

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

1 May - 26 June 2017

Chapter 4

Reviewer Name	Chapter / SPM	From Page (start)	From Line (start)	To Page (end)	To Line (end)	Comment	Response (from Chapter 4)
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 redundant 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. The final report has been streamlined as much as possible.
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 in the final report.
Germany	All Chapters					Please ensure that in all chapters information and case-studies are provided from all regions.	Regional representation is not the purpose of case studies, but we tried to ensure as much coverage in thematic and geographic areas as was relevant and possible.
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.	This was added to Ch4 introduction
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					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.	All of these elements have been ensured for the final draft of the report, for all chapters.
Germany	All Chapters					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.	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					We strongly encourage the chapter authors to ensure that their key findings are reflected in the key messages of the summary for policymakers.	The SPM has been revised based on the updated key findings from the chapters.
Germany	All Chapters					We encourage the authors to spell out the acronyms when they are introduced for the first time in the text.	Agree, editorial
Germany	All Chapters					All reference lists need to be rechecked regarding completeness, spelling and they also need to be structured in a similar style.	Agree, editorial
Germany	Ch. 4					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.	Thank you, for the final report, we read through all chapters and ensured that redundancies were eliminated to the extent possible. In some cases, repetitions were found to be necessary or helpful. Cross-referencing has been done as well
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 landdegradation: 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 deviation 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, clearing the different roles of science and politics, and taking away the barriers to fulfill their tasks properly.	Please see Section 4.1.2.2. on Baselines. This section stressed that many aspects of degradation exist, hence the need to consider several types of baseline.
Astrid Hilgers	All Chapters				The assessment, 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 considered. 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				More attention should be payed to the role that the private sector could pay, in the SPM and trougout 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. buisness for sustainabl;e 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 ecoagricultes 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 assesment 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	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 teh beginning of the document	Thank you. The discussion on NCP and its use in the whole assessment is addressed directly in the Preface.

Finnish Government	All Chapters				<p>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>Somewhat similar statement is found in the Executive Summary of Chapter 4: "Land degradation takes place in both natural vegetation and on previously transformed land, so choice of an appropriate baseline against which to assess change is important (unresolved)". Again, the choice of confidence term may be incorrect. The statement is that appropriate baseline is important and this is likely to be well established.</p>	The baseline discussion has been clarified in the SPM of the whole LDRA and in the Box.
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>	These comments are relevant to Chapt 6 and 8, Not relevant for chapter 7
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/mission-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>	Agree, role of financial sector is important. It has been addressed in the final report, especially in Chapter 6 and 8 (in accordance with the scope). In chapter 5, we also included the discussion on different valuations of ecosystem services.
Virginia Meléndez Ramírez	Ch. 4				<p>All the Chapter could start with an introduction and end with the conclusions, you could standardize the chapters + Several images in some chapters can not be seen well</p>	Chapter 4 now has a concluding section "Way Forward". Figures have been improved for quality.
IPBES Knowledge and Data Task Force (KD TF)/ Task Group on Indicators (TGI)	All Chapters				<p>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).</p>	Now Ch 4 reviews the topic of indicators in Sect 4.4.,also references use of existing, and proposals for new indicators.

Pavlos Tyrologou and Maria José Rubial from the Panel (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)	These topics are included in 4.3 which has minimal ES information, rather referring back to relevant parts of Sect 4.2.
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 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 biodiversity 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.	We agree. Distant effects and interactions are now mentioned in 4.1.2.1.
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.	The terms have been added to Glossary to avoid ambiguity
José Romero	All Chapters				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.	This has been clarified in Ch1. No direct relevance to Ch4.
José Romero	All Chapters				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?).	All confidence level terminology has been reviewed for consistency.
Australia NFP	All Chapters				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. 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.	Agree, clear policy guidance on WHAT (package of) measures would support conservation of B ES 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. These elements have been added to the SPM
Australia NFP	All Chapters				Lack of consistency throughout the report's chapters, including definitions used for essential concepts. 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 degradation is not used in the report. References to the UNCCD would be useful, along with adopting its definitions/glossary for concepts like land degradation, land restoration, etc.	Thank you, the definition of land degradation has been given to use by the scoping document (decided by IPBES Plenary). We are not in the position to change that. We do discuss UNCCD and its definition of land degradation where relevant. Also, for the final report, we read through all chapters and ensured that redundancies were eliminated to the extent possible. In some cases, repetitions were found to be necessary or helpful. Cross-referencing has been done as well

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> <p>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>	<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>
Australia NFP	All Chapters				<p>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.</p>	<p>Agree, we adjusted the reference used to promote consistency, or explain why other sources are used and why they differ.</p>
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>This point was addressed in Ch 1 and 2, also now added in "Baselines-Target" in 4.1.2.2. Consistency was ensured for the final draft.</p>
Joanne Perry NZ focal point	Ch. 4	General			<p>General comment on chapter 4 - this chapter could do with some specific analysis and examples centred around small island developing states, in particular the issues of land degradation due to inundations and salt water contamination due to sea level rise and storm over topping events, also salt water intrusion into water aquifers.</p>	<p>This issue has been added to 4.2.2.2 salinization and 4.2.8.1. climate</p>
Mahmood Yekeh Yazdandoost	Ch. 4	General			<p>Components of land can determine the quality of human health;</p>	<p>Several sections (including pollution) deal with this issue implicitly.</p>
Mahmood Yekeh Yazdandoost	Ch. 4	General			<p>Land degradation reduces the sustainability of production system with adverse effect on human health;</p>	<p>Several sections (including pollution) deal with this issue implicitly.</p>
Mahmood Yekeh Yazdandoost	Ch. 4	General			<p>Land degradation may cause invasive species to grow due to synergistic effects of biological invasions and climate change;</p>	<p>Section 4.3.7 contains a note on this issue now.</p>
Mahmood Yekeh Yazdandoost	Ch. 4	General			<p>Key biodiversity features in land restoration; and</p>	<p>Restoration is dealt with explicitly in Ch6. Outside of the scope of this chapter.</p>
Juan Comerma	Ch. 4	General			<p>Here I have three comments related to soils. The first is that soil formation rate and degradation do not apply well for many highly leached tropical soils, where soil formation occurs very deep or on inert materials, and we are more interested in preserving or improving the very topsoil, where nutrients like, N, P and S, and we are more interested in preserving or improving the topsoil where nutrients are hold with the thin OM. The second comment is about soil as a terrestrial C stock. I would emphasize more Organic matter instead of organic carbon, as the former contains very important nutrients like N, P and S, so critical specially in tropical soils. where fertilizer use is low. Beside OM contains over 50% SOC to explain its role in storing C important in mitigation of Greenhouse gases. The third comment is related to degradation of rangelands. Here I would add the problem of compaction of soils in rangelands, specially subjected to overgrazing, which is very important in tropical savannas and mountains.</p>	<p>These points are all relevant, thanks. We are, however, not able to deal with all manifestations and nuances as that would double or treble the length of the chapter. Given the nature of the chapter some of your points are taken up in different sections such as the climate change and rangeland sections.</p>
Marcus Zisenis	Ch. 4	General			<p>It would be worthwhile also to look into historically unregulated world trade as main driver of land degradation and exploitation which continues nowadays (e.g. WTO, TTIP, CETA).</p>	<p>This is outside of the scope of Chapter 4. Chapter 3 deals with drivers.</p>

K.N.Ninan	Ch. 4	General				This chapter runs into 163 pages which is a great disincentive for readers and reviewers to read or review it. No doubt it presents a wealth of information and data. Ideally a chapter should be around 80-100 pages or so. Authors may seriously consider to reduce the overall size of this chapter. Put essentials in the main chapter and other details may be put in an appendix to the chapter. References themselves run into close to 50 pages. May reduce this. Also too many figures. Please check and delete those that are not essential.	The chapter has been substantially revised and shortened.
Sandhya Chandrasekharan	Ch. 4	General				Perhaps the structure and drift of this chapter in general needs some rethinking and overlap with other chapters (agriculture, invasives) can be taken into account to reduce the volume of content.	This has been done by elimination of all human causes, their trends and also the normal processes before degradation. The material was transferred to Ch.3.
Germany	Ch. 4	General				Ch. 4 does not deal with the indicator for monitoring SDG 15.3 on LDN. UNCCD as the custodian agency for this indicator tries to define a minimum standard/consensus for monitoring land degradation. These latest developments should be covered in the assessment. Especially because this is an effort and opportunity to maybe overcome the bemoaned status quo of the many inconclusive studies which do not allow for clear conclusions for policymakers.	Indicator use and SDG 15.3 are now dealt with in Sect 4.4 "the way forward".
Suneetha Mazhenchery Subramanian	Ch. 4	General				trends captured appear primarily from modern science evidence. accounts from local communities are not explicit and would be important to share as in preceding chapters.	Ch 2 is assigned this by the scoping document. Outside of scope for Ch 4.
Marieke Sassen	Ch. 4	General				Needs editing for language and general tidying up and tightening of text.	The final draft has been substantially edited.
Marieke Sassen	Ch. 4	General				A number of subsections under 4.2 could put a stronger emphasis on/ more explicitly address the implications of the described processes for ecosystem functions that support NCPs (especially the sections on soil and water).	This aspect is part of the "processes", thus belongs in Ch 3.not Ch 4.
UNCCD SPI	Ch. 4	General				1. The chapter is clearly written, but should have been placed earlier in the report. 2. The chapter provides a clear typology of different types of land degradation and restoration.	The Scoping fixed the sequence of chapters. We can't change it.
Pedro Mendoza	Ch. 4	General				General comments. Much of the information sounds repetitive with Chapter 3	Chapter 3 boundary problem: now solved by deletion of all normal process and their anthropogenic causes and transfer to Ch 3.
Katalin Török	Ch. 4	General				The Chapter is far too long, too much detailed	Now solved by deletion of all normal process and their anthropogenic causes transferred to Ch 3.
Xavier de Lamo	Ch. 4	General				Eventhough the chapter meets its overall objective, I think that the chapter is not publishable in its current state. Besides the abundant editing errors (which are not the main objective of this review), many parts of the text are poorly written, which decreases the general readability of the text and makes it difficult to the reader to follow the text and get engaged with what it is trying to communicate. I strongly encourage to carry out an exhaustive editing and proofreading process once the main substantial issues have been addressed, to ensure readability, conciseness, and a consistent style. One of the reasons behind the text's low readability is the repetition of concepts and findings throughout the text which, in my opinion, is partly caused by the cumbersome and confusing table of contents. The fact that the chapter is organized in many tiny little sections creates a high degree of overlapping between them and makes it difficult to do not be repetitive. I suggest a complete restructure of the table of contents to a more simplified one, with fewer sections.	The final chapter has been revised and edited to be more concise. Overlaps have been eliminated and language edited for errors.
Christophe CUDENNEC	Ch. 4	General				In terms of report structure, I think having the section on "water" before the one on "pollution" would be more logical	The water section is about physical hydrology, and has only indirect relationships to pollution
Astrid Hilgers	Ch. 4	General				Compliments, a great improvement compared to the FOD. More complete, relevant, better introduction to land degradation, and better-structured.	Thank you!

Astrid Hilgers	Ch. 4	General				The ex sum has a qualitative character, figures on specific degradation components, extent, severity or trends are hardly mentioned, nor distribution. Would that be possible, or does current state of knowledge not allow for that? If so this qualitative character could be mentioned in the first para of the ex sum. If concrete figures can be given about historical loss of: soil properties, land cover, land-based carbon, productivity, water holding capacity, river discharges characteristics, biodiversity, and possibly (or in Chapter 5?) loss in individual functions/services such as food, fiber, water availability, and climate change would be extremely policy relevant and complementary to Chapter 7.	The Executive Summary has been updated to include quantitative values where possible, but also emphasizing the dearth of information.
Astrid Hilgers	Ch. 4	General				If the chapter would give an introduction on how land degradation is defined/specified and which tangible components are distinguished would be helpful in understanding and interpreting the major conclusions: E.g.: soil para, vegetation, biodiversity, water characteristics, productivity, carbon storage, ecosystem services and functions, ,which baseline (is or are) used, natural or only antropogenic caused changes, ...?	The baseline concept is in Ch 2, but we felt that this issue was vital to the discussion of CH4 material and we therefore retained this at the chapter level.
Astrid Hilgers	Ch. 4	General				Chapter is extremely interesting and informative, but should be made shorter and more accessible to maximize its effect in the IPBES process.	Now solved by deletion of all normal process and their anthropogenic causes transferred to Ch 3.
Finnish Government	Ch. 4	General				throughout the chapter, unify the units for year (y, yr). Also unify gC and g C.	All units have been corrected in a standard manner.
NFP of China	Ch. 4	General				1. "Taiwan" should be changed to "Taiwan, China", and "Hong Kong" "Hongkong" should be changed to "HongKong SAR,China". 2. Please use either "the People's Republic of China" or "China" based on the context.	These names do not occur in Ch 4. 2. "China" is used throughout
Germany	Ch. 4	General				Improve the quality of the following Figures: 4.7 / 4.8 / 4.11 / 4.17 / 4.18 / 4.20 / 4.21 / 4.23 / 4.24 / 4.26 / 4.36 / 4.39 / 4.58 / 4.59 / 4.60 / 6.62 / 6.63 / 4.64.	Quality of all Figures has been improved by the graphic designer team
Mahmood Yekeh Yazdandoost	Ch. 4	General				The most effective strategies for reducing key biodiversity threats in land restoration/degradation areas	The strategies for reducing key biodiversity threats are discussed in Ch6, as per it's scoping. Not within scoping of Ch4
Susan Cordell	Ch. 4	General				The title is a bit misleading as the text is almost wholly about land degradation with minimal information on restoration	Restoration is dealt with explicitly in Ch6. Outside of the scope of this chapter. The title has been revised
Germany	Ch. 4	General				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.	All updated Key Findings have been incorporated into final SPM
Astrid Hilgers	Ch. 4	General				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 considered. Chapter 6 provides this wider range of options.	A wider range of sustainable land management practices has been incorporated into relevant chapters, but specific into Ch6. Not directly relevant to Ch4
Astrid Hilgers	Ch. 4	General				troughout the document. References p.e.1. Levashova 2011 Opportunities and challenges for private sector entrepreneurship and investment in biodiversity, ecosystem services and nature	Private sector is discussed in Ch2 and in Ch6. Not directly relevant to Ch4
Finnish Government	Ch. 4	General				C6. The word instrumental resposes used in SPM, Ch 6 and 8 is kind of confusing. Legal resposes 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.	Not Ch 4 topic
Caroline van Leenders	Ch. 4	General				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/mission-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!	Agree, role of financial sector is important. It has been addressed in the final report, especially in Chapter 6 and 8 (in accordance with the scope). Not directly relevant to Ch4

						<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> <p>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>	<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) were lacking in previous drafts. Chapt 7 provides a set of measures in its Key Messages. These elements have been added to the SPM</p>
Australia NFP	Ch. 4	General				<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> <p>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>	<p>Chapter 1 provides a methodology for case study selection. The case studies are no longer replicated throughout the report and are more diverse in nature.</p>
South Africa	Ch. 4	1	1	163	3424	<p>very useful content, excellent document. Should be linked more clearly to the regional assessments</p>	<p>challenging to establish those links. However, we made an effort to have a more consistent cross-assessment check and referencing. This was especially done at the SPM level.</p>
LI Qingfeng	Ch. 4	1	15	1	22	<p>Different styles were used for the Chinese name in the book. in the following paragraph, for example, The name Zhao Caiyun and Caiyun Zhao was the same person. It is recommended to use one format for the Chinese name --- capitalise all letters for the family name (ZHAO) and capitalise only first letter for the first name (Caiyun). The whole writing for the above named person is Caiyun ZHAO (or ZHAO Caiyun, if considering the Chinese style). The Chinese names in the following paragraph should be:</p> <p>Caiyun ZHAO = Caiyun Zhao or Zhao Caiyun; Guo LI = Li Guo or (need to verify the person's family name is LI, not GUO); Gensuo JIA = Gensuo Jia; Leilei CHENG = Cheng Leilei; Ling QING or Qing LING = Qing Ling (need to verify the persons family name); Nengwen XIAO = Xiao Nengwen; Fei WANG = Fei Wang; Ying QING or Qing YING = Qing Ying (need to verify the persons family name, and also the make sure if the Qing Ling or Qing Ying is the same person);</p> <p>"Contributing Authors Albert Bleeker (the Netherlands), Molly E. Brown (USA), Zhao Caiyun (China), Evan Ellicot (USA), Geraldo Wilson Fernandes (Brazile), Violette Geissen (the Netherlands), Li Guo (China), Panu Halme (Finland), Jim Harris (UK), Cesar Izaurralde (USA), Robert Jandl (Austria), Gensuo Jia (China), Cheng Leilei (China), Richard Lindsay (UK), Qing Ling (China), Guy Midgley (South Africa), Mohamed Neffati (Tunisia), Giuseppe Molinaro (USA), Xiao Nengwen (China), Margaret Palmer (USA), Gary Pierzynski (USA), Tobias Plieninger (Denmark), Pascal Podwojewski (France), Bernardo Dourado Ranieri (Canada), Kate Tully (USA), Ernesto Viglizzo (Argentina), Fei Wang (China), Qing Ying (China), Caiyun Zhao (China)</p>	<p>All names have been corrected. Thank you very much for your detailed attention to the matter.</p>

Xavier de Lamo	Ch. 4	2	26	4	141	This is a general comment for the whole structure of the chapter, as defined in the Table of Contents. I'm not entirely sure if some of the subsections included in section 4.2, are actually "degradation processes" as the title says, or ecological systems in which degradation happens (i.e. Section 4.2.3.3, Section 4.2.5, Section 4.2.6.2). As a consequence, some topics are repeated in several parts of the text (as an example, nutrition pollution as a degradation process is treated in more or less depth in section 4.2.2.4, 4.2.4, 4.2.5). I wonder classification of land degradation processes by components in components (for example: 1) Soil conditions, 2) vegetational and animal populations, 3) atmospheric conditions, 4) Water conditions and how all this would be affected by climate change) would make the text in section 4.2 clearer. Regardless on how the sections are organized, I think the titles could definitely be improved (i.e. "Carbon stocks and sequestration" (section 4.2.3) is not a land degradation process in itself,	The chapter has been streamlined and the section names changed to reflect the content more clearly without overlap
Ruishan Chen	Ch. 4	2	27	4	140	the title of the sections are incomplete, like pollution, water, climate change, what does this mean to land degradation? The title should reflect the content of that section.	The chapter has been streamlined and the section names changed to reflect the content more clearly without overlap
Ruishan Chen	Ch. 4	2	27	4	140	where is the status and trends of land degradation? This was discussed in 4.3.3 cropping systems and 4.3.7, what about other situations? Where is the changes in biodiversity and ecosystem functions?	Where information is available, this is in the Chapter. Trends of human activities that may lead to degradation are in Ch.3.
Ruishan Chen	Ch. 4	2	32	2	36	where is 4.1.3 between 4.1.2 and 4.1.4?	Section 4.1.3. added
Ruishan Chen	Ch. 4	2	32	2	36	the topic of this chapter is status and trend of land degradation and restoration, so restoration is also an important part of this chapter, what about the process of land restoration? What about the history of restoration studies? The title should be the process of land degradation, because we can't miss land in the title.	Restoration now dealt with in Ch 6
Marieke Sassen	Ch. 4	2	37	11	108	3rd level sub titles to be formulated as processes? (to fit with the title) Also should be made more consistent with figure 4.1, line 402, p13	Titles of sections are revised. Fig 4.1, line 402 -has been removed
Ruishan Chen	Ch. 4	2	38	3	51	soil erosion is also a soil degradation process, why it is not including in 4.2.2?	Erosion is sufficiently distinct from chemical changes. It is also the most important component of degradation.
Ruishan Chen	Ch. 4	2	38	2	84	soil pollution is also a soil degradation process	Erosion is sufficiently distinct from chemical changes. It is also the most important component of degradation.
Ruishan Chen	Ch. 4	2	38	3	84	Classification of degradation processes should have a unified framework, for example, according to land use/land cover types, such as water, wetland, agricultural land; or according to different problems, such as soil pollution, deforestation, desertification, karstification and others. Whatsoever, deforestation and desertification can't be ignored in this part.	The structure of 4.2 - cross-cutting processes - followed by occurrence in key human activities 4.3 was adopted to be the way to avoid repetition of the same material (e.g. erosion) under every human activity where it occurs (agriculture, grazing, forestry etc.)
Miguel Taboada	Ch. 4	2	51			Plant mineral nutrition is not a degradation process	The chapter has been streamlined and the section names changed to reflect the content more clearly without overlap
Ruishan Chen	Ch. 4	2	63	2	68	why 4.2.4.3 is not included in 4.2.5 water?	The water section is about physical hydrology, and has only indirect relationships to pollution
Ruishan Chen	Ch. 4	2	69	3	78	for water system degradation, water pollution, dam construction, sand mining and dredging, water system simplification are problems should be concerned here.	Mining affects water systems in many ways: pollution, siltation, deforestation and other direct disturbances associated with mine extraction and waste releases. Not only "sand mining" affects the structure of water ecosystems but all alluvial explorations and major dams. Exploration, extraction and waste disposal and mine water effluents associated with all mineral commodities have direct impacts on waterways. The text highlight these direct impacts to freshwater and riparian ecosystems, especially concerning tailings releases (section 4.3.9.2 Mining Wastes). The other items are deal with in other parts of the chapter
Ruishan Chen	Ch. 4	3	101	3	101	4.2.7 landscape-level degradation processes, I strongly recommend that this part should be included in the 4.2.2 degradation process	4.2.2. is about soil, 4.2.7. landscape scale processes - which are much wider than soil erosion (e.g. habitat fragmentation and biodiversity)
Ruishan Chen	Ch. 4	3	102	3	108	is climate change the driver of land degradation, or the process of land degradation related to climate change?	In this context, climate change is a driver, leading to various types of degradation.

