

**External review of the first order draft of the land degradation and restoration assessment**  
**30 May - 11 July 2016**  
**Chapter 3**

Reviewer Name	Chapter	From Page (start)	From Line (start)	To Page (end)	To Line (end)	Reviewer Comments	Response (from Chapter 3)
LI Qingfeng	0	0	general comment on FOD LDRA			1, The Report in overall is too academia, too detailed in scientific exploration and descriptions. In consideration of the principal aim "to facilitate the implementation of the National ... and the "Inter-governmental" nature of the organization, the Report has to be more "publicly explicit", rather than "scientifically complicated". If the Report is to be read by the policy makers, and to draw attentions from the public, the content is to be simplified and the volume greatly reduced, one third is more than enough.	In the chapter revision these points are taken into account. The content was simplified wherever possible.
LI Qingfeng	0	0	general comment on FOD LDRA			2, An Executive Summary and a List of Acronymns and Abbreviations are necessary.	Thank you, this has been done for the final draft of the Chapter 3 and all chapters of the report.
German government	0	0	general comment on FOD LDRA			We believe that the first order draft of the IPBES thematic assessment on Land Degradation and Restoration generally has a comprehensive and scientifically sound structure and we congratulate the authors for this achievement. This is a <i>first order draft</i> however, and, therefore, we hope that our comments will be useful for the further development and maturing of this assessment so that in the <i>second order draft</i> scientifically strong and comprehensive key messages can emerge. We very much look forward to the <i>second order draft</i> of this important assessment.	Thank you for taking the time to review the full report. We appreciate your feedback and the constructive comments you offered thereafter.
German government	0	0	general comment on FOD LDRA			<b>We request the co-chairs of this assessment to ensure that the general comments listed for this assessment are made available to the CLAs and LAs of all 8 chapters.</b> Reason: Cross-referencing between the 8 chapters of the FOD sections by chapter authors should help to (1) avoid repetition; (2) use the same terminology/definitions, (c) strengthen the logical connection between the 8 chapters and, thus, (d) strengthen the overall storyline of the assessment. <del>It needs to be critically highlighted that Chapter 1 needs to provide a sound basis</del>	This has been done. 1) In the Second Author Meeting (SAM) in Bonn chapter boundaries were defined; 2) glossary has been made; 3) common drivers and ES were addressed from different chapter perspectives . The general comments have been distributed to all chapters and revisions have been made by chapters as stated above.
German government	0	0	general comment on FOD LDRA			on the scope of this assessment and on the key definitions/terminology used throughout the 8 chapters. This should help to develop a strong storyline throughout the chapters. Chapter 8 on decision support should reflect more strongly on the findings of the previous chapters and also discuss policy support tools. Currently, chapter 8 remains quite general. All in all, the chapter authors should analyse the findings of the other chapters of the assessment and cross-reference to these. As we are discussing a thematic assessment which should also add value to the IPBES global assessment (D2c), we strongly encourage the authors of the 8 chapters to also analyse the relevant findings emerging from the four regional IPBES assessments.	The work of the regional assessments is ongoing and there is some coordination that happened at strategic points, including the joint Second Author Meeting that brought together all 5 assessments
German government	0	0	general comment on FOD LDRA			A major cross-cutting issue throughout the document is that <b>land degradation and restoration are being "lumped" too much together</b> , without considering that each of these measures has different drivers, processes etc. Discussing both aspects separately and with a stronger biodiversity and ecosystems perspective would add value to the document.	In the subsequent draft, Chapter 3 has taken that into consideration, discussing degradation and restoration separately. We also have tried to make the links to biodiversity and ecosystems more prominent.
German government	0	0	general comment on FOD LDRA			The assessment should provide balanced scientific-based opinions and not overemphasize certain opinions, thereby possibly paying less attention to other perspectives. Therefore, the arguments in a chapter should not build just around one or two opinion-based citations.	While we have used the available scientific evidence, we have also used other available information and knowledge to form a balanced opinion based on the literature we have assessed.

German government	0	0	general comment on FOD LDRA			<b>Please ensure that all 8 chapters will start with an executive summary that includes a list of key messages and their degrees of confidences, based on the Platform's confidence framework in the Platform's guide on assessments (IPBES/4/INF/9).</b> Such key messages will be extremely relevant for the user groups of this assessment and most certainly for identifying policy options.	This has been done in the final draft.
German government	0	0	general comment on FOD LDRA			Provide an annex for this assessment that lists all the acronyms, abbreviations and key terms (including their definitions) used in the assessment.	This has been done in the final draft.
German government	0	0	general comment on FOD LDRA			Ensure consistency in the wording and the use of the key terms provided in section 1.1.2 throughout the document (all 8 chapters) of this assessment. Please also ensure that the wording of definitions provided in section 1.1.2 corresponds to the wording of these definitions as outlined in Decision 3/1, Annex VIII.	Chapter 3 has tried to be consistent with the 1.1.2
German government	0	0	general comment on FOD LDRA			Ensure that prescriptive language is not used.	Text has been checked for prescriptive language and replaced with "if...then" phrasing.
German government	0	0	general comment on FOD LDRA			In the further development of the assessment report, please also refer to other IPBES work programme items that are thematically linked to this assessment (e.g. "capacity development (D1a/b)"; "indigenous and local knowledge (D1c)"; "regional assessments (D2b)"; "global assessment (D2c)"; "pollination, pollination and food production (D3a)"; "scenarios and modeling (D3c)"; "policy support tools (D4c)").	Cross-reference to the IPBES policy support tools has been made.
German government	0	0	general comment on FOD LDRA			Regarding chapter 1 and in chapter 8: highlight the relevance of the LDR assessment for the Strategic Plan for Biodiversity 2011–2020 / Aichi Targets (specifically goal 15), and the SDGs (and especially SDG 15).	This has been done in the subsequent draft.
German government	0	0	general comment on FOD LDRA			Outline in chapter 1 and in chapter 8, how the land degradation and restoration assessment will deliver to/support the IPBES global assessment on biodiversity and ecosystem services (D2c).	Not applicable to Ch3
German government	0	0	general comment on FOD LDRA			The terms "sustainable land use" and "sustainable land management" are somewhat being used interchangeably. Please check the definitions of both terms and if necessary, please align the use of these terms accordingly throughout the assessment report (all 8 chapters).	The terms have been defined in the glossary and used accordingly.
German government	0	0	general comment on FOD LDRA			Throughout the document the terms "reduction" and "mitigation" are being used. Please provide information about the technical difference between both terms.	The terms have been defined in the glossary and used accordingly.
German government	0	0	general comment on FOD LDRA			Regarding figures, tables, photos/images: Ensure in the <i>second order draft</i> and the associated SPM that the <b>quality of all visual materials should be high</b> .	Visual materials have been improved to the best quality possible through using a specialized cartographer to redraw the figures and obtaining high quality photos.
German government	0	0	general comment on FOD LDRA			Information and data targetting the same or similar issues (e.g. on urbanisation/global extent of land degradation, deforestation rates ...), are outlined in the various chapters of the report, partly by referring to different statistical sources. We strongly encourage you to develop <b>comprehensive chapters-spanning tables and figures on similar issues</b> in order to align information throughout the 8 chapters so that strong key messages can emerge.	Chapters-spanning tables were not possible due to sheet complexity. But we did ensure more alignment and hand-overs.
German government	0	0	general comment on FOD LDRA			Ensure for all 8 chapters that data and other facts (numbers, percentages, statements, citations) are provided with at least one reference.	Done.
German government	0	0	general comment on FOD LDRA			Not all references cited in the text are to be found in the reference lists of the chapters. Please critically cross-check.	All reference material has been added to the referece manager to ensure correct citations.

