2015 for ecological benefits of large wildfires - this is a global review and should be included in your perspective on fire [Dominick DellaSala, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
14818	56	33			ok - but you left out the positive impacts - see DellaSala and Hanson 2015 for an entire book on the subject [Dominick DellaSala, United States of America]	Noted - this text has been greatly reduced and the essence moved to a cross chapter box.
7956	57	10	57	10	The authors may also want to consider the role of peat accretion in coastal wetlands on resisting the effects of rising sea levels. Peat accretion rates are highest in coastal zones experiencing rising sea levels or in subsiding basins in which the water table is rising. See: (Glaser, P.H., J. C. Volin, T. J. Givnish, B. C.S. Hansen, and C. A. Stricker (2012). Carbon and sediment accumulation in the Everglades (USA) during the past 4000 years: rates, drivers, and sources of error. Journal of Geophysical Research-Biogeosciences 117, G03026, doi:10.1029/2011JG001821, 2012.) The concern in the Everglades of South Florida is whether peat accretion rates can keep up with rising sea level and hence prevent salinization of this vast freshwater aquifer (as well as maintaining the hydraulic gradient necessary to allow the drainage required for maintaining coastal communities [Paul Glaser, United States of America]	Accepted - suggested text and referencewas added to the draft
14758	57	10	57	10	The authors may also want to consider the role of peat accretion in coastal wetlands on resisting the effects of rising sea levels. Peat accretion rates are highest in coastal zones experiencing rising sea levels or in subsiding basins in which the water table is rising. See: (Glaser, P.H., J. C. Volin, T. J. Givnish, B. C.S. Hansen, and C. A. Stricker (2012). Carbon and sediment accumulation in the Everglades (USA) during the past 4000 years: rates, drivers, and sources of error. Journal of Geophysical Research-Biogeosciences 117, G03026, doi:10.1029/2011JG001821, 2012.) The concern in the Everglades of South Florida is whether peat accretion rates can keep up with rising sea level and hence prevent salinization of this vast freshwater aquifer (as well as maintaining the hydraulic gradient necessary to allow the drainage required for maintaining coastal communities. [Paul Glaser, United States of America]	Accepted - suggested text and referencewas added to the draft
8174	57	14	57	15	The phrase 'for China's wetland degradation' after 'The reasons - -' is suggested tobe deleted. [Muhammad Mohsin Iqbal, Pakistan]	Taken into account - text deleted
7958	57	17	57	17	The authors should consult with Professor Line Rochfort of the University of Laval, Quebec for advice on how to proceed with this section. She is the expert on peatland restoration in Canada. [Paul Glaser, United States of America]	Noted
18880	57	19	60	14	mixed with case study in chapter 3,the Figure 3.11, Figure 3.12,Figure 3.13 in chapter almost same with the Figure 4.9,Figure 4.10,Figure 4.11 in chapter 4 [Jianguo Wu, China]	Taken into account - the section has been coordinated with Ch 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8176	57	19	60	14	The case study 4.11.9 Saltwater intrusion also exists in Chapter 3 under 3.8.2 Salinization due to salt water intrusion. A decision needs to be made as to under which chapter this fits best. [Muhammad Mohsin Iqbal, Pakistan]	Taken into account - the section has been coordinated with Ch 4
17594	57	20	60	14	Paragraph 4 11 9: In a further paragraph (about island and the use of walls to protect land gainst sea level rise), you speak about mitigating strategies through a critical point of view. Why not doing the same in this paragraph? For example there is now an increasing interest about Managed Aquifer Recharge, especially where rain intensity may be important. The idea is to harvest rainwater (that could not infiltrate for example in cities) to inject freshwater within aquifer using injection wells. This is a mitigating strategy first to allow greater aquifer recharge and favor groundwater use, but a secondary consequence would be to mitigate land degradation I guess. See for example Coelho V., *Bertrand G., Montenegro S., Paiva A., Batista L., Ferreira E (2018). Groundwater depth and electrical conductivity monitoring as a tool for designing further MAR strategies in a complex estuarial system. Example of Recife, Brazil. Journal of Environmental Management 209: 426-439. DOI: 10.1016/j.jenvman.2017.12.078 (and references therein) [Guillaume Bertrand, France]	Noted - but it does not really fit into this section
394	57	10			The authors may also want to consider the role of coastal wetlands that accumulate peat on resisting the effects of rising sea levels. Peat accretion rates are highest in coastal zones experiencing rising sea levels or in subsiding basins in which the water table is rising. The concern in the Everglades of South Florida is whether peat accretion rates can keep up with rising sea level and hence prevent salinization of this vast freshwater aquifer (as well as maintaining the hydraulic gradient necessary to allow the drainage required to prevent the coastal developed areas from flooding. [Paul Glaser, United States of America]	Accepted - suggested text was added to the draft