Astrid Hilgers	Ch. 4	7	200	7	200	Start the executive summary on how land degradation is defined/specified and which tangible components are distinguished. This would be helpful in understanding and interpreting the major conclusions in the ES: E.g.: soil para, vegetation, biodiversity, water characteristics, productivity, carbon storage, ecosystem services and functions, ,which baseline (is or are) used, and are natural or only antropogenic caused changes dealt with, and both state and process variables, ?	Mostly topics for Ch.1 and 2., but with different emphasis. Hence it is included in the Introduction of Ch.4. (4.1.2 and 4.1.3.)
Astrid Hilgers	Ch. 4	7	201	7	213	Is this an all ecosystem types covering statement, or just a few, and if the latter, why this selection?	It applies to all ecosystems that are degraded
Virginia Meléndez Ramírez	Ch. 4	7	201	7	202	Is afimation very well established?	"well established" added to sentence.
Christophe CUDENNEC	Ch. 4	7	201	10	354	There should be in this executive section at least one paragraph in relation to section on "water"	Review contents of Exec Summary
Ruishan Chen	Ch. 4	7	201	7	201	biophysical degradation should be more specific, and write as land degradation.	"Biophysical" is explained in the Introduction and glossary
Osama Elsidig	Ch. 4	7	202	7	203	We should empasize here that there is wide consensus that land degradation is a global problem resulting in substantial loss in NCPs. I suggest to delete " however the global extent, severity and trends indegradation remains inconclusive"	The extent and severity is what is "inconclusive", not its existence
Li Qingfeng	Ch. 4	7	203			"NCPs" --- should be "Nature's contributions to people (NCPs)". Although the "NCPs" have been clearly defined as the abbreviations for the "Nature's contributions s to people" in the "Acronyms and abbreviations", the full spellings should be given in the abstract as the abstract may quite often be used seperatedly from the main text.	The LDR Assessment has dropped the term "NCP" in favour of the more widely-used "ecosystem services". NCP has been removed from this chapter
UNCCD SPI	Ch. 4	7	203	7	203	What does "NCP" stand for - in full first time in text please	This chapter has dropped the term "NCP" in favour of the more widely-used "ecosystem services". NCP has been removed from this chapter. The discussion on NCP was used in LDRA assessment is discussed in the Preface to the report.
Dan Pennock	Ch. 4	7	203	7	205	The statement that 4/5ths of agricultural land suffers from severe erosion is not scientifically credible nor is it supported by section 4.2.1	Exec Summary lines 201-213 has several different points mixed together. Examples of extent of degradation are not good.
Royal C. Gardner	Ch. 4	7	207	7	208	The 75% wetland loss is over what timeframe?	Timeframe specified.
Marieke Sassen	Ch. 4	7	213	7	213	Refer to Chapter 3 too?	Cross-reference has been made
Cristobal Diaz	Ch. 4	7	214	7	217	I propose include climate change, environmental changes	These aspects are dealt with in Ch3. By agreement among experts, Ch4 deals only with the consequences of climate change (Sect.4.2.8.). See also the
Astrid Hilgers	Ch. 4	7	214	7	217	The statement is on ecosystems, while the explaining text is on drivers. Deforestation is a form of land cover loss. Is the list of drivers pretending being all covering, the major ones, or just examples?	Removed the human action items, leaving just the outcomes
Xavier de Lamo	Ch. 4	7	215	7	215	"Processes include loss of natural cover, deforestation". Isn't "deforestation" a type of "loss of natural cover"? Suggest to rephrased it as " Processes include loss of natural forest, including deforestation" or something similar	Rephrased
Xavier de Lamo	Ch. 4	7	216	7	217	"Anthropogenic increases in outbreaks of pests and diseases of crops and forestry". Would not be better to say "crops and forests"?	Changed to "forests"
Ruishan Chen	Ch. 4	7	228	7	235	this may lead to complain about the local stakeholders, however, tecoupling make a big difference here, such as dam building in upstream which affect downstream river and lake system, or deforestation in Brzil may related to increasing demand of beef and soybean in China.	Rephrased
Astrid Hilgers	Ch. 4	7	236	8	242	This message is unfinished, and need rephrasing. The issue is highly relevant though! How can we distinguish between fluctuations and structural degradation? What could a natural state baseline (including natural fluctuations) could contribute to this problem?	We added a new Ex Summ paragraph to summarize the concluding section of the chapter on "the way forward"?
Marieke Sassen	Ch. 4	7	236	7	236	..."from antropogenic degradation..."	Addition made
Germany	Ch. 4	7	236			This paragraph seems to contradict box 4.2 on p68. On the one hand (on p7) it is argued that the distinctions between climate fluctuations and degradation are problematic. On the other hand it is suggested (in box 4.2 on p68) that degradation/desertification in the Sahel is only climate-driven.	The paragraph has been clarified
Germany	Ch. 4	7	240	7	242	These sentences are not understandable/incomplete.	True, thank you, this was rephrased.
Marieke Sassen	Ch. 4	7	240	7	240	Clarify: do you mean to say that this does not mean that local degradation does not occur due to poor land management?	This was clarified in the final draft.

Li Changxiao	Ch. 4	7	240	8	242	It is not clear about the statement "... There is an urgent need to both very few. Make sense for urgent need ... of LDR Observatory networks". Please make a clarification.	This was clarified in the final draft.
Katalin Török	Ch. 4	7	240			not the opposite is intended?: This does not, however, mean that local degradation also occurs due to poor land management.	True, thank you, this was rephrased.
Dan Pennock	Ch. 4	8	241	8	241	"There is an urgent need to both very few" makes no sense.	True, thank you, this was rephrased.
Marieke Sassen	Ch. 4	8	241	8	242	The text here is unfinished	True, thank you, this was rephrased.
Xavier de Lamo	Ch. 4	8	241	8	241	"There is an urgent need to both very few" Unclear. Please rephrase.	True, thank you, this was rephrased.
UNCCD SPI	Ch. 4	8	241	8	241	Don't understand" There is an urgent need to both very few."	True, thank you, this was rephrased.
Katalin Török	Ch. 4	8	241			wording: There is an urgent need to both very few. ???	True, thank you, this was rephrased.
Xavier de Lamo	Ch. 4	8	242	8	242	"LDR" is not in the acronyms table	Added
Astrid Hilgers	Ch. 4	8	243	8	257	Para a little ambiguous. Why biodiversity mentioned in line 246? C storage, water holding capacity, river discharges, productivity, land cover, micro climate are all seriously impacted by landscape transformation. If transformed landscapes are degraded as such, then why the sentence 'however degradation can take place in fully -transformed landscapes' ? Probably is meant that the latter can further degrade by bad management than necessary given its human land use. Choosing baselines is essential for unambiguously assess degradation. Multiple natural state baselines can also be helpful for assessing zero net degra loss, depending on whether the relative loss or the absolute loss of different types of NCP's is considered and compared. In global biodiversity outlooks the change compared to the natural state baseline is used as measure to compare and aggregate. Also, the natural state baseline provides a theoretical restoration potential, and makes degradation assessments fair between countries in different stages of socioeconomic development (see UNEP 2003, and Chapt 2). The last sentence is unclear.	Calling land "transformation" a type of "degradation" is oversimplified and unrealistic when considering Ecosystem Services. True, one might consider two steps, natural to agriculture then good to degraded agriculture. but since a "natural" baseline is often only guessed at, there seems to be no point in imagining the pre-transformation condition. Clarified text here and Sect 4.1.2.2.
Germany	Ch. 4	8	243	8	257	The arguments presented in this para are substantial for the discussions on the use of either "recent time-bound baselines" or the use of "historic baselines". We encourage you to consider discussing your differentiated approach also in the current background information (pages 20-21 of the SPM) provided for key message "B1." in the summary for policy makers for the IPBES assessment. We also encourage you to discuss your differentiated approach against the discussions on "a global consensus on the definition and baseline for land degradation" outlined in ch 2 (specifically, pages 6, and chapter 2.2.1).	Baseline discussed has been thoroughly discussed among all experts and finalized within Ch1, Ch2 with relevant points in Ch4 and SPM. Consistency has been ensure throughout.
Xavier de Lamo	Ch. 4	8	247	8	248	"at the cost of other NCPs 247 such as regulatory services and biodiversity". According to Pascual et al. (2017), Biodiversity is not a NCPs.	Added "...the human benefits of biodiversity..."
Xavier de Lamo	Ch. 4	8	255	8	257	"Restoration, and mitigation of degradation without changes in current land management practices is likely to be more common than attempts to restore landscapes to their historical state." I don't understand how restoration can take place without any change in land management practices, did you mean "land use" instead of "land management practices"?	Rephrased as "...without changes in current land use.."
Miguel Taboada	Ch. 4	8	258	8	275	Agree. But a possible coverup of soil degradation by technology should be included in this section.	Do you mean, for example, replacement of lost fertility with artificial fertilizers?
UNCCD SPI	Ch. 4	8	264	8	264	Rather "in all countries on all continents"	Changed
Astrid Hilgers	Ch. 4	8	265	8	266	Probably enhanced erosion can be 1000 fold or more the natural rate. More useful is a kind of average, and what the exceedance mean in relation too soil formation.	This has been checked in Sect 4.2.1
Astrid Hilgers	Ch. 4	8	268	8	270	The next sentence line 268 is not clear in various ways. Is actually 4.5 million ha of cropland lost and abandoned, and if so, where? Why introduce the future here. Could this be useful information for Chapt 7?	Rephrased to eliminate confusion of crop production and area of crops
Dan Pennock	Ch. 4	8	269	8	269	Equivalent to "an annual loss of 4.5 million ha of cropland", not an actual loss of cropland.	Rephrased to eliminate confusion of crop production and area of crops
Katalin Török	Ch. 4	8	270			are the years correct???	Years confirmed, and reference given to the section in the main chapter.

Cristobal Diaz	Ch. 4	8	271	8	271	I propose include:" Soil acidification and alkalization due to over application of fertilizers, emendation(with Ca), and atmospheric pollutants, in North America, Caribbean, Central and Northern Europe and southern China	This was added
Dan Pennock	Ch. 4	8	273	8	273	The figure for salinization due to irrigation is 76 M ha on p. 28, l. 785	Correct value inserted in 4.2.2.3
Astrid Hilgers	Ch. 4	9	285	9	295	This is a typical baseline related para. The changes are perceived differently using a natural state baseline or taking the livestock production perspective. We prefer to use the perspectives of different types of ecosystem services when appropriate.	Baseline discussed has been thoroughly discussed among all experts and finalized within Ch1, Ch2 with relevant points in Ch4 and SPM. Consistency has been ensure throughout.
Cristobal Diaz	Ch. 4	9	293	9	293	I propose add: "Eutrophication in river, lake, dam, and wetland systems...."	Corrected
Susan Cordell	Ch. 4	9	297			Wildfire often leads to an increase in bio-available nutrients. Also the grass/fire cycle plays a large role in transforming ecosystems - it needs to be mentioned. See D'Antonio and others for citations	Added: release of nutrients (which can be acquired by new vegetation or lost by erosion) and also role of fire in transforming ecosystems and cover types.
Astrid Hilgers	Ch. 4	9	297	9	304	Statements in this para not very clear as loss of human life and costs for fire fighting are not examples of degradation by fire.	The content of the paragraph was clarified in the final draft
Ben ten Brink	Ch. 4	9	297	9	304	Statements in this para not very clear. To what components of land degra and related functions is fire detrimental: the functions human life and cost of fire-fighting?	The content of the paragraph was clarified in the final draft
Xavier de Lamo	Ch. 4	9	299	9	300	"These can include: loss of human life, enormous costs for fire-fighting" . These are indeed effects of wildfire, but with little relation to land degradation. Suggest to focus only on effects on land degradation processes.	The content of the paragraph was clarified in the final draft
Cristobal Diaz	Ch. 4	9	299	9	300	I propose add:" These can include: loss of human life, enormous costs for fire-fighting, biodiversity losses including in the soil,"	The content of the paragraph was clarified in the final draft
Astrid Hilgers	Ch. 4	9	305	9	321	The distribution of the effects is spread unevenly over the world related to the most expanding populations'. Actually it is not unevenly distributed, but evenly, but in different times. This happened in developed countries in the past, and in developing countries in the present and future. So dependent on the stage of socioeconomic development and transition. Concerning the impact of urbanisation per se, if growing populations were not living in cities but in the rural areas in much lower densities, the impact would be probably several times higher. Key point is growing population and consumption as drivers behind loss in many land components and services (trade off with housing, transport and industrial production functions); urbanisation may well be preferred, mitigating these impacts, compared to a non urban distribution of a similar demographic and consumption development.	This is an observation of the current situation ("Status"). The historical and future perspectives are assigned to other chapters (mainly Chapter 3)
Ben ten Brink	Ch. 4	9	305	9	321	The distribution of the effects is spread unevenly over the world related to the most expanding populations'. Actually it is not unevenly distributed, but evenly, but in different times. This happened in developed countries in the past, and in developing countries in the present and future. So dependent on the stage of socioeconomic development and transition. Concerning the impact of urbanisation per se, if growing populations were not living in cities but in the rural areas in much lower densities, the impact would be probably several times higher. Key point is growing population and consumption as drivers behind loss in many land components and services (trade off with housing, transport and industrial production functions); urbanisation may well be preferred, mitigating these impacts, compared to a non urban distribution of a similar demographic and consumption development.	This is an observation of the current situation ("Status"). The historical and future perspectives are assigned to other chapters (mainly Chapter 3)
Xavier de Lamo	Ch. 4	9	307	9	308	"By 2011, over 50% of the global population, about 3.6 billion had urbanized compared to 13% in 1900." Unclear. Please rephrase	Edited
Xavier de Lamo	Ch. 4	9	315	9	315	"changes in species composition and biodiversity" Again, biodiversity is not a NCP according to the definition provided by Pascual et al. (2017)	This problem is a result of the original combination of "Ecosystem Services" and "Biodiversity" in the formulation of "Intergovernmental Platform on Biodiversity and Ecosystem Services". Given the "IPBES" combination of two topics (ES, biodiversity), this statement is correct.
Xavier de Lamo	Ch. 4	9	316	9	317	"Sustainable urban development includes managing and designing for biodiversity" There are other components of sustainable urban development as well, and arguable more relevant, such as the desing of energy and water efficiency schemes which reduce the need of energy infrastructure outside urban areas, recuce atmospheric pollution, reduce pressure on water resources, etc.	Biodiversity management should be paired with the degradation of NCP (i.e. ecosystem services). "Sustainable urban development includesavoidance of degradation of NCP....as well as....managing and designing for biodiversity."

Astrid Hilgers	Ch. 4	10	322	10	324	Impacts from other drivers than land transformation are well understood, although not all. See Chapter 7 and a series of global and regional outlooks under the CBD, OECD and UNEP.	We checked these sources and amended text as necessary
Ben ten Brink	Ch. 4	10	322	10	324	Impacts from other drivers than land transformation are well understood, although not all. See Chapter 7 and a series of global and regional outlooks under the CBD, OECD and UNEP.	We checked these sources and amended text as necessary
Mahmood Yekeh Yazdandoost	Ch. 4	10	325	10	334	While mentioning the causes of biodiversity loss, which come in many places and chapters, on stressing the importance of causative factors, be careful the statements don't underestimate each other.	Harmonization was ensured across chapters, thank you.
Marieke Sassen	Ch. 4	10	325	10	334	Integrate a statement on the fact that, even if poorly researched, there are some indications that biodiversity loss can lead t reduced NCPs (see page 70, lines 2085-2095)	There is a lot of evidence for this, as given in Sections 4.2.6.3.3. and 4. Although IPBES separates biodiversity (B) and ES (=NCP), the Assessment needs to incorporate the effect of biodiversity on NCP.
Xavier de Lamo	Ch. 4	10	337	10	338	<i>"In addition to temperature increases and precipitation changes, there is also evidence that increased CO2 concentrations, changes in near surface ozone and pollution from nitrogen and sulphur deposition may all have widespread impacts on plant and animal life"</i> Not sure ozone pollution and nitrogen and sulphur deposition can be considered "climate change impacts"	Tue, was corrected
Astrid Hilgers	Ch. 4	10	338	10	340	Here the two- ways are land degradation in terms of soil organic and vegetation carbon loss increasing CO2 concentrations on the one hand and the increase in temperature that may increase land degradation on its turn by desertification, drying and consequent large scale forest and peatland fires, reducing permafrost and releasing methan, changing the SOC balance increasing the proces of SOC decaying.	Comment not fully understood, but the text referred to was strengthened by including the topics mentioned.
Ben ten Brink	Ch. 4	10	338	10	340	Here th two- ways are land degradation in terms of soil organic and vegetation carbon loss increasing CO2 concentrations on the one hand and the increase in temperature that may increase land degradation on its turn by desertification, drying and consequent large scale forest and peatland fires, reducing permafrost and releasing methan, changing the SOC balance increasing the proces of SOC decaying.	Comment not fully understood, but the text referred to was strengthened by including the topics mentioned.
Cristobal Diaz	Ch. 4	10	342	10	342	Maybe included: ".....contribution to carbon emissions, mainly methane , as temperatures increase and permafrost declines.	Will mention the methane emission from resulting wetlands and CO2 from combustion.
Marieke Sassen	Ch. 4		343		354	This relates to (incomplete) wording on lines 241-242. Could there be a message about the need to develop appropriate indicators that allow the distinction between different types of degradation?	Indicators will be dealt with elsewhere (probably in a new section (4.4) on the way forward. The point here is that "degradation" must be qualified since there are many states and processes that are lumped together as degradation.
Astrid Hilgers	Ch. 4	10	343	10	353	A key issue, showing the many ways of assessing land degradation, depending on the perspective (and so the baseline) taken. From the one perspective it is negatiely perceived, from the other positive. Therefore it would make more sense to neutrally describe the changes in land properties and ecosystem functions compared to the natural state baseline (actually trade offs) as a result of human interventions, instead of judging them as good or bad, which is a matter of political judgment, not of scientific judgment. This suggestion could be given as a more scientific way to deal with these contradictory views.	Disagree with reviewer's opinion. Baselines are not the point, rather it is that some types of ecosystem degradation increases some NCPs while decreasing others. It is not a matter of judgement - these are measurable entities.
Ben ten Brink	Ch. 4	10	343	10	353	A key issue, showing the many ways of assessing land degradation, depending on the perspective (and so the baseline) taken. From the one perspective it is negatiely perceived, from the other positive. Therefore it would make more sense to neutrally describe the changes in land properties and ecosystem functions compared to the natural state baseline (actually trade offs) as a result of human interventions, instead of judging them as good or bad, which is a matter of political judgment, not of scientific judgment. This suggestion could be given as a more scientific way to deal with these contradictory views.	Disagree with reviewer's opinion. Baselines are not the point, rather it is that some types of ecosystem degradation increases some NCPs while decreasing others. It is not a matter of judgement - these are measurable entities.
Katalin Török	Ch. 4	10	346			invasiON by alien species	Corrected
Katalin Török	Ch. 4	10	349			natural biodiverSITY	Corrected
Xavier de Lamo	Ch. 4	10	350	10	351	<i>"Eutrophication of wetlands may create high productivity of algae at the expense of other flora and fauna."</i> I'm not convinced on that algae bloom resulting from eutrophication can be regarded as an increase in NCP in any case. Suggest to include another example.	Good point, was done

