

External review of the second order draft of the land degradation and restoration assessment

1 May - 26 June 2017

Chapter 7

Reviewer Name	Chapter / SPM	From Page (start)	From Line (start)	To Page (end)	To Line (end)	Comment	Response (from Chapter 7)
LI Qingfeng	All Chapters					Overall comments for the Book: 1, there seems too many repetitions in different chapters and sections for the subject matters of definitions, descriptions and explanations, etc., of "land degradation and restoration". Although they are necessary for each individual Chapters, it seems a little bit redundancy if appearing in the same book. 2, The economical (cost-benefit) analyses, as well as the ecological assessments, behind the "Successful stories", should be strengthened, if the stories are more convincing, in particular, if the success is backed with big "projects".	Agree, redundant text on LDR definition and approach has been taken out in discussion with other CLAs. If there are success stories to add, please do, but not relevant for chapter 7
Germany	All Chapters					We urgently request the chapter authors to ensure that all facts and figures contained in the chapters are accurately cited and adequately referenced with up-to-date sources. We also encourage chapter authors to cross-check, whether the same facts and figures on a specific theme are being used throughout the assessment.	Agree, consistency between chapters has been checked for the final report.
Germany	All Chapters					Please ensure that in all chapters information and case-studies are provided from all regions.	Not necessary to have cases from all regions per se, but a certain balance should be aimed at, which we strived to achieve.
Germany	All Chapters					We kindly request the co-chairs and chapter authors to ensure that the key findings emerging from each chapter are captured in the key messages of the SPM.	The SPM has been revised based on the updated key findings from the chapters.
Germany	All Chapters					Please include the concept on 'planetary boundaries' in your discussions.	Agree, Planetary boundaries is an interesting discussion point. We have included a discussion on this in the final draft. But given our results (no scenarios found that can meet all global targets) we do not know enough on large scale tipping points and calamities.
Germany	All Chapters					Ensure that terminologies are used consistently throughout all chapters.	Although it is desirable, consistent terminology is not always possible, given the fact that the reviewed literature is not consistent either, a key characteristic in land degradation literature to use.

Germany	All Chapters				<p>It is appreciated that each chapter starts with an "executive summary" Please ensure that all Figures/Tables have a high resolution quality. A glossary should be included that provides definitions/explanations of the frequently used terms. Each chapter should also start with a list of acronyms/abbreviations used in the chapter. In some Figures and Tables colours have been used to outline status and trends in a regions or a country. It would be very helpful if the same colour is used for a country/region throughout a chapter and preferably throughout all 8 chapters. The term 'NCP' should be used consistently and with the exact wording provided in IPBES-5/1.</p>	All of these elements have been ensured for the final draft of the report, for all chapters.
Germany	All Chapters				<p>Ensure that definitions, facts, figures and trends outlined in the 8 chapters e.g. on the spatial extent of land degradation / the spatial extent of wetland / water / soil / urbanisation / deforestation / wild fires / conflict, etc... are consistent across all chapters.</p>	Although it is desirable consistent terminology is not always possible, given the fact that the reviewed literature is not consistent either, a key characteristic in land degradation literature.to use
Germany	All Chapters				<p>It is also not clear whether there is consistency between the chapters, what role agricultural lands have in the land degradation theme? Are they considered per se to be degraded sites or are they transformed lands, whose productivity can be negatively affected through severe exploitation? Clarification required.</p>	<p>'Land degradation' is defined for the purposes of this assessment as the many processes that lead to a decline or loss in ecosystem functions, ecosystem services, or biodiversity, in any terrestrial ecosystems, including land-enclosed aquatic ecosystems. 'Degraded land' takes many forms. In some cases all function, services, and biodiversity are adversely affected; in others only some are negatively affected while others elements have been enhanced. Converting natural ecosystems into human-oriented production ecosystems - for instance agriculture or managed forests - creates benefits to society but may also result in losses of biodiversity and non-target ecosystem services. In general more intensive use leads to more trade-offs. On the other hand higher yields per unit area due to intensification reduces the need for more land conversion and related losses. Valuing and balancing these tradeoffs is a challenge that is not so much a task of scientists, but rather of the society as a whole.</p>
Germany	All Chapters				<p>We strongly encourage the authors to check, whether information on certain issues has already been provided in one of the previous chapters of the assessment report. If this is the case, then it would be useful to avoid redundancies and rather consider cross-referencing between chapters. Sometimes the impression arose that there was no exchange between the authors of the different chapters.</p>	Redundant sentences have been taken out, except in those cases where it contributes to the accessibility of the text.
Germany	All Chapters				<p>We strongly encourage the chapter authors to ensure that their key findings are reflected in the key messages of the summary for policymakers.</p>	The SPM has been revised based on the updated key findings from the chapters.
Germany	All Chapters				<p>We encourage the authors to spell out the acronyms when they are introduced for the first time in the text.</p>	Agree, editorial
Germany	All Chapters				<p>All reference lists need to be rechecked regarding completeness, spelling and they also need to be structured in a similar style.</p>	Agree, editorial

Thomas Brooks	All Chapters				Congratulations to all authors for their great efforts towards delivery of this SOD	Thank you
Thomas Brooks	All Chapters				In many places, the report uses language like "biodiversity and ecosystem functions and services". I recommend deleting the "functions and" throughout. This would be consistent with a) the wording and intent of widely-accepted definitions of biodiversity (eg CBD, IPBES itself) that encompass all levels and types of genetic, species, and ecosystem diversity (see eg Noss 1990 Conserv Biol), and b) the IPBES conceptual framework, which i) includes composition, structure, and function of genetic, species, and ecosystem diversity in its "Nature/Mother Earth" component while ii) including ecosystem services/nature's gifts in its "Nature's Contributions to People" component.	Agree, the term 'Services' would be for me ok to briefly represent 'function and services' throughout the LDRA. Editorial
Astrid Hilgers	All Chapters				On the definition of landegradation: Agreement on baselines is a essential to set verifiable targets and track progress towards these targets. A natural state baseline, although it has some problems to solve, offers a fair and unambiguous reference to compare current and future state and trends. However, land degradation is a multidimensional issue, concerning the change in and trade offs between soil variables, vegetation, biodiversity components, water characteristics and many ecosystem functions and services. Consequently assessing any diviation from the natural state baseline of one or more of these factors as ' degradation' would result in the entire world being degraded. In this approach land degradation would lost its political utility. An alternative approach would be to map and quantify these changes compared to the natural state baseline without judging as ' degradation', and consider these changes as trade-offs, often unintentionally, from a particular use of the land such as forestry, cropland or housing. Whether these changes and trade offs are accepted or not and can be considered as degradation belongs to the political domain, not the scientific. This approach creates a strict distinction between measuring and assessing factual changes and the judgment whether it is acceptable or not, clarifying the different roles of science and politics, and taking away the barriers to fullfill their tasks properly.	Agree very much. A persistent issue in the LDR field that should be resolved to break the deadlock and become targeted and effective again. Operatonalizing the definition of LDR requires discussion with CLAs. Tracking changes in land degradation components i.e. soil, land cover, productivity, water holding capacity, biodiversity and ecosystem services, but do not make a value statement in terms of 'land degradation'. The former is part of the scientic domain (detect changes), the latter ppart of the political domain (assess desirability)
Astrid Hilgers	All Chapters				The assesment, in specific the SPM and chapters 2 and 3, seem to be biased towards conservation agriculture as a solution, while a wider range of sustainable landmanagement practices and other response options should be considerd. Chapter 6 provides this wider range of options.	Agree, conservation agriculture is not the only solution to SLM. From a broader perspective it may even worsen loss of B and ES, leading to more conversion of natural land and accompanying B ES loss.

Astrid Hilgers	All Chapters				<p>More attention should be paid to the role that the private sector could play, in the SPM and throughout the document. References p.e.1. Levashova 2011 Opportunities and challenges for private sector entrepreneurship and investment in biodiversity, ecosystem services and nature conservation, Opportunities and challenges for private sector entrepreneurship and investment in biodiversity, ecosystem services and nature conservation. 2. Jenkins, Scherr and Inbar 2012 Markets for Biodiversity Services: Potential Roles and Challenges Journal Environment: Science and Policy for Sustainable Development 3. Business for Sustainable Landscapes, an action agenda, Scherr at all 2017, published by Ecoagriculture partners and IUCN. 4. Scaling Up Investment & Finance for Integrated Landscape Management: Challenges & Innovations, Shames at all 2013, published by Ecoagriculture partners 5. Finance for One Planet, Leenders and Bor 2016 www.rvo.nl/CoP_FINC 6. Scaling up investments in ecosystem restoration, policy brief Netherlands Assessment Agency, Sewell, Bouman, van der Esch 2016 http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-scaling-up-investments-in-ecosystem-restoration_2088.pdf 7. Outcome Statement – Global Landscapes Forum: The Investment Case 2016 http://www.landscapes.org/wp-content/uploads/2016/06/GLF-London-Outcomes-v02.pdf</p>	Agree, the role of the private sector should be part of Chapt 6 and 8
Astrid Hilgers	All Chapters				the term NCP should be explained in the SPM and in the beginning of the document	Agree, editorial

Finnish Government	All Chapters				<p>fundamental issue of measuring degradation against a baseline is well addressed in the LDR Assessment. However, there is obvious overlap and redundancy as well as some conflicting information between different parts of the assessment on the issue. In the SPM the key message B1 is related to the issue of baselines and it is well elaborated in the second part of the SPM with some text, a figure and a box. The issues covered are clearly referenced to the Chapter 2 where many of the statements are further elaborated and the issue is also well covered in the Executive Summary of Chapter 2. This is appropriate as according to the Scoping Document for the LDR Assessment the chapter 2 is requested to deal with concepts.</p> <p>The overlap and some conflicting messages can be found from chapters 1 and 4. While the nature of Chapter 1 is clearly introductory and as such treating the issue of baselines could be well justified, the messages it conveys relative to the SPM and Chapter 2 are conflicting. In the Executive Summary of chapter 1 the last point reads: "Degradation and restoration are both concepts which require a baseline to be measured (unresolved). {Box 1.1}. The types of baselines which can be used are briefly discussed here, and elaborated in chapter 2." Here the confidence term 'unresolved' is contradictory to the very clear statement in the B1 of the SPM: "[Land degradation] is scientifically measurable (well established). Land degradation can only be measured in comparison to a baseline,...". It seems the confidence statement in the Ch 1 Executive Summary may be incorrect. It is hardly unresolved that a baseline is needed to measure amount of degradation or restoration.</p>	<p>Agree. There should be made a step towards an unambiguous and pragmatic operationalisation of the baseline. However, it should be noted that although the LDR approach is consistent within the LDRA chapters, the reports reviewed are not.</p>
Finnish Government	All Chapters				<p>C6. The word instrumental responses used in SPM, Ch 6 and 8 is kind of confusing. Legal responses are considered to be "enabling responses" not in the category of "instrumental responses". This distinction is problematic as legal instruments are also instrumental responses. I would rather say that well functioning legal and governance systems are enabling responses, while specific legal instruments such as environmental impact assessments, legal standards etc are instrumental responses.</p>	<p>These comments are relevant to Chapt 6 and 8, Not relevant for chapt 7</p>
Caroline van Leenders	All Chapters				<p>I've been working in the financial sector since 2014. I've run a Community of Practice of 15 financial institutions on natural capital in The Netherlands and wrote the eBook Finance For One Planet with Iersso9ns and 12 stories from their practice. I'm now involved in helping DG Environment of the EC with moderating a Community of Practice of financials on biodiversity. See http://ec.europa.eu/environment/biodiversity/business/assets/pdf/mi-ssion-statement_en.pdf and I'm working on the start of a CoP FIs and sustainable Landscapes in Africa. I see more and more FIs interspersed in biodiversity and investing with a landscape approach. I think it is high time to make financial flows more visible and include private finance more. If you want any details please contact me!</p>	<p>Agree, role of financial sector not relevant for Chapt 7, but is for chapt 6 and 8 and is addressed there.</p>