812	57	10			The authors may also want to consider the role of coastal wetlands that accumulate peat on resisting the effects of rising sea levels. Peat accretion rates are highest in coastal zones experiencing rising sea levels or in subsiding basins in which the water table is rising. The concern in the Everglades of South Florida is whether peat accretion rates can keep up with rising sea level and hence prevent salinization of this vast freshwater aquifer (as well as maintaining the hydraulic gradient that allows drainage necessary to prevent the coastal developed areas from flooding. [Paul Glaser, United States of America]	Accepted - suggested text was added to the draft
11736	57	11			The case studies in this section are a repeat of those in chapter 3 this sort of overlap must be resolved. [Debra Roberts, South Africa]	Taken into account - repeted case studies has been located either Ch3 or Ch4
396	57	17			The authors should consult with Professor Line Rochfort of the University of Laval, Quebec for advice on how to proceed with this section. She is the expert on peatland restoration in Canada. [Paul Glaser, United States of America]	Noted
25820	57	19			this case study is repeated in chapter 3, section 3.8.2, please consider how to deal with overlapping material [Hans Poertner and WGII TSU, Germany]	Taken into account - the section has been coordinated with Ch 5
11002	58	1	58	1	The left panel in Figure 4.9 appears squashed and it is quite difficult to read the texts. There is still space to stretch the panel a bit for to make the texts readable. [Debra Roberts, South Africa]	Taken into account - the figure is removed
25826	58	10	58	12	Figure not needed, concentrate on figures that are policy relevant or provide conceptual or mechanistic understanding [Hans Poertner and WGII TSU, Germany]	Taken into account - the figure is removed
11004	58	1	59	16	The figures on these pages have been used in chapter 3. Should you be using the very same pictures in this chapter? [Debra Roberts, South Africa]	Taken into account - the figure is removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3896	58		59		I feel the chapter is nicely written however the description about Fig. 4.9 (which is similar in Chapter 3 Fig. 3.11) needs to be made more precise. [Pushp Raj Tiwari, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - the figure is removed
190	58				Some of the salinification is due to extreme freshwater usage and should not all be attributed to sea level rise. [Beth Middleton, United States of America]	Noted - this is already mentioned in the first paragraph
11006	59	6	59	13	Consider adding quantitative information on economic loss as a result of the changes mentioned here. [Debra Roberts, South Africa]	Rejected - such information is not available
19612	59	6	59	13	The reason for the drying of Lake Urmia is the combination of climate change and human activities (water resources management) during the past three decades. The construction of numerous dams on the rivers entering this lake is the main reason for the drying of the lake. This problem is due to the weak scientific and management ability in the field of climate and water resources. The lake has now become a source of salt release to the northwestern regions of Iran. [sadegh ziayan, Iran]	Noted - this is already mentioned in this paragraph
10344	59	28	60	7	Too much overlap with sections of Chapter 3 [John Devaney, Ireland]	Taken into account - the section has now been synchronised with Ch 3
26498	60	21	60	29	Uncertainty Language is used here and in only very few other places. Needs to be used throughout the chapter [Hans Poertner and WGII TSU, Germany]	Noted
26728	60	22	60	24	High temp biochar are more stable over time, but they do immobilise P as an adverse effect. [Knud Christensen, Denmark]	Taken into consideration: immobilisation of P added
27352	60	15	61	47	This discussion on biochar is rather unbalanced and reads rather like a biochar advocacy piece. It does not reflect the broad range of scientific studies on the technology, particularly those that are more circumspect and nuanced about the technology's potential. Please do a more thorough and balanced literature review and clearly outline uncertainties, regional and local contingencies, etc. [Doreen Stabinsky, United States of America]	Taken into consideration. Text added to acknowledge negative results, limitations, and risks that need to be managed.
5072	60	15	61	47	Suggest that this might be moved to section 4.10 - Addressing/targeting land degradation. This seems more like a review of biochar as a technology (which is very relevant) as opposed to a specific case study of where it has been implemented. [Eamon Haughey, Ireland]	Noted - there will be references to this section in 4.10.