Virginia Meléndez Ramírez	Ch. 4	11	356	11	356	you can delete the word aims	Noted
Marieke Sassen	Ch. 4	11	363	11	363	add "underlying degradation" after "processes"	Added
Sandhya Chandrasekharan	Ch. 4	11	364	11	364	NBP (natures benefits to people?) needs to figure in the abbreviations	NBP/NCP terminology now changed to "ecosystem services". This was explained in Preface to the final report.
Germany	Ch. 4	11	364	11	364	Spell out "NBP"	NBP/NCP terminology now changed to "ecosystem services". This was explained in Preface to the final report.
Eila Gendig	Ch. 4	11	364			Please define/explain "NBP"	NBP/NCP terminology now changed to "ecosystem services". This was explained in Preface to the final report.
Marieke Sassen	Ch. 4	11	364	11	364	Should NBP be NCP? Only NCP is used in the executive summary and NBP (assuming nature's benefits to people?) is not in the Acronym list. Bit repetitive with "on which human livelihoods depend"	NBP/NCP terminology now changed to "ecosystem services". This was explained in Preface to the final report.
Katalin Török	Ch. 4	11	364			NCPs (altogether 13 NBPs still in the text, please change for NCP)	NBP/NCP terminology now changed to "ecosystem services". This was explained in Preface to the final report.
Susan Cordell	Ch. 4	11	364			NBP not listed in acronyms	NBP/NCP terminology now changed to "ecosystem services". This was explained in Preface to the final report.
Marieke Sassen	Ch. 4	11	365	11	366	Multiple problems with this sentence. What is the message? That this is a limitation? (the fact that the vast scope of anthr. degr. is illustrated by reference (complicated formulation) to just one aspect), or that this is what this chapter will do? (illustrate the vast scope using just this one aspect). From looking at the contents it's the former but this sounds confusing. Then referring to "just one aspect" and then saying this is "the multiplicity of aspects of soil degradation" is contradictory.	Rephrased, thank you
Marieke Sassen	Ch. 4	11	365	11	374	Following from the above: in any case why have these details about soil degradation in the chapter intro? It does not make sense to me. It should move to section 4.2., perhaps in a box with table 4.1.(see also comment on line 396). Botgh this bit of text and table 4.1. have no place in this section of the chapter.	Removed as suggested
Dan Pennock	Ch. 4	11	370	370	374	Ref to Pennock et al. 2015 not in reference list; in any case it should be to Montanarella et al. 2015	Corrected
Katalin Török	Ch. 4	11	370			Pennock et al missing from the litr	Corrected
Marieke Sassen	Ch. 4	11	374	11	374	Typo: Table 4.1 instead of Table 1	Table and figure numbering harmonized in the final draft
Marieke Sassen	Ch. 4	11	375	11	377	Some repetition in these two sentences	"connect" and "status and trends" are 2 different aims, not repetition
Dan Pennock	Ch. 4	11	379	370	379	NBPs not defined in list of abbreviations; NBP used throughout chapter	NBP/NCP terminology now changed to "ecosystem services"
Marieke Sassen	Ch. 4	11	379	11	379	the resultant livelihoods: make "the resultant livelihood implications" (livelihoods are not a direct result of degradation/restoration, other factors play a role too)	Done
Cristobal Diaz	Ch. 4	11	379	11	380	I propose to include: "..."; and the effectiveness of existing interventions and responses to mitigate and prevent degradation (Chapter 6).	Done
Marieke Sassen	Ch. 4	11	381	11	381	times of the process appearance: make "timelines and time scales"? "history" should be "histories"	Corrected
Marieke Sassen	Ch. 4	11	382	11	382	remove "the" before "degradation" and before "possibilities" (we are still listing the various aspects that the assessment encompasses here (line 380)	Corrected
Marieke Sassen	Ch. 4	11	384	11	386	Rephrase to something like: "A cautious approach is used because knowledge about the biophysical processes and outcomes is insufficient"	Rephrased
Marieke Sassen	Ch. 4	11	389	11	389	There is quite a lot of information still to come in section 4.1 too. Perhaps announce that too here?	Noted
Marieke Sassen	Ch. 4	11	391	11	391	"and negative effects of climate changes": this phrase does not fit in the previous sequence. Rephrase to e.g.: "as well as the negative effects of climate change"	Done
Marieke Sassen	Ch. 4	11	392	11	392	repetition with line 381	Deleted
Marieke Sassen	Ch. 4	12	396	12	396	I would move this table to a box in section 4.2. having it here gives the impression that soil processes are the main focus of the chapter, which is not the case. See also earlier comment about this.	Removed as suggested
Cristobal Diaz	Ch. 4	11	397	11	401	Lack the meaning of simbol E. I think that was an omission and correspond to Eastern Europe and Eurasia.	List of regions corrected

Mahmood Yekeh Yazdandoost	Ch. 4	12	397	12	401	Is it possible Table 4.1. to be illustrated in a better way?	This table was deleted in the final draft
Virginia Meléndez Ramírez	Ch. 4	12	397	12	397	The titles of the tables go up	All editorial issues have been fixed in the final draft
LI Changxiao	Ch. 4	12	397	12	401	The caption of the Table should be put above the table, same as for other tables throughout the document. In addition, please add "E = " prior to "Eastern Europe and Eurasia" in the line 399.	Assessment's convention was followed. "E" was added to list.
Germany	Ch. 4	12	397			Does "E" stand for Europe? In any case, in the explanation under the caption "E" is missing/not explained. Please cross-check.	Assessment's convention was followed. "E" was added to list.
Germany	Ch. 4	13	397			Why doesn't this Figure reflect the issue of 'biodiversity loss' and 'changes in species composition'?	Loss of biodiversity is listed in the table.
Marieke Sassen	Ch. 4	13	402	13	402	Process names are not (in) the same (order) as chapter titles. Terms in table are often better than the chapter titles I think.	The order is correct, but Fire is currently missing in text (Sect 4.3.6.)
Mahmood Yekeh Yazdandoost	Ch. 4	13	403	13	407	Fig. 4.1. was expected to be kept in the earlier chapter. Seems separately all chapters look fine, but when together, some shifting for the sake of sequence would be needed.	Fig. 4.1 deleted
Javier Ernesto Cortés Suárez	Ch. 4	13	403	13	407	Figure 4.1 - Its way to dense. I think that the chapter should be better explain by words rather than a figure.	Fig. 4.1 deleted
Virginia Meléndez Ramírez	Ch. 4	13	403	13	403	Fig. 4.1 The arrow is missing in Non timber extraction	Fig. 4.1 deleted
Eila Gendig	Ch. 4	13	403			Figure 4.1 needs further explanation as to why some drivers (e.g. Non-timber extraction) have no impact on processes, and some processes (e.g. Pollution; climate change) are not the result of any driver.	Fig. 4.1 deleted
Eila Gendig	Ch. 4	13	403			Figure 4.1 - Panes behind "Deforestation for soybean..." should be visible	Fig. 4.1 deleted
Mahmood Yekeh Yazdandoost	Ch. 4	13	410	13	416	Please avoid duplications. This paragraph, including definitions, has been noticed in many places.	Chapter 4 has been extensively revised and streamlined. All repetitions were removed
Nathalie van Haren	Ch. 4	13	410	13	412	Bring definition of "Degraded lands" more in line with IPBES definition as the third plenary of IPBES determined and as is indicated in Chapter 1, page 3 line 51-53	Definition is in line with the scoping document provided for this assessment
McAfee, Brenda	Ch. 4	13	410	13	415	This definition should include a clause to indicate that land includes wetlands	Added
Marieke Sassen	Ch. 4	13	410	13	412	Is this not already defined somewhere earlier in the report? You could start this paragraph with "While land degradation is recognised etc.	Correct, deleted
Javier Ernesto Cortés Suárez	Ch. 4	13	410	13	412	This definition should also include the gradual or subtle changes that reduce ecological integrity and health.	Definition was deleted since it is given in full earlier in the Assessment
Shiping Wang	Ch. 4	13	410	13	412	Usually there are different degraded magnitudes, including light, middle, heavy and extreme degradation. The degraded land can be recovered by natural restoration at least for the light and middle degradations. Probably the heavy and extreme degradations could not recovered unaided within decadal time scales because they beyond the degraded threshold. Therefore, the definition of degraded land is not accurate. Degradation is just be a stage or status that be successive processes far away to climix community, whether it can be recovered or not just be degraded magnitude, i.e. degradation should be taken into account the two aspects.	Definition was deleted since it is given in full earlier in the Assessment
Marieke Sassen	Ch. 4	13	411	13	411	Need to resolve the use of NBP versus NCP throughout the document. Will not come back to it hereinafter.	Now corrected
Marieke Sassen	Ch. 4	13	415	13	416	Same comment on definition as above	Definition deleted
Javier Ernesto Cortés Suárez	Ch. 4	13	415	13	416	This definition should be reviewed considering what I have just mention about in previous chapters.	Definition deleted
LI Changxiao	Ch. 4	13	416	13	416	Please add a full stop at the end. By the way, there are quite some punctuation erros and/or neglects throughout the document, and those will not be listed any more.	Done
Marieke Sassen	Ch. 4	14	417	14	417	Not sure how "public" this discourse is... What public do you mean? The use of "conditions" I a bit confusing here: usually you would use "environmental conditions" to refer to a combination of factors (climate, soils etc) that effect a subject of interest. I would rephrase to ", the term 'degraded' is used to describe five types of land condition". There is a time element involved, so "states" may be even better in this context: i.e. ", the term 'degraded' is used to describe land in five different states").	Statement now deleted

Xavier de Lamo	Ch. 4	14	417	14	418	"In the public discourse to date, the term "degradati on" has been applied to five environmental conditions (Figs 4.2, 4.3)" Please include references to support this.	Statement now deleted
Marieke Sassen	Ch. 4	14	418	14	419	Figure 4.2 "four types of degradation" in title even though it then lists 5 points. Which are not clearly "types of degradation". Also, the figure presents a timeline, which is confusing when the title speaks of "types". "States" seems more correct. So needs a better caption to capture what this figure really shows. Perhaps something like: "The five states of degradation". Also it is not clear what the "date of estimation" is used to illustrate.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Marieke Sassen	Ch. 4	14	418	14	419	Figure 4.2 On the 5 point list: 1.: "Often appears to be (what?), but is not (what?). Degraded I imagine, needs rephrasing. 3. "when stressors are removed" 4. "change" does not fluctuate. Replace with "factor" 5. This confusing when it says that it is the most serious type of degradation since it does not recover when stressors are removed: this is the same as under pt 4. I imagine the real reason it is the most serious type of degradation is the fact that reversal is typically not possible without massive investment. This needs to be clarified.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Javier Ernesto Cortés Suárez	Ch. 4	14	418	14	418	Figure 4.2 - There should be graphic examples that can contextualize the reader in a better way about the four types of degradation.	Added
Shiping Wang	Ch. 4	14	418	14	419	Fig. 4.2, it can be changed to combine a threshold which means regime shift from one state to another state and could not recover unaided for the 5th degraded stage.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Katalin Török	Ch. 4	14	418		419	typically noT possible	corrected
Xavier de Lamo	Ch. 4	14	418	14	419	"Figure 4.2. The four types of degradation". It should be five, not four.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Xavier de Lamo	Ch. 4	14	418	14	419	Type 1 and 2 have blurred definitions. Suggest to give examples for each type of degradation to add clarity.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
U.S. government	Ch. 4	14	418		419	This is a very useful diagram which shows the structural type of degradation, though it does need to be polished for the final version.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Eila Gendig	Ch. 4	14	418		419	Please explain/define "NCP"	Defined in the acronym list, no longer used in CH4
Marieke Sassen	Ch. 4	14	421	14	422	repetition of "types 4 and 5"	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Marieke Sassen	Ch. 4	14	422	14	422	"Type 3" should be "Type 4"	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Xavier de Lamo	Ch. 4	14	422	14	422	"Type 3 cannot recover by natural processes" I think you mean Type 4 here.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Marieke Sassen	Ch. 4	14	423	14	423	"application of focussed" etc	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Marieke Sassen	Ch. 4	14	425	14	425	The example of the Dust bowl to illustrate Type 3 seems inappropriate here since it was given as an example of Type 5 in Figure 4.2	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Marieke Sassen	Ch. 4	15	428	15	429	Odd sequence. "Degradation can be progressive (Fig 4.2.)" a bit lost here.	Fig 4. 2 removed and the "states" are explained using Fig 4.3.
Xavier de Lamo	Ch. 4	15	434	15	436	"On the other side of the surface(3), sites that move to the lower level in response to moderate (but variable) environmental and anthropogenic stress can recover: they are within the resilience of the site." It would be worth mentioning that this only happen when "Environmental Stress" is low (according to the figure).	Added a note to clarify this.
Marieke Sassen	Ch. 4	15	437	15	439	Are naturally low NCP sites (state 1) more susceptible to falling to 5 than others?	If the NCP axis is normalized (or expressed as a percentage) state 1 would need the same stresses (anthropogenic and environmental) as state 2. Of course this is just a conceptual diagram!
Marieke Sassen	Ch. 4	15	441	15	441	Figure 4.3. should be in bold. Replace "types" with "states"	Done
Katalin Török	Ch. 4	15	441		441	Missing from the litr: Lockwood and Lockwood 1993	Now added

Eila Gendig	Ch. 4	15	441		441	Figure 4.3 - Why is resilience only available under low environmental stress conditions, irrespective of the anthropogenic stress on the system?	Resilience declines along the environmental stress axis, also along the anthropogenic stress axis. This version of the diagram will be replaced to add environment-induced thresholds and interactions
Marieke Sassen	Ch. 4	15	442	15	442	I would explain the absence of resilience a bit better in relation to 5 in the text above the figure: it is referred to in the caption but not explicitly in the text, e.g. on how in this state (or condition) a site will have lost all/most resilience against further degradation	Actual examples of the states were added.
Cristobal Diaz	Ch. 4	15	442	15	442	"Modified from Lockwood and Lockwood 1993" - Modified by who? Which are the modifications in short? And for example the same in Figure 4.3 page 20, Figure 4.4 page 21	Line 442: Changed to "based on the cusp-catastrophe concept of Lockwood and Lockwood (1993)". Figs 4.3 and 4.4 legends unchanged - this is normal way to acknowledge sources.
Marieke Sassen	Ch. 4	15	443	15	443	"degradation and restoration trends"	Change now made.
Ben ten Brink	Ch. 4	15	443	17	525	Valuable addition to the Chapter. See also a UNEP/CBD paper on indicators and the function of baselines: UNEP (2003) Report of the expert meeting on indicators of biological diversity including indicators for rapid assessment of inland ecosystems. Document UNEP/CBD/SBSTTA/9/INF/7.Montreal. See also Chapter 2 LDRA. In the scenario analysis for the 1st Global Land Outlook of the UNCCD also a natural baseline has been applied. (UNCCD, forthcoming. Global Land Outlook1). See also PBL Netherlands Environmental Assessment Agency (Forthcoming this summer). Exploring the impact of changes in land use and land condition on food, water, climate change mitigation and biodiversity; Scenarios for the UNCCD Global Land Outlook. PBL Report. Den Haag. See also for the reconstruction of baseline values for soil characteristics: Stoorvogel, J.J., Bakkenes, M., Temme, A.J., Batjes, N.H. and Brink, B.J.E. ten. 2017a. S-World: A global soil map for environmental modelling. Land Degradation and Development 28: 22–33. and Stoorvogel, J.J., Bakkenes, M., Brink, B.J.E ten and Temme, A.J. 2017b. To what extent did we change our soils? A global comparison of natural and current conditions. Land Degradation and Development. DOI: 10.1002/ldr.2721.	Thanks for these additional sources. They were reviewed and included as appropriate
Virginia Meléndez Ramírez	Ch. 4	15	444	15	444	Already know the answer to these questions, can be deleted	Disagree - the text goes on to explain.
Marieke Sassen	Ch. 4	15	446	15	446	Use "current condition" (singular) or "current state"	Now corrected
Marieke Sassen	Ch. 4	15	447	15	448	Odd sentence. Suggested alternative: "A reference or baseline for comparison with the current situation can be established or defined in different ways, depending on the aims of the assessment".	Text changed using this comment
Katalin Török	Ch. 4	15	447			Missing form the litr: Prince 2016	Now added
Marieke Sassen	Ch. 4	15	448	15	449	From "Both degradation... Chapter 2.": this is in an odd place when the next pieces of text really refer to the previous sentence. I would move this to Line 447, after (Prince2016). And before the sentence on different types of references or baselines.	Now moved as suggested
Marieke Sassen	Ch. 4	15	448	15	448	"refer to" = "imply a"	Changed as suggested
Marieke Sassen	Ch. 4	16	449	16	449	"points in time"	Changed as suggested
Marieke Sassen	Ch. 4	16	451	16	464	Some repetition on the importance for IPBES, could be merged (lines 457 and 462)	Now corrected
Germany	Ch. 4	16	451	16	464	Your differentiated discussions on "target condition", "historical baseline" and "natural baseline" are substantial, and should be cross-checked against and if needed included (latter is especially the case for your discussions on "target condition") in the summary for policymakers as a new key message or in the context of discussions on 'baselines' under the existing key message B.1.	The discussion on baseline has been clarified in Ch1 and in the SPM
Marieke Sassen	Ch. 4	16	454	16	454	Delete "the" before "one that..."	Now corrected
Marieke Sassen	Ch. 4	16	456	16	458	"It is perhaps the most important of the states for policy purposes..." Unclear + Line 458 = odd grammar. Suggested correction: "This is perhaps the most important reference for policy purposes and [...], since it represents a desired future state, the achievement of which can be measured and monitored."	Now corrected
Katalin Török	Ch. 4	16	459		464	It might be beneficial to add some thoughts on tradeoffs among NCPs that can complicate the picture	Added to text

Mahmood Yekeh Yazdandoost	Ch. 4	16	464	16	464	Degradation and restoration are measured relative to a desired state- a target! This statement need a thorough thinking, because the target itself sometimes is under political pressure and	This point is addressed by noting that external factors can affect the achievement of the target.
Marieke Sassen	Ch. 4	16	464	16	464	Lost sentence. Move up.	It is meant to be a summation of the paragraph.
Virginia Meléndez Ramírez	Ch. 4	16	466	16	466	Can be delete "actual"	Done
Marieke Sassen	Ch. 4	16	470	16	470	"restoration efforts" (restoration itself is not informed in the literal sense anyway)	Changed as suggested
Marieke Sassen	Ch. 4	16	471	16	471	replace "specify" with "determine"	Done
Marieke Sassen	Ch. 4	16	472	16	472	replace "repetitive" with "repeated" or better "time series" rephrase "some legacies from past generations". E.g "including some very old ones"	Done
Marieke Sassen	Ch. 4	16	472	16	472	observations of what? Ecosystem condition?	changed to ecosystem properties
Marieke Sassen	Ch. 4	16	473	16	473	record of what? The whole of the Netherlands?	Details added
Katalin Török	Ch. 4	16	473		474	Missing from the litr: Silvertown et al. 2006; Smit et al. 2002	Added
Katalin Török	Ch. 4	16	476		477	Missing from the litr: Bakker et al. 1996; Kapfer et al. 1017 (DATE???)	Added
Li Changxiao	Ch. 4	16	477	16	477	Please change "1017" to "2017". By the way, there are also such kind of misspellings in other sections of the document and those will not be listed any more.	Corrected
Thomas Brooks	Ch. 4	16	478	16	478	The IUCN Red List is updated several times per year, so don't cite 2007 unless using specific information from 2007. Rather, follow http://www.iucnredlist.org/about/citing . Also, add the citation to the Literature Cited accordingly (currently missing).	Corrected
Katalin Török	Ch. 4	16	478		499	Missing from the litr: IUCN Red List of Threatened Species, 2007; Pauly 1995; Ludwig and Steffen 2017; Bull et al. 2014; Kotiaho et al. 2016; Spikins 2000	Corrected
Marieke Sassen	Ch. 4	16	487	16	487	"human driven degradation" (although some might argue it was also the start of human degradation...)	changed to anthropogenic
Marieke Sassen	Ch. 4	16	487	16	487	"an Anthropocene baseline is..."	Corrected
Xavier de Lamo	Ch. 4	16	487	16	487	"The use of an Anthropocene is attractive" Add "baseline" after Anthropocene	Corrected
Marieke Sassen	Ch. 4	17	494	17	494	In this case we don't create a trend, we asses/study one.	Wording changed
Marieke Sassen	Ch. 4	17	495	17	495	"degradation" = influence?	Wording changed
Marieke Sassen	Ch. 4	17	500	17	500	fossil parts of human-induced soil erosion? Rephrase	Wording changed
Marieke Sassen	Ch. 4	17	502	17	502	"the state" of what? The environment? Clarify	Wording changed
Katalin Török	Ch. 4	17	506		509	Missing: Pickett 1988; Johnson and Miyanishi 2008; Pickett 1989	Added
Marieke Sassen	Ch. 4	17	513	17	513	I am left witing for the "on the other hand" after the use of "in one respect" on line 509	Wording changed
Marieke Sassen	Ch. 4	17	513	17	513	"obtaining"= "inferring"	Wording changed
Katalin Török	Ch. 4	17	514		515	Missing: Wang et al. 2006; McGrath et al. 2015),	Added
Marieke Sassen	Ch. 4	17	515	17	517	Start a new sentence after "(McGrath et al 2015).", e.g. "Yet, there are many potential...)	Wording changed
Katalin Török	Ch. 4	18	519		519	Missing from litr: Dregne and Chou 1992; Campbell et al. 2008; wrong date: Cai et al 2011?	Corrected
Katalin Török	Ch. 4	18	529		547	Missing: Conacher, 2004; Oldeman et al. 1990; Prince et al. 20009; Noojipady et al. 2015; Prince 2016; Jackson and Prince 2016; Wessels et al 2012, Wessels et al 2008; Prince 2016; Sonnoveld and Dent 2009	Added (except for Conacher 2004)
Cristobal Diaz	Ch. 4	18	530	18	531	Only suggest that maybe included the Incan Empire in Latin America	List is long enough already
Marieke Sassen	Ch. 4	18	532	18	532	"modern day attempts"	Added
Marieke Sassen	Ch. 4	18	533	18	534	Section 4.1.2.1. does not mntion a failure to agree on how degradation should be defined. Merely that there are different stages of degradation, that are associated with the state/condition an ecosystem is in at a particular time. So this statement is a bit odd and should be revised.	Changed to the confusion of the ecosystem conditions that should be regarded as degraded (not definition of degradation).
Marieke Sassen	Ch. 4	18	536	18	537	delete "in situations wheretaken place". Unnecessary	Deleted
Li Changxiao	Ch. 4	18	538	18	538	Please add "but" prior to "more recently studies ...". By the way, there are quite some places in the document where it is lack of such kind of connection between the parallel two sentences. Those will not be listed any more.	Added
Marieke Sassen	Ch. 4	18	547	18	548	"...have found its methods to be inappropriate making it "unhelpful"". Vague formulation. Specify: Inappropriate and unhelpful how? For what? For who?	Deleted
Cristobal Diaz	Ch. 4	18	550	19	551	The term <u>GLADA</u> isn't reflected in "Acronyms and abbreviations "	Added
Marieke Sassen	Ch. 4	18	551	18	554	Caption should be above table	Format fixed for the final draft