Virginia Meléndez Ramírez	All Chapters					All the Chapter could start whit an introduction and end with the conclusions, you could standardize the chapters + Several images in some chapters can not be seen well	Agree. The formatting has been ensured for the final draft.
Pavlos Tyrologou and María José Rubial (PESP-EFG)	All Chapters					Most of the document is ecology and agricultural orientated but there is a fair amount of water (surface and ground) and mining so there is some geology discussed but not in depth. We also miss a deeper assessment on the contribution of heavy industry in land contamination and degradation and the legal and political instruments in place (or maybe missing) to prevent the land degradation and promote its protection (i.e.: environmental liability directive and/or others)	Interesting, land contamination is part of chapt 4, but has been not selected as LDR theme in chapt 7 for reasons of limitations in capacity, lack of scenarios, and relevance compared to other aspects such as SOC, food and water.
IPBES Knowledge and Data Task Force (KD TF)/ Task Group on Indicators (TGI)	All Chapters					This review provides feedback from the IPBES Knowledge and Data Task Force (KD TF) / Task Group on Indicators (TGI) on the use of IPBES core indicators in your assessment. We see potential for inclusion of additional core indicators and for the more consistent use of the standardized visuals provided. For information on core indicators potentially relevant to a given chapter, please see http://www.ipbes.net/indicators (or see the tab named, "core indicators" in this spreadsheet) and check the indicator trend graphs shared by your TSU. For the trends of IPBES core indicator, standardized visualizations should be used as much as possible to ensure the consistency between and within the assessments. The KD TF/TGI aim to follow up with specific recommendations in the near future. In the meantime, do not hesitate to reach out to them through your TSU or the KD TF TSU (ipbes.kdtsu@gmail.com).	Agree we standardize indicators as much as possible, but not all information in literature is expessed in (standard) core indicators.
U.S. government	All Chapters					The role of biodiversity and functioning ecosystems appears to only be seen through a human lens and one that is directly connected to a specific area. Loss of of biodiversity and ecosystem function in one area may affect down stream or far removed ecosystems - land degradation in one area may have huge affect in other areas both for biodiveristy and ecosystem function (think migratory birds). The document should have a greater focus on the role of land degradation on a wider set of ecosystem functions than currently apparent.	Agree, teleconnections are important. We have added some information on that in section 7.3, such as secondary and rebound impacts, external impacts/footprints, consequences of trade policies.
José Romero	All Chapters					General: in this report, the two concepts of "land" and "soil" seem to be interchangeable. It would be useful to define both terms in a glossary attached to this report. The definition of both terms should take into account and explain differences and nuances about "what is above ground" and "what is below ground" for land and soil.	Soil (change) is one component of land (changes). A persistent issue in the LDR field that should be resolved to break the deadlock and become targeted and effective again. Operationalizing the definition of LDR requires discussion with CLAs. Tracking changes in land degradation components i.e. soil, land cover, productivity, water holding capacity, biodiversity and ecosystem services, but do not make a value statement in terms of 'land degradation'. The former is part of the scientific domain (detect changes), the latter ppart of the political domain (assess desirability).

José Romero	All Chapters				<p>General: in this report, the concept of "trade-off" is used in a rather negative sense, while generally a trade-off is a situation reached for the satisfaction of divergent views and interests, which is considered to be a positive solution. We wonder if this rather negative use of trade-off in the report would be correctly translated in the other non-English languages. For example, in French, we would rather think of a happy outcome when a trade-off (e.g. a compromise, a good deal) is done in front of irreconcilable antagonisms. If the use in this report is more in a negative sense, then why not qualify trade-offs as e.g. "harmful". We hope that the English speakers authors understand our point and find a way out to address it in English as well as in the other non-English languages.</p>	<p>Interesting editorial issue. Trade offs are often used as negative statement, but the essence of the LDRA is to show that enforcing one service has consequences for Biodiv and other services. Whether this factual trade off (not judgmental) is considered as negative of positive is not part of the scientific domain (per definition) but of the political domain. It directly relates to comment and response in line 18.</p>
José Romero	All Chapters				<p>General: the use of the uncertainty statements in the Key Messages should follow some logics: either only in the headings, or everywhere in the paragraphs, or not at all in this section, etc. Currently, it is not clear what the rule is and which parts of the statements are accompanied with which uncertainty statement (e.g. if it is in the heading, then the whole paragraph has the same level of uncertainty?).</p>	<p>Agree, confidence statements should be consistent. This has been ensured for the final report.</p>
Australia NFP	All Chapters				<p>There is a lack of clear guidelines and recommendations for policymakers, particularly in the Summary for Policy Makers which is where we would expect to see them. What is really needed is a quick and easy guide to help a range of decision makers develop and implement policies which reflect the latest scientific data which this report should include.</p> <ul style="list-style-type: none"> o For example, page 3 of Chapter 1, the Executive Summary of the Chapter, claims that the paper, as an assessment of land degradation and restoration, will evaluate, summarize and present the latest evidence to guide decisions. From our reading of the SPM and chapters, there appears to be little guidance for policymakers and decision makers on how to use the latest evidence to develop policy options. 	<p>Agree, clear policy guidance on WHAT (package of) measures would support conservation of BES and which don't (chapt 3, 4, 5 and 7) and HOW these measures could be implemented in an effective and efficient manner (instruments, governance in chapt 6 and 8) are still lacking. Chapt 7 provides a set of measures in its Key Messages, to be added in the SPM</p>
Australia NFP	All Chapters				<p>The case studies in the report are not detailed enough in their current state to be broadly applicable, with little information on their outcomes, methods, and successes.</p> <ul style="list-style-type: none"> o Case studies are frequently repeated across the chapters. More examples including possible applications in different landscapes/areas/political environments would be useful as well as the case studies effectiveness, implementation and any lessons learned. An understanding of the criteria used to rate each case study would be very useful. 	<p>Agree, case studies are nice illustrations but seldom generic in nature, take much space at the expense of essential content, and often includes elements of many chapters (logic). The selection of case studies and the logic for the selection of case studies has been now developed and clearly set out in Ch1.</p>

					definitions used for essential concepts.	
Australia NFP	All Chapters				o The report uses a definition of land degradation different to that used by the United Nations Convention to Combat Desertification (UNCCD), the premiere international body overseeing global efforts to address land degradation, desertification and drought. For example, on Page 3 of Chapter 1, in the Executive Summary, the UNCCD definition of land is used, however the UNCCD definition of land	Agree, the UNCCD definition of LD should be mentioned. However, the definition of land degradation for LDRA was set out and approved by IPBES Plenary, and can not be changed.
Australia NFP	All Chapters				The use throughout the report of references which are significantly dated or not consistent throughout the chapters. This makes the assessment appear to have a lack of a clear methodologies which seek to establish the quality and clarity of the evidence base used to make claims throughout the report. o A specific example of both inconsistency in referencing and use of outdated sources occurs on pages 95 and 96 of Chapter 4, and page 38 of Chapter 3. In Chapter 4, the report uses a 2005 Global Forest Resource Assessment to make claims about the extent of forest cover in a number of countries, including Australia. Yet, in Chapter 3, the report uses a much more recent Global Forest Resource Assessment, from 2015, to look at trends in forest cover decline. If there's no way to use the most recent studies/iterations of reports to support claims in the Report, then the reason for using an older report should be made clear.	Agree, we adjusted the reference used to promote consistency, or explain why other sources are used and why they differ.
Mahmood Yekeh Yazdandoost	Ch.7	General			Human-caused changes in ecosystems are increasing land degradation, poverty and hunger;	Indeed, human-caused changes in ecosystems may cause land degradation in terms of changes in the land components (soil, vegetation, biodiv and ES), and may cause poverty and hunger. This is what the chapter shows
Mahmood Yekeh Yazdandoost	Ch.7	General			Land degradation threaten wild species as well as people that depend on them;	This is indeed what the chapter shows in terms of biodiversity loss and loss of ecosystem services
Mahmood Yekeh Yazdandoost	Ch.7	General			Land restoration is our most basic human rights and indicator for sustainable development; and	It is not to the LDRA as a scientific document to make this statement, but a political one.
Mahmood Yekeh Yazdandoost	Ch.7	General			Ecological and governance gaps in land restoration program and protected areas network should be assessed	Environmental gaps in land restoration programs can be assessed in chapter 4, 5 and 6; Governance gaps in Chapters 6 and 8. Not relevant for Chapter 7
Mahmood Yekeh Yazdandoost	Ch.7	General			Recommended, wherever applicable: 1-Partnership for sustainable conservation; 2-Connecting biodiversity to development; 3-Connecting ecosystem services and development to a better future; 4- Investing in sustainable landscape; 5-Positive environmental psychology.	Chapter 7 deals with future socioeconomic development and the impacts on biodiversity and ecosystem services, as found in published scenarios. Especially the issues 2 and 3 are dealt with. The issues 1, 4 and 5 have not been explicitly found as part of scenarios.
Emmanuelle Quillérou	Ch.7	General			You could include a reference to the scenarios developed in the ELD Initiative The Value of Land report (2015) somewhere in the chapter: ELD Initiative (2015). The value of land: Prosperous lands and positive rewards through sustainable land management Accessible : www.eld-initiative.org . In particular refer to chapters 3a and 3b which develop various scenarios.	Thank you for the suggestion. The ELD scenarios were included in section 7.3.2.

Marcus Zisenis	Ch.7	General			concrete measures by whom could lead to decrease land degradation pressure and improve biodiversity values on different regional scale on earth (e.g. Agenda 21). The deteriorating trends of land use degradation and loss of biodiversity on earth are not new and repeatedly described over time (e.g. Millennium Ecosystem Assessment, TEEB), but to select some positive measures and to allocate them to institutions with time targets for implementation as	Solution-oriented scenarios have been made in the several outlook reports of -and made for- CBD, OECD, UNEP and TEEB. The results have been included in Chapter 7.
Douglas, Diane	Ch. 7	General			Excellent. No comments	Thank you
Germany	Ch.7	General			The approved IPBES assessment D3c on "scenarios and modelling" discusses the following 4 types of scenarios: 'Exploratory scenarios' (agenda setting) - 'target-seeking scenarios' (design) - 'policy-screening scenarios' (intervention) - 'retrospective policy evaluation' (review). This chapter uses partly different names for scenarios: Apart from the 'exploratory scenarios' introduced on page 6, line 195, you also introduce for instance 'normative scenarios' (see page 6, lines 202); 'ex-post assessment' (page 6, line 203); 'visionary and target setting scenarios', or the newly developed scenarios 'SSPs' and 'RCPs' (see page 10, lines 297-299). Please list all scenarios presented in ch. 7 in a table and relate them to the 4 scenarios outlined in the approved IPBES assessment on "scenarios and modelling". It would be very useful to provide references for each of the mentioned scenarios for further reading.	For reason of limited space no overview table of the scenarios have been included. However, most scenarios have been categorized if they unambiguously could, and provided with references.
Germany	Ch.7	General			There is a vast amount of acronyms/abbreviations used in this chapter. Please consider listing and explaining all these abbreviations in a chapter or report glossary.	A glossary will be provided for the entire report
Germany	Ch.7	General			Check the entire chapter for repetitions. Now and then entire sentences reappeared on different pages.	Redundant sentences have been taken out in case it does not compromise readability.
UNCCD SPI	Ch.7	General			page 24 and further on page 57. As this is such a significant basis for this chapter I suggest they be explained in a box near the front.	The SSP RCP scenarios are described and included in new paragraph 7.1.5.1
UNCCD SPI	Ch.7	General			LDR is used lazily - check that the term is appropriate in each case. Define at first use (currently defined on p 58!)	LDR will be defined and operationalized at appropriate places such as in Chapter 1 and/or 2. However, it should be noted that, providing a review of scenarios, these may and will apply different definitions, a persistent characteristic of the debate in the LDR field. It is a core task of the LDRA to show this ongoing dispute and confusion, and where possible provide an operational and scientific sound solution enabling swift scientific progress and unambiguous policy support