14866	60	15	61	47	This section lacks of objectivity and looks like a plea for biochar, without considering the negative trade-offs and the risks of this activity, especially in terms of air quality (Genesio et al.2016) and environmental contamination. The potential of biochar as a negative emission technology should also be questioned, in link with SR15 information. - Buss, W., Mašek, O., Graham, M., & Wüst, D. (2015). Inherent organic compounds in biochar–their content, composition and potential toxic effects. Journal of environmental management, 156, 150-157. - Genesio, L., Vaccari, F. P., & Miglietta, F. (2016). Black carbon aerosol from biochar threats its negative emission potential. Global Change Biology, 22(7), 2313-2314. - Yang, F., Guo, H. Y., Su, D. L., Cheng, Z. Q., & Liao, S. H. (2015, December). Environmental assessment of biochar for security applications. In Architectural, Energy and Information Engineering: Proceedings of the 2015 International Conference on Architectural, Energy and Information Engineering (AEIE 2015), Xiamen, China, May 19-20, 2015 (p. 157). CRC Press. [Florian Claeys, France]	Taken into consideration: Text added about the need to pelletise to avoid black carbon emissions (Genesio et al), and introduce governance mechanisms to manage contaminated feedstock (heavy metals are only a concern if feedstock is contaminated) and risks from incorrect operation of production facilities (highlighted by Buss et al study). Yang contradicts other research, inlcuding Buss et al., showing miinimial levels of PAHs
1000	60	21	61	20	I miss an explicit comment about the improvement in soil fertility properties (especially physical properties) after the biochar application. Also it would be interesting to talk about the ability of biochar to buffer soil and water pollution due to its high surface-reactivity capacities. [Jose Luis Vicente Vicente, Germany]	Accepted: impact on porosity added. Text already mentions reduction in fertiliser requirement and increase in woater holding capacity.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18644	60	15			Likewise, this section describes a potentially very valuable mitigating strategy, but does not seem to fit into the flow of the discussion regarding land degradation. I would suggest that sections 4.4.4 and 4.11.10 be rearranged in the chapter to present the potential mitigation discussion together. [Henry Allen Torbert, United States of America]	Noted - biochar work has been harmonized not only within the chapter but also across chapters.
11492	60	20			The idea of taking potential natural fertilizer (manure, crop residues, compost, poultry litter) that has very high biological value (and could be used to treat degraded and abandoned cropland) and converting it instead to inert carbon, through further investment of heat energy, does not make immediate sense. Is there any critical discussion on this in the literature? Also, what information exists regarding the impact of biochar on the full biological soil system? What about assessments of combination of biochar – with its specific benefits, and organic waste, in the context of reforestation and other land restoration/ rehabilitation efforts? This is briefly hinted at in pg 61 line 39. Please expand. Re pg 61 line 45, how about bringing in the question of invasive alien plants as a source of biochar? Has this been considered? These sort of multiple-benefit solutions would be most interesting to policy makers. [Debra Roberts, South Africa]	Taken into consideration. Research shows greater climate benefit from using biomass for biochar than for bioenergy, if applied in a context where it delivers agronomic benefits (inc yield, dec fertiliser) and/or reduces non-CO2 emissions Compared with composting, biochar carbon has much greater stability; nutrients are retained apart from loss of some N. Combining biochar and compost reduces non-CO2 emissions as noted. Various woody weeds have been investigated as feedstocks but biomass of these is limited compared with the amount of residues and energy crops potentially available. Due to the word limits there is little capacity to expand the text to cover these points, but brief mention of hese points has been added.
6634	60	36			add after 'negative priming has been observed' in loamy grassland soil (Ventura et al., 2015; Ventura, M., Alberti, G., Viger, M., Jenkins, J., Girardin, C., Baronti, S., Zaldei, A., Taylor, G; Rumpel, C. Miglietta, F., Tonon, G., 2015: Biochar mineralization and priming effect on SOM decomposition in two European short rotation coppices. Global Change Biology Bioenergy, 7:1150-1160, DOI: 10.1111/gcbb.12219.) and clayey soils.... [Cornelia Rumpel, France]	Accepted: text added as proposed.
26730	61	4	61	6	Mentioning reduced N fertiliser requirements, adverse effect on P should also be mentioned (Pyrolysis Temperature-Dependent Changes in Dissolved Phosphorus Speciation of Plant and Manure Biochars, Uchimiya et al, journal of agricultural and food industry, 2014) (Pyrolysis temperature affects phosphorus transformation in biochar: Chemical fractionation and 31P NMR analysis, Gang Xu et al, Science of the total environment, 1016) [Knud Christensen, Denmark]	Accepted: P immobilisation now mentioned.
24940	61	4	61	10	of course it is better to do biochat than to burn crop residue, but it would be interesting to detail more the pros and cons with compost and digest (in term of C loss, organic matter loss, GHG emissions loss...) [Valerie Dermaux, France]	Taken into consideration: contrast with C stability in compost has been added; benefit from co-composting with biochar has been added; due to word limits detailed contrast with compost cannot be included.
8178	61	6	61	6	Is the increased plant yield synanimous with increased grain yield or increased forage yield? May please be specified. [Muhammad Mohsin Iqbal, Pakistan]	Accepted: increased yields have been observed in many types of plantsinlcuding grain crops, forage crops and vegetables; now noted.
1624	61	22	61	36	The mention of biochar's capacity to increase carbon storage in soil is missing which adds recalcitrant carbon to soil and stays in soil for several years(high mean residence time or half-life). There is published literature for this finding [Rajesh Chintala, United States of America]	Noted: This point is already included.