Marieke Sassen	Ch. 4	18	551	18	551	I would not call this table a synthesis, but an overview of various estimates of degradation	Changed to "some examples of"
Virginia Meléndez Ramírez	Ch. 4	19	551	19	551	Table 4.2 What does the acronym GLADA?	Added to Acronyms
						Need to clarify why refer to Ramankutty and Foley paper (mapping of global croplands, not degradation per se) in the caption as they are not in the table, nor mentioned anywhere in the text which may help to understand why they should be referred to in the caption. This table was copied from Gibbs and Salmon 2015, which is fine, but it should be checked that all information is included in order to understand the information. The original table footnotes were not copied for example, meaning that point c. in the caption is now a mystery. Also explain what "light degradation" means	
Marieke Sassen	Ch. 4	18	552	18	552		Thank you, this was clarified in the final draft.
Xavier de Lamo	Ch. 4	19	552	19	552	Please specify to which assessment the reference of "Ramankutty and Foley (1999)" belongs.	Ok, done
Ruishan Chen	Ch. 4	19	555		2586 (=586?)	Some interesting case studies should be presented as box in 4.2, such as soil erosion in loess plateau of China, desertification in Sahel, deforestation in Amazon and so on. This assessment should reflect science at "the state of art".	The Sahel is in a box, other examples are included in each section
Marieke Sassen	Ch. 4	19	556	19	556	Please add sub-sections to clarify the flow of the text	Most of the chapter is in sub-sections at the 4th level, some at the fifth, although the Co Chairs have asked to reduce the use of the 5th level. We tried to not create too many sub-levels/
Xavier de Lamo	Ch. 4	19	556	26	706	It is not clear why "Soil Erosion" and "Soil processes" have classified in different sections. Is not erosion a type of soil degradation process? Suggest to merge both sections into one to simplify the structure or alternatively, call rename "Soil processes" to "Other types of degradation processes"	Erosion is a critical process, while the others are locally important. Renamed 4.2.2. "other soil degradation processes seems a good idea.
Katalin Török	Ch. 4	19	559			Lal et al. Wrong date? 1998	This was corrected
Marieke Sassen	Ch. 4	19	561	19	561	Needs an example, or a reference (on similar processes in developed countries)	Added: Dotterweich, M. (2013). The history of human-induced soil erosion: Geomorphic legacies, early descriptions and research, and the development of soil conservation—A global synopsis. <i>Geomorphology</i> , 201, 1–34. https://doi.org/10.1016/j.geomorph.2013.07.021
Marieke Sassen	Ch. 4	19	564	19	564	Reformulate to "Important questions to consider with regards to soil erosion and its impacts on NBPs (or NCPs?) are shown in Table 4.3"	Its not a status and trend...
Cristobal Diaz	Ch. 4	19	564	19	564	The term NBPs isn't reflected in "Acronyms and abbreviations"	Now replaced with "Ecosystem Services"
Virginia Meléndez Ramírez	Ch. 4	19	565	19	565	Can be delete "Issue"	OK it was changed
Li Changxiao	Ch. 4	19	565	19	565	Table 4.3: there is lack of Table caption. Please consider to add "Eco-environmental impact" under "What does it affect?", and "Training on sustainable land use and Public awareness raising" under "Can we do anything about it?"	Caption was added
Eila Gendig	Ch. 4	19	566		566	table 4.3 - Where are impacts of erosion on off-site areas and aquatic systems?	Off-site impacts are part of the table
Marieke Sassen	Ch. 4	20	566	20	566	Consider using "Questions" instead of "issues" because that is what they are	Changed to "questions"
Eila Gendig	Ch. 4	20	568		568	Figure 4.3 - "Adverse changes in soil quality"; please add "and quantity"	Corrected
Katalin Török	Ch. 4	20	571		574	Here the contrast between e.g. Easter Island and Tikopia should be emphasized: at the former the management remained and the human population collapsed, while in Tikopia a major land management change resulted in survival of a stable population	Social economic effects are not related to this chapter
Li Changxiao	Ch. 4	20	573	20	573	Please change "suggests" to "suggest", and add "poor or inadequate" before "land management".	Corrected
Eila Gendig	Ch. 4	20	574		576	not limited to "developing countries"	Noted
Li Changxiao	Ch. 4	20	576	21	577	In Figure 4.4, please consider to add one more component - "Social economic effects" - parallel to "Agronomic effects" and "Environmental effects". Please also change "Eutrofication" to "Eutrophication".	Noted
Dan Pennock	Ch. 4	21	577	21	577	Empty box in Figure 4.4	Editorial mistake, the figure has been fixed
Marieke Sassen	Ch. 4	21	577	21	577	"The major negative impacts..."	Noted
Xavier de Lamo	Ch. 4	21	577	21	577	One box of the figure is completely empty.	Editorial mistake, the figure has been fixed
Eila Gendig	Ch. 4	21	577		577	Figure 4.4 only showing EXAMPLES of soil erosion and effects	This figure has been revised
Eila Gendig	Ch. 4	21	577		577	Figure 4.4 - "Economic effects" of erosion are missing; they do not necessarily entail environmental effects	Not in my FAO references
Cristobal Diaz	Ch. 4	21	577	21	577	In Figure 4.4 exists a square in blank.	Editorial mistake, the figure has been fixed
Marieke Sassen	Ch. 4	21	578	21	585	Consider moving this paragraph to Chapter 3.4.2.1 (that section could use this specification)	OK, deleted

Virginia Meléndez Ramírez	Ch. 4	21	578	21	578	Is there data until 2015?	Unfortunately No, or very scarce, because measurements of hotspots of erosion are difficult to find and recent data are lacking
Marieke Sassen	Ch. 4	21	581	21	581	..."particularly susceptible to erosion..."	Noted
Katalin Török	Ch. 4	21	588		592	The sentence is twice	Repetition deleted
Li Changxiao	Ch. 4	21	589	21	592	"The loss of 10.25% of yield due to erosion would be equivalent to the removal of 150 million ha from crop production or 4.5 million ha year ⁻¹ " should be further clarified. Additionally, the following sentence is in repetition with this one.	Noted and revised
Dan Pennock	Ch. 4	21	596	21	600	FAO and ITPS 2015 is a more up-to-date and comprehensive citation for this paragraph	This reference has been added
Virginia Meléndez Ramírez	Ch. 4	22	605	22	605	Table 4.4. Is there data for 2015?	Unfortunately No, or very scarce, because measurements of hotspots of erosion are difficult to find and recent data are lacking
Marieke Sassen	Ch. 4	22	606	22	606	"Three types of soil erosion..."	I agree, this sentence is on a wrong place, it should follow the natural process of erosion. Corrected
Eila Gendig	Ch. 4	22	612			"Occurs mainly in drylands."; but also in high-altitudeecosystems, characterised by low vegetation height and density	Corrected
NFP of China	Ch. 4	23	635	23	636	The conclusion lacks support of research results, so it is suggested to be deleted.	This has been removed
NFP of China	Ch. 4	23	635	23	636	No actual research results to support it, we recommend to delete this case.	The paragraph has been deleted, However there are plenty references, one specific review FROM CHINA: Shao, Y., Wyrwoll, K. H., Chappell, A., Huang, J., Lin, Z., McTainsh, G. H., ... & Yoon, S. (2011). Dust cycle: An emerging core theme in Earth system science, <i>Aeolian Res.</i> , 2, 181–204.// Seinfeld, J. H., Carmichael, G. R., Arimoto, R., Conant, W. C., Brechtel, F. J., Bates, T. S., ... & Huebert, B. J. (2004). ACE-ASIA: Regional climatic and atmospheric chemical effects of Asian dust and pollution. <i>Bulletin of the American Meteorological Society</i> , 85(3), 367-380.//Holden, C., 2001. The perfect dust storm. <i>Science</i> 294, 2469. There is a large literature on this point, including the front illustration of the largely Chinese GLOBAL ALARM: DUST AND SANDSTORMS FROM THE WORLD'S DRYLANDS http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/Global%20Alarm%20eng.pdf . Typical examples are: Gong, S. L. (2003). Characterization of soil dust aerosol in China and its transport and distribution during 2001 ACE-Asia: 2. Model simulation and validation. <i>Journal of Geophysical Research</i> , 108(D9), 1–13. http://doi.org/10.1029/2002JD002633
Marieke Sassen	Ch. 4	23	637	23	637	I cannot find "Mass transportation" as the third type of soil erosion in Morgan 2009 (see line606). The first two are natural erosion processes that can be exacerbated or otherwise influenced by human activities, the third is presented as a purely human induced process. Which it isn't. Mass transportation can also occur due to natural processes, such as e.g. through landslides. Please clarify.	Section re-structured and re-referenced
Marieke Sassen	Ch. 4	23	639	23	640	"However..." This sentence seems to be in the wrong place as it is a more general statement, not only valid for the point on mass transportation.	OK, thank you, this has been clarified
Xavier de Lamo	Ch. 4	23	642	23	642	Also, clarify how Table 4.5. illustrates possibilities for remediation?	
Marieke Sassen	Ch. 4	23	646	23	646	"Table 4.5. Effects of erosion" I think you mean "indicators", instead of "Effects"	I agree but it is cited like that in the referenced paper.
Katalin Török	Ch. 4	23	648			"significance": do you mean magnitude and extent? Or importance in terms of its implications for NCPs? Clarify	OK, I will change significance by magnitude and extension as suggested
Katalin Török	Ch. 4	24	654			Place of bracket: (Stroosnijder, 2005)	All reference citations have been corrected in the final draft.
Marieke Sassen	Ch. 4	24	657	24	661	"1 and 1.4 m yr ⁻¹ " - is this meter? Precipitation is rather expressed in mm	The unites were correct
Marieke Sassen	Ch. 4	24	662	24	667	This paragraph seems a bit lost here. Perhaps integrate elsewhere, e.g. with the next paragraph?	You are right, we restructured
Marieke Sassen	Ch. 4	24	662	24	667	Move to after 687? For better text flow.	This was done
McAfee, Brenda	Ch. 4	24	671	24	673	If a concise explanation can be included it would be interesting to know how teak trees increase the kinetic energy of raindrops and if the phenomenon is common to other trees.	We need to shorten the text. We cannot give more explanations. To measure the kinetic energy of raindrops is not easy. Below teak trees in Laos and Thailand there are recent references. For other trees, the results for the throughfall are erratic, sometimes you have less sometime more. But trees are much less protecting the soil than a grass plant.

Nathalie van Haren	Ch. 4	24	676	24	680	Why are only monocultures and conservation agriculture being mentioned here? Agroecology is recognised as a sustainable agricultural practice in Chapter 2, paragraph 2.3.2.1 Towards alternative paradigms. In chapter 6 agroecology and other sustainable practices are recognised. Other sources also recognise agroecology as a sustainable alternative to unsustainable agricultura, see FAO http://www.fao.org/agroecology/overview/en/ ; and as a response to soil degradation, see for instance Agroecology-based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa (2012) P. Tittonell et al http://www.sciencedirect.com/science/article/pii/S0378429011004151	Conservation agriculture has a restricted definition. Any type of cultivation with permanent soil cover (agroecology, agroforestry), the closest to the soil surface will prevent any erosion (except mass movements). In this chapter we just expose stus and trends of erosion, not mentioning any type of solution that could prevent/avoid erosion.
UNCCD SPI	Ch. 4	24	676	24	680	Why are only monocultures and conservation agriculture being mentioned here? Agroecology is recognised as a sustainable agricultural practice in Chapter 2, paragraph 2.3.2.1 Towards alternative paradigms. In chapter 6 agroecology and other sustainable practices are recognised. Other sources also recognise agroecology as a sustainable alternative to unsustainable agricultura, see FAO http://www.fao.org/agroecology/overview/en/ ; and as a response to soil degradation, see for instance Agroecology-based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa (2012) P. Tittonell et al http://www.sciencedirect.com/science/article/pii/S0378429011004151	Conservation agriculture has a restricted definition. Any type of cultivation with permanent soil cover (agroecology, agroforestry), the closest to the soil surface will prevent any erosion (except mass movements). In this chapter we just expose stus and trends of erosion, not mentioning any type of solution that could prevent/avoid erosion.
McAfee, Brenda	Ch. 4	24	678	24	678	conservation agriculture is used in other sections of the assessment without quotes. Need for a clear understanding of what is implied by this important concept. One might assume that agroforestry would be included in conservation agriculture.	Agroforestry is not considered as "conservation agriculture" in its definition. However, It a way to protect the soil same as agro-ecology.
Xavier de Lamo	Ch. 4	24	681	24	683	"According to the US Natural Resources Inventory (Wiebe, 2003; FAO and ITPS, 2015) soil erosion on 681 cropland in the United States declined nearly 40% between 1982 and 1997, from 3.1 to 1.9 * 10 ⁹ T year-682 1 even while the area of cropland remained roughly constant." If possible, please provide explanation on why this happened.	We cannot expand too much, as the chapter is already over the word limit
Marieke Sassen	Ch. 4	24	690	24	690	"Table 4.4." should be Table 4.6?	All numbering was corrected
Jyotirmoy Shankar Deb	Ch. 4	25	695	25	698	The figure used overlapping colours which made it confusing. Colours with contrast should be used for better understanding.	Figure was corrected for final report
Marieke Sassen	Ch. 4	25	696	25	698	Clarify what data was used for this graph (number of studies?)	There number of studies is now mentioned in brackets
Marieke Sassen	Ch. 4	26	702	26	706	delete. This is the same as lines 617-621	Ok, deleted
Li Changxiao	Ch. 4	26	702	26	706	This short paragraph is in repetition with the statements of lines 617-621 in page 22.	Ok, deleted
Xavier de Lamo	Ch. 4	26	707	30	877	It is not completely clear why "soil acidification" and "soil salinization and alkalization" have a more or less standard set of subsections and "Waterlogging" and "Soil Mineral Nutrition" have any.	The text has been substantially shortened so subheadings have been eliminated from the major sections.
Australia NFP	Ch. 4	26	707	26	721	Please amend line 720 with the following text: <i>of soil and freshwaters. Acid sulfate soils are prevalent in coastal regions, particularly in Australia (58,000 km²)</i> . This represents less than 10 per cent of Australia's total land mass.	We have made marked cuts to the entire document. While this clarification is useful, the approximate land area affected has been noted and the authors see no reason to expand the text to clarify the spatial extent further.
Dan Pennock	Ch. 4	26	710	26	712	Australia and some south-pacific islands have low ph soils; soil acidification was judged to be the number 1 threat to soil functions in Australia (FAO and ITPS 2015)	The occurrence in south Pacific islands was added to text. " Acid sulfate soils are common in coastal areas, particularly Australia (58,000 km ²) and some south Pacific islands... "
Virginia Meléndez Ramírez	Ch. 4	26	710	27	758	There are many citation from almost 20 years ago, there are more current? Check also in many paragraphs later, even in tables (e.g. 4.8), see: http://pubs.rsc.org/en/content/articlepdf/2011/ee/c1ee01029h	Some of the fundamental articles from several years ago have been cited. However, the text has been modified to cite more recent literature.
NFP of China	Ch. 4	26	712	26	720	1. The latest research results should be cited; 2. The problem exists only in southern China	An effort has been made to cite more recent literature.
NFP of China	Ch. 4	26	712	26	720	1. The quoted figure is not accurate, it is recommended to use more up-to-date research in China and revise accordingly; 2. Soil acidification problems exist only in the Southern China area, it is proposed to modify <i>China</i> to the Southern China area.	The text has been modified to indicate that soil acidification due to human activities is an issue in South Asia. "Acidic soils occur in South Eastern Asia, eastern North America, along the west coast and south central regions of Africa, Northern Europe and portions of Siberia and the Amazon basin of South America (Figure 4.6). "

Katalin Török	Ch. 4	26	713			Missing from litr: Guo et al 2010	The work of Guo et al. 2010 is cited in the agricultural effects paragraph. "Particularly severe effects have been reported in China (Guo et al. 2010) due to large application rates of nitrogen fertilizer (500- 4,000 kg N /ha-/yr) resulting in acidification of 20-221 kmol (H+)/ ha/yr) coupled with double cropping practices which remove cations (15-20 kmol (H+) /ha-/yr)."
Dan Pennock	Ch. 4	26	722	26	735	Title should be changed to Natural sources of acidification	Subtitle of sections have been eliminated due to a shortening of the text.
Marieke Sassen	Ch. 4	26	722	26	722	Change title to "natural acidification processes"? Now it sounds as if other causes might be discussed too.	Subtitle of sections have been eliminated due to a shortening of the text.
Eila Gendig	Ch. 4	26	723		735	Would also expect changes in plant species composition as an effect of acidification	Good point the text has been modified "Acidification decreases the supply and availability of inorganic nutrients (calcium, magnesium, phosphorus), decreasing soil fertility and affecting the nutritional needs of plants and animals and species distribution."
Suárez	Ch. 4	26	736	27	742	These should have an extensive explanation of the direct effects of soil acidification taking into account that for all living creatures this acts differently in a direct and indirect way	This is a good point, but given the constraints on the word limits to the text it is not possible to give examples of the different responses of different
Katalin Török	Ch. 4	27	752		755	Missing from the lirt: van Breemen et al. 1984; format: van Breemen, Mulder, & Driscoll, 1983.	van Breemen et al. (1983) is cited in the text and have been put in the overall reference list. e.g., "Soil acidification is a natural process occurring in regions with abundant precipitation and runoff, leading to accelerated weathering of soil minerals and leaching of base cations (e.g., calcium, magnesium) (van Breemen et al. 1983)." van Breemen et al, 1984 has been eliminated.
Katalin Török	Ch. 4	27	757			Missing from the litr: Teng and Rangel 2003	aggravates soil acidification by removal of nutrient cations from land (Teng and Rangel 2003)."
Miguel Taboada	Ch. 4	28	779	29	821	Soil salinization by irrigation water because of deficient drainage or bad water quality should be distinguished from dryland salization. This is mainly caused by land clearing and changes in groundwater regime.	or groundwater near the soil surface (< 2m) (India, Pakistan, China, Kenya, U.S.); use of brackish water for irrigation (Asia, Europe, Africa); intrusion of seawater near coastal areas; and shifts from deep rooted perennial
Marieke Sassen	Ch. 4	28	784	28	797	Integrate these two paragraphs. There are multiple references to irrigation being a cause of salinization but they need to be re-ordered (first that salinity occurs naturally but is exacerbated by human activities, such as irrigation... and finally that climate change is exacerbating this effect even further. Then the other causes of salinisztn)	The text has been rewritten to distinguish between natural saline soils and human processes that exacerbate this condition.
NFP of China	Ch. 4	28	785	28	787	The causality is not consistent with the facts	It is not clear what the reviewer is referring to here.
NFP of China	Ch. 4	28	785	28	787	The description of China's land became saline land because of irrigation is inconsistent with the fact, the figures are also inaccurate. It is suggested to modify the complex reasons for salinization and use the more updated and concrete figures.	The text in the role of human processes in salt-affected soils has been rewritten.
Marieke Sassen	Ch. 4	28	803		803	Explain what ESP and Ecse mean, in practice, for e.g. plant growth	The text has been simplified "Sodic soils have high levels of sodium adsorbed on cation exchange sites (> 15%). Sodic soils disperse (deflocculate) from soil aggregates forming sodium-clays that are difficult to till, have reduced infiltration and drainage, and are characterized by poor seed germination and restricted root growth. "
LI Changxiao	Ch. 4	29	805	29	805	Please take off "percent".	This has been done.
Eila Gendig	Ch. 4	29	816		816	Why are >50% of all sodic soils in Australasia? Please add an explanation	Table 4.8 is the original text, has been replaced by a map which represents a more recent analysis.
Cristobal Diaz	Ch. 4	29	816	29	816	Table 4.8 show data from UNEP, 1992 that are from one reference with 25 years. I don't know, but not exist data more recent ?	This text has been modified and updated with analysis from a more recent study (Wicke et al. 2011). The table has been replaced with a global map (Figure 4.8).
Marieke Sassen	Ch. 4	29	823	30	840	This whole section lacks referencing. E.g. on the fact that waterlogging is a chronic problem on all continents, on irrigation as the main contributor to waterlogging, urbanisation causing waterlogging etc. It also needs some information on the impacts of waterlogging on NCPs	References have been added to the text.