AGT Schut	Ch. 7	General				All bad things that may affect land is referred to as land degradation, without specifics about what processes were involved and how this process or a change in status was assessed. I accept that a clear definition was not provided, but at least it should be indicated if papers discussed were focussing on soil erosion, salinization, land use change or exhausting nutrient resources. Now this is often unclear what is meant by degradation. A land use change is maybe degradation from a biodiversity perspective but surely not for farmers, that distinction should be clearer.	LDR will be defined and operationalized at appropriate places such as in Chapter 1 and/or 2. Further clarification of the specific use of land degradation in the scenario chapter is given in the new paragraph 7.1.2.2. However, it should be noted that, providing a review of scenarios, these may and will apply different definitions, a persistent characteristic of the debate in the LDR field. Directly referring to a particular scenario 'land degradation' is applied as defined in that particular publication. However, where possible the specific issue (such as soil erosion, salinisation of land use change) is specified.
AGT Schut	Ch. 7	General				Intensification of agriculture may be a cause of land degradation, but more often is the solution to stop or reverse land degradation processes. Again, this depends on the point of view, whether one talks about biodiversity, soil fertility or land erosion.	This is a key issue in the land degradation debate that should be solved to be able to provide policymakers with clear and unambiguous information. LDR will be defined and operationalized at appropriate places such as in Chapter 1 and/or 2. Further clarification of the specific use of land degradation in the scenario chapter is given in the new paragraph 7.1.2.2. See also the response to comment 22.
AGT Schut	Ch. 7	General				Extensification of agriculture cannot be the solution to land degradation processes, the extensive use of agricultural areas is the cause of land mining and low fertility.	Extensification, in stead of intensification would further increase the future area of cropland in the world as well as in pasture and range land, as compared to the increase as expected in business as usual scenarios. This would further deteriorate the current remaining natural areas, in particular in the temperate, sub tropical and tropical biomes as can be seen in various scenarios considered.
Cristobal Diaz	Ch.7	General	All	All	General	references to the end. Examples are: NHT, 2001 Borda-Niño et al., 2016	Thank you, the references have been completed
U.S. government	Ch.7	2	22	3	84	There are some broken links in the TOC. Please revise.	TOC has been revised
Yujie Wang	Ch.7	2	42	2	42	Please double check the content page.	Bookmarks are now defined
Yujie Wang	Ch.7	3	59	3	60	Please double check the content page.	Bookmarks are now defined
Ruishan Chen	Ch. 7	2	23	3	58	The text mainly focused on degradation scenarios, however, scenarios on restoration should also be included, such as the future of rewilding, reforestation, forest transition and so on.	Quantitative global restoration scenarios, opposite to global prevention-oriented scenarios, have been hardly found, expect for reforestation, as mentioned in section 7.2.6.4.
Ruishan Chen	Ch. 7	2	32	2	52	Scenarios assessment by LDR theme should consider the types or process of land degradation in Chapter 4 and 6, so the section 7.2 should give examples on the scenarios of main degradation types, such as deforestation, desertification, urbanization, water system degradation such as dam building.	in this section we elaborated on scenarios of land degradation components which are relevant to people and for which global and local scenarios are available (see criteria for selection of the themes in section 7.1.5 of the SOD). The description of land degradation components in especially Chapt 4 (and to a lesser extent Chapt 6) can be much wider given the literature at hand.

							As stated in section 7.1 change (loss) in food and bio energy, timber and fiber production are considered as a few of the many forms 'land degradation' can take, next to other components of land degradation such as the change in soil characteristics, biodiversity, water holding capacity, land cover and (micro and macro) climate change. On the other hand, loss of food or fiber productivity for example can lead to degradation of other components such as biodiversity, soil organic carbon and water holding capacity due to additional conversion of natural land to compensate for that loss.
Ruishan Chen	Ch. 7	2	38	2	52	Food and bioenergy, timber and fiber are the consequences of land degradation, they may also be discussed in another part.	
Ruishan Chen	Ch. 7	2	45	2	47	Climate is a driver of land degradation, and also maybe urbanization, so it may not be discussed parallel with soil, land use and water	see the response to comment 290. However, climate change is also a driver of components of land degradation, as is agriculture and forestry. Urbanisation is not considered as a component of land degradation but a cause, as is land use change in the form of conversion of natural land.
Ruishan Chen	Ch. 7	3	64	3	64	The figure 1 in the list and the figure 1 in the text are not the same	This has been adjusted
U.S. government	Ch.7	1	87	5	166	ES needs some introduction before launching into key conclusions	We have referred to chapter 1
Sandhya Chandrasekharan	Ch.7	3	88	3	88	The world becomes too small (well established). What does that mean? The second line is excellent	We changed this to: 'The world is increasingly interconnected and needs cross-sectoral approaches to foster sustainable use of resources (well established).'
McAfee, Brenda	Ch.7	4	88	4	95	While <i>The world becomes too small</i> is a catchy title, the idea is not well explained in the paragraph. Also there is some confusion with regard to alternative scenarios, integrated models and integrated approaches and usefulness of these tools as compared to the text in lines 159-166. Combining these two paragraphs to highlight the messages from 7.2.and 7.3 regarding the importance of integration and that while integrated models and scenarios are indispensable tools to achieve this, the currently available tools are not able to do this.	Although the key message is catchy, in essence it is not about a world being too small but an anthropogenic use becoming too big. Therefore the key message has been adjusted directly related to the outcomes of sections 7.2 and 7.3 i.e.: No global scenarios were found that meet global goals collectively. The word alternative scenarios have been applied in contrast to business-as-usual scenarios. The former includes new policies while the latter does not. The word 'restoration scenarios' would not cover the message, for restoration is just one - minor- aspect in alternative scenarios as compared to prevention measures. Combining the two key messages would combine entirely different conclusions; the first is on the substance, stating that no policies has been found that could achieve the targets collectively, making major and transformative change necessary if the goals are sustained, the second is on the tools, stating we need better -and integrated- models to explore new alternative scenarios that take these interactions into account.
Rob Alkemade	Ch. 7	4	88	4	95	I like the 'world becomes too small' phrase, but unfortunately I do not see any evidence for this in the text.	The formulation of key messages in the executive summary has been adjusted. (see above)
Astrid Hilgers	7	4	91	4	101	There is a discrepancy. On line 91 it is stated that 'integrated approach show better results but still fail to achieve the goals collectively while on line 93 there is still a call for the integrated approaches to find sustainable solutions. But if they fail to achieve the goals collectively they cannot be sustainable.	Partially integrated approaches are preferable to sectoral approaches, with fully integrated approaches yielding the most insight. This does not necessarily mean that fully integrated approaches will necessarily result in solutions without significant sectoral compromise.

Cristobal Diaz	Ch.7	4	96	4	106	I suggest to include the increment of natural disasters as drought, floods, cyclones, earthquakes, volcanoes, tsunamies. Other factor is the war external or internal.	Droughts to the extent that climate change serves as a multiplier are included, along with a section on conflict. Other natural disasters are outside the scope of this chapter.
Rob Alkemade	Ch. 7	4	96	4	109	This is a relevant statement and may be one for the SPM. However, it is a result from other chapters	This conclusion comes also from the analysis of chapter 7 about the future, and will be included in the SPM.
Rob Alkemade	Ch. 7	4	103			Remove ' productivity loss' as this is not a cause of LD but an indicator for LD	Productivity loss has been applied as an indicator of land degradation as well as a cause. The latter concerns for example the possible (negative) impact of productivity loss on soil organic carbon levels, water holding capacity, vegetation cover and consequent soil erosion, or the loss of ecosystem services such as yields, and indirectly on biodiversity due to more conversion of natural land to compensate for yield loss. Consequently, productivity loss has been maintained.
Rob Alkemade	Ch. 7	4	108	4	109	Certainty statement and referencing mssing for the last sentence	This has been changed to "inconclusive"
Sandhya Chandrasekharan	Ch.7	4	110	4	112	consumption and lifestyles (preferably) and trade in food material as well	The issue of consumption, and thus different lifestyles, have been addressed in various key messages. The relevance of food trade haven't been extensively elaborated in the scenarios considered, and therefor not mentioned in the key messages.
Rob Alkemade	Ch. 7	4	114			What do mean bij production landscapes	with productive landscapes is meant landscapes that produce one or more ecosystem services to people, or by their natural characteristics, or by transformation to a production of one or a few specific ecosystem services, often -unavoidably- at the cost of other.
Mahmood Yekeh Yazdandoost	Ch.7	4	118	4	118	Very true.	Thank you.
Rob Alkemade	Ch. 7	4	118	4	128	The statement is on land conversion, not on land degradation as such. However, land conversion may be an important driver for land degradation, land conversion is only briefly addressed in section 7.2. Many land use change scenario studies exist.	Land use change is one of the largest drivers if not the most dominant driver, and therefor relevant to address it a specific key message. A variety of land use scenarios have been dealt with in various sections of Chapter 7 as part of the scenarios assessed in the soil, food, climate and biodiversity sections. Additional references will be considered.
Mahmood Yekeh Yazdandoost	Ch.7	4	125	4	128	Also on-line field research.	On-line field research is one component of the more general term of 'technical assistance' not explicitly mentioned as many other components.
Rob Alkemade	Ch. 7	4	129	5	141	The statement on consumption change is even more remote, it works through it impact on land use, so see former comment	Indeed, consumption mostly works through the impact on land use, although fossile energy use works via climate change, not explicitly mentioned here.
AGT Schut	Ch. 7	5	131	133		Refrase, vague sentence	The sentence has been adjusted
Mahmood Yekeh Yazdandoost	Ch.7	5	142	5	149	Very true.	Thank you.
Rob Alkemade	Ch. 7	5	142	5	149	Again this is through land use, see former 2 statements	Indeed, bio energy, a key issue in the climate and energy debate, has a major impact via land use change, more than via CO2 emissions in the short and longer term, as has been shown in various scenarios.