1002	61	22	61	47	I suggest the authors to unify the two sections about biochar, since I think it is a bit repetitive. [Jose Luis Vicente Vicente, Germany]	Accepted
26782	61	23	61	26	Please elaborate and assign reference. [Knud Christensen, Denmark]	Accepted: explanation and references added.
6636	61	10			Biochar also increases soil water contents and microbial functioning during drought events (Paetsch et al., 2018; Paetsch, L, Mueller, C.W., Kögel-Knabner, I., von Lützow, M., Girardin, C., Rumpel, C., 2018: Effect of in-situ aged and fresh biochar on soil water holding capacity and microbial C use under drought conditions. Nature Scientific Reports, 8:6852 [Cornelia Rumpel, France]	Accepted: text added as proposed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
814	62	1	62	2	The authors may wish to discuss the capacity of coastal peatlands to resist the impact of rising sea levels. In a recent review (last subsection of the Discussion) of peat accretion rates from warm-climate regions it was noted that the highest rates of peat accretion have been reported from coastal peatlands subjected to rising sea levels and also from subsiding basins inland which also drives rising water levels. Coastal peatlands have a limited capacity to buffer the adverse effects of rising sea level up to a point....as long as the rate of rising sea level does not exceed the capacity of the peatlands to acrete new layers of peat. Glaser, P.H., J. C. Volin, T. J. Givnish, B. C.S. Hansen, and C. A. Stricker (2012). Carbon and sediment accumulation in the Everglades (USA) during the past 4000 years: rates, drivers, and sources of error. Journal of Geophysical Research-Biogeosciences 117, G03026, doi:10.1029/2011JG001821, 2012. [Paul Glaser, United States of America]	Rejected – outside the scope of this section, which deals with the consequences of maladaptation and ways to avoid it, rather than the capacity of the coastal geomorphology itself to adapt. These issues are rather dealt with in the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), which includes a dedicated chapter on sea level rise.
7960	62	2	62	2	The authors may wish to include the role of peat accretion in resisting the effects of rising sea levels in coastal regions. In my recent review of this topic (see above reference to Glaser et al. 2012) I noted that the highest peat accretion rates have been reported from coastal peatlands subjected to rising sea levels and also from subsiding basins subject to rising water tables. The conclusion is that coastal peatlands have a limited capacity to buffer the adverse effects of rising sea level....as long as the rate of rising sea level does not exceed the reported rates of sea level rise (see above comment for page 57, line 10) [Paul Glaser, United States of America]	Taken into account - However, out of scope of this section, which specifically deals with coastal degradation as the result of maladaptation. Please refer to the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), which includes a dedicated chapter on sea level rise, for further discussion of adaptation to sea level rise.
8026	62	19	62	19	Storm surges are not part of tidal activity since they are caused by exceptional atmospheric conditions like storm surges; sunny day flooding or nuisance flooding are instead flooding caused by tidal activity. [Luca Castrucci, United States of America]	Rejected – outside the scope of this section, which deals with the consequences of maladaptation and ways to avoid it, rather than the capacity of the coastal geomorphology itself to adapt. These issues are rather dealt with in the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), which includes a dedicated chapter on sea level rise.
8020	62	3	63	8	I think it would be very good if a brief description about the buffer zone function that also wetlands can have. Wetlands can both limit flooding damages and give a habitat to a variety of species that otherwise will not be survive in open water. Unfortunately, their preservation is getting extremely difficult due mainly on the always increasing coastal development. [Luca Castrucci, United States of America]	Rejected – outside the scope of this section, which deals with the consequences of maladaptation and ways to avoid it, rather than the capacity of the coastal geomorphology itself to adapt. These issues are rather dealt with in the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), which includes a dedicated chapter on sea level rise.
398	62	2			The authors may wish to include the role of peat accretion in resisting the effects of rising sea levels in coastal regions. In my recent review of this topic (last subsections of the Discussion) covering peat accretion rates from warm-climate regions that I wrote in one of my recent papers I noted that the highest peat accretion rates have been reported from coastal peatlands subjected to rising sea levels and also from subsiding basins subject to rising water tables. The conclusion is that coastal peatlands have a limited capacity to buffer the adverse effects of rising sea level....as long as the rate of rising sea level does not exceed the reported rates of sea level rise. Glaser, P.H., J. C. Volin, T. J. Givnish, B. C.S. Hansen, and C. A. Stricker (2012). Carbon and sediment accumulation in the Everglades (USA) during the past 4000 years: rates, drivers, and sources of error. Journal of Geophysical Research-Biogeosciences 117, G03026, doi:10.1029/2011JG001821, 2012. [Paul Glaser, United States of America]	Taken into account – adaptation measures here address flooding events caused by tidal activity as well as by storm surges.

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11496	62	19			Sea walls can also lead to a false sense of security and increased coastal development in fundamentally risky areas, which in the long term will increase vulnerability to sea level rise. [Debra Roberts, South Africa]	Accepted – a sentence on coastal squeeze has been added.