Marieke Sassen	Ch. 4	29	830	29	830	"..leading to"...? Words missing	This section has been rewritten "Waterlogging results from excessive input of water and/or inadequate drainage. Increases in the water table towards the soil surface causes anoxic conditions, resulting in: depletion of soil oxygen and carbon dioxide accumulation; production of toxic sulphide; increased emissions of nitrous oxide - a greenhouse gas; and decreases nitrogen fixation by leguminous crops and pastures."
Li Changxiao	Ch. 4	29	830	29	830	Please take off "all leading to".	This section has been rewritten. "Waterlogging results from excessive input of water and/or inadequate drainage. Increases in the water table towards the soil surface causes anoxic conditions, resulting in: depletion of soil oxygen and carbon dioxide accumulation; production of toxic sulphide; increased emissions of nitrous oxide - a greenhouse gas; and decreases nitrogen fixation by leguminous crops and pastures."
Xavier de Lamo	Ch. 4	30	837	30	838	"Waterlogging would be exacerbated by increased precipitation, which is projected to occur under climate change (Melillo et al. 2014)". Please specify where this increase in precipitation is supposed to happen.	The text has been modified as follows "Waterlogging is exacerbated by increases in precipitation, which is projected for some regions under changing climate (Melillo et al. 2014)."
Marieke Sassen	Ch. 4	30	838	30	838	Not everywhere though. This statement needs to be revised.	Not clear what the reviewer is referring to.
Dan Pennock	Ch. 4	30	841			The title for this section would be better as Nutrient imbalance as both oversupply and under-supply are discussed	The title was changed to Soil nutrient imbalances
Marieke Sassen	Ch. 4	30	841	30	841	Reformulate as a soil degradation process. E.g. "Nutrient accumulation and losses"?	The title of the section was changed to Soil nutrient imbalances
Xavier de Lamo	Ch. 4	30	841	30	877	Section 4.2.2.4 could well be included as well in the section 4.2.4.2. This is another example of overlapping section, which causes repetition.	The chapter has been substantially revised. This overlap has been reduced and eliminated
Miguel Taboada	Ch. 4	30	841			I prefer another title for this section. For instance, soil nutrient imbalance. This would take into account not only nutrient depletion (typically in many poor rural areas) from nutrient excesses. Solutions are obviously quite different.	The title of the section was changed to Soil nutrient imbalances
Eila Gendig	Ch. 4	30	842		845	These 2 sentences are contradictory for European nutrient accumulation	They are not really contradictory. The rates of nutrient accumulation are high in Europe, but they are decreasing. The text has been rewritten to clarify the statement "High rates of soil nitrogen and phosphorus accumulation occur globally, particularly in Europe and South Asia (Bouwman et al. 2009). A comparison of rates for the year 2000 with those of 1970 and future projections suggest that while soil nutrient accumulation has and will continue to decrease in Europe, increases are occurring in South and Central America and Africa and particularly in South Asia. "
Marieke Sassen	Ch. 4	30	842	30	845	Seems contradictory with lines 858 so need to specify why this difference in Europe and SA	They are not really contradictory. The rates of nutrient accumulation are high in Europe, but they are decreasing. The text has been rewritten to clarify the statement "High rates of soil nitrogen and phosphorus accumulation occur globally, particularly in Europe and South Asia (Bouwman et al. 2009). A comparison of rates for the year 2000 with those of 1970 and future projections suggest that while soil nutrient accumulation has and will continue to decrease in Europe, increases are occurring in South and Central America and Africa and particularly in South Asia. "
Eila Gendig	Ch. 4	30	843			What is so special about the year 2000 that N and P accumulation is noteworthy for a specific year?	The analysis was conducted for specific past years and projected for specific future years. The text was rewritten to improve the clarity.
Eila Gendig	Ch. 4	30	845		848	There are 3 pathways for N losses in this paragraph. How is P depleted?	Depletion occurs when losses of phosphorus exceed inputs.
Katalin Török	Ch. 4	30	845			Citation: Bouwman, Beusen and Billen, 2009	This article is cited and referenced in the text.
Eila Gendig	Ch. 4	30	848		851	A global analysis would not yield sufficient resolution to indicate improvements for improved Fertilizer application.	Why not? Unclear comment.
IPBES Knowledge and Data Task Force (KD TF)/ Task Group on Indicators (TGI)	Ch. 4	31	876	31	876	The graph of Nitrogen + Phosphate Fertilizers can be replaced to the graph which TGI will provide soon	This figure has been eliminated from the text.
Eila Gendig	Ch. 4	31	877			"Mt P" is for part "b" of the diagram. What is the unit for part "a"?	The analysis was conducted for specific past years and projected for specific future years. The text was rewritten to improve the clarity.
Li Changxiao	Ch. 4	31	878	43	1286	There are some grammar errors (especially plural or single), misuse of punctuation, neglects, inconsistent format of citation of references, and the like.	The final draft has been edited to eliminate all of those errors.
Cristobal Diaz	Ch. 4	31	878	41	1202	The point "4.2.3. Carbon stocks and sequestration" is very extensive, I think that maybe shortened taking into account that it isn't the main task of the Chapter.	The final draft has been made more concise
Xavier de Lamo	Ch. 4	31	878	31	878	Suggest to rename the section to "Loss of carbon stocks and sequestration"	Agree. Now "4.2.3. Loss of Carbon stocks and degradation of carbon sequestration"
U.S. government	Ch. 4	31	878	37	1115	This section is well written and reflects the latest understanding of carbon flux in the ecosystems discussed.	Thank you
Marieke Sassen	Ch. 4	31	879	33	967	Section 4.2.3.1. - Split into subsections	The final draft has been made more concise

Xavier de Lamo	Ch. 4	31	880	31	880	Please insert reference for the carbon content figure. Usually a reference value of 58% is assumed in the literature.	References have been added in the final draft.
Li Changxiao	Ch. 4	31	880	31	881	The statement "Soil organic matter ... and stable humus" should be rephrased due to the confusing expression.	The text has been revised for clarity. Thank you.
Eila Gendig	Ch. 4	31	887		889	Total global C in terrestrial soils to a depth of 1m? Please specify spatial scale	The text has been revised for clarity. Thank you.
Finnish Government	Ch. 4	31	888			3000 Pg and 1,505 Pg --> unify	This has been done.
Marieke Sassen	Ch. 4	31	888	31	890	Why highlight the estimates by Batjes, but refer to table 4.9 which contain the Scharlemann estimates? (or were these included in Scharlemann's review? But even then why highlight these values specifically?) Clarify or change.	The Batjes paper is highlighted since it is an oft cited reference that gives confidence limits to the estimate. Wording changed to reflect this
Eila Gendig	Ch. 4	31	889		890	Why is permafrost noted separately and not included?	Contributions from permafrost and other significant sources such as peatlands are given separately due to their high contribution to the overall carbon that is excluded in the Batje reference
Finnish Government	Ch. 4	32	897			Gt C equals Pg C. Units should be the same to help the reader.	The text has been revised for clarity. Thank you.
Virginia Meléndez Ramírez	Ch. 4	32	897	32	897	Include metric units of the dates.	LDRA is using SI abbreviations and instead of negative indices, back slash (/) .
Dan Pennock	Ch. 4	32	899	32	900	Citing only the highest losses (50%) is biased; should cite the average losses from these studies as well.	A range in loss has been give
Eila Gendig	Ch. 4	32	899		900	The baseline discussion (previous parts of chapter 4) and its recommendation to use the year 2000 as baseline seems invalidated, if there are studies which can make comparisons of soil components to 70 years ago. Maybe the discussion needs more definition of factors/localities, where longer time horizons are possible	We disagree. Sect 4.1.2.2. states that longer baselines can sometimes be found. 2000 is a default.
Katalin Török	Ch. 4	32	903			Missing from the list: Joosten 2015	This was not included - in no area is the exhaustive set of all references given
Eila Gendig	Ch. 4	32	907		913	Not clear, if these are wind erosion, water erosion or mass transport values	The text has been revised for clarity. Thank you.
Finnish Government	Ch. 4	32	932			something is missing from the sentence, rewrite.	The text has been revised for clarity. Thank you.
Xavier de Lamo	Ch. 4	32	932	32	932	"Estimates vary global potential for soil C sequestration". Unclear. Please rephrase	The text has been revised for clarity. Thank you.
Nathalie van Haren	Ch. 4	33	955	33	967	BIAS: This section is biased towards Conservation Agriculture, a term that is often used by the agri-chemical industry as an answer to unsustainable agriculture that is highly agri-chemicals dependent. In the list of responses to land degradation, agroecology is not taken up, while it is recognised as sustainable agricultural practice in Chapter 2, paragraph 2.3.2.1 Towards alternative paradigms. In chapter 6 agroecology and other sustainable practices are recognised. Other sources also recognise agroecology as a sustainable alternative to unsustainable agriculture by FAO http://www.fao.org/agroecology/overview/en/ ; and as a response to soil degradation, see for instance Agroecology-based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa (2012) P. Tittonell et al http://www.sciencedirect.com/science/article/pii/S0378429011004151	Conservation agriculture no longer emphasised or used as an only example in the text
UNCCD SPI	Ch. 4	33	955	33	967	BIAS: This section is biased towards Conservation Agriculture, a term that is often used by the agri-chemical industry as an answer to unsustainable agriculture that is highly agri-chemicals dependent. In the list of responses to land degradation, agroecology is not taken up, while it is recognised as sustainable agricultural practice in Chapter 2, paragraph 2.3.2.1 Towards alternative paradigms. In chapter 6 agroecology and other sustainable practices are recognised. Other sources also recognise agroecology as a sustainable alternative to unsustainable agriculture by FAO http://www.fao.org/agroecology/overview/en/ ; and as a response to soil degradation, see for instance Agroecology-based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa (2012) P. Tittonell et al http://www.sciencedirect.com/science/article/pii/S0378429011004151	Conservation agriculture no longer emphasised or used as an only example in the text
Nathalie van Haren	Ch. 4	33	966	33	967	What is traditional agriculture, improved agriculture and conservation agriculture: please explain	section changed and terms no longer used in the text. Figure is removed
Astrid Hilgers	Ch. 4	33	966	33	967	What is traditional agriculture, improved agriculture and conservation agriculture: please explain	section changed and terms no longer used in the text. Figure is removed
UNCCD SPI	Ch. 4	33	966	33	967	What is traditional agriculture, improved agriculture and conservation agriculture: please explain	section changed and terms no longer used in the text. Figure is removed

Ben ten Brink	Ch. 4	34	968	37	1116	Coherence with Chapt 7 recommended. See for historical loss of SOC and productivity also: PBL Netherlands Environmental Assessment Agency (Forthcoming this summer, I can send you final draft). Exploring the impact of changes in land use and land condition on food, water, climate change mitigation and biodiversity; Scenarios for the UNCCD Global Land Outlook. PBL Report. Den Haag. based on: Stoorvogel, J.J., Bakkenes, M., Temme, A.J., Batjes, N.H. and Brink, B.J.E. ten. 2017a. S-World: A global soil map for environmental modelling. Land Degradation and Development 28: 22–33. and Stoorvogel, J.J., Bakkenes, M., Brink, B.J.E ten and Temme, A.J. 2017b. To what extent did we change our soils? A global comparison of natural and current conditions. Land Degradation and Development. DOI: 10.1002/ldr.2721.	Only published literature is allowed in LDRA. We agree that this literature is relevant for projections, but we believe that Ch7 is the one that need to be coherent with Ch4 for the past and current state, otherwise its models may be unrealistic.
Marieke Sassen	Ch. 4	34	968	34	968	Split into subsections. The section also needs reorganising for logical flow. See some suggestions below	We do not wish to have 5 level headings, structural reorganization is possible and we have done some of that.
Marieke Sassen	Ch. 4	34	969	34	985	Suggestion: Move to after line 1086 (and add the text on wildfires from lines 1002-1004) and start the section with the text from line 1006 onwards so that it starts with an introduction on biomass production, then HANPP and then emissions.	Structural reorganization has been done
Finnish Government	Ch. 4	34	978			define NPP	It is defined in the sentence, also now appears in glossary
Finnish Government	Ch. 4	34	985			define Hr	No longer used
Katalin Török	Ch. 4	34	985			What is Hr? Please add: Heterotrophic respiration	No longer used
Marieke Sassen	Ch. 4	34	986	34	1005	Move all text to a Box with definitions (but remove "For 1997-2004 [...] van der Werf et al 2006)" to line 985	We have rationalised the text to remove redundancies, removed unnecessary definitions, and created a box
Shiping Wang	Ch. 4	34	995	34	995	Usually heterotrophic respiration is microbial respiration with decomposition of dead organic matter. Thus, removal by herbivory intake should be not included as Hr. In fact, it should take into account when calculation about NBP.	Heterotrophic respiration includes both microbial and herbivore respiration. The former typically cominates, but not necessarily in intensively grazed rangelands
Risto Sievänen	Ch. 4	34	1002	34	1002	Provide reason why its is difficult to distinguish NEP from NBP	NBP now replaced with ecosystem services.
Susan Cordell	Ch. 4	35	1011			Does this section include mangroves? See new work and estimates on carbon sorage by Kauffman et al 2017. Also Donato et al	Mangroves are explicitly mentioned
Finnish Government	Ch. 4	35	1011	35	1030	particularly Table 4.9. Could these texts be joined to avoid repetition of partly the same discussion?	The text has been rationalised to remove repetition
Katalin Török	Ch. 4	35	1011		1012	Please add: globally or total on the planet	This has been clarified
Risto Sievänen	Ch. 4	35	1028	35	1029	Year missing from cite	No longer cited
Finnish Government	Ch. 4	35	1029			year is missing from the reference	No longer cited
Dan Pennock	Ch. 4	35	1031	35	1032	NPP was estimated as 55 PgC yr-1 in l. 991 on p. 34. Need to check consistency (and abbreviations) in this section	The values have been rationalised - these were GPP, not NPP
Eila Gendig	Ch. 4	35	1031			2.6 Pg C yr-1 is vastly different to the figure mentioned for NPP on page 34, line991; and is much smaller than values following for parts of total	This value is actually NEP, and has been replaced
Finnish Government	Ch. 4	35	1031	35	1035	The start of the paragraph is confusing: the first sentence is about productivity, while the second and third are aprantly related to storages, but it is not clear in which does the sentence "About half is in forests" referring to. To NPP or storage? In other words, if global NPP is 2.6 Pg C y-1, how can 60% of this euqal 40.8 + 31.3 Pg C y-1?	The text has been clarified and rationalised.
McAfee, Brenda	Ch. 4	35	1031	35	1031	Page 34 provdies several definitions related to production (GPP, NPP NBP etc.) Most refer to carbon or organic matter. The introduction to this paragraph then refers to productivity as the rate of accumulation of biomass. It improve clarity if this paragraph would refer to primary production to be consistant with the earlier material and with the examples that follow that refer to NPP.	These have now been moved to a box and clarified
Finnish Government	Ch. 4	35	1032			...of this.. --> of what?	The text has been clarified.
Risto Sievänen	Ch. 4	35	1040	35	1040	Provide citation for numerical estimates.	Citation added
Katalin Török	Ch. 4	35	1043			Year incorrect or this is adifferent paper? Keenan et al. 2016.	They are all Keenan 2016
Risto Sievänen	Ch. 4	36	1044	36	1045	Has the rising tropospheric ozone a significant effect on NPP?	Yes, from experiments it does, but is often ignored is this literature, which is why we mention it
Finnish Government	Ch. 4	36	1044			How can rising tropospheric O3 increase NPP? Please explain.	No, it decreases it by impairing photosynthesis; now explained
Risto Sievänen	Ch. 4	36	1045	36	1045	Ainsworth et al. 2014 not in References	Added, should be 2012
Risto Sievänen	Ch. 4	36	1045	36	1048	It is unclear on the basis of this text how the missing land sink is related to NPP.	The land sink is not missing. The new text connects up the sink issues, NPP , stocks and degradation
Katalin Török	Ch. 4	36	1045			Missing from the litr.: Ainsworth et al. 2014	Fixed
Finnish Government	Ch. 4	36	1046			continues --> continue	fixed
Finnish Government	Ch. 4	36	1046	36	1047	The sentence is strange: "...estimate of emissions... increase emissions..."	Sentence completely rephrased
Finnish Government	Ch. 4	36	1047			How can an increase be plus/minus? Perhaps should be ca. or on average?	Sentence completely rephrased

Finnish Government	Ch. 4	36	1049			suggest adding full stop after increased and starting the next sentence with "This has..."	Sentence completely rephrased
Katalin Török	Ch. 4	36	1049		1063	NPP for marine habitats should be discussed as well or under 1031 para	This is a LAND Degradation assessment, by its scoping we do not assess oceans
Risto Sievänen	Ch. 4	36	1050	36	1050	Delete human-induced: it is irrelevant for NPP whether climate change is human induced or not.	Done
Risto Sievänen	Ch. 4	36	1050	36	1050	Mao et al. 2016 not in References	Added
Katalin Török	Ch. 4	36	1050		1055	Missing from the litr: Mao et al. 2016, Miehe et al. 2008; Fensholt et al. 2012; de Jong et al. 2013; Lui et al. 2015, (or year incorrect)	Added
Finnish Government	Ch. 4	36	1051			"and" missing between "century" and "a loss.." ?	Sentence was rephrased
Finnish Government	Ch. 4	36	1052			There IS some agreement...	Sentence was rephrased
Risto Sievänen	Ch. 4	36	1059	36	1060	Reduced NPP due to forest fires needs a reference.	Citation was added
Dan Pennock	Ch. 4	36	1061	36	1063	What is the citation for this?	Lui 2015
Finnish Government	Ch. 4	36	1061			rainfall (associated with...	Fixed
Christophe CUDENNEC	Ch. 4	56	1064	64	1868	Impacts of land degradation on freshwater resources (and water pollution in the previous section) are considered - BUT NOT the impacts of hydrological change on land degradation. Land parcels are imbedded in an upstream-downstream relationship not only impacting downstream	not a comment for section 4.3.3.2
Christophe CUDENNEC	Ch. 4	56	1064	64	1868	Blue water is used for land use (and so degradation or protection) thanks to infrastructures: dams, canals, piping, distribution networks ... This is under-addressed in general, their intensification, design, management, ageing also. See http://www.unesco.org/new/fr/natural-sciences/environment/water/wwap/wwdr/2016-water-and-jobs/ Ceola S., Montanari A., Krueger T., Dyer F., Kreibich H., Westerberg I., Carr G., Cudennec C., Eshorbagy A., Savenije H., van der Zaag P., Rosbjerg D., Aksoy H., Viola F., Petrucci G., MacLeod K., Croke B., Ganora D., Hermans L., Polo M.J., Xu Z., Borga M., Helmschrot J., Toth E., Ranzi R., Castellarin A., Hurford A., Brilly M., Viglione A., Blöschl G., Sivapalan M., Domeneghetti A., Marinelli A., Di Baldassarre G. Adaptation of water resources systems to changing society and environment – A statement by the International Association of Hydrological Sciences. Hydrological Sciences Journal, 61, 16, 2803-2817, http://dx.doi.org/10.1080/02626667.2016.1230674 .	not a comment for section 4.3.3.2
Finnish Government	Ch. 4	37	1076			TC --> tC ?	Fixed
Finnish Government	Ch. 4	37	1079			increases --> decreases?	Fixed
Xavier de Lamo	Ch. 4	37	1080	37	1081	Suggest to replace " <i>replacement of draft animals by tractors</i> " with intensification of agriculture.	Replaced
Katalin Török	Ch. 4	37	1084			Missing from the litr: Weng et al. 2012	No longer used
Finnish Government	Ch. 4	37	1085	37	1086	What does the sentence mean? Explain /rewrite	sentence moved and altered
Eila Gendig	Ch. 4	37	1116	40	1196	RE-stocking C content in peatlands is slow; would be useful to have this additional information with data on C seq rates	Accumulation rates added.
Marieke Sassen	Ch. 4	37	1116	37	1116	"Loss of carbon from peatlands" (formulated as process)	Not sure how to respond here, but we believe we addressed this comment in the final draft
Risto Sievänen	Ch. 4	38	1130	38	1130	Lappalainen 1996 missing from References	Reference added
Finnish Government	Ch. 4	38	1137		1141	Actually Tarnocai et al state that only 19% of the permafrost are peatlands, so not all permafrost C can be included in peatland C estimates	Text now deleted
Finnish Government	Ch. 4	40	1179	40	1180	The used reference 'Aapala et al. 1996' is out of date and not really suitable in this context.	Text now deleted
Dan Pennock	Ch. 4	40	1194	40	1196	This section should provide the current estimated carbon emissions, which cannot be estimated from the maps	Global emission values added

Finnish Government	Ch. 4	41	1197	41	1201	Figure 4.14: Does this also include pristine mires? This should be indicated in the figure legend. Define CO2e and explain that it accounts for all GHGs, also CH4. Also lines 1194 to 1196 refer to "damaged peatlands", which is wrong if Fig. 4.14 and 4.15 actually report emissions from pristine mires, which seems probable.	Legend revised
Eila Gendig	Ch. 4	42	1226			Please explain "RCP4.5"	A brief description of RCP scenarios, including a small table of the RCPs will be inserted in the Chapter that will be referred to in the relevant sections. After "RCP", (see Section 4.1.2.3.) was inserted to refer to this description.
Xavier de Lamo	Ch. 4	42	1226	42	1226	Please provide an explanation of what RCP 4.5 exactly means for readers not familiar with GHG emission scenarios.	A brief description of RCP scenarios, including a small table of the RCPs will be inserted in the Chapter that will be referred to in the relevant sections. After "RCP", (see Section 4.1.2.3.) was inserted to refer to this description.
Katalin Török	Ch. 4	42	1226			Please explain RCP	A brief description of RCP scenarios, including a small table of the RCPs will be inserted in the Chapter that will be referred to in the relevant sections. After "RCP", (see Section 4.1.2.3.) was inserted to refer to this description.
Dan Pennock	Ch. 4	43	1265	43	1265	What is soil and water evasion?	The word evasion has been replaced in the text with an alternate phrase "reemissions; soil and water emissions of previously deposited mercury"
Dan Pennock	Ch. 4	43	1275			Ozone, not ozome.	The typographical error was corrected.
Germany	Ch. 4	43	1275	43	1276	Please check again scientific validity of the sentence "increased near surface ozone levels, largely as a consequence of climate change...". "Crop yield production" is not a common term, it is either "crop yield" or "crop production".	This sentence was rewritten and combined with other text on nitrogen effects. The mis spelling of ozone was corrected, the wording was changed to crop yield, and the mechanism of ozone formation was clarified in the revised text.
IPBES Knowledge and Data Task Force (KD TF)/ Task Group on Indicators (TGI)	Ch. 4	45	1302	45	1302	The graph of Nitrogen Deposit Trends can be replaced to the graph which TGI provided	The graphics for the chapters have been revised. The authors made use of relevant Core Indicator graphics provided by TGI
NFP of China	Ch. 4	47	1323	47	1324	The database provided in the reference is incorrect, and the link offered does not provide data and information supporting the arguments	Links to the data, and the data interpretation have been confirmed. This was done with the China delegation in Medellin, Colombia (IPBES-6) in March 2018
NFP of China	Ch. 4	47	1323	47	1324	The reference of the database isn't correct and the supplied links fail to provide supportive data and information to the argument. It is suggested to replace the case.	Links to the data, and the data interpretation have been confirmed. This was done with the China delegation during IPBES-6 in Medellin, Colombia (March, 2018)
Virginia Meléndez Ramírez	Ch. 4	47	1328	47	1328	Fig. 4.22 Include the meaning of the legend... in graphics (A) Left ... and you can use (B) for graphics right	Figure 4.22 has been deleted in the revised text.
Germany	Ch. 4	47	1328			Use the same colour in both pie charts to identify a country that is named in both.	Figure 4.22 has been deleted in the revised text.
IPBES Knowledge and Data Task Force (KD TF)/ Task Group on Indicators (TGI)	Ch. 4	47	1328	47		The graph of Nitrogen + Phosphate Fertilizers can be replaced to the graph which TGI will provide soon	Figure 4.22 has been deleted in the revised text.
Xavier de Lamo	Ch. 4	48	1343	48	1343	"Figure X" Please specify which Figure refers to	Figure numbers have been clarified.
Germany	Ch. 4	49	1361	49	1361	Please reformulate the title of this section. The term 'Pesticides' includes insecticides.	The section has been merged with the persistent organic pollutant section so the title was changed to persistent organic pollutants.
Marieke Sassen	Ch. 4	49	1361	49	1361	The section is not only about pesticides and insecticides. Also insecticides, are pesticides. Text mentions antibiotics, herbicides, fungicides so chose a title that covers all of this	The section has been merged with the persistent organic pollutant section so the title was changed to persistent organic pollutants.
Virginia Meléndez Ramírez	Ch. 4	49	1361	49	1361	Other graphic by region: https://www.washingtonpost.com/news/wonk/wp/2013/08/18/the-world-uses-billions-of-pounds-of-pesticides-each-year-is-that-a-problem/?utm_term=.88cd54d00e41	This is useful information but was not added as a figure to decrease the length of the section.
Germany	Ch. 4	49	1365	49	1367	Please replace "escape into" with 'are emitted into'. The sentence should read: "... which are use in livestock production are emitted into the environment."	The sentence of concern has been re-written. "Monitoring programs show that application of pesticides and livestock antibiotics in agricultural regions are transported to adjacent land and downstream water bodies (Yang et al. 2014; Kodešová et al. 2016; Wang et al. 2016). "