German government	0	0	general comment on FOD LDRA			We have acknowledged that professional language editing will be taken care of at a later stage. We have therefore restricted ourselves to providing comments only on the thematic contents of each chapter. Therefore, please ensure that language editing is taken care of.	Text has been fully editing for the final draft .
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			Perhaps excusable in a FOD, but the majority of the text needs substantial editing to improve English expression and ensure clarity.	Text has been fully editing for the final draft .
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			The document length should be substantially reduced, so that it is readable for the intended audience of policy-makers. Delete the text that does not relate directly to the topic of assessment of land degradation. Condense the explanatory text and provide references for further detail.	We aimed to be as concise as possible in the chapter revisions.
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			The report title is misleading. The assessment is not about land degradation but rather about biodiversity loss, because land degradation has been defined here as "processes that cause biodiversity loss and loss of ecosystem functions and services". Ideally the title should be reworded to reflect the content.	Title used was given to us in the Scoping Document, which was approved by IPBES Plenary (please see annex VIII to Decision IPBES-3/1). We are not in the position to change the title.
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			We encourage the authors to elaborate on how land degradation/restoration can seamlessly integrate agriculture, ecosystems services and biodiversity.	This has been addressed in the final version of the assessment report.
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			It would be helpful if the report used the language of DPSIR; this could help to minimise the repetition between chapters, if authors can recognise that for example chapter 4 should be confined to pressure and state, and not also discuss drivers (ch3) and impacts (on ecosystems - Ch 5), and human responses (ch 6).	The assessment is build around DPSIR. Chapter 6 and part of 8 addresses the response part. Drivers, Pressures, State, Impact Response
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			Not all references cited can be found in the reference list. This needs to be taken care of.	All literature has been added to the referece manager to ensure correct citations.
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			The second order draft should include key messages and their level of confidence. This is currently lacking.	Executive summary has been developed, including level of confidence
Hamid Custovic (SPI)	0	0	general comment on FOD LDRA			Some item are repeated on introduction of different chapters.	OK. Some overlap in intro is OK, as long as being dealt with from a specific chapter angle.
Peter Onorato	0	0	general comment on FOD LDRA			<p>Considering IPBES' role as the interface between science and policy, we consider it critical that the reports clearly communicate the key findings, implications and recommendations within chapters so that they can be readily used by policy makers. To assist this there may be value in the chapters having a uniform structure, similar to that in the Executive Summary of the IPCC Chapters. In addition to including an executive summary, the following headers might help focus the authors' attention to ensuring their chapters are targeted to policy-makers as opposed to an academic audience:</p> <ul style="list-style-type: none"> <li>- Executive Summary</li> <li>1. Key Findings</li> <li>2. Critical Implications</li> <li>3. Gaps in Knowledge and Data</li> <li>4. Recommendations</li> <li>5. FAQ</li> </ul> <p>A clear and consistent structure, along with key findings and recommendations, could be of great benefit to policy makers.</p>	All chapters have an executive summary. SPM addresses all other elements presented.

Peter Onorato	0	0	general comment on FOD LDRA		Some of the Chapters (particularly Chapter 2) competing scientific views on certain issues are presented, almost debate-like, one after another. While it's important to understand the current state of the science, we do not think that IPBES Assessment Reports should be used as a platform to advance contested academic theories as this diminishes the report's ability to be a clear and concise communication document. In order to best bridge the gap between science and policy, and to provide policymakers with clear guidance, Assessment Reports should present the latest knowledge and make recommendations based on this. Policy makers generally don't have the depth of knowledge to balance contested scientific theories and will rely on IPBES' work to clearly identify the best policy options available	Not directly relevant to Ch3, but we paid close attention to tone and presentation of evidence in the SOD.
Peter Onorato	0	0	general comment on FOD LDRA		The SDGs constitute the new global paradigm for sustainable development. As such, we consider there to be value in drawing more links between the SDGs and IPBES' work within the reports. Again, this will help policymakers effectively prosecute the case for improved biodiversity policies, and help identify where clear links exist between biodiversity policy and other issues including development and broader environmental outcomes, strengthening the case for biodiversity policy priorities.	This has been done.
Ayman Batisha	0	0	general comment on FOD LDRA		The entire report should be homogenously arranged, logically build and fully integrated with no inconsistency, disharmony or overlapping within its chapters and sections. The titles of chapters and sections are generally too long to be professional.	Harmonization and the avoidance of overlaps has been ensured for the final draft. Titles of the chapters have been pre-approved by Plenary and are defined by the scoping for the assessment. We are not in the position to change the titles of the chapters.
Ayman Batisha	0	0	general comment on FOD LDRA		Number of sections still requires more work and careful revision. As examples, in Chapter 1, There should be more sections to clarify 1.2 What constitutes Success in the restoration of degraded land?; 1.3.1.1 until 1.3.1.5 should be corrected; in Chapter 2, the classification of Natural and social science and the law, Human sciences, and Social inequities should be justified (or correct); in Chapter 3, how "3.6. Food security through tackling land degradation" is related with the direct and indirect drivers of land degradation and restoration; in Chapter 4, most of sections deals with multiple drivers and Key Human Drivers, although the reader expect that "the status and trends of land degradation and restoration and associated changes in biodiversity and ecosystem functions" will be analyzed; in Chapter 5, the reader expect that there are some sort of comparisons between the case of land degradation and the case of land restoration; in Chapter 6, Responses to avoid land degradation and restore degraded land, the reader expect that there is an Environmental assessment evaluation and a full Economic and financial mechanisms, how can it be applied in the mentioned Case studies and how he/she can estimate the total cost in his/her Case study; in Chapter 7, Issues not being raised include how soft computing techniques such as Fuzzy Logic and Neural Networks can develop scenarios of how land degradation and restoration could evolve in both Near-term and Long-term; in Chapter 8, the reader expect that there a focus on soft computing techniques, and the possible application in the fields of the decision support systems used to address land degradation and restoration based on a well-defined Environmental indicators.	The final draft has been extensively revised. The overlaps and redundancies solved, and the whole text edited. Thank you for your close reading of the report.