AGT Schut	Ch. 7	5	144	144		2 degree constant is unclear. You mean a scenario of maximum 2 degree global warming compared to a reference situation? Please specify.	We refer to scenarios that limit warming from pre-industrial levels to 2 degrees. This is now explained with first usage, with 2 degree scenario used afterwards.
Cristobal Diaz	Ch.7	5	147	5	147	I propose to include: "Vastly expanded timber and energy biomass production for climate change mitigation and biofuels production purposes...."	Agree - added.
Rob Alkemade	Ch. 7	5	150	5	158	A reference to a certain section is missing. Terms like Wicked problem and rplexity only appear here. So statement might be OK, it is not grounded sufficiently in the chapter. So remove or add a section	The concept has been included into the section 7.3
Rob Alkemade	Ch. 7	5	160			Replace ' to cope with' with to understand	This was changed.
Rob Alkemade	Ch. 7	5	166			A statement on the role of land management, here and there addressed in the text, as of major importance, is missing	The importance of (sustainable) land management has been addressed in lines 123-128 (of the SOD) or 142-147 (in final document)
Javier Ernesto Cortés Suárez	Ch.7	6	169	6	171	These should clarify on which of the four categories of ecosystem services (provisioning, regulating, supporting and cultural services) are the selected ecosystem services included. As well as to include a brief justification on why area these the most relevant ecosystem services in order to be selected, and which is the reason for not including cultural services.	Changed to: The ecosystem services considered are provisioning services, such as production of food, bio-energy, fiber and timber as well as regulating services, including regulation of water stress and flooding and climate regulation through carbon storage and sequestration. The effects of land degradation and restoration on cultural services are less explored in scenarios
Rob Alkemade	Ch. 7	6	171			section 7.2 missing	You can find section 7.2.on page 12 line 361
Yujie Wang	Ch.7	6	173	6	174	Please change "7.3" to "7.2" and "7.4" to "7.3".	You can find section 7.2.on page 12 line 361
Rob Alkemade	Ch. 7	6	177	8	246	This part introduces different terminologies, concepts and definitions then could be derived from the methodological assessment on scenarios and models (IPBES, 2016). It is also based on an arbitrary set of literature. Please make the text shorter by referring to the methodological assessment, and make it consistent with it.	Replaced with IPBES references and short introduction to scenarios.
Rob Alkemade	Ch. 7	6	180			Please use the definition from the glossary of the methodological assessment	changed
Rob Alkemade	Ch. 7	6	181	6	184	Scenarios help to map uncertainties, they can not reduce, and they help to understand, not to cope with.	changed
Rob Alkemade	Ch. 7	6	195			Referring to the methodological assessment here, but there 4 types are distinguished, not 2.	The report uses 3 types of scenarios of which the last two can be grouped under intervention scenarios. Please replace sentence 'Practically, / 'Business as usual' scenario)' with "Practically, scenarios can help to explore different plausible futures ("exploratory scenarios") or identify the effectiveness and efficiency of individual measures or in combinations, including assessing the cost of policy inaction, This includes "Intervention scenarios", i.e. "target-seeking scenarios", that provide alternative pathways for reaching this target and "policy screening scenarios" that represent various policy options under consideration. This is adapted text from the IPBES scenarios summary for policy makers.

Rob Alkemade	Ch. 7	7	210			Please use the definition of the various model types from the glossary of the methodological assessment	Adopt the language of the IPBES scenarios report and not use ex-ante / ex-post etc,. Possibly the above sentence is sufficient if we need to save space
Rob Alkemade	Ch. 7	7	214			baseline scenario is a confusing term, so if you use them, always define them, but better is to avoid at all. Business as usual scenarios are exploratory scenario and is one of the archetypes adopted in the methodological assessment	We have changed it into BAU.
U.S. government	Ch.7	7	219	7	219	"Results" seems to be an inappropriate term, given how scenarios are described. Consider using "scenario outcomes" instead.	changed to outcomes
Rob Alkemade	Ch. 7	7	219	7	231	This is a very generic section and could be related to the concept on multiple values (Pascual et al., 2017). This may be moved to earlier introductory chapters	This is introduction to the executive summary - perhaps generic is acceptable.
U.S. government	Ch.7	7	223	7	223	LDR should be defined in each chapter.	LDR will be defined and operationalized at appropriate places such as in Chapter 1 and/or 2. However, it should be noted that, providing a review of scenarios, these may and will apply different definitions, a persistent characteristic of the debate in th
UNCCD SPI	Ch.7	7	231			How is "land degradation is about the assessment of these trade off"?	Change in soil, biodiversity, land cover and ecosystem functions are inherent to the transformation of landscapes favouring one or a few functions such as food and fibre production, at the cost -often unintentionally- of other functions such as water and climate regulation. In essence, assessing land degradation is about assessing these tradeoffs. The text has been adjusted accordingly.
UNCCD SPI	Ch.7	7	231	8	232	Footnote 1 - "can be a value between 0 and the baseline" This is too narrow, and inconsistent with other parts of the report . The baseline options presented in chapter 2 include natural state and various historical periods. It is thus possible that a target could exceed a baseline, if the baseline includes degradation.	That is correct, the sentence has been adjusted accordingly: Targets are the result of balancing socioeconomic and ecological interest, and can be a value between 0 and the natural baseline (UNEP, 2003; Kotiaho, 2016), or exceeding the baseline in case degradation is part of the baseline (such as a reference year) or when the target exceeds the natural baseline such as a food productivity target in intensive agriculture.
U.S. government	Ch.7	8	232	8	246	This paragraph needs to be tightened because it is hard to follow. Perhaps baseline issue should be its own paragraph.	The paragraph shows the different conclusions that can be drawn when taking alternative baselines, a key issue for the reader to be aware of. The tekst has been adjusted and merged with footnotes one and two.
Rob Alkemade	Ch. 7	8	232	8	244	This text is particularly 'textbook' like, which should be avoided	Noted. Text was modified accordingly
U.S. government	Ch.7	8	244	8	246	Explain what is meant by "more integrated scenarios" - more integrated than what? Please clarify.	changed to "models that take into consideration the influence of a wider range of sectors"
Yujie Wang	Ch.7	8	245	8	246	Please double check the content within the brackets.	Noted
Cristobal Diaz	Ch.7	8	246	8	247	I suggest to add:with the environmental impacts of this unsustainable consumption frequently displaced to the developing world	Thank you. Changed accordingly.
UNCCD SPI	Ch.7	8	246		247	2nd par - reword for clarity.	Removed
Germany	Ch.7	8	246		247	Spell out 'SSPs' as it is being mentioned for the first time in this chapter.	This is no longer the first mention
AGT Schut	Ch. 7	8	246		247	what is env. Degradation referring to here. Does this refer to consumption or land use change in general? Second paragraph f the box is vague. Not sure what the message is.	This source refers to the ecological footprint. Second paragraph deleted

U.S. government	Ch.7	8	246	8	247	This box states that population growth will remain relatively unchanged by 2100. This should not be stated as fact. Use language like "is projected to remain relatively unchanged." And is this true of all SSPs or just under certain scenarios? Later in this very chapter you discuss the potential for large population growth (e.g., Line 1679).	Reworded. Here we are highlighting the relative proximity of demographic trajectories within the context of per capita consumption. Even considering extreme scenarios, increased consumption per capita is likely to have a more causal impact than variation between population growth trajectories. E.g., should India and China begin consuming on OECD levels, the environmental impact will be drastically affected. All SSP population trajectories are included in a figure.
U.S. government	Ch.7	8	246	8	247	For statements like "global consumption is dominated by the OECD" - are you referring to past trends or future projections? Use precise language to make these statements clear.	"currently" added
Rob Alkemade	Ch. 7	8	247			It is unclear what Box 7.1 is doing here	Indirect drivers of LD are introduced in the paragraph above. This box seeks to provide some information regarding scenarios of these drivers. Population has been a hotly discussed issue in meetings and deserves some place within a chapter on LDR scenarios.
Rob Alkemade	Ch. 7	8	249	8	253	As far as I know, GLADA, GLASOD, no the Atlas are scenario studies, but map historic and current states.	Agree. The World Atlas on Desertification was removed from the text.
Yujie Wang	Ch.7	8	251	8	251	Please define the meaning of "GLADA" in Line 251.	Noted. Both GLADA and GLASOD acronyms definitions are now included in the revised text.
Rob Alkemade	Ch. 7	8	254			Why compare to climate?, There are sufficient ways to address land degradation	We stand behind our choice. We purposely select this comparison because it allows us to highlight the contrast that exist between a multidimensional problem such as land degradation vs. the climate change one-dimensional trajectory from cold to hot that has facilitated to demonstrate the urgency of the issue.
Rob Alkemade	Ch. 7	9	260	9	271	This part is generic and should be consistent with the other chapters. I see the point on land condition, but I do not see this worked out in the remainder of the chapter	This section has critical information that has reverberated into the key messages in the SPM. Text in other sections was edited for consistency.
U.S. government	Ch.7	9	269	9	271	The chapter's scope (covering all changes in land condition) may be too broad since many land condition changes are expected in the future. Consider limiting the scope.	Noted. Land condition was replaced by land transformation.
McAfee, Brenda	Ch. 7	9	270	9	271	Is the definition of land degradation used in Chapter 7 consistent with that used throughout the report?	Chapter 7 doesn't provide a definition of land degradation but draws on the definition as given in the Terms of Reference of the LDRA and described in Chapter 1. Chapter does provide an operationalization of the land degradation definition in terms of components of land degradation dealt with, how they structure the Chapter, and how they do mutually relate. Further it has been stated that land degradation is an ambiguous term that is hard to scientifically operationalize in models and quantitative scenario analyses. To solve this ambiguity, the word land degradation has been avoided where appropriate and replaced by the more neutral and scientifically measurable term 'land condition', expressed as change in soil, biodiversity and ecosystem services compared to a particular baseline, due to human activities.

AGT Schut	Ch. 7	9	270			Vague, please specify. So an increase in soil carbon content would be termed land degradation? This is probably not what is meant.	The paragraph has been adjusted in 'Given the multidimensional nature and subjective character of land degradation, this chapter focusses on a more neutral approach, focussing on the change in - and trade-offs between- biodiversity, soil properties and ecosystem services from human interventions, where data allow. This provides a flexible approach that will appeal to a range of stakeholders and allows for a comparison over time and between regions, and allows for aggregation from local to global scales. Following this logic, land use change is not considered synonymous with land degradation; however various driver scenarios of land use change (often embedded within land use change scenarios) are exhaustively explored being a major cause of change.'
Rob Alkemade	Ch. 7	9	272			This section is very limited, I would expect an overview of the available scenarios and categorized by archetypes of scenarios, policy screening scenarios and target seeking scenario, may also fit in the archetypes. Scenarios could address the main drivers of land degradation or directly address some of the indicators for land degradation.	For reasons of space limitation no overview of the scenarios assessed has been included. The archetypes approach is not considered as helpful for the purpose of this chapter. In stead the scenarios have been briefly described and characterized in terms mentioned in paragraph 7.1.2.1, derived from the IPBES report on scenarios and models.
Thomas Brooks	Ch.7	20	272	20	273	CHAPTER 7. Add text reading something like "Species extinction rates are currently at least three orders of magnitude above those natural through Earth's history, and aggregate extinction risk is increasing for most taxonomic groups, although at widely differing rates (well-established)". This would parallel the point from SPM key message A9 (Page 4, Lines 90-91; Page 18, Lines 502-503) that land degradation is manifest as either or both of a) reduction in the populations of wild organisms, and b) loss of species". At the moment, the key message here only covers the first of these. Essential to add the second. This is supported by text on eg Chapter 4, Page 68, although that should also be strengthened (see comments above).	Noted, thank you for the suggestion
Yujie Wang	Ch.7	9	289	9	290	Please define the meaning of "CBD" in Line 290.	Noted
Yujie Wang	Ch.7	10	296	10	296	Please define the meaning of "SDGs" in Line 296.	Noted
U.S. government	Ch.7	10	303	10	303	Not sure what is meant by "sharp criteria" or "scenario reports." Please clarify.	Clarified with: "It is not easy to define precise criteria for the selection of land degradation and restoration scenario literature for the aim of this assessment"
U.S. government	Ch.7	10	303	10	318	This section suggests that only actual land degradation is being considered, whereas lines 269-271 suggested that all changes in land condition were being considered. Which is correct?	The lines 269-271 deal with the issue how 'land degradation' is operationalized in this scenario chapter. It says land degradation is a multidimensional and subjective entity that is by consequence hard to assess unambiguously in a scientific manner. Therefore, in this chapter, it is dealt with in measurable individual components, showing the changes from human interventions. The lines 303-318 deals with the criteria selecting which land degradation scenario reports from the potentially many, given the broad definition (see lines 254-271 and chapter 1), are included in this assessment. Here the choice has been made to select the most relevant scenario reports, dealing with changes in a selection of relevant soil properties, a selection of relevant ecosystem services and biodiversity, dealing with changes on a significant spatial and temporal scale.
AGT Schut	Ch. 7	12	309			add "changes in"before soil properties	Noted