3544	63	1	63	22	Financial out lay in the Budget and actual expenditure :- While above is the distressed picture, such schemes and measures should be taken through policy, plan augmenting new schemes and reviving the closed schemes that the distress situation can be improved. Budgetary fund should be allotted and released for real expenditure. No system of cost norm on per hectare of treatable area basis should be fixed, as this system hardly serve the desire of watershed saturation. Open requirement as per estimates should be the allocation. [Prafulla Kumar Mabdal, India]	Noted
19354	63	9	63	22	Could be deleted, no value addition to what is already known and to general. [Binaya Raj Shivakoti, Japan]	Rejected - identifying knowledge gaps is an important part of the assessment
27540	63	10	63	22	Important gaps include information essential for priority setting eg. cropped areas vital for food security that are most at risk; estimates of the degraded cropland that is suitable for improved land management [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	taken into account - text is revised
1626	63	10	63	22	There are a lot technologies and scientific knowledge available to tackle degradation. But the rehabilitation and adoption of knolwedge/technology it is in the hands of people. There is huge knowledge gaps about the needs, challenges, and barriers for people/demographics/ethnics to consider existing tools and knowledge. So there is need to focus on social science and economics which enable us to help people with tackling of degradation challenges in the context of climate change and food insecurity across the globe [Rajesh Chintala, United States of America]	taken into account - text is revised
27534	63	11	63	12	many of the co-benefits are well established and not just well known in theory [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Noted
2556	63	15	63	15	The authors could add the use of long-term datasets (e.g., from reanalyses or from ESA CCI projects) to monitor land degradation. [William Lahoz, Norway]	Noted
27536	63	15	63	17	information on national extent in high risk areas is more important than the global extent. [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - beyond the scope to discuss individual countries. Also, national estimates are hard to compare because of varying methods and definitions.
27538	63	15	63	17	the key decision makers are national not global and the data on extent must be designed to serve them [David Norse, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - beyond the scope to discuss individual countries. Also, national estimates are hard to compare because of varying methods and definitions.
2558	63	16	63	16	The authors could identify also the ancillary data, e.g., in situ; citizen science. [William Lahoz, Norway]	Noted
11494	63	9			(1) In this section it is important to raise solution-based research to the forefront. Any research on any of the adaptation and mitigation options mentioned in the report, especially regarding their benefits, co-benefits and potential maladaptations will be vital in the next few years. (2) Research into soils as biological ecosystems is also very sparse. Despite their monumental impact, soil fauna are being habitually overlooked in land studies it seems. This is a major knowledge gap, especially with regard to co-benefits / maladaptation of soil-focussed climate interventions. (3) Another major area where detailed research is needed in a variety of settings is the question of increasing food production with decreasing land degradation. The world needs solutions – ideally, multiple options – that are proven, economical, effective and guaranteed sustainable. The more research in this area the better. [Debra Roberts, South Africa]	taken into account - text is revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6638	63	23			add: socioeconomic and political conditions to achieve changes within agricultural systems in different regions of the world are uncertain [Cornelia Rumpel, France]	Accepted
192	63				A big knowledge gap is the specifics of how the interaction between land use and climate change plays out. This information is critical to devising ways to move forward with conservation of natural systems in the future. [Beth Middleton, United States of America]	taken into account - text is revised
3546	64	1	64	49	Well equipped, strengthy, expert official functionary need. Strong official organization should be established with the specialized enough number of technical personnel who will transform education, undertake research and transmit the established practices to the land owners and users and will plan, design, formulate and implement the schemes. Once resources will be built up then industry, agriculture, non-agriculture etc. can be accommodated thereon. Governments should establish such functionary at National, State/Provincial, District, Sub-Division/ Taluka , Block and Ground level maintaining a line of hierarchy on the principle of responsibility and authority should be co-terminus. If well equipped strong set up of functionary is built up then only the success will be possible. Clarion call to combat adverse climate.