Ayman Batisha	0	0	general comment on FOD LDRA			<p>The entire report should be homogenous and integrated with no interference within its chapters and sections. As a quick example, the first section in Chapters 1, 5 &amp; 6 is Introduction; whereas in Chapter 2 is Executive summary: Key Messages; in Chapter 3 is Purpose and value of chapter; in Chapter 4 is Introduction to the degradation process; in Chapter 7 is Table of Content, Executive Summary (Key policy messages), At the global level, At the local level (only where different from global messages); and in Chapter 8 is Executive Summary. Similarly, the end section in Chapter 1 is 1.3 Case studies of successful land restoration; in Chapter 2 is Conclusions - Working with perceptions as a policy tool; in Chapter 3 is 3.7 References Cited; in Chapter 4 is 4.6 Conclusions, 4.7 Glossary, 4.8 References; in Chapter 5 is 5.5 Remaining Challenges; in Chapter 6 is 6.4.4.2 Case studies, 6.5 References; in Chapter 7 is 7.4.4 New approaches: Visioning LDR for Sustainable Futures; and in Chapter 8 is 8.4.3 Identify and prioritize responses to reduce trade-offs and/or enhance synergies to address land degradation and/or develop restoration.</p>	The full assessment has gone through multiple revision rounds and streamlining across chapters. Consistent structuring across chapters has been developed as well.
Ayman Batisha	0	0	general comment on FOD LDRA			<p>Numbers of topics still require work and revision, as examples, please compare "3.3.6 Fire regime change" with "4.3.6 Fire regime change", and "6.3.1.5 Fire regime change", also, compare "3.4 Climate change as a threat multiplier of degradation drivers", with "4.2 Cross cutting degradation processes common to multiple drivers", and "6.3.1.10 Climate change as a threat multiplier".</p>	Harmonization across chapters has been ensured for the final draft.
Ayman Batisha	0	0	general comment on FOD LDRA			<p>There should be examples/chapter to clarify how the biogeochemical cycle (carbon, oxygen, nitrogen, phosphorus, sulfur, calcium, rock and water etc.) through both biotic (biosphere) and abiotic (atmosphere, hydrosphere, and lithosphere) compartments of Earth can cause land degradation and restoration. Special attention should be emphasized to the human-caused cycle of atrazine, which may affect certain species. Land degradation and restoration should be assessed in the light of Global Changes; Global Warming; Global Sea Level Rise, and Global Ocean. Land degradation and restoration should be assessed into two categories which operates at different time scales: the biological – physical, (Near-term) and the geological, (Long-term). Land restoration opportunities, planning, economics, implementation constraints, and limits should be defined.</p>	Drivers of LD, both direct and indirect are at the core of the chapter 3 and have been addressed accordingly. The biophysical aspects are discussed at length in Ch4.
Ayman Batisha	0	0	general comment on FOD LDRA			<p>Assessment on land degradation and restoration should emphasize on multiple Land-use Categories; Forest Land, Cropland, Grassland, Wetlands, Peatlands, Settlements, and most important and significant Arid and Semi-arid land. Assessment on land degradation and restoration should emphasize on Policy Oriented Research. Human Settlements, Industry, and Infrastructure in both Urban and Rural Areas should be surveyed. Cross-cutting issues such that Agriculture, Water, Energy, Industrial Processes, CO2 Transport, Injection and Geological Storage, Waste Generation, Composition, Incineration, Treatment, Discharge, Disposal and Management should be focused.</p>	Drivers of LD, both direct and indirect are at the core of the chapter 3 and have been addressed accordingly.

Ayman Batisha	0	0	general comment on FOD LDRA			Research related to the Science of land degradation and restoration should be emphasized on. Assessment on land degradation and restoration generally deal with multiple meanings of fuzzy concepts, so it is strongly recommended to add chapter/section to provide General Guidance to the subject of how applying fuzzy concepts in the context of land degradation and restoration using soft computing techniques. The scope of soft computing covers the areas of Fuzzy Logic, Neural Networks, Chaos Theory, Evolutionary Computing, Rough Sets, Ant Colony, Immunological Computing, Particle Swarm, Wavelet, Probabilistic Computing, Hybrid Methods and other similar techniques to address real world complexities achieving tractability, robustness and low cost solution. The chapter may be devoted to effective approaches to Data Collection; dealing with Uncertainties; Methodological and efficient technique Choice; Time Series Consistency Identification of Key Categories, and Quality Assurance/Quality Control and Verification. The application areas of soft computing include but are not limited to Detection and Attribution of land degradation: from Global to Regional and local, land degradation Projections and Predictability (Near-term and Long-term). Land degradation Phenomena and its relevance for future Global and Climate Change. Detection and attribution of observed and multi-sector degradation, emergent risks, key vulnerabilities, and opportunities should be addressed. Land degradation and restoration should be assessed in the light of statistical analysis and levels of confidence.	Thank you, we have incorporated relevant elements into Ch3 in the SOD in accordance with the scoping for the chapter.
Ayman Batisha	0	0	general comment on FOD LDRA			Atlas of Global, Regional and local land degradation and restoration Existing, Projections and Predictability should be annexed.	We tried to integrate all relevant information within the body of the text, so as to not overload the final report with extensive back matter.
Anna Luise	0	0	general comment on FOD LDRA			The Chapters are disomogenous. Their structure is different as well as the degree of deepening of the topics which, in general, remains too weak. Some general concepts and the conceptual framework itself are repeated too many times with no real added value in the various Chapters. Even if all concepts should be based on sound scientific data and information, too many references could generate some confusion. The report should take into consideration its utilisation, among all, in policy making processes, and adopt an appropriate language. Some overlapping, for example for Chapter 7 and 8. On the contrary, some citations are disomogenous.	We solved inappropriate overlap between chapters and within chapters for the final draft.
Beverly Wemple	Chapter 3	0	0	--	--	Overall, I would encourage you to take opportunities to shorten the chapter by combining and streamlining some subsections, especially the interactions subsections and the data availability and confidence subsections	The 7 subsections in the FOD have now been reduced to 3 subsections for each direct driver. We have moved all of the information on interactions among direct drivers to a single section (3.5).
Francesco Morari	Chapter 3	0	0			General: The chapter is very convincing since it describes exhaustively and in details the drivers of land degradation as well as their extent and severity. The different sections are in general harmonized and information is updated, referring to the most recent literature on the topic. When provided, figures and tables are informative and help in the reading of the text. In particular, I appreciated the overview tables (e.g. table 3.1 or table 3.9) and the world maps reporting the global distribution of the drivers. In general, I would suggest to enrich each driver section with figures and/or tables (e.g. 3.3., 3.3.4, ect.). Conversely, I did not find the boxes very useful. Somehow they were confusing to me since I found them not harmonized both for the type of information and their length.	We removed many figures and tables especially within the direct drivers sections. We now focus more on trends and extent of each of the direct drivers from data sources such as FAOstat and other databases as opposed to relying on previously published figures. The number of boxes has also been reduced in the SOD.
Ashish Upadhyay	Chapter 3	0	0			Chapter 3, 4 and 6 some of the components are overlapping like Grazing land management, Cropland management, fire regime change, planted forest are like this topics are introduction and way of representation are overlap so pl. arrange the proper format.	In our meeting in Bonn in 2016 we met with chapters and worked to delineate clear boundaries between the chapters. Chapter overlap has been greatly reduced in the SOD.