Virginia Meléndez Ramírez	Ch. 4	49	1365	49	1365	e.g. sales of companies 2014 https://www.statista.com/statistics/257489/revenue-of-top-agrochemical-companies-worldwide-2011/	This is useful information but was not added as a figure to decrease the length of the section.
IPBES Knowledge and Data Task Force (KD TF)/ Task Group on Indicators (TGI)	Ch. 4	50	1370	50		The graph of Trends in pesticide use can be replaced to the graph which TGI will provide soon	The graphics for the chapters have been revised. The authors made use of relevant Core Indicator graphics provided by TGI
Diana Patricia Alvarado-Solano	Ch. 4	50	1373	50	1380	Those statistics could be related with the expansion and intensification of the agricultural activities in less developed countries, where the environmental policies exist but is hardly applied? Also, in the previous chapter was stated that the expansion and intensification of agricultural activities was a response of the global food trademarket imposed by more developed countries, in which the consumption depends on exportations?	section reworded
McAfee, Brenda	Ch. 4	50	1375	50	1375	While use of glyphosate is the subject to current debate, there is still widespread global use. The evolution of its use can not really be compared to DDT https://link.springer.com/article/10.1186/s12302-016-0070-0	The mention of glyphosate has been deleted.
Dan Pennock	Ch. 4	50	1386	51	1409	Difficult to evaluate this - six unpublished or in prep studies are cited.	The final chapter contains citation to studies that are published. All in prep studies have been eliminated.
Nathalie van Haren	Ch. 4	50	1390	51	1400	No literature references to the work of Geissen in the references, chapter 4.4	Geissen has been eliminated from references in the text.
Astrid Hilgers	Ch. 4	50	1390	51	1400	No literature references to the work of Geissen in the references, chapter 4.4	Geissen has been eliminated from references in the text.
UNCCD SPI	Ch. 4	50	1390	51	1400	No literature references to the work of Geissen in the references, chapter 4.4	Geissen has been eliminated from references in the text.
Virginia Meléndez Ramírez	Ch. 4	50	1391	50	1391	Geissen et al ... in prep?	Geissen has been eliminated from references in the text.
U.S. government	Ch. 4	51	1394	51	1405	Most of this paragraph references unfinished studies that have not undergone peer review evaluation. This is inappropriate to include if there is no peer reviewed scientifically published data to back it up. At the very minimum, it should be qualified with a statement such as "Preliminary data suggests..."	The final chapter contains citation to studies that are published. All in prep studies have been eliminated.
Germany	Ch. 4	52	1423	53	1484	Issues on pesticides, pharmaceuticals (antibiotics), toxic trace elements and persistent organic pollutants in land and water bodies are key findings, but are currently not reflected in the SPM. Please cross-check.	SPM has been substantially revised from the first round to include updated Key Findings from the chapters.
Marieke Sassen	Ch. 4	52	1430	52	1430	Fig 2 = Fig 4.27?	Figure 4.27 has been eliminated from the text.
Germany	Ch. 4	52	1436	52	1452	Regarding the effects of pesticides in the environment: You may wish to considering including a reference to the findings of the IPBES assessment on pollinators, pollination and food security.	This section has been substantively re-worked and a specific pesticides section no longer exists, but has been included into other sections
Virginia Meléndez Ramírez	Ch. 4	52	1450	52	1450	In addition insecticides are used in several countries for cattle ticks, and where mosquitoes are transmitters of diseases.	Thank you. This has been noted
Marieke Sassen	Ch. 4	52	1451	52	1452	IPM works for pests, but what about weeds and diseases that require fungicide or antibiotic use? Any alternatives?	Text on fungicides, herbicides and antibiotics, and others POPs has been added to the section.
Marieke Sassen	Ch. 4	52	1466	53	1468	If they are naturally occurring I would suggest not calling it "contamination" but "presence" or so for those associated with weathering of rocks. Keep "contamination" for small spill areas line 1468	The text has been edited as follows: "Sources of trace element contamination vary considerably from naturally occurring, low level contamination associated with release from soil or weathering, to small areas with high concentrations caused by spills or poorly managed human activities (e.g., mining, smelting, industrial production) to widespread atmospheric deposition or land application of contaminated by-products including animal manures and biosolids."
Marieke Sassen	Ch. 4	53	1475	53	1475	"ameliorated" = reduced?	The word ameliorated is no longer used in the section.
Marieke Sassen	Ch. 4	53	1486	54	1506	Please address the overlaps with section 4.2.4.2.2 on pesticides et al. Including moving Fig 4.30 to that section (or removing it). It is alright to mention them but concentrate on the others. Or merge them into one section on "(Organic) chemical and pharmaceuticals as in section 4.2.4.3.3 p55.	The text has been substantially revised and many sections have been truncated for ease of readability and to reduce overlap.
Nathalie van Haren	Ch. 4	53	1487	53	1488	Bias: the use of the wording "improve crop production" is biased (industrial farming speak). Please change to more neutral wording "increase crop yields"	The phrase "improve crop production" is no longer used due to text editing and condensation.
Germany	Ch. 4	53	1487	53	1487	Please reformulate the sentence because the term "pesticide" includes herbicides and probably also fungicides.	The text has been modified to clarify the application of herbicides and fungicides.
Astrid Hilgers	Ch. 4	53	1487	53	1488	Please change to more neutral wording increase crop yields instead of improve crop production	The term crop production has been changed to crop yields throughout the section.

UNCCD SPI	Ch. 4	53	1487	53	1488	Bias: the use of the wording "improve crop production" is biased (industrial farming speak). Please change to more neutral wording "increase crop yields"	The term crop production has been changed to crop yields throughout the section.
Marieke Sassen	Ch. 4	53	1492	53	1493	Give examples of common names for these products if possible, or their uses as most people are unlike to know them (except for PCBs and DDT)	Some of these chemicals do not have product names because they are by products or include a class of compounds. Examples of application have been added in where possible for clarification. E.g., hexchlorobenze (fungicide).
Nathalie van Haren	Ch. 4	53	1496	53	1497	Source figure 4.30 is FAO statistical Yearbook 2013 (not 2016)	Figure 4.30 has been eliminated from the section.
Astrid Hilgers	Ch. 4	53	1496	53	1497	Source figure 4.30 is FAO statistical Yearbook 2013 (not 2016)	Figure 4.30 has been eliminated from the section.
UNCCD SPI	Ch. 4	53	1496	53	1497	Source figure 4.30 is FAO statistical Yearbook 2013 (not 2016)	Figure 4.30 has been eliminated from the section.
Marieke Sassen	Ch. 4	54	1516	54	1518	If possible, give examples of common names for these products if possible, or otherwise their uses as most people are unlike to know them. Same for lines 1520-1521	Some of these chemicals do not have product names because they are by products or include a class of compounds. Examples of application have been added in where possible for clarification. E.g., hexchlorobenze (fungicide).
Marieke Sassen	Ch. 4	54	1527	55	1539	This seems a more general summary on water pollution. I would suggest removing this section title as it is the same as 4.2.4.3. or calling it "Overview" or "Introduction"	Section title has been renamed
Xavier de Lamo	Ch. 4	55	1540	55	1562	As said, I think the content of this section highly overlaps/is repeted in some prior sections. Suggest to relocate all text regarding nutrient pollution in one section.	section has been reduced and helps remove overlap
Marieke Sassen	Ch. 4	55	1568	55	1570	From: "data on the extent...": Adress repetition with lines 1572-1573	Text has been edited to remove repetition
NFP of China	Ch. 4	55	1571	55	1572	Reference to this example is not found. It is suggested this example be removed.	Text has been removed
Nathalie van Haren	Ch. 4	55	1571	55	1572	The sentence "Use of pesticides is particularly high in Columbia, Costa Rica, Japan, China, Belgium and the Netherlands (FAO 2012) seems in contradiction with Figure 4.30 at page 53,	reviewer comment is no longer relevant since section was extensively revised
Astrid Hilgers	Ch. 4	55	1571	55	1572	The sentence "Use of pesticides is particularly high in Columbia, Costa Rica, Japan, China, Belgium and the Netherlands (FAO 2012) seems in contradiction with Figure 4.30 (based on FAO 2016) at page 53, about Global rates of pesitcide application to arrable land, where China, Malaysia, North Kalimantan, Japan, New Zealand, Colombia, Bolivia, Chile, Uruguay and Surinam seem to be pesticide champions	reviewer comment is no longer relevant since section was extensively revised
Diana Patricia Alvarado-Solano	Ch. 4	55	1571	55	1571	Columbia (State from United States) or Colombia (Country from South America)?	Corrected
UNCCD SPI	Ch. 4	55	1571	55	1572	The sentence "Use of pesticides is particularly high in Columbia, Costa Rica, Japan, China, Belgium and the Netherlands (FAO 2012) seems in contradiction with Figure 4.30 at page 53, about Global rates of pesitcide application to arrable land, where China, Malaysia, North Kalimantan, Japan, New Zealand, Colombia, Bolivia, Chile, Uruguay and Surinam seem to be pesticide champions	reviewer comment is no longer relevant since section was extensively revised
NFP of China	Ch. 4	55	1571	55	1572	No reference support,we recommend to delete	reviewer comment is no longer relevant since section was extensively revised
U.S. government	Ch. 4	56	1595	56	1603	Sentence about sediment being top priority needs a citation. Does this refer to the Table 4.12? Please clarify.	This section deleted as advised
Marieke Sassen	Ch. 4	56	1600	56	1602	Any evidence? This section is very poorly referenced	Section has been improved and up to date references added
Marieke Sassen	Ch. 4	56	1603	56	1603	Move table to the introduction of this subsection (4.2.4.3)	Done
Marieke Sassen	Ch. 4	56	1604	56	1604	Reformulate to a process. E.g Changes in water regimes? Or changes in freshwater ecosystems?	Thank you, we changed it to "Changes in the hydrological regime "
Xavier de Lamo	Ch. 4	56	1604	56	1604	Suggest to at least rename this section to "Impacts on water" or something similar, in order to be consistent with other sections.	Thank you, we changed it to "Changes in the hydrological regime "
Mahmood Yekeh Yazdandoost	Ch. 4	56	1607	56	1608	0.6% is missing!?	We add additional 0.3% and the last 0.3 presents lost by decreasing decimal
Marieke Sassen	Ch. 4	57	1607	57	1607	Figure 4.31 does not illustrate the numbers mentionned in the previous lines as is suggested. Is there a figure missing?	We removed the figure duo to space constrain
Christophe CUDENNEC	Ch. 4	57	1618	57	1623	More recent figures can be found in World Water Development Reports of the UN	Thank you, we changed it to "Changes in the hydrological regime "
U.S. government	Ch. 4	57	1618	57	1639	The "blue" and "green" water references are somewhat confusing. I suggest these not be introduced until the section 4.2.5.1.2, and then both defined clearly.	The text has been clarified

Marieke Sassen	Ch. 4	57	1625	57	1651	Refer to Fig 4.31 showing the cycles somewhere in this section	We removed the figure duo to space constrain
Marieke Sassen	Ch. 4	59	1691	59	1692	Are these the same areas where groundwater resources are under threat? See lines 1665-1667, p58	As in this case its includes a larger area and population, yes 1.76 billions are part of the 4.8 billions
Marieke Sassen	Ch. 4	59	1696	59	1696	White water needs a definition	Thank you, a definition added (evaporation)
Marieke Sassen	Ch. 4	59	1701	59	1722	These two subsections seem to deal with the same issue. The impact of hydroelectric (or other) dams on hydrologic regimes is missing.	The text has been streamlined and redundancies eliminated
Cristobal Diaz	Ch. 4	59	1701	60	1734	I suggest to introduce in the points 4.2.5.1.6. Degradation of hydrologic regimes, 4.2.5.1.7. Surface hydrologic regimes, 4.2.5.1.8. Groundwater regimes, the effects of the drought in the depletion of levels and water quantities, as is the present case of Caribbean with a prologated drought for more than 3 years, parts of Europe and so	We do not agree with the comment as this section deal with effect of anthropogenic driver on physical aspects of the hydrological regime
Marieke Sassen	Ch. 4	59	1702	59	1705	General. Integrate with lines 1611-1617, p57	Moved as suggested
Dan Pennock	Ch. 4	60	1736	60	1741	A potentially useful graphic, but arrows are not coloured, A,B and C are not defined nor are the x's.	The final graphics have all been revised to include the highest quality and resolution possible
Marieke Sassen	Ch. 4	60	1736	60	1741	This table seems incomplete and needs better explanation. What do the circles and the letters represent? Also, colors as per the caption need to be added (all arrows are now black). Clarify what X and x mean and add the stars indicating quality to the table Also, the table is not referred to anywhere in the text.	This table has been eliminated from the final draft
Germany	Ch. 4	60	1736			Use larger font to improve readability. Is the caption of Table 4.13 correct? Although the caption of the Table talks about red and green arrows all arrows shown in the Table are black. The different numbers of asterisks described in the caption are also not visible in the Table itself. And the Capital "A"; "B", "C" and "D" in the Table are not described in the caption.	This table has been eliminated from the final draft
Gardner	Ch. 4	60	1748	61	1755	Figure 4.32 and accompanying text is relying on outdated data. The WET Index was refined and updated in Dixon et al (2016), https://www.researchgate.net/publication/284235148_Tracking_global_change_in_ecosystem_area_The_Wetland_Extent_Trends_index . Note as well that the WET Index is being currently updated by UNEP-WCMC at the request of Ramsar, and the new data will include Latin America and the Caribbean for the first time.	That wetland index is just another estimate of the same thing, which does not use updated data, just the same data with another transformation
LI Changxiao	Ch. 4	60	1750	60	1750	Please change "extend" to "extent".	Corrected
Thomas Brooks	Ch. 4	61	1755	61	1755	Add a sentence here like "The IUCN Red List assesses 6,244 freshwater species as threatened or extinct (http://www.iucnredlist.org/)"	Given the space constrains, it doesn't seem necessary to add this information which is somehow included in the papers already cited.
Marieke Sassen	Ch. 4	61	1755	61	1755	There is also the recently developed Wetlands Extent (WET) Index, which estimates that global extent of natural wetland declined by 30 per cent between 1970 and 2008, drawing on over 1,000 different time-series records. See: M.J.R. Dixon, J. Loh, N.C. Davidson, C. Beltrame, R. Freeman, M. Walpole. Tracking global change in ecosystem area: The Wetland Extent Trends index. Biological Conservation, Volume 193, January 2016, Pages 27–35.	Given the space constrains, it doesn't seem necessary to add this information which is somehow included in the papers already cited.
Marieke Sassen	Ch. 4	61	1756	61	1762	This needs referencing	All references were added to final report
U.S. government	Ch. 4	61	1756	61	1759	This text addresses drivers of degradation and should be combined/coordinated with the text in 4.2.5.2.3.	Moved to the driver section and merged.
Cristobal Diaz	Ch. 4	61	1756	51	1759	Maybe included in "The main drivers of wetland degradation have been conversion to croplands, hydrological regulation, coastal defenses, water extraction for agriculture, wastewater treatment without control , disease control (particularly for mosquitoes), spread of invasive species, aquaculture, urbanization, and infrastructure development including shipping channels"	This issue has been reflected in the text.
Marieke Sassen	Ch. 4	61	1760	61	1762	Some of the drivers listed above also have positive effects (e.g. coastal defense, disease control). This needs to be recognised here also.	Not on wetlands.
U.S. government	Ch. 4	62	1772	62	1777	This text is nearly a repeat of the text below, and mostly discusses causes of the process, so consider merging this text with the paragraph below.	This text has been removed.
Germany	Ch. 4	62	1783	62	1783	Replace "Dhal" with "Dahl".	This has been done
U.S. government	Ch. 4	62	1793	62	1793	It is not clear how "Deeper water bodies" is a driver of loss for forested wetlands (per the figure caption). This should be explained more clearly.	Clarified in the figure caption.

Marieke Sassen	Ch. 4	62	1799	62	1813	Make sure the title fits the content. Here the content uses recovery levels to indicate implications for biodiversity and ecosystem services but there is a lot more general information on impacts of wetland degradation throughout the previous sub-sections, that should be integrated here.	The previous sections are descriptions and causes of the degradation process and do not involve much on impacts as the present section does. We believe that this is best left as is.
Javier Ernesto Cortés Suárez	Ch. 4	62	1799	62	1799	These should have graphic examples (e.g. photos) from around the world that can show the importance of restored and undisturbed wetlands.	Given the tightness of space and the lack of specific information that general pictures provide, we believe it is best not to add additional text
Li Changxiao	Ch. 4	62	1804	62	1810	"Specifically, it showed that ...".	Corrected
Susan Cordell	Ch. 4	62	1810			There are newer studies on carbon recovery as a result of restoration - see Vien Ngoc Nam et al 2016	This study only applies to one single site, so it will not help to understand the general picture about C storage
Cristobal Diaz	Ch. 4	63	1833	64	1868	According to my modest understanding would be decided if point 4.2.5.2. Wetland/4.2.5.2.5. Remediation measures will be in this position in Chapter 4 or in Chapter 6 - Responses to halt land degradation and to restore degraded land/6.3.2.5 Responses to wetland conversion.]	Thank you, this was moved to Chapter 6 as suggested
Marieke Sassen	Ch. 4	63	1834	63	1842	Address high level of overlap with the previous section (4.2.5.2.4.)	Moved to other section
Marieke Sassen	Ch. 4	63	1843	63	1854	I would start the section with this paragraph: the actions. Then go on to discuss the outcomes	Moved to other section
Marieke Sassen	Ch. 4	64	1870	64	1870	Change title to "introduction" or similar to reflect content	Chapter has been extensively revised and relevant titles have been corrected to reflect the content
Thomas Brooks	Ch. 4	64	1873	64	1873	Change "has been recognised" to "is recognised by some". The term is not accepted by the International Commission on Stratigraphy or the International Union of Geological Sciences.	Corrected
Marieke Sassen	Ch. 4	64	1883	64	1883	explain "In 2002 there was a reserve of 120% of (?) the cropped area at the time": 120%?	Done
Katalin Török	Ch. 4	64	1885			Please do not use NCPs in plural (it is already plural)	"NCP" was changed to "ecosystem services" throughout.
Katalin Török	Ch. 4	64	1887			Please explain what "60% suitable for agriculture" means	Clarified
Marieke Sassen	Ch. 4	64	1888	64	1888	"conservation areas in..."	Corrected
McAfee, Brenda	Ch. 4	64	1897	64	1898	Although the rate of deforestation in Brazil was decreasing until 2012, since then deforestation has been increasing http://rainforests.mongabay.com/amazon/deforestation_calculations.html	Thank you this was noted.
Virginia Meléndez Ramírez	Ch. 4	65	1906	65	1906	Complete foot of figure, color black =	Figure was corrected for final report
Germany	Ch. 4	65	1906			This Figure is really not at all readable. Even whilst using full imagination.	A higher resolution was provided for the final report
Marieke Sassen	Ch. 4	66	1914	66	1941	"syndromes": reword	Reworded
Katalin Török	Ch. 4	66	1929			This statement gives the message that only economic gains should be considered, other NCP not. Please revise	We do not believe that only economic gains should be considered. Was revised to clarify.
Virginia Meléndez Ramírez	Ch. 4	66	1931	66	1931	Other example: http://www.scielo.org.mx/pdf/therya/v4n3/v4n3a3.pdf	Thanks, noted. Unfortunately not all examples can be included
Katalin Török	Ch. 4	66	1936		1938	Desta and Coppock, 2002; Scholes and Hall, de Klerk 2004 missing from the litr	Reference list checked and updated.
McAfee, Brenda	Ch. 4	67	1956	67	1956	Brandt et al 2016 missing from references	Reference list checked and updated.
Katalin Török	Ch. 4	67	1958			MacInnis-Ng et al., 2011 missing from the litr	Reference list checked and updated.
Javier Ernesto Cortés Suárez	Ch. 4	67	1960	67	1960	These should also consider that drylands are also generated by Desertization processes, which is completely different from Desertification process.	Desertization (and sandification, aridification) is the process of degradation that CAN lead to desertification (not necessarily reaching it). The term has been added to clarify this point.
Virginia Meléndez Ramírez	Ch. 4	67	1960	67	1960	You can incorporate the previous paragraph here.	Bush encroachment is mentioned in the previous paragraph and is only cited here to avoid getting into the argument of whether bush encroachment is a type of desertification
Germany	Ch. 4	67	1961	67	1962	UNCCD defines desertification as land degradation in drylands and also includes aspects beyond biotic productivity.	We used the definition from UNCCD directly
Marieke Sassen	Ch. 4	67	1978	67	1979	Where is Box 4.1.2.1? And 4.2.6.3? (or is this Box 4.2 on p68?)	All numbered figures, tables and boxes were renumbered in the final report
Marieke Sassen	Ch. 4	67	1992	67	1993	Rephrase to clarify: lumped under what term? Also the list in between brackets is an odd combination of terms)	"desertification" added to clarify
Ruishan Chen	Ch. 4	68	1997	68	1998	I find box 4.2 and Box 4.3, where is Box 4.1?	All numbered figures, tables and boxes were renumbered in the final report
Marcus Zisenis	Ch. 4	68	1998	69	2030	It should be differentiated that species richness is a misleading indicator for shorter time periods of current age. For instance, drainage of bogs increases species richness by unnatural and untypical pioneer woodland species.	I agree with this, but in my opinion this is a very specific case that may not apply at global scales, which are the ones we're using in the report
Xavier de Lamo	Ch. 4	68	1998	68	1998	Suggest to rename it to "Biodiversity Loss" or something similar.	Done