Javier Ernesto Cortés	Ch.7	10	313	10	315	These should include cultural services from nature that also contribute to people in terms of values, knowledge and education, among others.	Agree, but inapplicable in later draft when we changed the list criteria text.
Javier Ernesto Cortés	Ch.7	10	316	10	316	These should also include scientifically sound and qualitative reports, which are not less relevant than quantitative researches.	Agreed
Sandhya Chandrasekharan	Ch.7	10	317	10	318	Should the Holl and Aide reference then figure in Chapter 6 as well, for continuity and common ground	Reference was removed
U.S. government	Ch.7	10	319	11	336	The term "local scenarios" should be described when introduced, not later in the discussion.	Noted, and changed to "regional scenarios" (from sub-global to local)
Rob Alkemade	Ch. 7	10	319			Great that a review has been done and about 250 studies were found. However I cannot find an analysis of these studies. It would be great to know what the overall pattern is	The major conclusions from the analysis of locale analysis is given following the analysis on global scenarios in subsequent paragraphs of sections 7.2 and 7.3 in terms of impacts on soil, biodiversity, food, water, climate and fiber/timber and bio fuels.
Javier Ernesto Cortés Suárez	Ch.7	10	332	10	334	These should be better justified because it cant be possible that for only this reason the cultural ecosystem services were not included. Specially considering that these services are not less important than others, and through which a process of restoration of degraded lands may or may not be successful.	Ok! We inserted at line 200 ' <i>such as sense of place and connectedness to nature</i> ' also at line 2086 inserted ' <i>There is also need to explicitly consider the and restoration on cultural services, such as sense of place and connectedness to nature, are less explored in scenarios.</i> '
UNCCD SPI	Ch.7	11	342			it is not clear how restoration is shown in this table	This is a drivers table not for responses, so we revised the table to focus on regions instead of drivers, and adjusted the title (to remove restoration from the title and reorder the contents, including n=250)
U.S. government	Ch.7	11	359	11	360	What is meant by "diversity of contexts covered" - this has not been explained. Isn't the plan to draw some general trends from local scenarios. Explain why this can be done even with these difficult obstacles.	Noted and reworded
Astrid Hilgers	7	12	361	54	1646	Section 7.2.1 till 7.2.6 take the reader through the various LDR themes. A nice and structured set up. It would help if the themes are discussed in a similar fashion, with similar headers!.	Thank you for your comment, the general structure has been adjusted
Yujie Wang	Ch.7	12	364	12	364	It is not clear about how long and how large of the area.	Noted, it is a global scenario
Cristobal Diaz	Ch.7	12	364	12	364	When the term SOC is shown by first time would be explained to the reader which is their meaning.	A glossary will be provided for the assessment

						General comment on section 7.2. This section addresses 6 themes related to land degradation. On most these themes extensive scenario studies has been done (e.g. climate and land use change). The main issue is of course how these themes relate to land degradatio, and future changes in a theme (e.g. climate) affect indicators of land degradation. This is to say that there are many many scenario studies available, the difficulty to how it relates to land degradtion may be more difficult. The mainly anecdotal way these themes are treated do not enhance the understanding. An approach of using archetypes of scenarios may structure this section, and may answer the questions of: is land degradtion expected to increase? what are the main drivers and what are strategies to avoid degradation and restore degraded land. It would be good to view the material that has been used, including the 250 studies from the review, in the perspectives of archetypes trying to find answers on the main questions.	The focus of this section was on scenarios that explicitly dealt with soil factors. The questions of about drivers and expected increases for land degradation generally are dealt with elsewhere in the report.
Rob Alkemade	Ch. 7	12	364				
Rob Alkemade	Ch. 7	12	364			General: The section draws very much on PBL work, which may cause a bias. There is a lot more available from other models on soil carbon, biodiversity, land use change, water and climate. A lot of scenario work from the DGVMs is missing, where soil factors are reported, e.g. Popp et al., 2014, but there are many others	Indeed, the work of PBL is quite dominant in this Chapter which is partly unavoidable given their dominant contributions in the field of integrated global environmental assessments and outlooks since 1996, not only on biodiversity, but recently also water, food, climate and soils as related to changes in land use and detrimental land management practices. However, the dominance was reduced by selecting and compressing PBL related results, and adding new
U.S. government	Ch.7	12	366	12	371	Considering starting by adding up these numbers and providing the total expected losses before providing the breakdown by driver.	Thank you for the suggestion. We added a sentence at the start of point 2: "Future losses of SOC until 2050 are estimated at approximately 65 Gt C"
Karen Holl	Ch. 7	12	376			Considerable" should be "considerably"	Noted
AGT Schut	Ch. 7	12	383	386		I doubt that seriously, see comment for line 644	See response to comment on l. 644 for a fuller response
UNCCD SPI	Ch.7	12	386		387	? what type of degradation?	We added "in particular soil erosion, soil organic carbon decline, nutrient imbalance, and acidification". These four threats are assessed as poor and declining in FAO and ITPS 2015.
Rob Alkemade	Ch. 7	12	390			Please avoid the term 'baseline', which is very confusing.	Agree. Changed to: 7.2.1.1 Scenarios for threats to soil functions
Rob Alkemade	Ch. 7	12	391	13	416	This describes history and current state, overlap with other chapters on state and drivers?	this is a brief description of the section. Chapters must be Standalone and a brief introduction is required
Australia NFP	Ch. 7	12	397	12	399	Please amend the text to reflect the below feedback: <i>Erosion, salinity, oversupply of nutrients are far greater threats as they impact a greater area and higher value agriculture commodities than acidification.</i>	These drivers are mentioned as global threat in the lines above that statement (in SOD, lines: 393-395). The figure from Montanarella et al 2016 indicates acidification as biggest threat for Australia and the South-West Pacific. We rephrased to make that clear. Of course, differences in 1st, 2nd, 3rd rank threats might show when taking into account Australia by itself.
Yujie Wang	Ch.7	12	398	12	399	I think it could be better if the conditions in arid and semi-arid China or Asia can also be mentioned here.	Added "as well as in arid and semi-arid China and Asia."
Yujie Wang	Ch.7	13	400	13	400	This figure is not clear, please improve it.	A higher resolution figure will be included in the final draft.
Germany	Ch.7	13	401		401	This Figure has a low resolution quality. Please improve it. Spell out a threat instead of just writing 1st, 2nd, 3rd or 4th main threat (Erosion, SOC etc.).	The numbers (1st, 2nd etc.) represent a ranking by the members of the ITPS. We revised the figure caption to explain this better: "Ranked most severe", Ranked second-most severe" etc.

UNCCD SPI	Ch.7	13	401		401	considering the spatial variation in soil attributes, landscape, and land use it is hard to see the relevance of an assessment at this resolution	The desirability of a higher resolution assessment is undoubted but it does not exist at this time.
Rob Alkemade	Ch. 7	13	417			Stating the scarcity is one, but I would like to see a summary and analysis of the studies that are available. The scarcity can be addressed as a knowledge gap.	That is addressed in 3.1.9
Rob Alkemade	Ch. 7	14	423			Please give the sources of this figures.	This sentence was deleted
Rob Alkemade	Ch. 7	14	427			Absence? So what about the 250 studies you found?	I assume the 250 studies refer to the whole chapter - unfortunately few address soil degradation or restoration outside of SOC scenarios.
Rob Alkemade	Ch. 7	14	434	14	481	This is very much biased towards the IMAGE work, there is a lot of work done by other Integrated assessment modellers and by vegetation models, that deal with soil carbon.	The Crowther et al. study is based on extrapolation of research results, not the IMAGE model, and Smith et al. (l. 482-488) use three DGVMs in there work. Again, the focus in this section was on explicitly soil-focused scenarios.
UNCCD SPI	Ch.7	14	436		438	under what scenarios were these increases predicted? scenarios that are compatible with climate targets??	Inclusion of the complete information on scenarios used for this and other studies would be too space consuming for this assessment, but details can be found in the citations.
U.S. government	Ch.7	15	466	15	469	Can you acknowledge how the other SSPs play out, in order to show variability in results? This is done for biodiversity, but not for soil. Is there no difference? If so, state this.	For future scenarios on soil characteristics only one scenario -SSP2- has been worked out in the PBL publication, being the first one in an integrated environmental assessment, building on recent work. For this scenario an assessment has been also for the impact of changes in soil condition on land-related productivity (corrected for climate change influence), carbon storage, food, climate change and biodiversity. Next to biodiversity, SSP1, SSP2 and SSP3 have also been worked out for food production, agricultural area, and discharge of water in major river basins, drawing on earlier work. The limitation to scenario SSP2 for changes in soil has been stated in paragraph 7.1.5.1
UNCCD SPI	Ch.7	15	470		481	Does this study include impact on inputs to soil?	Not in a consistent manner - the various FACE studies had a range of experimental designs and no cross-study comparison would have been possible.
Germany	Ch.7	16	496	16	496	Spell out the abbreviations "GCMs" and "LUMP" as both terms are being used here for the first time in the chapter.	Thank you. We moved the definition up in the text.
McAfee, Brenda	Ch. 7	16	502	16	504	An explanation as to why the NDVI cannot be extrapolated to the future and why its use to indicate production loss has been contested would be helpful here.	No revision was made - unclear what was referred to with comment.
AGT Schut	Ch. 7	16	513	529		Hard to believe. Erosion upstream usually results in deposition downstream. Is this taken into account or is this number only reporting on losses in plots in erosion-prone areas? Further, what is the normal background loss that occurs naturally as well? I would expect that most of the flooding parts of the Netherlands is a net deposition area. Is that taken into account?	As stated, the values are drawn from published meta-analyses from soil erosion plot data. I am unaware of comparable studies on landscape-scale implications of erosion, which, as the reviewer points out, is very unfortunate.
AGT Schut	Ch. 7	17	537		539	Is hard to believe as general statement given the large regions with severe nutrient deficiencies, e.g. sub-saharan Africa. Are authors referring to CO2 emissions associated with production of N or the n effluent from field and farms into waterways?	The study by Steefen et al. highlights that this is driven by oversupply in some regions while others (eg SSA) require higher inputs; this is stated in lines 534-536.