Meredith Root-Bernstein	Chapter 3	0	0			General: In this chapter, it is not totally clear to me that the same definition of land degradation is being used as in previous chapters. Chapter 1 defines degradation as a state in which loss of biodiversity and ecosystem services cannot be recovered at a decadal time scale. I see no discussion of the spontaneous recovery timescales of different habitats under the drivers discussed. It is also not clear whether the correct concept is "recovery under the status quo, with human practices more or less the same but perhaps at lower intensity" or "recovery under land abandonment". Sometimes the same thing is discussed as a driver of degradation (agroforestry, this chapter) and an example of good restoration practice (agroforestry, Chapter 1). Clearly, agroforestry does not correspond to the Holocene baseline, but does that mean that it is inherently a degraded state? In many examples in this chapter it also appears that land use change is identical to degradation. I am not sure it is helpful to see an urban site as a degraded habitat: does restoration of urban sites imply removing cities? Is this a helpful position? More clarity would be helpful so that the chapters are coherent.	Definitions and baselines were discussed in our meeting in Bonn. It was agreed that everyone would be using the definition of land degradation as outlined in the scoping document. The baseline for indicators was set at 1992 with "present" at 2013 +/- 3 years.
Sandra Luque	Chapter 3	0	0	0	0	General comments: Update references, reshape, shorten, consider transitional lands, and tackle mitigation measures in the light of climate change	Extensive revision in the SOD resulted major restructuring and updating with current data. Mitigation measures are addressed in later chapters.
Mekuria Argaw	Chapter 3	0	0			General comment: the chapter is very well organized and nicely written. There is a huge list of literature cited in the text. It would be nice to limit the literature citations in the text and make or polish the writing as a stand alone body of text providing analysis and expert argument on the issues. The heavy literature citation makes it a simple literature review work.	In the first draft we wanted to be as comprehensive as possible. We will get guidance in the final draft on how to systematically reduce extraneous references
Ben ten Brink	Chapter 3	0	0			General comment to the chapter: Pressure categories sometimes close to endterms of State as worked out in Chapt 4. It would be more informative to elaborate on the indirect and direct drivers and why and how they change over time from the past to the present and may grow in the future given demographic, economic and consumption growth globally and distributed over the various world regions. opportunities to reduce or mitigate drivers are dealt with in Chapter 6.	For each of the direct drivers we now have a stand alone section on "Past, present and future extent" which describes both trends and extent of each of the direct drivers. These sections are also now more balanced with future trends and extent.
Hamid Custovic (SPI)	Chapter 3	0	0			General comment: Chapter 3 should revisit the findings of land change science, e.g. by referring to "indirect drivers". It should also discuss the relationship between deforestation and degradation, thereby considering controversial academic opinions. We strongly encourage the authors to further strengthen critical conceptualized evaluation in this chapter and rather shorten the descriptive features and the overviews of practices provided here.	Each of the direct drivers sections now has a subsection on indirect drivers. This is a good suggestion and this focus on indirect drivers greatly improved the chapter.
German government	Chapter 3	0	0			General comment: The impacts of intensive agriculture/industrialized agriculture should be assessed and included in the report (in chapter 3.3.3 on cropland management).	Status of land degradation due to different drivers is covered in chapter 4.
Penny van Oosterzee	Chapter 3	1	2			This is a very comprehensive draft. I have made some comments throughout but my main comment would be that there is very little on restoration. Degradation dominates. I can understand why this is the case but I still think there needs to be more research into the restoration part of the equation. One thought is that you could use relevant case studies and boxes after the various degradation sections to highlight restoration approaches.	Due to space limitations and potential overlap with Chapter 6 "Responses to halt land degradation and to restore degraded land" we limited our evaluation of restoration approaches to brief summaries at the end of each direct driver. In the FGD we will have a new section 3.4 titled "Drivers of Land Restoration and Rehabilitation" to more comprehensively address restoration and rehabilitation efforts in response not only to individual direct drivers but also multiple and interacting direct drivers of land degradation.

Kaisu Aapala	Chapter 3	1	3	1	3	The title of this chapter is confusing - what are direct and indirect drives of restoration? And basically the same question about most of the subtitles in this chapter as well. In some subchapters restoration is included "automatically" in the first sentence as a fixed set - "drivers of land degradation and restoration", but after that the text only concerns land degradation. This is so common that I don't even try to add all cases as separate lines on this table. They are easy enough to find using 'find'.	The titles for the 7 direct drivers should reflect a neutral human activity that can either degrade OR be used to restore land. For example, grazing land management is a human activity that if done poorly will degrade land (overstocking) but may also be used to restore lands (reduce stocking rates, rotational regime that doesn't result in significant declines in forage). The title reflect that many drivers not only degrade lands but to also restore lands.
M. Y. Yazdandoost	Chapter 3	2	22	68	2143	The elaboration of the following points would shape the structural frame for this chapter: · Strengthening institutional flexibility and responsiveness in turning collective commitment into integrative action; · Removal of stress from natural environment through change in global commodity supply chains; · Relationship between structural changes in species composition and forests resilience; · Forest law enforcement and governance; · Problem scenarios, like economic uncertainties and their implications on natural environment and ecosystem services; and · Effectiveness of policy (institutions and governance) on the quality of the services obtained from nature.	We have incorporated these suggestions where possible into the revised text
Royal C. Gardner	Chapter 3	2	25	2	98	Although deforestation trends are highlighted as a direct driver of LD, wetland destruction and/or degradation is not. It would seem to warrant being discussed, especially in light of: chapter 4's statement that LD is the greatest stressor impacting freshwater quality, biodiversity, and ecosystem services (line 813) and chapter 7's observation that managing land is about managing water (line 617).	We examine the trend and extent of each of the drivers across different biomes which now includes wetlands in the SOD and will be maintained in the FGD. Deforestation is no longer a stand alone section in the SOD.
Markus Giger	Chapter 3	2	35	2		While there is a chapter on "Extent of land degradation due to grazing land management" there is no corresponding chapter on extent of land degradation due to cropland management! This would need to be an important chapter. There is data available on the state of agricultural land (SOLAW report, FAO. At present there are just some statements about increase in pesticide and fertilizer use. But how far has this degraded crop land? (And how far has the underuse of fertilizer contributed to soil nutrient mining in Africa?). What about salinisation and water logging? What about lost of agro-biodiversity? However, chapter 4 also seems to be reporting about extent of degradation (so maybe this is an issue of coordination between Chapter 3 and 4 which will need to be managed. At present it seems both chapters are dealing with it- partly.	Cropland and agroforestry management as a driver of land degradation follow grazing land management in both the FOD and SOD. In the SOD we have better delineated the boundaries between Chapters 3 and 4 with Chapter 4 reporting on the status of land degradation. In Chapter 4, Sections 4.3.3. Cropping Systems, 4.3.3.1. Cropland area and trend, and 4.3.3.2. Effects of cropping on land degradation address land degradation severity in these systems. Soil salinization is addressed in chapter 4, section 4.2.2.2. The effects of land degradation agrobiodiversity is addressed in Chapter 5 section 5.3.2.7 Indigenous and Local Food Systems.
Beverley Wemple	Chapter 3	4	109	4	125	Chapter is very well written and thorough, but I think the structure forces it to be longer than necessary. I would encourage you to pull sections on interactions from each form of land degradation and write a single section on this topic to be placed before the section on climate as a threat multiplier	The 7 subsections in the FOD have now been reduced to 3 subsections for each direct driver. We have moved all of the information on interactions among direct drivers to a single section (3.5).
Beverley Wemple	Chapter 3	4	109	4	125	Individual sections on data availability and confidence could also be combined, allowing you to say that there is high confidence about some drivers and little info on others (i.e. non-timber forest product extraction). I suggest placing this section before the individual sections on land degradation types, so that the reported values and trends could be framed around varying levels of data availability and confidence	The 7 subsections in the FOD have now been reduced to 3 subsections for each direct driver. We have moved all of the information on interactions among direct drivers to a single section (3.5).