Xavier de Lamo	Ch. 4	68	1998	72	2175	I don't understand why biodiversity loss in water systems (freshwater, wetlands) is not considered in the chapter. I think that, at least, an explanation for this should be given	The scale of the results presented in this sections is global and doesn't make distinction among kinds of ecosystems
Ben ten Brink	Ch. 4	68	1998	70	2073	Coherence with Chapt 7 recommended	I cannot do this, I have no access to chapter 7
Javier Ernesto Cortés Suárez	Ch. 4	68	1999	68	1999	These should clarify what kind of wildlife taxonomic groups (vertebrate and/or invertebrates) does this status and trends consider.	Clarified
Marieke Sassen	Ch. 4	68	2004	68	2004	Where is Box 1?	There is no Box, corrected.
Thomas Brooks	Ch. 4	68	2021	68	2022	are therefore disproportionately threatened" seems to have been garbled. I assume that this should read something like "Among well-known species, the high proportion of species with	Corrected
Javier Ernesto Cortés Suárez	Ch. 4	68	2021	68	2022	There should be different examples from around the world that can contextualize the reader about the increase of well-known species with very small ranges.	Example included
Thomas Brooks	Ch. 4	68	2023	68	2023	This paragraph needs to add some text on extinction risk. Add text here along the lines of "The IUCN Red List documents 25,360 species as threatened or extinct (http://www.iucnredlist.org/), and repeat assessments of entire taxonomic groups show that extinction risk is increasing over time, albeit at widely varying rates (Butchart et al. 2007 PLoS ONE). In the absence of conservation actions to date, these slides towards extinction would have been ~20% faster (Hoffmann et al. 2010 Science)."	Text added.
Thomas Brooks	Ch. 4	68	2024	68	2025	It is not correct to say that "such efforts have not yet led to detectable global trends". Delete the "Although" on Line 2023, and correct to read something like "and such efforts are effective: species with high protected area coverage of the key biodiversity areas at which they occur are sliding towards extinction at only half the rate as those species for which key biodiversity areas have poor protected area coverage (Butchart et al. 2012)". See http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0032529 .	Sentence deleted, the previous comment already addressed this issue.
Marieke Sassen	Ch. 4	68	2025	68	2025	"...let to detectable change in (?) global trends."	Sentence deleted
Javier Ernesto Cortés Suárez	Ch. 4	69	2027	69	2028	These should also clarify that low genetic diversity its not always a matter of affected habitats, but an intrinsic characteristic of some species, which affects even more seriously its survival in degraded habitats or lands.	This discussion relates to the methodology used in the paper, we cannot discuss it in this report.
Germany	Ch. 4	69	2036			This Figure has a low resolution quality and is far too small to read. Please improve.	It has the highest resolution possible as it has been downloaded from the journal website. The graphic designers were able to enhance it for final draft.
Javier Ernesto Cortés Suárez	Ch. 4	69	2040	69	2044	These should be also complemented through information for each fauna taxonomic group.	Yes, if we had less strict space constrains.
UNCCD SPI	Ch. 4	99	2054	99	2054	Sorry, do not understand how this section on "Remediation" fits into Section?	This text has been deleted it as explained in the comment on the text. Agroforestry and sustainable land management measures are within the scope of Ch6. These references have been passed on to the experts of Ch6.
Jyotirmoy Shankar Deb	Ch. 4	70	2056	70	2084	The figure shows data representation for different animal groups. But, that of amphibia is confusing, because only 25 populations can't make any conclusion for the entire group. Kindly correlate.	I'm not sure what his means, but the remediation section has been dropped
Germany	Ch. 4	70	2057			Fragmentation should be replaced by degradation, in order to be consistent with the key in Figure 4.41 but even more due to the fact that fragmentation is just one factor out of many which can lead to habitat degradation.	I agree, but the figure comes form the Living planet report as is. The information about the sample size if quite clear so anyone can come up with their own interpretations about it.
Thomas Brooks	Ch. 4	70	2057	70	2058	Add citation to Maxwell et al. (2016) Science	Changed
Cristobal Diaz	Ch. 4	70	2057	70	2058	The main cause overexploitation is repeated in 2057 and 2058	That citation does not exists in the journal Science as is.
Germany	Ch. 4	70	2058	70	2058	Overexploitation should be replaced by climate change (since this point is not mentioned in the text, whereas overexploitation is mentioned twice).	Corrected
Javier Ernesto Cortés Suárez	Ch. 4	70	2059	70	2060	These should be better explain, because what the figure is saying is that invasive species and disease are more threatening in amphibians and reptiles than in other vertebrate groups.	Corrected
Dan Pennock	Ch. 4	70	2060	70	2062	The inclusion of microbial diversity is unwarranted and unsubstantiated in the literature	Corrected
Eila Gendig	Ch. 4	70	2062		2070	Might be worthwhile to link to species' functional role in ecosystem	Corrected

Javier Ernesto Cortés Suárez	Ch. 4	70	2062	70	2062	This is relative and I think the responsibility shouldnt be assing only to agriculture in general considering that there are different leves of agriculture, being the extensive productive practices the most harmful for biodiversity.	It is included already, in lines 2066 - 2070
Javier Ernesto Cortés Suárez	Ch. 4	70	2064	70	2064	Maybe you meant ilegal recreational purposes through illegal wildlife trafficking, although it is not its only purpose (e.g. house keeping).	Corrected
Javier Ernesto Cortés Suárez	Ch. 4	70	2073	70	2073	Figure 4. 41 - Should be used to analyze in a more detailed way how are these common drivers of biodiversity loss acting in the different taxonomic groups according to its threat percentage.	Corrected
Germany	Ch. 4	70	2073			Since all other main causes are briefly described in this sub-section it might be worthwhile to also to mention climate change: Climate change has major impacts on species phenology, species ranges but also on biological interactions (preditor-prey relationships, symbiosis, food plant - herbivory interactions, pollination etc.). Different species-specific responses to climate change lead to de-synchronisation of biological interactions.	The scope of the report is global land. The space is very restricted, there is no room for a more detailed discussion
Li Changxiao	Ch. 4	71	2099	71	2099	Please add "ecosystems" after "degraded".	Agree, corrected
Germany	Ch. 4	71	2133	71	2135	Include a footnote or a box to describe 'alpha diversity' and 'beta diversity'.	This section has been removed
McAfee, Brenda	Ch. 4	71	2134	71	2135	To make this explanation more accessible to policy makers, it would be helpful to add a simple explanation of alpha and beta diversity or avoiding the use of the terms by explaining the relevant observations in lay person anguage.	This text has been deleted it as explained in the comment on the text.
Marieke Sassen	Ch. 4	72	2158	72	2162	The connection between these two statements (and the rest of the text) needs to be clarified	This text has been deleted it as explained in the comment on the text.
Marieke Sassen	Ch. 4	72	2166	72	2166	Mulching, no till agriculture are also quite common now	This text has been deleted it as explained in the comment on the text.
Nathalie van Haren	Ch. 4	72	2167	72	2167	There is much more to say about the sustainable effects on land, water, biodiversity, climate of agroecology: for instance by FAO http://www.fao.org/agroecology/overview/en/ ; and as a response to soil degradation, see for instance Agroecology-based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa (2012) P. Tittonell et al http://www.sciencedirect.com/science/article/pii/S0378429011004151	This text has been deleted it as explained in the comment on the text. Agroforestry and sustainable land management measures are within the scope of Ch6. These references have been passed on to the experts of Ch6.
Astrid Hilgers	Ch. 4	72	2167	72	2167	There is much more to say about the sustainable effects on land, water, biodiversity, climate of agroecology: for instance by FAO http://www.fao.org/agroecology/overview/en/ ; and as a response to soil degradation, see for instance Agroecology-based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa (2012) P. Tittonell et al http://www.sciencedirect.com/science/article/pii/S0378429011004151	This text has been deleted it as explained in the comment on the text. Agroforestry and sustainable land management measures are within the scope of Ch6. These references have been passed on to the experts of Ch6.
UNCCD SPI	Ch. 4	72	2167	72	2167	There is much more to say about the sustainable effects on land, water, biodiversity, climate of agroecology: for instance by FAO http://www.fao.org/agroecology/overview/en/ ; and as a response to soil degradation, see for instance Agroecology-based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa (2012) P. Tittonell et al http://www.sciencedirect.com/science/article/pii/S0378429011004151	This text has been deleted it as explained in the comment on the text. Agroforestry and sustainable land management measures are within the scope of Ch6. These references have been passed on to the experts of Ch6.
Marieke Sassen	Ch. 4	72	2170	72	2170	"as to the extent of land degradation,..."	This text has been deleted.
Susan Cordell	Ch. 4	72	2176			Again - the detrimental aspect and increase in affected lands from the grass/fire cycle needs to be addressed	The text has been clarified
Javier Ernesto Cortés Suárez	Ch. 4	72	2176	72	2176	These should have more graphic examples from around the world that exemplify the importance of fire as a generator of land degradation. It is also important to consider the sabanization process generated through forest fires, where native vegetation is replaced by invasive species (pastures and ferns) adapted to fire. Which in turn interrupts the cycle of natural regeneration and promotes new fires, leading to processes of desertification and desertization.	We have included many cases studies in the chapter as well as graphic illustration. However, due to space limitation we couldn't add more. Ch4 already contains the most amount of figures of all chapters in the report.
Marieke Sassen	Ch. 4	73	2183	73	2189	Description of drivers of change in fire regimes. More appropriate in Chapter 3 sections on fire	The text has been removed from Ch4
Marieke Sassen	Ch. 4	73	2199	73	2205	More appropriate in section 4.2.8.4	Moved.

Virginia Meléndez Ramírez	Ch. 4	73	2219	73	2219	Add reference.	References have been added to the text.
Marieke Sassen	Ch. 4	74	2240	74	2240	Add some detail on how: were the fires not "natural"? Did they destroy large areas of forest? I would also add Indonesia's smouldering peatland fires as an example of below ground fires	Clarification was made, thank you.
Suneetha Mazhenchery Subramanian	Ch. 4	74	2242			a discussion on controlled fires as practised by several communitiues as for instance in N Australia resulting in carbon credits could also be included.	This has been done at Ch1 level and we did not want to repeat
Germany	Ch. 4	74	2245			Can the satellite image be provided in a higher resolution? The font size used in the image needs to be larger.	The final graphics have all been revised to include the highest quality and resolution possible
Susan Cordell	Ch. 4	75	2253			This section needs more attention given the known increases in pest/pathogens - also invasive species should have its own section and not thrown in here	This was elaborated in the final report
Marieke Sassen	Ch. 4	75	2253	75	2264	Odd section: clarify how pests and diseases are (linked to) a degradation process? Invasive species are more obvious but not covered in the title and the text should be moved to section 4.3.7. Then this section can be removed altogether	This was clarified. The driver itself has been discussed in Ch3.
Germany	Ch. 4	75	2259	75	2259	Expand on what criteria are used to define weeds as "noxious".	Added "plants that grow aggressively, multiply quickly without natural controls, and display adverse effects through contact or ingestion".
Ruishan Chen	Ch. 4	76	2265	76	2280	coastal land reclamation can also be considered here.	Coastal is not included in LDRA. Only freshwater.
Joanne Perry NZ focal point	Ch. 4	76	2271		2276	This paragraph appears to suggest that mountain top removal lead to an increased number of earthquakes, was that your intent? If so this needs to be stated more clearly along with the rationale behind why that would occur. Reduced over burden causes some destabilisation and fracturing of below ground structures???	More detail and citations have been added
McAfee, Brenda	Ch. 4	78	2329	78	2333	Clarification is needed as to whether the IUCN activities related to forest protection refer to all tropical forests or only to the Congo Basin and whether the "activities" are certification related refer or a range of activities.	This has been clarified in the final text
Li Changxiao	Ch. 4	79	2353	79	2354	The statement "In turn, NCP that depend on ... decline" is better to be rephrased.	NCP reference was eliminated in favour of ecosystem services
Javier Ernesto Cortés Suárez	Ch. 4	79	2372	79	2372	There should be more specific examples about the importance of conectivity around the world. It is also important to consider the conectivity scale, which is different and variable for wildlife.	The text has been nuanced, but the issue of connective is also discussed in Ch3 and Ch5
Marieke Sassen	Ch. 4	80	2385	81	2412	I would expect more detail on the impacts of disturbances from logging, mining	Text elaborated
Marieke Sassen	Ch. 4	80	2405	80	2412	For an example of factors that affect species sensitivity to logging see http://www.cifor.org/library/1663/life-after-logging-reconciling-wildlife-conservation-and-production-forestry-in-indonesian-borneo/	Reference noted
Germany	Ch. 4	81	2416			This Figure has a low resolution quality and is far too small to read. Please improve.	The resolution of the final figure has been improved
Susan Cordell	Ch. 4	81	2418			In section 4.2.8 there should be a section on climate change driven novel and or non-analogue ecosystems	Does this mean the emergence of completely new ecosystems as a result of climate change?
Xavier de Lamo	Ch. 4	81	2418	85	2587	Some of the contents of these section are just a mere repetition of things that have been stated before. Given that Climate Change is such a cross-cutting issue, I wonder if it wouldn't be better to consider the influence/impact of climate change in each of the previous degradation processes. This could help to reduce repetition.	Chapter 4 has been extensively revised and streamlined. All repetitions were removed
Xavier de Lamo	Ch. 4	81	2418	85	2587	This section includes confidence terms for most of the findings, which doesn't happen in many of the prior section, with the exception of the Exectutive summary. Please consider to include confidence temrs in the rest of sections as well, or, alternative, explain why only the climate change section includes them.	The format required limit certainty estimates to the Executive summary. Accuracy of actual numbers, of course, are highly desirable wherever they occur. Unfortunately there is a dearth of such information.
Douglas, Diane	Ch. 4	82	2437	2437	82	There are a few typos in the first sentence of this paragraph	Editorial mistakes fixed
Shiping Wang	Ch. 4	82	2437	82	2437	There is a space between 'is' and 'affecting'.Also the end of this sentence should be added '.'	Fixed

						In addition to the effects of warming on insects described in the text, other detrimental effects for insects should be also mentioned: For example some insects with non-overlapping, discrete generations may be able to develop more than one generation due to warmer temperature conditions, with the risk of loosing a whole generation at the end of autumn, when conditions get unfavourable. This may lead to a potential developmental trap. For reference see: Hans Van Dyck, Dries Bonte, Rik Puls, Karl Gotthard and Dirk Maes (2015): "The lost generation hypothesis: could climate change drive ectotherms into a developmental trap?". <i>Oikos</i> 124: 54–61, 2015 . doi: 10.1111/oik.02066 or: http://onlinelibrary.wiley.com/doi/10.1111/oik.02066/epdf	This addition was accepted and incorporated
Germany	Ch. 4	82	2440	82	2442		
Susan Cordell	Ch. 4	82	2466			Yes - but strong contrary data also exists that is very compelling for the tropics - see Clark et al 2010	Deleted, to avoid the debate and due to space limitation
Javier Ernesto Cortés Suárez	Ch. 4	83	2504	83	2508	These should also consider information about other vulnerable ecosystems such as "paramos", which are important water reserves and are only found in some parts of the world.	Because of the length limitation, could not discuss this in the text
Shiping Wang	Ch. 4	83	2504	83	2504	tundra' was error spell.	Corrected
Thomas Brooks	Ch. 4	83	2512	83	2512	Add text reading something like "although in general, important sites for biodiversity will remain important even under such climate change driven migration scenarios (Hole et al. 2009 <i>Ecology Letters</i>)".	Thank you but, this does not seem to connect with the context
Javier Ernesto Cortés Suárez	Ch. 4	83	2512	83	2518	There should be more examples (also graphic) from around the world referring to wildlife species migration or actual conservation status of some species due to migration.	Because of the length limitation, could not discuss more
Thomas Brooks	Ch. 4	83	2517	83	2518	Add citation to Peden et al. (2015) <i>PLoS ONE</i> http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0065427	Added
Germany	Ch. 4	84	2542			This Figure has a low resolution quality and is far too small to read. Please improve.	Final resolution has been increased
Susan Cordell	Ch. 4	85	2550			Invasive species need own section as related to climate change - also	This point is now included in Sect 4.3.7. "Invasive species"
Joanne Perry NZ focal point	Ch. 4	85	2550		2570	There appears to be a lot of material that is repeated from previous sections, please reduce repetition and streamline.	Chapter 4 has been extensively revised and streamlined. All repetitions were removed
Javier Ernesto Cortés Suárez	Ch. 4	85	2550	85	2550	There should be examples of pest and disease incidence on wildlife animals (e.g. malformations or abnormalities among other aspects)	Because of the length limitation, could not discuss more
Marieke Sassen	Ch. 4	85	2571	85	2571	Correct numbering	Li Guo
Marieke Sassen	Ch. 4	85	2573	85	2575	The way in which these practices contribute to CC mitigation needs to be explained	Li Guo
Ben ten Brink	Ch. 4	86	2588	116	3422	It is not to situate this Section between Chapter 3 on drivers, sections of Chapter 4 on state (as a result from drivers impacts), and Chapter 5 on impacts on biodiversity and ES. What is the	Chapter 3 goes into detail on drivers of EDR. In this section we link the drivers to impacts on the resource base.
Marieke Sassen	Ch. 4	86	2588	86	Section 4.3	This is a good idea but not easy to avoid excessive repetition on the trends of certain drivers. This needs to be thoroughly checked and the right balance found (both in this section, related sections on impacts in this Chapter and in Chapter 3). Links to relevant sections of Chapter 3 need to be made in the text.	Thorough editing has been done for the final report
Germany	Ch. 4	87	2637			Spell out what is meant by the abbreviations in the y axis (EUR, OCE, NAM, etc.).	This figure was eliminated from the chapter due to space constraints. It was offered to Ch3 together with this comment
U.S. government	Ch. 4	89	2665	89	2700	Recommend also acknowledging other services provided by extensive grazing lands.	Graham von Maltitz
Shiping Wang	Ch. 4	89	2676	89	2676	' should be added before 'A 70-80%' in th line.	Added
UNCCD SPI	Ch. 4	89	2691	89	2700	Many spelling and editorial mistakes	Thorough editing has been done for the final report
Shiping Wang	Ch. 4	89	2698	89	2698	' should be added before 'light grazing' in th line.	Added
Dan Pennock	Ch. 4	90	2704	91	2755	This is a very brief summary of information preseted in much greater detail earlier in the chapter - what is the point of it?	Reduced by referencing text in Section 4.2
Nathalie van Haren	Ch. 4	90	2706	90	2706	"toxic effects of [...] pest and disease control" is vague language, please be concrete: "toxic effects of [...] pesticides and fungicides"	added
UNCCD SPI	Ch. 4	90	2706	90	2706	"toxic effects of [...] pest and disease control" is vague language, please be concrete: "toxic effects of [...] pesticides and fungicides"	added
NFP of China	Ch. 4	90	2708	90	2711	No actual research results to support it, we recommend to delete this case.	We removed reference to countries
NFP of China	Ch. 4	90	2708	90	2711	Examples in the article does not refer to the relevant research results. Due to the lack of evidence, it is suggested the example be deleted or add supportive research results.	reference to countries removed
LI Changxiao	Ch. 4	90	2735	90	2735	Please change "though" to "through".	Corrected