AGT Schut	Ch. 7	17	555		555	"the land degradation syndrome" is undefined / not introduced. Soil compaction may not be negative at all, for example to create rice paddies one needs subsoil compaction. Further, compaction is resulting from mechanisation, which a very clear net positive effect. So, this needs to be specified in detail.	Agreed and deleted: "is an important component of the land degradation syndrome, which"
AGT Schut	Ch. 7	17	569		573	General statements that do not add much to the text. Where is the evidence supporting that a decline in soil biodiversity is a serious problem and is affecting land functions etc?	There are no scenarios that can be used to support the statement. I suspect the general statements are also elsewhere in the text, and hence it was deleted.
AGT Schut	Ch. 7	18	586	597		Very old estimates. Where these projections accurate?	Agreed that they are old, but no recent evaluations found.
Cristobal Diaz	Ch.7	18	587	18	588	I propose include:,degrading cultivated land, water and potentially arable land.	Agreed and changed
AGT Schut	Ch. 7	17	588		592	This is based on old references, part of this salt problem may not have affected the areas as thought, or dying of climates may have stopped water percolation and influx of upwelling salt from deeper layers elsewhere in the landscape (for example in Australia)..	Agree with the suggestion, some references were deleted.
Astrid Hilgers	7	18	610	20	669	The various Chapters are written independently. However, strong links are there. 7.2.1.2. has a strong link to (and some overlap with) Chapter 6. Should be mentioned.	Noted, the linkage work between chapters has been done during an Author Meeting of different chapters
UNCCD SPI	Ch.7	19	617			not clear how this can reverse loss of soil quality?	That is explained in the paragraph following that statement, and this follows in a more natural way in the revised section above concerning the degradation processes.
UNCCD SPI	Ch.7	19	620			in what form? C does not come on its own - is it biochar or some other form of organic matter?	This has been clarified in the final text
UNCCD SPI	Ch.7	19	621			compost should be the first, not last, option for "recovery of N and C"	I agree - sentence was rephrased singling out composting
Yujie Wang	Ch.7	19	636	19	638	The right half bracket is missing, please check.	Correct - added a closing bracket after "in some areas"
AGT Schut	Ch. 7	19	644		653	To get C into the soil one needs to produce biomass, 0.5 tC/ha equates to 1t biomass per ha. Getting C from elsewhere would relocate the problem to another part of the landscape, but may not solve it on that scale at all. Read "Lessons from the Drentsche Essen".	The next three comments are related. Recent papers (eg Van Groenigen et al. cited below) have stressed the limits to increasing SOC caused by the concomitant need to "sequester" large amounts of N (and other nutrients) at the same time in the soil organic
AGT Schut	Ch. 7	19	644		653	From soil stoichiometry, one can learn that for increase in C a lot of additional nutrients are needed to, including N. Kirkby, C.A., Richardson, A.E., Wade, L.J., Conyers, M., Kirkegaard, J.A., 2016. Inorganic Nutrients Increase Humification Efficiency and C-Sequestration in an Annually Cropped Soil. Plos One 11.	Thank you, we took the reference into account, and added a statement to the text.
AGT Schut	Ch. 7	19	644		653	A back-of-envelope calculation will learn that increasing soil C in agricultural areas has a negative net effect, as N production requires a lot of CO2 emissions, and application results in N2O gas emission. See: Van Groenigen, J.W., van Kessel, C., Hungate, B.A., Oenema, O., Powlson, D.S., van Groenigen, K.J., 2017. Sequestering Soil Organic Carbon: A Nitrogen Dilemma. Environ. Sci. Technol. 51, 4738–4739.	Thank you, we took the reference into account, and added a statement to the text.
UNCCD SPI	Ch.7	19	656		657	What is unsustainable release of C? (what would be a sustainable release of C?)	Noted; changed into: "considerable release of C"

UNCCD SPI	Ch.7	20	663		668	repeated text from 644+	Noted
Germany	Ch.7	20	665	20	666	The section " <i>The "4 per mille" initiative ... could be possible (Minasny et al., 2017)</i> " is a complete repetition of the lines 646-650 on page 19. Please revise.	This is correct - the repeated section was deleted.
Yujie Wang	Ch.7	20	665	20	666	A full comma is missing at the end of this sentence.	Noted
Karen Holl	Ch. 7	20	668		668	Box 7.2 – "Agroecology" is usually a single word not "agro ecology" as written. Should be Zea "mays". Latin names should be italicized.	Ok thank you
Rob Alkemade	Ch. 7	20	670			A lot on biodiversity, virtually nothing on land use. Many scenario studies on land use change exist	Many LUC scenarios exist but for the purposes of the report our sections focus on components of land degradation, not on drivers such as land use change. We can clarify this further, and will consider the references you send us. Note that studies from Popp et al. on LU and deforestation are taken into account in the climate section.
Rob Alkemade	Ch. 7	21	697			It is unclear how biodiversity is treated here: is biodiversity loss an indicator for land degradation or is land degradation one of the causes of biodiversity loss? in the first case scenarios for biodiversity loss are expected, in the second case the focus will be on how LD affects biodiversity.	As stated in section 7.1 change in biodiversity is seen as one of the many forms 'land degradation' can take, next to other components of land degradation such as the change in soil characteristics, productivity, water holding capacity, land cover and ecosystem functions. Simultaneously, a change in other LD components can be a cause of biodiversity loss, and vice versa, loss of biodiversity can deteriorate productivity, land cover or soil organic carbon content. This close linkages are usually referred to as a nexus.
Rob Alkemade	Ch. 7	21	705	21	709	Only a minor part of the biodiversity loss is related to land degradation as such. Biodiversity projections exist from many other studies, see e.g. the Global biodiversity Outlook and work published after that. I would expect a more overall figure.	This is an illustrative figure from one of the reports. We will be more explicit about that, and will look into the possibility if creating a new figure that includes data of several reports adds to the readability of this chapter.
Karen Holl	Ch. 7	22	746			Delete "Peter H." This is repeated multiple times where some authors first names are included. The citations need to be proofed.	Noted. References have been cleaned and double checked in the final draft.
Cristobal Diaz	Ch.7	23	773	23	773	I suggest to add: with associated negative impacts on freshwater biodiversity (e.g.,Stoeckl et al., 2013), such as reductions in species richness and abundance, and possible shortages in ecological discharges for water maintain in protected areas with rich biodiversity .	Noted
Virginia Meléndez Ramírez	7	23	782	23	792	Some examples of loss of diversity such as animals due to climate change could be added	Outside of the scope of this assessment, as it focusses on land degradation.
Germany	Ch.7	24	803		803	This Figure has a low resolution quality. Please improve it.	Final draft will include high resolution images and source.
Karen Holl	Ch. 7	24	805		816	Lines 805-816 and the following couple of pages – These discussed ways to reduce biodiversity loss. Many options are discussed but never is the topic of slowing population growth directly addressed. Certainly consumption by high consuming nations would need to be reduced, along with dietary changes which are discussed, but it seems a major oversight to not mention reducing population growth as one factor that has the potential to reduce biodiversity loss.	Indeed, alternative population growth scenarios have been rarely implemented for reasons of the large time lag of around 40 year to have serious impact on the end terms, but recently the SSP1-3 scenario do differ in populations growth, and have been applied for UNCCD's Global Land outlook, also included in this report.

Cristobal Diaz	Ch.7	24	816	24	816	I suggest to change: 3. Changing human production and consumption patterns, including reduced meat intake, food and water waste.	Noted
AGT Schut	Ch. 7	25	826			the study looked at the impacts of declines in primary production, may not have been degradation at all.	As stated in section 7.1 change in productivity is seen as one of the many forms 'land degradation' can take, next to other components of land degradation such as the change in soil characteristics, biodiversity, water holding capacity, land cover and ecosystem functions. The change in productivity has been derived from changes in NDVI over a 30 year period (1982-210), and extrapolated towards 2050 after being corrected for influences from climate change over the same period, to approach as much as possible land-based productivity change.
AGT Schut	Ch. 7	25	826			From what I know, impacts of productivity declines were studied, that may not be related to land degradation per se.	As stated in section 7.1 change in productivity is seen as one of the many forms 'land degradation' can take, next to other components of land degradation such as the change in soil characteristics, biodiversity, water holding capacity, land cover and ecosystem functions. The change in productivity has been derived from changes in NDVI over a 30 year period (1982-210), and extrapolated towards 2050 after being corrected for influences from climate change over the same period, to approach as much as possible land-based productivity change.
Thomas Brooks	Ch.7	25	835	25	839	I would be very wary about using "in prep" studies for such a figure. Recommend replacing with published work, using widely-used indicators like the Living Planet Index (for populations) and the Red List Index (for extinction risk). Figure 1 from Visconti et al. (2015) Conservation Letters would be an example.	Thank you! We made use of your suggestions. And the in prep study has since been published, so it is now included in full reference.
Rob Alkemade	Ch. 7	25	836	25	839	This is an example of how LD may affect biodiversity, however rather limited. It would be good to put this in a wider perspective	Thank you. Some additional LU references were added, but note that studies from Popp et al. on LU and deforestation are taken into account in the climate section.
AGT Schut	Ch. 7	17	841			Rephrase sentence	Noted
AGT Schut	Ch. 7	17	847		848	check format of references, excluding authors first names	Noted. References have been cleaned and double checked in the final draft.
AGT Schut	Ch. 7	17	855			replace alien species by exotic species	Noted, but we will leave this as it is, because the common terminology in IPBES is invasive alien species (IAS)
UNCCD SPI	Ch.7	26	861		862	Provide a reference, and explain the Willet diet - 70 g what? Any meat protein? Red meat?	Noted, reference has been included and some elaboration in a footnote.
Rob Alkemade	Ch. 7	26	866			Figure 7.6. The usefulness of this figure depends on whether you see biodiversity itself as an indicator for land degradation, I don't think that is the case. That means that many of these options are out of the scope of this assessment	As elaborated in section 7.1 biodiversity loss is considered as one of the components of land degradation, next to others such as changes in soil, water holding capacity, land cover, productivity and ecosystem services. Chapter 7 is structured according to a feasible selection of these components.
UNCCD SPI	Ch.7	26	868	27	869	The potential for closing the yield gap is noted as particularly high in Africa. What assumptions were applied for Africa?	Africa is not mentioned in this paragpah, but indeed the yield gap is large in Africa due to many socioeconomic and technical constraints as elaborated in section 7.2.3
Thomas Brooks	Ch.7	27	873	27	881	Supplement this with citation and results from Butchart et al. (2015) (2015) Shortfalls and solutions for meeting national and global conservation area targets. Conservation Letters 8: 329–337.	Yes, agreed that these could be useful. We had a look and used them where relevant.