Ben ten Brink	Chapter 3	4	127	4	133	This paragraph requires specification. Not only extent and severity are important, but also the spatial distribution of drivers. Next, it may elaborate how drivers link to declines in nature, anthropogenic assets, nature's benefits to people and a good quality of life, but it should not overlap. Further, I miss here the link between pressures and ecosystem services as agreed in Bonn: food, water, energy/climate/Csq.	We have elaborated on the spatial distribution of drivers and their impacts in the sections dedicated to the individual drivers. Chapter 3 discusses at length the direct and indirect drivers of land degradation, whereas Chapter 5 addresses how the drivers laid out in Chapter 3 link to declines in nature, ecosystem services, anthropogenic assets, nature's benefit to people and a good quality of life.
Samuel Nshutiyayesu	Chapter 3	4	134	4	144	This shouldn't appear here as it is repeated and more explained under section 3.2	We agree that there is some amount of repetition here. However, we have chosen to retain this section and define/introduce direct and indirect drivers at the start of the chapter (rather than move it to section 3.2) as it sets the context for the entire chapter.
Elena Havlicek	Chapter 3	4	134	4	139	To consider natural events (earthquakes, etc) as natural drivers of land degradation is confusing as such events are part of the natural rejuvenation of ecosystems and cannot be considered as leading to decline in nature. It is clearly explained later in the text ( p. 1477-1478). I suggest to adapt.	Your comment is valid. We have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Ben ten Brink	Chapter 3	4	134	4	139	I suggest to exclude natural drivers from this section, as well as the entire LDRA, for it is hard to suggest policy options to deal with those.	We have removed the section on 'Natural drivers' in the revised version of the chapter. We only introduce it here briefly, to differentiate it from anthropogenic drivers
Elena Havlicek	Chapter 3	4	137	4	139	Proposal: Direct drivers are those that are not the result of human activities (...), that are beyond human control but that can be coupled with and enhance direct anthropogenic drivers. Direct anthropogenic [...] (need for better English wording)	Definitions for the LDR assessment were defined by the IPBES Scoping document and are not changed in order to maintain consistent terminology throughout all of the IPBES assessments.
Monika Kopecka	Chapter 3	4	146	4	146	Instead of Fig. 3.1. ( IPBES Framework) Fig. 1.1 from the Chapter 1 can be quoted	This figure is not there in the revised draft
Monika Kopecka	Chapter 3	4	146	4	146	Instead of Fig. 3.1. ( IPBES Framework) Fig. 1.1 from the Chapter 1 can be quoted	This figure is not there in the revised draft
German government	Chapter 3	4	148	4	148	In section 1.1.2 (page 3) the terms "restoration" and "rehabilitation" have been introduced/defined. In the same chapter, in Figure 1.1 (page 4), and in Figure. 3.1 (page 4 of chapter 3) both terms are used. It is therefore important to continue using both terms - and not only the term "restoration". Reason "restoration" and "rehabilitation" will require different intervention measures, which need to be taken into consideration in LDR decision-making.	This figure (Fig 3.1 of the first order draft) is no longer there in the revised version of the chapter
Gunay Erpul	Chapter 3	4	149	4	150	Is there a common assessment information protocol with regional assessment on biomes?	Yes, not only IPBES regional assessments but all IPBES assessments should be using the same framework for biomes. We have had a lengthy discussion about the use of biomes in our assessment and the approach of LDRA is now outlined in the Preface to the report (in the final draft).
Peter Onorato	Chapter 3	5	156	5	157	Indirect drivers or human actions and decisions and are ultimately the mechanism by which to halt, reduce, and mitigate land degradation.	This has now been corrected
Penny van Oosterzee	Chapter 3	5	161			Where does Chapter 2 fit? Somewhere in between the two Chapter 5's?	This figure (Fig 3.1 of the first order draft) is no longer there in the revised version of the chapter. This figure is now in Chapter 1, Figure 1.1.
Monika Kopecka	Chapter 3	5	161	5	162	Redundant Figure 3.1 - no need to use the same figure as in the Chapter 1	This figure (Fig 3.1 of the first order draft) is no longer there in the revised version of the chapter

Monika Kopecka	Chapter 3	5	161	5	162	Redundant Figure 3. 1 - no need to use the same figure as in the Chapter 1	This figure (Fig 3.1 of the first order draft) is no longer there in the revised version of the chapter
German government	Chapter 3	5	161			Figure 3.1: See comments made on Figure 1.1 (i.e. in Figure 1.1 (page 4), and in Figure. 3.1 (page 4 of chapter 3) both terms are used. It is therefore important to continue using both terms - and not only the term "restoration". Reason "restoration" and "rehabilitation" will require different intervention measures, which need to be taken into consideration in LDR decision-making.)	This figure (Fig 3.1 of the first order draft) is no longer there in the revised version of the chapter
Kaisu Aapala	Chapter 3	5	164	5	164	Restoration is mentioned in the title but not ones in the text.	In the final draft, we have added a paragraph in this section defining restoration and rehabilitation drivers and describe how these drivers are often a reversal or release from pressure from the direct degradation driver. We also included in the Indirect Drivers section more description and examples of enabling factors for restoration.
Francesco Morari	Chapter 3	5	165	5	167	Direct natural drivers are the firsts described in section 3.2 but they are reported at the 11th point in table 3.1. I would expect coherence between the text and the table.	We no longer report natural drivers in Table 3.1. Further, the section on 'Natural drivers' has been removed in the revised draft due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Elena Havlicek	Chapter 3	5	165	4	166	Same comment as above. Fundamentally land degradation is an anthropocentric point of view. In many cases, such events, at regional scale can lead and actually lead to higher biodiversity (beta biodiversity)	Agreed. We included this in the table in the final government draft.
Saw Leng Guan	Chapter 3	5	166	5	167	How about floods, droughts, and other adversed weather events such as hurricanes, typhoons and cyclons? These may be more common than earthquakes and volcanic eruptions in some countries	We have revised the sentence to include events such as floods, typhoons and hurricanes. Further, we discuss extreme weather events such as droughts in Sec 3.6
Gunay Erpul	Chapter 3	5	177	5	177	Box 3.1 or Table 3.1??	This is now clarified in the revised draft
Monika Kopecka	Chapter 3	6	177	6	177	land-use change etc. (3.1) Does it mean Fig. 3.1, Table 3.1 or Box 3.1 ?	This is now clarified in the revised draft
Monika Kopecka	Chapter 3	6	177	6	177	land-use change etc. (3.1) Does it mean Fig. 3.1, Table 3.1 or Box 3.1 ?	This is now clarified in the revised draft
Comerma (ITPS)	Chapter 3	6	187	6	187	in box 3.1 in direct drivers eliminate (sometimes also called pressures) it creates confusion with indicators	If the suggestion here is to eliminate the definition of "driver" in Box 3.1, we need to keep this definition. We believe it's important to define the term "driver" in our chapter and how we are using the term. The definition of driver was also given to us through the IPBES Scoping document.
Gengxing Zhao	Chapter 3	6	187	6	188	The definition of drivers should be factors that cause land degradation, instead of factors that cause changes in nature and good quality of life.	Our definition of drivers corresponds to that in the IPBES conceptual framework and the one found in the scoping document for Chapter 3.
Sandra Luque	Chapter 3	6	187	BOX 3.1		Instead of using "Natural direct drivers" the use of "Biophysical drivers" will be most appropriate in tandem with references on the topic	Natural direct drivers are no longer discussed in any detail in the revised text due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.