-There is direct impact of land degradation both physical (Erosion) and chemical on the climate change in the items and parameters ,like - relative humidity, air temperature, sunshine intensity, soil temperature, water temperature, evapo-transpiration, soil moisture content, soil carbon charring, both surface and ground water storage, wind velocity, and constituents of soil, water and air. All these are advancing to non-congenial condition for the living beings. The gravity, depth and spread is international. Our clarion call is let the forthcoming year be the year of Integrated Soil and Water Conservation. May it be voiced clarion call “Agriculture is the super culture of all the cultures in the World. Conserve Land, Soil, fresh water for nourishing People, Plants and Animals and for survival of the Civilization”. Unless enough and productive land, soils and fresh water are available, the full success for food security can hardly be achieved. Therefore, the Governments may consider afresh to launch a development programme exclusively for “Natural Resources Conservation (Soil and Water Conservation) Mission” . It is very much relevant that the entire Soil & Water Conservation operation is densely labour intensive. Need of a clarion call for integrated soil and water conservation. -There should be a clarion call to generate awareness to give real emphasis on the integrated soil and water conservation ,rather plot to plot soil and water conservation in order to upgrade the degraded lands and soils to resist degradation of land and soil, conserve rain water in inland both in surface and in ground to build and maintain a strong and firm foundation of Agriculture as well as non-agriculture for the present and for the future. This should be given the top agenda now in all programs and schemes. intensive and environment friendly, rather environment refreshing. [Prafulla Kumar Mabdal, India]	Noted
16068	81	1	83	32	IPCC need to encourage collaborative between scientists and policy makers in west africa aims to increase understanding of the regional climate and how il will change, and also apply that knowledge to practical development questions. [Youssouph Sane, Senegal]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3548	112	1	112	8	Ex-Additional Director of Agriculture, West Bengal, India ,Recipient of Award (1) Leadership (SCSI),(2) Dr.KGTT(SCSI),(3) Gold Medal (IASWC,(4) Special Honour (SCSI),(5) Hrit Ratna (AIASA), (6) Asian Technical (WASWAQC), (7) Distinguished Extensionist (WASWAC), (8) Fellowship Award (CWSS-BCKV). References- 1.Land degradation in the developing World- Anderson P- IFPRI, 2.News letter- Soils are endangered, but the degradation can be rolled back-FAO 04/12/2015 3. Soil erosion and degradation-Treats .world wild life.org 4.Status of the World Soil Resources. IYS-2015, FAO 5. Land degradation and Agriculture – FAO 6. World Soil erosion information- FAO. 7. Global cost of land egradation- IFPRI 8. Land degradation: the change in the provision of ecosystem goods and services - GLADIS. 9. Watershed net works of India- SLUS of India 10. Degraded land- World Resource Institute . [Prafulla Kumar Mabdal, India]	Noted
6974					Coherence and Homogeneity with Chapter 3 and other Chapters should be improved. [Anna Luise, Italy]	taken into account - text revised
1570					Overall, as in the other sections, urban and developed world issues and roles are hugely underemphasized [Billie Turner II, United States of America]	accepted - text on urban areas added to 4..11.1,
5380					Participatory land use plans at local level, incentives for land husbandry and supporting policies (land use, watershed management, etc) need to be discussed in the executive summary and details need to be provided in the document accordingly [Daniel Danano Dale, Italy]	accepted - text revised
5396					General comment on information on the extent and rates of land degradation. While the information / data provided in this section is informative, there is gap in information from regions such as Africa, the Near East and Asia. It is obvious that there are research undertakings and assessments made in these parts of the world. It is recommended to review available literature from these regions and discuss on them. Sources for this information could among others include: FAO, University of Bern, Wageningen University, ISRIC [Daniel Danano Dale, Italy]	taken into account - we have now a better geographical balance

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6002					Under land degradation (chapter 4), desertification (Chapter 3) and the interlinkages between desertification, land degradation, food security and GHG fluxes: synergies, trade-offs and integrated response options (Chapter 6) : I feel it is important to highlight lessons learnt (success or failure) and experiences gained from past activities in some countries, in land use planning, soil and water conservation projects and programs, watershed management projects and programs and recently the sustainable land management program supported by many UN organizations and bilateral arrangements. More importantly, countries have invested substantial amount of resources and have taken policy decisions to implement several of these projects and programs with the primary objectives of mitigating land degradation in agricultural landscapes, afforestation, reforestation and restoration / rehabilitation of degraded lands to fight desertification. Some of these have been highlighted in the two chapters but discussion on some of the successful experiences need to be further indicated. This will help the scaling up and out of SLM and ecosystem restoration efforts that are indicated in the document in several places. The WOCAT-LADA documentation, its databases and publications will be of use. Similarly, there are several research undertakings in countries. Some of the innovations from research and the documented traditional practices need to be briefly discussed to some degree if not exhaustively. Institutional issues from the point of view of creating enabling environments (sharing experience) of successful models could be of use The documents have sufficiently addressed the problems (severity, extent, magnitude etc), challenges and opportunities in the chapters. If the authors and coordinators of the work are convinced of the usefulness, a separate chapter on good practices of land use and landscape activities could be created or simply sections be included in the chapters to present useful experiences and lessons learnt in the past and recently. [Daniel Danano Dale, Italy]	taken into account - sections on responses to LD have been added; references to WOCAT-LADA have been included where relevant;