Thomas Brooks	Ch.7	27	881	27	881	Add text here on scenarios for climate change mitigation (especially REDD+), and their implications for biodiversity. Two references would be Strassburg et al. (2012) Impacts of incentives to reduce emissions from deforestation on global species extinctions. Nature Climate Change 2: 350–355; and Jantz et al. (2015) Future habitat loss and extinctions driven by land-use change in biodiversity hotspots under four scenarios of climate-change mitigation. Conservation Biology 29: 1122–1131.	Yes, agreed that these could be useful. We had a look and used them where relevant.
Virginia Meléndez Ramírez	7	27	904	27	905	Some examples could be added on the introduction of key or indicator species as a restoration measure.	Thank you for the suggestion. However, the limited space in the chapter means we have to limit examples. Also, this would fit better into the scope of chapter 6 on restoration options.
McAfee, Brenda	Ch. 7	28	927	28	927	Does defect refer to a gap or oversight?	Mainly gap. As explained in the text: lack of comprehensive cross-disciplinary analysis of the interlinkages between the different types of drivers and mechanisms of land degradation and their effects at various scales in space and time.
Astrid Hilgers	7	28	930	28	930	Although t the effects of land degraation on food security are not analysed in an integrated manner, the statement suggests that nothing has been done yet. This is clearly not the case. There are many activities in this direction.	We changed "start" to "embark". However, I think the statement is clear enough that we are not starting from scratch.
Yujie Wang	Ch.7	28	946	28	953	There are two same sentences of "There is however evidence...".	Correct. Thank you. This paragraph was rewritten and repetitions were deleted.
Germany	Ch.7	28	952	29	954	Sentence is the repetition of the preceeding sentence.	Correct. Thank you. This paragraph was rewritten and repetitions were deleted.
AGT Schut	Ch. 7	28	952	957		Text is repeat of previous, e.g. on lines 946.	Correct. Thank you. This paragraph was rewritten and repetitions were deleted.
U.S. government	Ch.7	28	952	29	954	This sentence is repeated from lines 946-947.	Correct. Thank you. This paragraph was rewritten and repetitions were deleted.
AGT Schut	Ch. 7	17	955			Repeated text	Correct. Thank you. This paragraph was rewritten and repetitions were deleted.
UNCCD SPI	Ch.7	29	958		959	it is not only in arid regions that LDCs are vulnerable to LD	we changed "i.e. arid regions" to "e.g. semi-arid regions"
UNCCD SPI	Ch.7	29	961		962	Box 7.2 useful list of processes generally ignored in the rest of th report. how does land degradation cause loss of pollinators? bioenergy is an agricultural crop. How can expansion of bioenergy reduce agricultural area? Bioenergy is not a mechanism of land degradation.	The one-but-last bullet was rewritten as: "Loss of supporting ecosystem services, due to biodiversity loss in field margins and/or in formerly natural adjacent areas (e.g. pollination, resilience against pests and diseases)" - Bioenergy was removed from the last bullet.
AGT Schut	Ch. 7	17	969			Only true when referring to production, but not for yield. Crop growth is not often measured, is that the proper term authors wanted to use?	Correct. "growth" was replaced by "yields" and "agricultural expansion" was replaced by "by shifting production to newly explored areas".
Yujie Wang	Ch.7	29	969	29	971	"There" should be used.	The first word in line 969: "There" was replaced by "The".
Germany	Ch.7	29	974	29	975	"mining surrounding natural areas" ?? Relation to the rest of the sentence?	Correct. "mining surrounding areas" was cut from line 974/975 and put between brackets after "to small crop land areas" in line 972.
Rob Alkemade	Ch. 7	30	983	30	985	Could you add a reference to underpin these suggestions	This paragraph was moved to the end of section 7.2.3.1. They should be seen as conclusion of this section.
Germany	Ch.7	30	987			Spell out and explain "IAM frameworks".	IAM was replaced by Integrated assessment modelling.
Rob Alkemade	Ch. 7	30	987	30	991	Can you provide avidence for this statement on Integrated assessment models?	Rederence is given to IMAGE and IASA modelling arsenal. The sentence was slightly reformulated.
Rob Alkemade	Ch. 7	30	1006	30	1009	Can you lease add a reference to underpin this statement?	The sentence was reformulated to make it clear that this is how the model was desigend.

Rob Alkemade	Ch. 7	30	1009	33	1064	This section also draws heavily on a particular, not yet published, study, I would put it in the context of the many other Land use scenario studies	I don't agree. This study - now published - distinguishes itself from the many other land use scenarios in that land degradation (the core topic of this publication) is explicitly addressed. References to the restoration scenario (which was not yet published) were removed from the text.
UNCCD SPI	Ch.7	31	1017		1017	explain the key in same terms as in the text discussing this study	Agreed and changed
Yujie Wang	Ch.7	32	1037	32	1044	These two maps are not clear and their references should be added.	The maps were removed
Germany	Ch.7	32	1043		1043	This Figure has a low resolution quality. Please improve it.	The maps were removed
AGT Schut	Ch. 7	33	1068	1070		The term masked may not be appropriate here. Increased production is resulting from better agricultural practises that may revert land degradation processes....unless the reference is to land erosion??	In specific cases land degradation forms such as soil erosion and loss of SOC, micro nutrients and texture can be masked by fertilization and irrigation looking only at food production. In the longer term, after passing critical levels, also foodproduction can be affected. However, no local scenarios have been found on this issue and the text has been deleted
AGT Schut	Ch. 7	34	1093	1096		Why would these do better than specialised farming using good agricultural practises? Not convincing at all, where is the evidence?	This statement is too general and could not be sufficiently underpinned, and has been deleted.
AGT Schut	Ch. 7	17	1094			Only true when referring to e.g. soil erosion. Conservation tillage without inputs is conserving poverty and does not address issues of land mining, see Giller, K.E., Witter, E., Corbeels, M., Tittonell, P., 2009. Conservation agriculture and smallholder farming in Africa: The heretics' view. Field Crops Res. 114, 23-34; Giller, K.E., Andersson, J.A., Corbeels, M., Kirkegaard, J., Mortensen, D., Erenstein, O., Vanlauwe, B., 2015. Beyond Conservation Agriculture. Frontiers in Plant Science 6. ; Vanlauwe, B., Wendt, J., Giller, K.E., Corbeels, M., Gerard, B., Nolte, C., 2014. A fourth principle is required to define Conservation Agriculture in sub-Saharan Africa: The appropriate use of fertilizer to enhance crop productivity. Field Crops Res. 155, 10-13.	The statement is too general and could not be underpinned and has been deleted accordingly
AGT Schut	Ch. 7	17	1098			I do not agree here, I do not see the evidence. No-till is a useful option to prevent erosion, but requires herbicides and is mostly used in monocropping. No-till may increase top soil C but likely lowers overall soil C contents. Low-input systems are often the cause of land degradation (i.e. mining the soil).	The statement is too general and has been deleted accordingly. It neither concerns conclusions from scenario analyses.
Virginia Meléndez Ramírez	7	34	1098	34	1102	Complete the paragraph with: and restoration of some ecosystems.	The statement is too general and has been deleted accordingly. It neither concerns conclusions from scenario analyses.
UNCCD SPI	Ch.7	35	1137		1141	It is surprising that this list of solutions does not include Water-use efficiency or water-harvesting methods.	Water efficiency only increases use of the resource as has been well documented in the literature while water harvesting is not effective on the scales covered by this chapter.
Cristobal Diaz	Ch.7	35	1141	35		It is important to remark that main and systematic efforts would be realized in diminished the quantity of wastewaters generated and their treatment in order to limit the contamination of lands and soils and waters that contributes to land degradation and limit the food production	I looked into wastewater, but the future projects are not in the literature and the comment is a little unclear so no adjustment made.
UNCCD SPI	Ch.7	35	1144			what is meant by "water change"?	Adjusted

Cristobal Diaz	Ch.7	35	1145	35	1145	To add: "The future of changes in hydrological cycles and precipitation patterns will be impacted....."	Adjusted
U.S. government	Ch.7	35	1166	36	1173	Is this true for all SSPs? A section like this should be included for each category (soil, food, water, etc.) to provide parallel structure and an understanding of the variability in predictions from the different SSPs. If the SSPs are silent on an issues, say so.	The SSPs have now been integrated into every thematic section.
UNCCD SPI	Ch.7	35	1169			this seems highly unlikely, and does not correspond with figures in the cited report http://pure.iiasa.ac.at/13008/1/WP-16-006.pdf p66:currently 3.6 billion people worldwide (51%) are living in potential severe water scarcity areas and this figure will increase to 4.8 to 5.7 billion by 2050 (57% to 58%). 73% of the affected people live in Asia in 2010 (69% in 2050). http://pure.iiasa.ac.at/13008/1/WP-16-006.pdf p66:currently 3.6 billion people	pg. 82: "A hydro-economic classification, which categorizes countries based on their hydro-climatic complexity and economic-institutional capacity, was performed. Results of this analysis show that 22 countries are in the water stress categories (rich and poor economies remaining water stressed) in 2010 and 28 to 33 countries will be in the water stress categories in the 2050s, depending on the scenario considered. The consequence is that about 3.6 to 4.6 billion people (43-47% of total population who will produce 41-44% of total GDP) will be under the water stress category. 91 to 96% of the affected population will live in Asia..."
Germany	Ch.7	37	1222	37	1224	The predicted changes in water quantity also include increases in flood levels.	Adjusted to add variance
Germany	Ch.7	37	1225	37	1228	The predicted changes in water quantity also include increases in flood levels.	Adjusted to add variance
UNCCD SPI	Ch.7	39	1245		1246	Text not visible at bottom of box	Noted
Germany	Ch.7	39	1245		1246	The last sentences in Box 7.3 seem to be missing.	Noted
McAfee, Brenda	Ch.7	39	1245		1246	The text is almost identical to text under Key Findings (lines 1131-1142)	Adjusted to add variance
Pavlos Tyrologou and María José Rubial (PESP-EFG)	Ch.7	39	1245	39	1246	"Managing land is managing water" is a key concept. We are happy to see this statement in the document. We are missing however a reference to heavy industry assets located in river basin and the lack of environmental liability requirements (or light requirements) which can cause severe damage to soil and water (ground water and surficial water through direct spill of subsurface discharge) in the undesirable event of an accident occurring. This box, and in general the whole document seems too biased toward the side of agriculture and livestock. Little references to industry (i.e.: energy production and utilities) with high impacts and dependencies on soil and in this case also water	A sentence has been added which reflects the importance of industry noting that there are not global models of industrial impacts on water and land at regional levels available for future scenarios.
Karen Holl	Ch. 7	39	1245		1246	Box 7.3 – The tone of this box changes from the rest of the text. It mostly repeats information that is already in the main text. It is also cut off at the end. The third point is never finished. I recommend deleting this box as I didn't see any information that wasn't covered elsewhere.	We decided against changing this box as others found it useful.
Astrid Hilgers	7	39	1246	39	1246	There is a strong link between land and water management. However, one can not say that it is the same. Land management will influence water quality and quantity but there is more to the story!	While we recognize this is not the full story and we don't think the text explains it as such many others also found this comment important and hence we have decided to retain it.

						CH. 7. Box 7.3 The sentence "higher nutrient use efficiency in crop production can substantially reduce accumulation of contaminants" is unclear. The term "contaminants" usually implies toxics - if the authors mean nutrients, they could use either "nutrients" or "pollutants" - if they mean pesticides, they should provide more explanation of the linkage with nutrient use efficiency.	
U.S. government	Ch.7	39	1246	39	1246		We changed it to pollutants and nutrients and added explanation
Cristobal Diaz	Ch.7	40	1250	40	1250	To add:such as the greenhouse gases emissions (GHG emissions).....	Adjusted to: 'gas emissions' in the sentence as suggested
UNCCD SPI	Ch.7	40	1259			how do you store N2O?	Adjusted to:Greenhouse gas (CO2 /N2O) emissions; stored carbon,
Germany	Ch.7	41	1280	48	1455	The following Figures have a low resolution quality, and need improvement: Figure 7.11 / 7.12 / 7.13 / 7.14 / 7.16.	Final draft will include high resolution images and source.
U.S. government	Ch.7	41	1281	41		Box - Perhaps climate should be the first category discussed? This box describing the RCPs and SSPs would be useful earlier in the chapter.	Indeed the description of the RCP and SSPs not only applies to climate change but also to impacts on other components such as soils, biodiversity, food and water. There we shift the information to a new paragraph 7.1.5.1 of the introduction section of Chapter 7.
UNCCD SPI	Ch.7	43	1308			elsewhere baseline refers to the scenario against which land degradation is assessed. i suggest you call this BAU GHG emissions	Business as usual and baseline scenarios are highly identical (no new policies). No reason to adjust
Cristobal Diaz	Ch.7	43	1329	43	1329	To include:the possible severe negative impacts of climate change on tropical ecosystems,....	Agree, we followed your suggestion
Cristobal Diaz	Ch.7	43	1337	43	1338	To add: Climate change could also indirectly lead to land degradation, by impacting on future food production and water availability	Agree, we followed your suggestion
UNCCD SPI	Ch.7	43	1338			point not clear: explain how impacts on food production lead to land degradation	This is explained in line 1342 , we added:by impacting on future food production (IPCC,2014a), thus leading to further land conversion to meet food security demands.
Yujie Wang	Ch.7	44	1344	44	1344	This figure is not clear and its reference should be added.	Final draft will include high resolution images and source.
UNCCD SPI	Ch.7	44	1349		1350	point not clear. Impacts on what?	What is meant is, that climate change can impact on biodiversity, and climate change policies may mitigate or adapt to these effects - while some policies have direct positive effects on biodiversity. Adjusted in the text
Karen Holl	Ch. 7	44	1350			It is suggested to mitigate climate change effects by afforesting. That should be changed to "restoring forest in lands that were formerly forested." Afforesting land that wasn't previously forested, particularly in shrubland and ancient grassland sites, can decrease biodiversity and have other negative consequences such as increased evapotranspiration and reduction of water supply.	Agree, we followed your suggestion