Adonia Kamukasa Adonia	Chapter 3	7	188	7	188	Table 3.1, column 3 under the heading of linked degradation and restoration: Deforestation and clearance of natural vegetation also leads to changes in biomass/carbon stock above and below the ground/underground as well as soil organic matter (Bowyer et al., 2009; World Meteorological Organisation, 2005)	Agreed. Changes in above and belowground biomass and carbon stocks are now included in forest management
Samuel Nshutiyayesu	Chapter 3	7	188	7	188	The location of the forest could be considered as a subcategory of deforestation direct driver (Table 3.1.) since linked processes to deforestation can be more amplified (e.g. in high mountains countries like Rwanda)	We agree that forest location is critically important in evaluating deforestation (now native and plant forest management in the SOD since deforestation has been removed) as a driver of land degradation. Direct drivers and their subcategories, however, are human actions. Forest location is not a human action but the context in which forest management actions are taken.
Nicola Dal Ferro	Chapter 3	7	188	7	189	In the context of "Linked degradation or restoration processes" about deforestation, I can suggest to include some other processes. Something like "Genetic erosion" or "loss of biodiversity", that is never mentioned, or loss/change in native vegetation.	Deforestation is no longer treated as a separate driver in the revised draft.
Gengxing Zhao	Chapter 3	7	188	Table 3.1	No.5	"Non-timber natural resource extraction" might have more effects on soil.	We have only listed a subset of linked degradation processes. To clarify this, we have now changed the column title to reflect this (Examples of linked degradation and restoration processes)
Gengxing Zhao	Chapter 3	7	188	Table 3.1	No.8	"Land abandonment" should add "soil salinization" in the last column.	Land abandonment is no longer treated as a separate driver in the Chapter 3 SOD. However, land abandonment in addition to soil salinization is addressed at length in Chapter 4.
Gengxing Zhao	Chapter 3	7	188	Table 3.1	No.9	"Mineral resource extraction" should add "destruction of soil structure" in the last column.	We have only listed a subset of linked degradation processes. To clarify this, we will change the column title to reflect this (Examples of linked degradation and restoration processes)
Gunay Erpul	Chapter 3	7	188	7	188	Table 3.1, Grazing Land Management, Linked degradation or restoration process, loss of biotic diversity?	Loss of biotic diversity as a linked degradation process has been addressed in the final draft.
Zhengshan JU	Chapter 3	7	188	8	189	Table 3.1 and table 3.2 is by far the most key content in this chapter. Both the drivers defined and described are too simple with no logic, no importance ranking and no systemic. suggested: establish a detailed and systemic drivers system. The content description behind should be corresponding to that system.	In the executive summary of the final draft, we have included a table on the severity, trend, and extent of land degradation drivers across biomes globally. An example of this table is included in the Chapter 3 SOD (Table 3.3). A protocol to assess the severity, trend and extent of these direct drivers has been included as a methodological note to the SPM.
John Parrotta	Chapter 3	7	188	8		Table 3.1: Header of the 3rd column is misleading - suggest "Principal biophysical effects" as an alternative.	We have retained the use of the terms 'linked degradation and restoration processes' to ensure consistency in the use of terminology across chapters (e.g. chapter 4)
Penny van Oosterzee	Chapter 3	7	188			Restoration processes don't appear to be covered. Row 1: In Australia, sub categories might be clearing for fodder which will regrow vs clearing that is permanent; linked processes miss out the resultant massive species invasion. Row 6: There are sub categories here. Fire regime change can be used for carbon farming, by burning earlier in the dry season to avoid large fires. Fire regime change can also be leaving the forest to burn in a conflagration etc	Restoration processes are not discussed in depth in this version, but were expanded upon in the final draft.
Monika Kopecka	Chapter 3	7	188	7	188	Table 3.1 Abbreviation NA is not explained, line 1 N/A, line 6,7,8 NA	This has been changed to 'Not Applicable' to clarify
Comerma (ITPS)	Chapter 3	7	188	7		Table 3.1: In linked degradation more emphasis on organic matter loss for many cases	We have only listed a subset of linked degradation processes. To clarify this, we have now changed the column title to reflect this (Examples of linked degradation and restoration processes)

						The drivers mentioned in the table are arbitrary and anecdotal. Why these, why not other? Is this list all encompassing and mutually exclusive? Land abandonment is a strange one, for it takes human stress away. How to perceive this? The HIPOC FF categorization is more usual: Habitat loss (land use change such as cropland, planted pasture, urbanization, forestry plantation, infrastructure), Invasives, Pollution, Overexploitation (of natural areas such as from grazing, wood collection, bush meat, NTFP, water-, peat-, nutrient- extraction, fisheries, ..), Climate change, Fire and Fragmentation. Deforestation as included in the list is not a pressure but the result of many pressures such as expanding croplands, grazing land, urbanization, fire, forestry plantations, CC etc.	We have now revised the list of drivers. Land abandonment and deforestation are no longer treated as separate drivers. We believe the current list of drivers is fairly comprehensive.
Ben ten Brink	Chapter 3	7	188	7	188		
Monika Kopecka	Chapter 3	7	188	7	188	Table 3.1 Abbreviation NA is not explained, line 1 N/A, line 6,7,8 NA	This has been changed to 'Not Applicable' to clarify
German government	Chapter 3	7	188			General comment on Table 3.1 needs a caption	This has now been added
German government	Chapter 3	7	188			The last column of Table 3.1 is titled "Linked degradation or restoration processes". The information provided in this column is only about degradation processes. The table would benefit from information provided on restoration processes as well. Please also consider separating the information in the last column of the table (titled "linked degradation or restoration processes") into two columns: One column on "linked degradation processes" and a second column on "linked restoration or rehabilitation processes".	Because restoration processes are largely the inverse of degradation processes, we believe that splitting the column into 2 columns will result in a large amount of replicated content. In the final draft, linked "restoration processes" has been removed and now just states "linked degradation processes"
German government	Chapter 3	7	188			Table 3.1: Line 1: Are the deforestation and clearance of introduced plants not considered to be a direct driver of soil erosion, change in runoff and infiltration regime?	Deforestation is no longer treated as a separate driver in the revised draft.
Shiping Wang	Chapter 3	7	188		Table 3.1	It could be consider the change of species composition especially poisonous plants, and vegetative coverage	We have only listed a subset of linked degradation processes. To clarify this, we have now changed the column title to reflect this (Examples of linked degradation and restoration processes)
Penny van Oosterzee	Chapter 3	8	189			This should include corrupt institutions or maybe it goes into subcategories. Corruption cause massive degradation.	This has been revised. We consider corruption as subcategory, and it has been included as such in Table 3.3 of the final draft as "poor governance and corruption"
Comerma (ITPS)	Chapter 3	8	189	8		Table 3.2: We should include or emphasize land tenure as an indirect driver	This table has been revised. Table 3.3 was added to add a layer of detail that Table 3.2 was not meant to have. "Insecurity in land tenure" is now part of Table 3.3 in the final report.
Marina Rosales Benites de Franco	Chapter 3	8	189	8	189	I would like to propose shall include in item subcategories of Institutions and governance: the corruption and illegal economic activities.	This has been revised. We consider corruption as subcategory, and it has been included as such in Table 3.3 of the final draft as "poor governance and corruption"
Saw Leng Guan	Chapter 3	8	189			As comments above. Should include climate induced drivers, e.g. natural cycles of droughts and floods, cyclones, hurricanes, typhoons all these can cause land degradation. However, we may want to differentiate these from climate change from anthropogenic effects. This may be difficult to differentiate but should be noted.	We have removed the row on direct natural drivers from Table 3.1. We also have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Adonia Kamukasa Adonia	Chapter 3	9	190	9	190	Table 3.3 is good but prone to subjective judgement and may not be friendly to readers who are color blind. In case, the data on the highlighted variables/parameters is available, a graph would be more appropriate.	Table 3.3 has been removed from the revised draft.