14820					In closing, while there is much useful and comprehenisve material in this chapter, it is missing some key discussions and literature. The inclusion of the socio-economic perspective on degradation is not helpful as it implies degradation is ok so long as it has some human potential. If ecosystems collapse, even while benefiting humanity in the short-term, that cannot be a good thing overall. So I have to ask, why is this written the way it is? Moreover, the chapter seems to downplay the importance of population growth and consumption with respect to land degradation citing only a few papers where there is no correlation but missing the entire field of ecological footprint analysis. Additional concerns include a lack of attention to the relation between uncharacteristic fires and logging, no discussion of the limits of SFM or Reduced Impact Logging in the tropics - which doesn't work (see citation), some bias in the discussion of wood product carbon stores that does not take into consideration the relative importance of intact forests as carbon sinks, no discussion of the importance of SDGs (UN) and the Aichi biodiversity targets, very little discussion of the Paris climate accord and attention to carbon sinks, and no discussion at all of the importance of protected areas, wilderness, re-wilding, r and connectivity/refugia approaches. Overall, the chapter needs much greater attention to conservation biology perspectives that are clearly missing with more of a slant toward socioeconomics and unproven SFM (no citations on efficacy, limitations, etc) [Dominick DellaSala, United States of America]	taken into account - details are addressed in subsequent review comments

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26468					Chapter 4 Executive summary need more specific and quantifiable findings. The structure of ESs needs to be uniform across chapters. [Hans Poertner and WGII TSU, Germany]	taken into account - details are addressed in subsequent review comments
10342					Given the definition of "Land degradation" supplied, biological invasions are a major driver of degradation, and I think warrant a sub section, or at least more in-depth discussion. [John Devaney, Ireland]	accpted - details in section 4.4.1.1
27546					The structure of the chapter is adequate, the contents are precise, some images must be with greater resolution, it is necessary to homologate the references, no progress of the countries in the subject is appreciated, there are mixed processes; bio-geo-chemicals that affect ecosystems, no cost are included of this process [José Antonio Benjamín Ordóñez Díaz, Mexico]	noted
24656					Degradation as a result of use of fertilizers fall into this category [Lizzy Igbine, Nigeria]	rejected - comment unclear
26576					4.11.10.1 Role of biochar in climate change mitigation, states: "Biochar is relatively resistant to decomposition compared with fresh organic matter, so represents a long-term C store (very high confidence)." This is an extremely optimistic statement, and it is not clear what "long term" means nor what the basis for 'very high confidence" of long term stability is. Our sense of the literature is that the stability is highly variable and factors controlling it are not well understood. also note that woody materials, i.e. wood would be preferred feedstock if long term stability of chars from wood is greater, which would likely indicate trees as preferred feedstocks. [Rachel Smolker, United States of America]	Rejected. There is a strong body of literature supporting the statement, including the cited literature. See also Woolf et al, 2018. Biochar for Climate Change Mitigation: Navigating from Science to Evidence-Based Policy. In Soil and Climate (pp. 219-248). CRC Press.
26578					4.11.10 (hotspots and case studies) discusses the issue of priming, referring to the impact of biochar addition on pre-existing soil carbon stocks. Some studies have shown that biochar can result in the loss of soil carbon, resulting over time in soils with LESS, rather than more C. The factors that determine this are complex and to date there is little basis for assuming reliable control or results. A useful discussion of the inconsistent results on priming and microbial responses to biochar additions is [Rachel Smolker, United States of America]	Noted. Priming is already discussed in this section. Additional reference to recent meta-analysis of priming has been added (Ding et al., 2018)
26580					Budai A. et al. 2016. Biochar persistence, priming and microbial responses to temperature series. Biology and Fertility of Soils, vol 52, issue 6 pp 794-761. [Rachel Smolker, United States of America]	Noted: Part of comment 26578
26582					Whether biochar is stable over long time horizons, or whether or not priming results in loss of preexisting soil carbon are interrelated. The goal should be to improve soils, including their carbon content, not to replace preexisting carbon with biochar. [Rachel Smolker, United States of America]	Noted. Text already discusses context in which biochar stability is greatest and priming is lowest (negative priming predominates)
26586					It is stated in 4.11.10 "avoided emissions from decomposition of organic wastes that are instead used for biochar, such as manure that would otherwise be stockpiled, crop residues that would be burned or processing residues that would be landfilled; reduced emissions from compost (Agyarko-Mintah et al., 2017; Wu et al., 10 2017)." Yet earlier it was stated that woody biomass is required to produce biochar with long term stability. Given there is already large and unsustainable wood for bioenergy, for construction and a bioeconomy as well as paper products etc., it would seem unlikely that adequate supplies of woody biomass to supply biochar production on a scale that would be relevant to global C cycle can be achieved "without competition for land area" (as stated in 1.3.4.4). [Rachel Smolker, United States of America]	Noted. The limitation of biomass availability is already discussed. Woody biochars have higher stability; manure biochars have lower stability but other beneficial properties. A combination of woody material (such as from urban greenwaste, sawmill residues, forest thinning) and manure makes biochar wiht high C stability and agronomic value.