UNCCD SPI	Ch.7	45	1374		1377	this analysis is viewed as particularly pessimistic: Kline, K.L., Msangi, S., Dale, V.H., Woods, J., Souza, G.M., Osseweijer, P., Clancy, J.S., Hilbert, J.A., Johnson, F.X., McDonnell, P.C. and Mugera, H.K., 2017. Reconciling food security and bioenergy: priorities for action. GCB Bioenergy, 9(3), pp.557-576. http://onlinelibrary.wiley.com/doi/10.1111/gcbb.12366/full Also: file:///C:/Users/alc/Downloads/Comments%20on%20Avoiding%20Bioenergy%20Competition%20for%20Food%20Crops%20and%20Land-201502.pdf and https://oversight.house.gov/wp-content/uploads/2016/03/2016-03-16-Wallace-Tyner-Testimony.pdf	Inserted: "... may vary significantly and may take up to 50-100 years as exemplified for African wet savannahs." Kline et al don't say anything on carbon payback time. Wallace-Tyner agree with Searchinger.
Sandhya Chandrasekharan	Ch.7	46	1394	46	1394	second last bullet in the box says "Low farm incomes could be supplemented by payments for ecosystem services. " but beyond incomes, how is the productivity - domestic consumption gap to be met? That is what environment ministries need to convince agricultural ministries about. It is an important "scenario" that could be developed and supported with more research	This comment is unclear - I don't understand what is meant, we can add more information
UNCCD SPI	Ch.7	47	1397		1398	this is a statement of fact. It can't be "unresolved". Confine it to IPCC AR5 and then there can be no doubt of the accuracy of the statement.	True, thank you for the advice on the approach.
Yujie Wang	Ch.7	47	1425	47	1425	Please change "CO2" into "CO ₂ ".	changed
Yujie Wang	Ch.7	48	1438	48	1438	Please change "m3" into " m ³ ".	changed
Karen Holl	Ch. 7	48	1442		1447	Again afforestation is discussed as a positive outcome from a conservation perspective with no caveats about the issues of planting trees into land that wasn't originally forest. See Veldman, J. W., G. E. Overbeck, D. Negreiros, G. Mahy, S. Le Stradic, G. W. Fernandes, G. Durigan, E. Buisson, F. E. Putz & others. 2015. Tyranny of trees in grassy biomes. Science 347:484-485.	This is now noted and cited
Germany	Ch.7	49	1455		1456	The writing in the dark green area is unreadable. Please improve the quality of this Figure.	Noted
Yujie Wang	Ch.7	49	1457	52	1526	"7.2.6.3" is missing.	Noted
Germany	Ch.7	50	1470	50	1475	It would be better instead of mentioning REDD directly use the formal term: "positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries" then it would read "respective scenarios" in line 1471; and regarding the co-benefits it would be better to express that the achievement of those co-benefits heavily depends on the "correct implementation" of mitigation and adaptation strategies in the forest sector. Rationale: The report should not only stress the mitigation potential of forests, but also their role in adaptation efforts which is not properly addressed in REDD+, that is one of the reasons why the JMA later in the negotiations gained support from the African countries.	Agreed
Germany	Ch.7	50	1476	50	1482	Paragraph needs more clarity on the message to be conveyed.	Noted
Germany	Ch.7	50	1483	50	1486	Unclear what is the link between Lauri et al. and WWF. Later in the sentence it would be better to link numbers and regions for reader-friendliness.	Distinction is clearly made now.

Javier Ernesto Cortés Suárez	Ch.7	51	1495	51	1495	There should be graphic examples (e.g. photos) than can highlight the importance of the Amazon Basin in this topic.	Thank you, we have considered adding photos to illustrate the pont, but there are already relevant illustrations in previous chapters on the importance of Amazaon Basin and we didn't feel that it would be necceary in this chapter.
Germany	Ch.7	51	1496	51	1501	The two references Gerwing and Nepstad et al. make no sense at all. It is totally unclear what kind of message should be conveyed here. Needs complete restructuring.	We revised this paragraph.
Javier Ernesto Cortés Suárez	Ch.7	51	1506	51	1506	There should be graphic examples (e.g. photos) than can highlight the importance of the Congo Basin in this topic.	Thank you, we have considered adding photos to illustrate the pont, but there are already relevant illustrations in previous chapters and we didn't feel that it would be necceary in this chapter.
Javier Ernesto Cortés Suárez	Ch.7	51	1515	51	1515	There should be graphic examples (e.g. photos) than can highlight the importance of Southeast Asia in this topic.	Thank you, we have considered adding photos to illustrate the pont, but there are already relevant illustrations in previous chapters and we didn't feel that it would be necceary in this chapter, given the scope.
Germany	Ch.7	51	1516	51	1516	Delete "relatively".	Deleted as reduntant.
Germany	Ch.7	52	1526	52	1526	The restoration of forests should not be selected as an option to substitute "low productivity grasslands" as long as these are natural ecosystems. Restoration of forest should only be applied on degraded former forest land.	Made more nuanced
Javier Ernesto Cortés	Ch.7	52	1530	52	1530	These should be reviewed considering that Ecological Restoration concept is different from Restoration Ecology concept. Ecological restoration allows to establish the effects of the actions of Restoration ecology and contributes to the enrichment of the ecological theory.	Noted
UNCCD SPI	Ch.7	52	1550			do you mean water yield?	Yes thank you. Changed to water yield
Yujie Wang	Ch.7	53	1575	53	1575	Please check the citation style "(Bhakta et al. 2016)".	Noted
Yujie Wang	Ch.7	54	1610	54	1610	Please check the citation style "Caspari et al 2014".	Noted
Yujie Wang	Ch.7	54	1615	54	1615	Please check the citation style "Curran et al. 2012".	Noted
Germany	Ch.7	54	1630	54	1630	In the paragraph on Biochar it should also be mentioned that in order to have a significant mitigation effect huge quantities of Biomass would need to be converted into Biochar, raising questions about land-use conflicts, negative effects on biodiversity, energy-balance etc.	This is now noted
Karen Holl	Ch. 7	54	1631			The biochar section seems out of place right after governance. It seems like it should go much earlier when soil carbon sequestration is discussed.	Moved to soil section

						There are many suitable references reviewing the benefits of biochar. The book by Lehmann and Joseph presents a large body of evidence: Lehmann, J. and Joseph, S. eds., 2015. Biochar for environmental management: science, technology and implementation. Routledge. It would also be appropriate to cite one or more of the recent meta-analyses on the impacts of biochar on plant yield (eg Jeffery, S., Verheijen, F.G., Van Der Velde, M. and Bastos, A.C., 2011. A quantitative review of the effects of biochar application to soils on crop productivity using meta-analysis. Agriculture, ecosystems & environment, 144(1), pp.175-187. Biederman, L.A. and Harpole, W.S., 2013. Biochar and its effects on plant productivity and nutrient cycling: a meta-analysis. GCB bioenergy, 5(2), pp.202-214. Liu, X., Zhang, A., Ji, C., Joseph, S., Bian, R., Li, L., Pan, G. and Paz-Ferreiro, J., 2013. Biochar's effect on crop productivity and the dependence on experimental conditions—a meta-analysis of literature data. Plant and soil, 373(1-2), pp.583-594.	
UNCCD SPI	Ch.7	54	1632		1633		Thank you. Many of these references are now included.
UNCCD SPI	Ch.7	54	1644		1645	Biochar made from clean feedstocks in recommended production conditions does not contain any toxic constituents; biochar only contains "contaminants" if made from feedstock contaminated with organic or inorganic contaminants, or at higher than recommended temperatures. Therefore this should be worded: ... in terms of contaminants that may be contained in it.	Reworded
U.S. government	Ch.7	55	1652	58	1800	7.3.1 and 7.3.2 could be moved before 7.2, which would help provide context to all of 7.2. 7.3.3 and 7.3.4 are good summaries to follow 7.2.	It was decided to keep the sequence of the sections as it is, first presenting scenario outcomes of the individual themes and then -in 7.3- to discuss the outcomes of integrated scenario analyses also including trade offs between the themes. However, general information on the Shared Socioeconomic Pathways (SSP) scenarios in 7.3 has been put in 7.1 as you suggested, providing context for both 7.2 and 7.3.
U.S. government	Ch.7	56	1713	57	1737	This description would be useful up in the chapter introduction.	Noted: moved up to 7.1 and revised with Global Land Outlook SSP outcomes.
Germany	Ch.7	56	1724	56	1726	Delete the sentences starting with "They have been used to explore the ..." because they are replications of the sentence in lines 1722-1724 on the same page.	Agree, repetition removed.
Yujie Wang	Ch.7	56	1725	56	1725	Please check the citation style"(van Vuuren et al., 2014; van Vuuren, Edmonds, et al., 2011)".	Noted
Germany	Ch.7	57	1741			What are 'A1'; 'A2'; 'B1'; 'B2'?	inserted on line 1708 , after regional) -' labelled A1, A2, B1 and B2 in Figure 7.20a'. Deleted ref to Figure 7.3.1a
Yujie Wang	Ch.7	57	1745	57	1746	Please uniform the reference style.	Noted
Germany	Ch.7	58	1794	58	1795	Please cross-check the statement with findings of the previous chapters, which suggest the activities in the agriculture sector could be seen as the major driver of biodiversity loss as well (in the past, present and maybe also in future?).	Inserted 'for food production' after 'fertile land'. Also replaced 'certain environment' in line 1794 with 'some situations'. Consistent with other chapters.

McAfee, Brenda	Ch.7	59	1824	59	1825	On p. 57, line 1755 states that scientific understanding of ecosystem processes and interactions have enhanced scenario analysis. The paragraph starting on line 1821 notes the high levels of uncertainty confounding scenario analysis as a result of fundamental gaps in understanding of ecosystem functioning and dynamics. While these two statements are not exactly conflicting they cause confusion. Similarly for traditional knowledge. Is the issue a matter of scale? or a lack of data?	Text changed as follows Scenario analysis is subject to limitations associated with (i) the ability to incorporate the wide range of potential drivers and pressures, (ii) the adequacy of current knowledge, data and models to represent ecosystem functioning and dynamics, and (iii) the considerable uncertainty associated with the appraisal of social and political responses, including behavioural change and the efficacy of policy interventions and governance regimes(Smith et al. 2010). . In spite of considerable progress, scenarios are currently limited
UNCCD SPI	Ch.7	60	1853			What does "visioning LDR" mean?	Visioning is defined and explained on 7.3.2 lines 1764 to 1771 and visioning perspective for LDR is explained in the first para of this section
UNCCD SPI	Ch.7	60	1859		1860	Statement makes no sense: In this context, LDR is perceived more as a means rather than an end in itself. Reword.	edited to remove offending statement in this context: removed 'LDR is perceived more as a means rather than an end in itself'. I. This visionary.' and inserted 'This objective-oriented perspective.... ..
UNCCD SPI	Ch.7	60	1861			do you mean anthropocentric?	agree : anthropocentric , although anthropogenic was intended to refer specifically to effects of human activities : used term 'human'
Virginia Meléndez Ramírez	Ch. 7	61	1903	61	1903	You can add conclusion of the chapter	We didn't change this. Not consistent with other chapter outlines