Gunay Erpul	Chapter 3	9	190	9	190	Table 3.3. what is the title of Table?	This table is no longer in the revised version of the chapter.
Monika Kopecka	Chapter 3	9	190	10	193	Table 3.3 Method used to assess severity of land degradation is not clear What was the assessed period? Input data?	This table is no longer in the revised version of the chapter. A version of this table became part of the SPM with an extensively detailed methodology (please see final SPM)
Ben ten Brink	Chapter 3	9	190	9	190	It should be clarified what is meant in this table. It is not about land degradation, that is in Chapt 4, but it should be on the intensity and distribution of drivers. Intensity should be clarified as well. What determines intensity? Probably it relates to the impact on biodiv or ecosystem services. But the impact will be different for each of them. eg: Fertilizers increase food yields but will deteriorate original biodiversity. So biodiversity and each ecosystem function requires its own table.	This table is no longer in the revised version of the chapter
Marina Rosales Benites de Franco	Chapter 3	9	190	9	190	I consider driver "Mineral Resources Extraction and Energy Development" could be in orange color at tropical forest. We have huge problems with illegal mineral extraction in the Amazonian, especially in Perú: <a href="http://www.actualidadambiental.pe/wp-content/uploads/2014/06/La-realidad-de-la-miner%C3%ADa-ilegal-en-pa%C3%ADses-amaz%C3%B3nicos-SPDA.pdf">http://www.actualidadambiental.pe/wp-content/uploads/2014/06/La-realidad-de-la-miner%C3%ADa-ilegal-en-pa%C3%ADses-amaz%C3%B3nicos-SPDA.pdf</a> and <a href="http://www.minam.gob.pe/prensa/wp-content/uploads/sites/44/2013/12/dialogo-con-la-prensa-2_Minereia_ilegal.pdf">http://www.minam.gob.pe/prensa/wp-content/uploads/sites/44/2013/12/dialogo-con-la-prensa-2_Minereia_ilegal.pdf</a> . Please, in this context could you review lines 234 and 235 page 11.	We thank the reviewer for the suggestions. We now have a team of experts who evaluate the severity, trends and extent table which now appears in the Summary for Policy Makers. We will share this comment with our evaluation team. We have also revised the section on mining - now Section 3.4.7 "Mineral Resource Extraction", which takes care of the last part of the comment.
Monika Kopecka	Chapter 3	9	190	10	193	Table 3.3 Method used to assess severity of land degradation is not clear What was the assessed period? Input data?	This table is no longer in the revised version of the chapter. A version of this table became part of the SPM with an extensively detailed methodology (please see final SPM)
Elena Havlicek	Chapter 3	9	190	9		Table 3.3. (not completed) Deforestation is mentioned as a severe driver of land degradation in deserts. Depending on the definition should be the case.	This table is no longer there in the revised version of the chapter. Further, deforestation is no longer treated as a separate driver in the revised draft.
Beverly Wemple	Chapter 3	9	192	9		Table 3.3. : Is inclusion of deforestation in the column for deserts intended?	This table is no longer there in the revised version of the chapter. Further, deforestation is no longer treated as a separate driver in the revised draft.
Ben ten Brink	Chapter 3	11	198	14	345	This sub section is quite close to chapter 4 on state: decreasing extent of forest (and other biomes) as a basic indicator of biodiversity. It would be less overlapping and more informative to elaborate on the direct and indirect drivers behind, such as population, economic and consumption growth, leading to more demand for food (cropland and planted pasture), fiber (forestry plantations, wood collection), bio-energy, climate change related-biome shifts, urbanisation/unchecked settlements, infrastructure, human caused fire, all leading to deforestation or forest deterioration.	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc.

						I strongly question the inclusion of shifting cultivation as a component of deforestation. Deforestation means conversion to some non-forest land cover. Traditional shifting cultivation systems practiced in many parts of the world rely on natural regeneration process to restore forest cover between cultivation cycles. In terms of biodiversity and ecosystem services impacts, it is incorrect to lump this often sustainable agro/forest landscape management practice with cattle ranching, mining, urbanization et al. The authors should reflect a deeper understanding of shifting cultivation, and would recommend the following publication and associated references: Parrotta, J.A., Dey de Pryck, J., Darko Obiri, B., Padoch, C., Powell, B. and Sandbrook, C. 2015. The Historical, Environmental and Socio-Economic Context of Forests and Tree-Based Systems for Food Security and Nutrition. Chapter 3 (pp. 71-134) in: Vira, B., Mansourian, S. and Wildburger, C. Forests and Food: Addressing Hunger and Nutrition across Sustainable Landscapes. Cambridge, UK: Open Book Publishers, 2015. <a href="http://dx.doi.org/10.11647/OBP.0085">http://dx.doi.org/10.11647/OBP.0085</a> . The authors should also refer to Chapter 12 of Parrotta & Trosper (2012) noted above for additional insights on shifting cultivation.	This text is no longer there in the revised version of the document.
John Parrotta	Chapter 3	11	203				
Nicola Dal Ferro	Chapter 3	11	211	11	220	I suggest to avoid here the use of "direct drivers" and "indirect drivers" as the reader can be confused with those related to land degradation and previously proposed.	This text is no longer there in the revised version of the document. The indirect drivers of deforestation are discussed in Section 3.3, and in relation to other direct drivers, where relevant, in sections 3.4 & 3.5. The terms "direct" and "indirect" drivers were laid out in the original scoping document which we are required to follow in this chapter. The definitions for each of these drivers were provided by IPBES.
Samuel Nshutiyayesu	Chapter 3	11	220	11	220	The difference between trees removal and clearance of other native vegetation should be provided, and the implications of the clearance of other native vegetation explained.	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. Removal of non-forest vegetation also may be found in direct drivers sections such as removal of vegetation in grazing, extractive industry, and development due to industry, infrastructure, and urbanization.
Mekuria Argaw	Chapter 3	11	228	11	228	what is the figure for Africa?	This text has been removed, and we no longer provide regional/ continental estimates of overall deforestation. Deforestation is now discussed in the context of other drivers (e.g. forest clearance for agricultural expansion) in sections 3.4 & 3.5 where appropriate.
Zhengshan JU	Chapter 3	11	234	234	235	From the perspective of global level, the mining, as the decentralized points, if the influence to deforestation can be ignored?	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc.

Ashish Upadhyay	Chapter 3	12	246			Because they were concerned with soils for agricultural purposes, land degradation was defined as the action on land that decreases sustainable crop production over time. They emphasize that the definition is applicable to any area in which basic soil conservation principles were not obeyed when establishing agricultural lands after deforestation or other land-use change. Furthermore, Castro Filho et al. (2001) discussed the use of biotic and abiotic early warning indicators of land degradation which can be easily seen along the road in southern Brazil. It is important to have enough data of the area of interest when assessing large-scale land degradation. The Paraná River basin was used as an example to illustrate tools and techniques that can be utilised to assess sediment load in large watershed. The use of modelling tools and techniques was beneficial as it gave information on areas that were at great risk of land degradation at the time of the study.	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, conversion to grazing lands etc.
Gengxing Zhao	Chapter 3	12	246	13	288	There should be more contents about changes in soil fertility caused by deforestation.	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. In addition changes in soil fertility associated with deforestation and other types of vegetation removal can be found in Chapter 4, in detail.
Sandra Luque	Chapter 3	12	246	14	345	One of the mains problems is illegal login see : <a href="http://www.worldwildlife.org/threats/deforestation">http://www.worldwildlife.org/threats/deforestation</a> ___ update information use FAO 2014 Forest report, FRA 2015 /IUFRO reports	This section is no longer there in the revised version of the chapter
Gunay Erpul	Chapter 3	12	246	13	288	What happens to below ground biodiversity soil erosion after deforestation? After severe soil losses in the deforested areas, is ES and BD reversible?	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. Text on loss of soil biodiversity due to land degradation can be found in Chapter 4 in section 4.2.9.5.
Penny van Oosterzee	Chapter 3	12	246			There should be a discussion of the impact of roads eg Laurance, Balmford et al. Nature paper in 2013.	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. However, the impact of roads is a cross cutting issue and information on roads may be found in section 3.4.8 Industrialization, Infrastructure, and Urbanization
Saw Leng Guan	Chapter 3	12	257			Singapore is a poor example, it is too small to make projections for the future. Can't you give examples from other larger countries? Brazil, Malaysia, Indonesia, Philippines, India? For Malaysia for example recent conservation assessment see Saw L.G. & Chua L.S.L., Suhaida M., Yong, W.S.Y. & Hamidah M. (2010). Conservation of rare, endangered and threatened plants of Malaysia. Kew Bulletin 65: 681-689.	This text, and section, is no longer there in the revised draft.
Comerma (ITPS)	Chapter 3	13	280		281	Emphasize impact on water production and regulation in the Andes though Souht and Central America	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. There was no space to treat in detail the impacts to water production and regulation throughout the Andes. We believe this topic is more appropriate to the regional assessment, where it is covered.