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26588					The statement that syngas produced during biochar production can provide fuel that will generate electricity and offset fossil fuel use is highly optimistic given that there has, to our knowledge been no power generation from biochar production facilities of any significance to date, and there is an inherent trade off between production of char vs production of syngas. Both cannot be optimized simultaneously. [Rachel Smolker, United States of America]	Rejected: There are facilities operating that produce biochar and utilise the syngas for heat and/or electricity production. For example, the International Biochar Initiative (T. Miles pers. comm.) states that most of the biochar that is produced in North America is a co-product of generating energy as heat or power. In the Southeast much of the biochar is produced as a co-product of generating heat from wood residues for drying wood products. In the Western US it is often the co-product of generating power. IBI estimates that about 45,000 dry tons of biochar are produced in US each year from processing 200,000 dry tons of wood residues for heat or power. A few small plants have been built for primarily producing biochar and secondarily producing power.
26590					There are serious and downplayed concerns about albedo impacts of biochar application. Biochar is essentially black carbon, which absorbs heat/light. This is important given that increasing soil temperatures is associated with loss of carbon. A study on albedo impacts reported: "The analysis resulted in a reduction of the overall climate mitigation benefit of biochar systems by 13–22% due to the albedo change as compared to an analysis which disregards the albedo effect." [Rachel Smolker, United States of America]	Taken into consideration: potential negative effect of biochar on albedo has been added. Please see a thorough discussion on this topic in Woolf et al., 2018.
26592					Meyer et al 2012. Albedo impact on the suitability of biochar systems to mitigate global warming. Environ. Sci. Technol., 2012, 46 (22), pp 12726–12734 [Rachel Smolker, United States of America]	Noted: part of comment 26590
26594					Some studies show increased crop yields following application of biochar, while others have found the opposite. Impacts on crop yields, like other impacts are highly variable. Depending on the chemical composition, biochars can harbor toxins. for example: [Rachel Smolker, United States of America]	Noted: the variability in response is already mentioned. A sentence has been added to stress this, and also the need to ensure uncontaminated feedstock.
26596					Jones, D.L. and Quilliam, R.S. 2014. Metal contaminated biochar and wood ash negatively affect plant growth and soil quality after land application. J Hazardous Materials. 276. pp 362-370 [Rachel Smolker, United States of America]	Noted: part of comment 26594
26598					Viger et al reported "Positive growth effects were accompanied by down-regulation of a large suite of plant defence genes, including the jasmonic acid biosynthetic pathway, defensins and most categories of secondary metabolites. Such genes are critical for plant protection against insect and pathogen attack, as well as defence against stresses including drought." [Rachel Smolker, United States of America]	Taken into consideration: sentence added on biochar impacts on plant disease.
26600					Viger et al 2015. More plant growth but less plant defence: first global gene expression data for plants grown in soil amended with biochar. Global Change Biology 7, pp 658-672. [Rachel Smolker, United States of America]	Noted: pat of comment 26598
26602					4.11.10.1states that biochar reduces methane in flooded soils, but also reduces methane uptake in drylands and that biochar reduces N2O emissions, but "impact varies widely". That includes resulting in increased N2O emissions in some cases! [Rachel Smolker, United States of America]	Taken into consideration: Additional reference to meta-analysis showing average effect of 0% added.
26604					Yoo, G. et al. 2018. Variable effects of biochar application to soils on nitrification-mediated N2O emissions. Sci Total Environ. DOI: 10.1016/j.scitotenv.2018.01.098 [Rachel Smolker, United States of America]	Noted: part of comment 26602
26606					The lack of consistent results should lead to a very precautious approach to including biochar among real viable options for land based CDR [Rachel Smolker, United States of America]	Taken into consideration: the need to match biochar properties to soil constraints is stressed.

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15956					A comment to my previous comments I can see that it's not possible to attach literature as i have indicated above - I will be happy to send by email the book chapter referred to in my previous comments if IPCC authors do not have access to the literature. [Rasmus Fensholt, Denmark]	Taken into account - the text has been revised substantially
17556					Consider including in the references the study: An assessment of the global impact of 21st century land use change on soil erosion (https://www.researchgate.net/publication/321504572_An_assessment_of_the_global_impact_of_21st_century_land_use_change_on_soil_erosion). The study discusses that land use change into copland is responsible of erosion and soil loss. This study also reports :" In Fig. 4, we illustrate the variation of soil erosion modelled for a selection of the 54 countries, which reported the proportion of their cropland area under conservation agriculture to the FAO. The conservation agriculture covers about 15.3% of the observed cropland (1.6 of 10.3 million km2), resulting in an estimated overall soil erosion reduction of about 7% compared to the baseline scenario in 2012 (from 10.93 to 10.15 Pg yr−1). [TURI FILECCIA, Italy]	Taken into consideration: the need to match biochar properties to soil constraints is stressed.