Nathalie van Haren	Ch. 4	90	2736	90	2737	Please be specific what kinds of degradation monoculture cause.	We added brief comment on degradation caused by monocultures (although this is often done to promote other ecosystem processes – e.g. food provision).
Astrid Hilgers	Ch. 4	90	2736	90	2737	Please be specific what kinds of degradation monoculture cause.	We added brief comment on degradation caused by monocultures (although this is often done to promote other ecosystem processes – e.g. food provision).
UNCCD SPI	Ch. 4	90	2736	90	2737	Please be specific what kinds of degradation monoculture cause.	this is often done to promote other ecosystem processes – e.g. food provision).
Germany	Ch. 4	90	2745	90	2746	Include reference to the IPBES assessment on 'pollinators, pollination and food production'.	IPBES deliverables were references as relevant throughout the chapter.
Germany	Ch. 4	91	2756	91	2759	Cross-check that "restoration" and "rehabilitation" are not being used interchangeably in this section.	Thank you , we ensured consistency for the final report
Marieke Sassen	Ch. 4	91	2757	91	2758	Land sparing only functions under certain conditions. See in Chapter 3	Correct. This text was also offered to Ch6 where it belongs more appropriately. The text was aligned with CH3 discussion on the topic
Marieke Sassen	Ch. 4	91	2757	91	2764	This paragraph needs referencing	Reference added.
Li Changxiao	Ch. 4	91	2762	91	2764	Are there examples or case studies that can be cited hereby?	This text was offered to Ch6 where it belongs more appropriately. Ch6 has plenty of case studies to illustrate the discussion
Germany	Ch. 4	92	2765		2766	This Figure 4.53 has a low resolution quality and is far too small to read. Please improve.	All final figures have been improved. Only highest resolutions were included in the final draft
U.S. government	Ch. 4	92	2766	96	2934	This section provides a nice overview of the current state of the forest globally and reflects the latest statistics on forest extent and the contributions to the carbon sink.	Thank you!
Germany	Ch. 4	92	2773	93	2775	Reference is missing. Supposed to be numbers taken from FRA 2015. When the time horizon is the last 25 years than SE Asia should also be named as a region of deforestation far above global average.	How are the World's forest Changing Global Forest resource assessment 2015 and Nation al Academic Press, 1993 Sustainable Agricultural and the environment in the humid tropic ISBN 0- 309-58840-15 P 22
Thomas Brooks	Ch. 4	93	2776	93	2776	Add a sentence here like "Deforestation and forest degradation is associated with dramatic biodiversity loss, with 10,092 forest species assessed as threatened or extinct on the IUCN Red List (http://www.iucnredlist.org/)".	Sentence added as suggested and missing word (temperate forests) added.
Marieke Sassen	Ch. 4	93	2776	93	2776	end of sentence missing	"temperate forests" inserted
Susan Cordell	Ch. 4	93	2777			See Goncalves et al 2017 for updated numbers on this and other systems in the tropics	Could not find that paper to updated Goncalves et al 2017
Germany	Ch. 4	93	2778	93	2778	Further up in the chapter the native forest cover is given in "hectares" here "km2" is used. Please harmonize units throughout the whole text to ensure reader friendliness.	square km and ha are the units set by LDRA
Germany	Ch. 4	93	2779	93	2780	The "largest percentage" of 50 is given for Central America, thus it is maybe the largest total area but not the percentages.	Noted, thank you.
Diana Patricia Alvarado-Solano	Ch. 4	93	2790	93	2795	Recommended literature: Plant diversity patterns in neotropical dry forests and their conservation implications. DRYFLOR, 2016. Published in: Science 23 Sep 2016: Vol. 353, Issue 6306, pp. 1383-1387, DOI: 10.1126/science.aaf5080; Also: Patterns of Species Distributions in the Dry Seasonal Forests of South America Author(s): Darien E. Prado and Peter E. Gibbs Source: Annals of the Missouri Botanical Garden, Vol. 80, No. 4 (1993), pp. 902-927 Published by: Missouri Botanical Garden Press Stable URL: http://www.jstor.org/stable/2399937 ; Also: Dexter et al (2015). Floristics and biogeography of vegetation in seasonally dry tropical regions. International Forestry Review Vol.17(S2), 2015. DOI: 10.1505/146554815815834859	Noted, thank you.
Germany	Ch. 4	93	2794	93	2790	Euphorbiaceae is not a family of Caryophyllales.	The wording in the original paper is confusing. Now changed to indicate Euphorbiacea is not in the Caryophyllales . Reworded: "The flora of this biome is characterized by a high biodiversity; legumes are dominant, also Cactaceae
Germany	Ch. 4	93	2796	93	2796	Chapter 4.3.4.2 named "Human utilization of humid tropical forests" while the other sub-chapters in this section are not with the focus of human utilization. Requires adjustment.	Section titles were reviewed
Germany	Ch. 4	93	2797	93	2798	Indonesia is a country and not a region. Should be changed to south-east Asia.	Changed to SE Asia
Eila Gendig	Ch. 4	93	2797			Is this loss of native, mature forest stands? Or plantation forestry. Might need to specify.	Was clarified in the final report
McAfee, Brenda	Ch. 4	93	2803	93	2805	Please refer to coment on line 70 above regarding current data set for deforestation in Brazil.	There is nothing on line 70 about deforestation (line 70 is part of the Contents). Furthermore, the text on deforestation has been offered to Chapter 3. The information on deforestation was checked in their Chapter (Section 3.3.3)

Germany	Ch. 4	93	2813	93	2814	Only forest fragmentation? Or also a significant increase in degradation?	The consequences of fragmentation are addressed in Section 4.2.6.5.
Douglas, Diane	Ch. 4	94	2817	2819	94	There are a few typos and formatting issues in these few sentences	Final editing has been done for the final report to ensure consistency and lack of errors.
Germany	Ch. 4	94	2819	94	2836	The focus on Indonesia is too diminished and and not coherent with the regional approach applied for the Amazon and Central African region. The tropical forest in SE Asia is far more than just Indonesia thus this whole section needs restructuring and rewriting.	Changed to discussion on SE Asia (as a region). This particular text was also eliminated from Ch4 , as it was deemed to be more appropriate at Ch3 level. This text was offered to them to consider.
McAfee, Brenda	Ch. 4	94	2839	94	2839	Either insert temperate before forest or delete forest. Is there a description of the subregion classification somewhere in the report ? The classification should be referenced here.	Reference "units of measurement" in Assessment.
Germany	Ch. 4	94	2844	94	2844	Explain "NBPs".	Now changed to ecosystem services (ES) throughout the assessment.
Li Changxiao	Ch. 4	95	2863	95	2863	Should the "ib" be "in"?	Corrected
McAfee, Brenda	Ch. 4	95	2874	95	2875	The example does not fit with the first sentence as Canada is not part of northern Europe. Fire frequency is one of several considerations in the assessment of drivers of species loss in boreal forests	This was changed
Germany	Ch. 4	95	2877	95	2877	Remove bracket.	Removed
Marieke Sassen	Ch. 4	95	2883	96	2920	It would be good to include some information on the implications of plantation increases for NCPs. Now the text is mainly about trends (check text on plantations in Chapter 3!)	The trends in human actions is supposed to be in Ch3. Ch4 deals with degradation processes alone.
Germany	Ch. 4	95	2896	95	2899	Uruguay started to grow, however it is not on the list. Uruguay reported to FAO an extension of 992,000 ha of planted forests in 2012 and 629,000 ha in 2000.	Base year has been included.
Li Changxiao	Ch. 4	95	2898	95	2898	Should the "14 ha" be "14 000 ha"?	Yes, it should be "14 000 ha" - corrected
Australia NFP	Ch. 4	95	2900	96	2909	The Australian Government has more recent data on the extent of forest available for wood production in Australia, based on the State of the Forests Report 2013. According to this data, 5 per cent, or 36.6 million hectares of native forest in both public forests and leasehold and private forests, of Australia's territory is used for commercial wood production. Please amend the text to reflect this change, from the 1 per cent figure in the current text.	The text has been removed, from chapter 4 as it was seen as a chapter 3 issue. Chapter 3 has not used the specific country statistics.
Germany	Ch. 4	95	2900	96	2909	Again wording is not correct "largest area" (total amount) but afterwards numbers are only given as percentages (relative numbers).	This section has been removed
Marieke Sassen	Ch. 4	96	2904	96	2904	Explain the difference among the 3 countries with some dry tropical forest within the 61 countries with highest proportions of plantations as evaluated by the 2005FRA and the 3 countries with details in the 2016 State of the World's forest report (line 2910-2912. Or were the latter just detailed examples? Why are they interesting here? E.g. did they have particular high increases in plantation areas? Other reasons?	The text has been removed, from chapter 4 as it was seen as a chapter 3 issue. Chapter 3 has not used the specific country statistics.
Germany	Ch. 4	96	2911	96	2912	5.4 million trees? How does that translate into area? Do we also count trees outside forests? Is it only forest land or agriculture as well? More clarity needed.	The text has been removed, from chapter 4 as it was seen as a chapter 3 issue. Chapter 3 has not used the specific example
Germany	Ch. 4	96	2913	96	2920	Base year for these numbers is missing again. What is the share of palm oil here? Is 12.2 million ha less than 9 % (acacia)? Because that would mean that in the tropics a total of more than 125 million ha of plantation exist (278 million on the global scale (line 2885/2886)).	Base year has been included.
Germany	Ch. 4	96	2922	96	2934	References are given in footnotes (see lines 2927,2929, 2930), whereas in the other sub-chapters they are directly included in the text. Harmonization needed.	Final editing has been done for the final report to ensure consistency.
Nathalie van Haren	Ch. 4	96	2933	96	2933	What is 'traditional' in 'traditional monoculture systems' Explain!	This text is now part of Ch6, where it belongs more appropriately. This comment was passed along to Ch6 experts to clarify.
UNCCD SPI	Ch. 4	96	2933	96	2933	What is 'traditional' in 'traditional monoculture systems' Explain!	This text is now part of Ch6, where it belongs more appropriately. This comment was passed along to Ch6 experts to clarify.

						The term "non-timber natural resource extraction" excludes timber from the list, however it is the primary issue in the heading of the chapter and there is even a sub-chapter (4.3.5.1) on wood harvesting. Definitions may not be universal on this issue however we strongly recommend to leave this topic out and put more emphasize on uncontested (real) "non-timber natural resources" fuelwood, no matter how it is collected in the forest (randomly, as a secondary use after harvest, or directly from fuelwood plantations) is use of timber. This is even more the case for charcoal, since the production of charcoal demands bigger dimensions of branches and trunks, since the process of pyrolysis is not very efficient in these households, non-industrial, systems (< 20% of timber input).	Arrangement of timber, fuelwood and non timber natural resources has been adjusted as suggested.
Germany	Ch. 4	96	2935	98	3020		
Germany	Ch. 4	97	2954	97	2954	Delete "lost".	Deleted
McAfee, Brenda	Ch. 4	97	2963	95	2963	Brodie and Aslan 2011 missing from references	Added
Marieke Sassen	Ch. 4	97	2972	97	2972	Also e.g. Prunus africana in Africa See http://www.sciencedirect.com/science/article/pii/S037887410300299X	Citation added
Marieke Sassen	Ch. 4	97	2984	97	2984	needs references (for change in forest structure e.g.: http://www.cifor.org/library/5725/fuelwood-collection-and-its-impacts-on-a-protected-tropical-mountain-forest-in-uganda/)	Citation added
Germany	Ch. 4	98	3022	99	3053	Madagascar is explicitly mentioned (line 3022) however further on in the sub-chapter there is no example given with regard to Madagascar.	Examples are not given for all cases
Germany	Ch. 4	99	3033	99	3033	100% means extinction. Is this the idea?	local extinction is correct - text modified to make this clear
Marieke Sassen	Ch. 4	99	3065	99	3065	But cultural factors also play a strong role in preferences for bushmeat over substitutes	True, these factors are described in detail in Ch5
Thomas Brooks	Ch. 4	99	3069	99	3069	Add something like "and a total of 4,766 species are assessed as threatened or extinct on the IUCN Red List due to threat from invasive species" (http://www.iucnredlist.org/).	Added the detail of the example of IAS impacts on the native species."A recent global assessment found invasive alien species to have affected 30% of threatened birds (but as much as 67% on islands), 11% of threatened amphibians, and 8% of threatened mammals (Baillie et al., 2004). Among analysis of the ranges of nearly 1,400 threatened vertebrate species, 22% of which are imperilled by invasive organisms (Bellard et al. 2016). "
Germany	Ch. 4	100	3077	100	3080	Siehe im Scoping festgelegte Definition: Line 3078: "there are approximately 50,000 invasives [...] --> if you read the cited source (Pimentel et al. 2005 carefully), you can see that it states that more than 50,000 species have been introduced to the United States, but it also states that "only a portion of those cause significant damage", which means that not all of them, in fact only a fraction of them are "invasives" by definition. We suggest to revise the statement accordingly and replace "invasives" by "alien species".	Agree, changed invasive species into alien species.
Eila Gendig	Ch. 4	100	3079		3080	The number one cause for native spp loss are IAS? Why not habitat loss, climate change, human impact? Does not appear to be the dominant problem in many regions.	This part has been deleted.
Germany	Ch. 4	100	3094	100	3095	Line 3094-3095: "Generally, interactions [...]" --> sentence is incomplete / does not make sense.	Corrected
Li Changxiao	Ch. 4	100	3095	101	3098	It should have some transitional sentences to move to soil microbes.	Corrected
NFP of China	Ch. 4	101	3101	101	3105	In China, there is no direct causal relationship between wetland reclamation and alien species invasion, and the term "large-scale reclamation" is inconsistent to China's reality, hence the case is proposed to be removed.	Reworded so as not to suggest a obligatory causal relationship
NFP of China	Ch. 4	101	3101	101	3105	There is no clear causal link between the two, and " large-scale reclamation" does not meet the reality in China,we recommend to delete	Please see: Yuan, L., Ge, Z., Fan, X., & Zhang, L. (2014). Ecosystem-based coastal zone management: A comprehensive assessment of coastal ecosystems in the Yangtze Estuary coastal zone. <i>Ocean & Coastal Management</i> , 95, 63–71. https://doi.org/10.1016/j.OCECOAMAN.2014.04.005
McAfee, Brenda	Ch. 4	101	3103	95	3103	Spartina	Corrected
Germany	Ch. 4	101	3105	101	3106	Line 3105-3106: "Similarly, invasion by Phragmites australis [...]" --> sentence is incomplete / does not make sense.	Corrected
Li Changxiao	Ch. 4	101	3105	101	3106	The latin name "Phragmites australis" should be italicized. The sentence is imcomplete.	Corrected

Joanne Perry NZ focal point	Ch. 4	101	3117			New Zealand has a number of examples that are relevant to the discussion on this page, possum, rats mice, ferrets, stoats, weasels and rabbits, all introduced pest that degrade natural communities. Wilding conifer http://www.doc.govt.nz/nature/pests-and-threats/common-weeds/wilding-conifers/ , gorse (imported for hedging by early settlers, crack willow trees (originally used for river bank erosion control), all plants imported for forestry, farming and erosion control that are now managed as serious pest. Others like lupin smother braided river systems but are loved by tourist and some locals for the beautiful image they provide when flowering http://mackenzienc.com/mackenzie-lupins/	Thank you, we have added these examples
Germany	Ch. 4	102	3123	102	3123	Figure 4.57: --> source is missing in description.	Source added
Germany	Ch. 4	102	3123			This Figure has a low resolution quality. Please improve. Spell out the abbreviations 'VL' (very low), 'LM 'M'm 'H' etc.	The figure has been improved and corrected
Eila Gendig	Ch. 4	102	3124			The economic and cultural impact of invasive alien species on local communities will in cases be high. Possible to emphasise and provide an example?	Thank you, but Ch.4 is about the degradation mechanisms that result from the invasion. We have added a citation on this topic (Levine, J. M., Vilà, M., D'Antonio, C. M., Dukes, J. S., Grigulis, K., & Lavorel, S. (2003). Mechanisms underlying the impacts of exotic plant invasions. Proceedings of the Royal Society of London Ser. B. https://doi.org/10.1098/rspb.2003.2327)
Eila Gendig	Ch. 4	102	3128		3130	Microorganisms (bacteria, virus, fungi) are also part of the major international travellers and pose high risks to native wildlife and primary production (agriculture, horticulture, fish farming, apiculture,...), with very high economic implications. But MOs are not specifically mentioned.	This point has been added, thank you.
Eila Gendig	Ch. 4	102	3134		3138	The size of the area, from which the invader is to be eradicated, and/or its "defendability" to new invasions, are parameters of high importance for eradication operations (see examples in NZ of eradication of e.g. Argentinian ants, mice and rats on small offshore islands)	This point has been added, thank you.
Eila Gendig	Ch. 4	107	3248	109		Mining requires infrastructure to be established; not yet included	Degradation associated with infrastructure is covered in Sect. 4.3.10.
Marieke Sassen	Ch. 4	107	3258	107	3258	Surely impacts are not as extensive as that of large scale surface mining? See also lines 3263-3265: I am not sure that statement can be made. See also Chapter 3 on this.	The widespread nature of ASM and the huge populations of artisanal miners make it a relevant driver of degradation. Global population of ASGM is estimated to be more than 20 million. Nine out of every 10 miners are considered to be artisanal miners. There are no estimates of ASM-driven degradation globally. Their impacts are not addressed due to lack of accountability. The text was improved to provide this background and raise awareness of this ubiquitous but often neglected sector.
Virginia Meléndez Ramírez	Ch. 4	108	3287	108	3287	Add countries with mining extraction and major countries that perform the extraction e.g. Canada	The globalization effects on mining trends are important. However, it may be off the scope of the chapter. Mining is performed in most countries and some of them hold many operations internationally (like the case of Canada). A small paragraph that describes global trends of mining, including a map authored by me, showing mining database in the world over Plant Species Loss data was offered to Chapter 3.
Eila Gendig	Ch. 4	108	3287			Even if rehabilitation of sites is done, the landscape and biota on site will never return to the same pre-operational state. Changes at the landscape level can drastically change the local ecosystem and are not reversible.	The rehabilitation of disturbed sites in mining aim at establishment of functional sites, not necessarily to restoration of original characteristics. In many cases, efforts are focused on interrupting sources of impacts (e.g. pollution or erosion) with the use of varied interventions (chemical, engineering, biological, ecological). The need to a restoration to original state although considered utopian by many, has not shown to be feasible yet. The text that describes efforts towards developing restoration technologies to mitigate impacts, and provide conditions for new future uses, or for long term regeneration to new functional ecosystems was offered to Chapter 6.

						In terms of South Africa requirements, you could look up and cite the following paper: McNeill, T, Quillérou, E (2016) Making money after mining: farming on rehabilitated open cast mines can lead to increased revenues – but it needs to be maintained. The Solutions Journal, Special issue on "Sustainable Land Solutions", September-October, 74-79. This paper also shows that depending on how rehabilitation is undertaken, revenues may be lower or higher than before mining (no inclusion of costs because of cost data not being available). This could add to the biophysical perspective taken in this chapter and make it a very little bit more multi-disciplinary.	Thank you. This reference has been passed on to Ch6, as this part of the text was found to be more in line with Chapter 6 scope and was passed on to that Chapter after Third Author Meeting in July 2017.
Emmanuelle Quillérou	Ch. 4	108	3287	108	3297		
Germany	Ch. 4	109	3299			Spell out "ARD".	This has been done.
LI Changxiao	Ch. 4	110	3306	110	3306	Please add "be" after "will".	This has been done.
Eila Gendig	Ch. 4	110	3308		3311	The timespan of these studies is very large >50 years. Also not clear whether the N input is solely from urbanisation - or has also other sources. Liquid N input (e.g. wastewater/sewage) or gaseous source?	This section was removed
NFP of China	Ch. 4	113	3324	113	3324	It involves territorial issues (The nine-dash line) in the Figure. It is recommended that the Figure B be removed	This figure has been revised
LI Changxiao	Ch. 4	112	3327	112	3327	Please change "... is specific locations" to "... in specific locations".	This has been done.
NFP of China	Ch. 4	118	3342		3342	Beijing is a municipality directly under the central government, not a province. Remove the "province".	"Province " removed in version offered to Ch. 3 and 6 (with this comment)
LI Changxiao	Ch. 4	113	3342	113	3342	Please change "Beijing province" to "Beijing Municipality".	Changed
NFP of China	Ch. 4	115	3342		3342	Remove "province" and optimize the Figure	"Province" removed
Eila Gendig	Ch. 4	114	3345		3347	Why do the studies cited in lines 3308-3311 use N input as proxy for urbanisation, but here, the major impacts from urbanisation do not include N?	The N input removed, so the major impacts from urbanisation do not include N
Thomas Brooks	Ch. 4	114	3354	114	3354	Add citation to biodiversity hotspots as Mittermeier et al. (2004) Hotspots: Revisited. CEMEX, Mexico.	Thank you, but this reference is quite obscure! Is there not a better one that readers can find?
Thomas Brooks	Ch. 4	114	3357	114	3357	Expand to provide sources, thus saying "...critically endangered or endangered species themselves (according to the IUCN Red List) from Alliance for Zero Extinction (AZE) sites (Ricketts et al. 2005 PNAS)..."	We reduced this section.
NFP of China	Ch. 4	115	3375	115	3379	The calculation method of this example is wrong, the data "29%, 15.7%" does not reflect the value of ecosystem services, we recommend to delete this case	This case was removed
NFP of China	Ch. 4	115	3375	115	3379	The % cannot be used to measure the value of ecosystem services, the calculation method is incorrect. It is proposed to delete this case.	This text was removed from Ch4, due to overlap with Ch3. Text passed to Chapter 3 (with this comment)
Sandhya Chandrasekharan	Ch. 4	116	3398	116	3411	Urbanisation seems like an afterthought here, and does not have "balanced" treatment compared to the other sections. While urban areas account for less than 3% of the world's surface area, it would be good, from a policy perspective to have "scenarios" of how urban areas need to manage their huge (75% of the world's resources consumed) footprints on land beyond the designated urban. Is that even possible? Can energy and food needs be met locally or within a reasonable geographic spread under ANY scenario? What are the best options/possibilities? It would be a good thought exercise	We removed this text from the chapter due to overlap with Ch6. Chapter 6 deals with "Responses to avoid land degradation and restore degraded land"
Virginia Meléndez Ramírez	Ch. 4	116	3411	116	3411	Add conclusions of the chapter.	A new section has been added "The way forward"
Dan Pennock	Ch. 4	117	3423			Many references are still missing	All references were checked and reference format was fixed for the final report
Germany	Ch. 4	117	3423			Many references are missing in the reference list such as Miehle 2006, Miehle et al 2010, Thomas and Middleton 1994, Benkhe and Mortimore 2016...	All references were checked and reference format was fixed for the final report