Shiping Wang	Chapter 3	13	286		288	It could be added the contents about the effect of deforestation on soil erosion and runoff	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc.
German government	Chapter 3	13	286	13	286	Regarding the statement "... impair pollination ...", please include a reference to the outcomes of IPBES deliverable 3(a) on the thematic assessment of pollinators, pollination and food production.	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc.
Shiping Wang	Chapter 3	13	289	14	334	Most of contents focus on description of the present status, lacking of analysis of direct and indirect drivers, which should be addressed.	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc.
Monika Kopecka	Chapter 3	13	290	13	311	Does "M ha" mean "million ha"? (both expressions are used several times) Also "million ha yr-1" and "M ha y-1" should be unified	This text is no longer there in the revised version of the document. All units have been standardized throughout the report to leave no ambiguity.
Monika Kopecka	Chapter 3	13	290	13	311	Does "M ha" mean "million ha"? (both expressions are used several times) Also "million ha yr-1" and "M ha y-1" should be unified	This text is no longer there in the revised version of the document. All units have been standardized throughout the report to leave no ambiguity.
Comerma (ITPS)	Chapter 3	13	305	13	307	In the World Soil Report page 378 refers to a Brazil Policy for deforestation called Forest Code that has drastically decreased deforestation	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. World Soil Report has been referenced elsewhere, as appropriate.
Samuel Nshutiyayesu	Chapter 3	13	311	13	311	There should be included the information/data about future trajectories (some references e.g. Barnes (1990), Deforestation trends in tropical Africa; Kinnaid et al (2003): Deforestation Trends in a Tropical Landscape and Implications for Endangered Large Mammals; OECD (2012), OECD environmental outlook to 2050)	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. Future trends are the scope of Ch4 and Ch7, and are not meant to be dealt with at Ch3 level.
Samuel Nshutiyayesu	Chapter 3	13	313	13	315	For the interaction between deforestation and climate change, some reference should be helpful (like Lawrence (2015), Effects of tropical deforestation on climate and agriculture)	We thank the reviewer for pointing out this reference. However, deforestation is no longer treated as a separate driver in and of itself, but rather in the context of other drivers such as conversion for agriculture. The role of climate change in influencing these other drivers is discussed in Sec 3.6
Meredith Root-Bernstein	Chapter 3	14	321			The CDM has not been defined, please do so.	This text is no longer there in the revised draft of the chapter. But all acrobymys have been defined and pulled into an Acronym list in the final report.
Royal C. Gardner	Chapter 3	14	332	14	334	For information about remote sensing to observe wetland trends, see the discussion on pages 13-14 about JAXA's Global Mangrove Watch and the ESA's GlobWetland Africa projects with Ramsar: <a href="http://www.ramsar.org/sites/default/files/documents/library/cop12_doc23_bn7_sowws_e_0.pdf">http://www.ramsar.org/sites/default/files/documents/library/cop12_doc23_bn7_sowws_e_0.pdf</a> .	Biomes was removed from trends and extent of global land degradation drivers in the SPM and only global subregions was retained. The Wetland Extent Trend (WET) is included in the final draft of SPM

Zhengshan JU	Chapter 3	14	332	14	334	Suggest added global satellite remote sensing data of forest dynamic monitoring data to Support your view	This section has been removed in the revised draft of the chapter. Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. We have taken your suggestion into account in the revision process.
Adonia Kamukasa Adonia	Chapter 3	14	335	14	345	under 3.3.1.6, it may be worth mentioning climate smart agriculture (FAO, 2013) and sustainable land use management (World Bank, 2008).	Deforestation is no longer treated as a separate driver in the revised draft. Rather it is now integrated with other drivers, e.g deforestation as a result of land clearance for agriculture, grazing lands etc. Climate smart technologies are dealt with in Chapter 6 as part of the "responses" (and within their scope). We felt the treatment in Ch6 was sufficient and didn't require repetition at Ch3 level.
Zhengshan JU	Chapter 3	14	336	14	345	Through the way of afforestation to increase artificial forest is a kind of effective measures to fill the primeval forest area reducing. There are many vivid examples in Chiina.	This section has been removed in the revised draft of the chapter but we discuss afforestation in Section 3.4.2.3 in the final draft.
Peter Onorato	Chapter 3	14	336	14	345	The opportunities to halt, reduce and mitigate deforestation, among other things, include adoption of low carbon growth strategies with less dependence on natural resources, reducing emissions from deforestation and degradation (REDD), sustainable forest management for natural as well as planted forests, increases in extent of protected areas, innovative and effective conservation initiatives in natural forests, wild life and biodiversity rich areas, promotion of substitutes for wood based products, ensuring affordable alternate energy resources for rural people, strengthened network of communities, government institutions, Civil Society Organizations (CSO's), multilateral and bilateral agreements, participatory forest management, innovative policy, legislative and regulatory measures.	This section has been removed in the revised draft of the chapter. Information on responses to land degradation such as REDD+ may now be found in section 3.4.4.2 Indirect drivers of changes in the extent and management of forests and tree plantations.
Samuel Nshutiyayesu	Chapter 3	14	345	14	345	There should be added some success stories (e.g. Rwanda's National Forest Policy won the World Future Council's Future Policy Award, and in 2011 the United Nations gave Rwanda the gold award for its forest promotion policies (see REMA (2015), Rwanda State of Environment and Outlook Report; see also online refereces at <a href="http://www.un.org/apps/news/story.asp?NewsID=39661#.V4NMQet97tQ">http://www.un.org/apps/news/story.asp?NewsID=39661#.V4NMQet97tQ</a> ; <a href="https://www.worldfuturecouncil.org/future-policy-award-crowns-worlds-best-forest-policies/">https://www.worldfuturecouncil.org/future-policy-award-crowns-worlds-best-forest-policies/</a> )	We expanded on this and have included mention of success stories throughout chapter, as relevant, in the final draft.
Ben ten Brink	Chapter 3	14	347	20	501	Why grazing land management? Why not grazing as such. Management is not the pressure (would be fun though to see the managers graze), but the grazing. Then the cattle density is the pressure factor (heads), related to the carrying capacity of the field, which is related to its natural fertility/climate and the conservation of the soil properties. Then you would have a generic variable for pressure. This could be linked to the impacts on biodiversity and the ecosystem functions food, water, energy/climate in Chapter 4.	We identify 8 direct drivers of land degradation in chapter 3. In the title our hope was to link to the actual human activity that drives land degradation. We agree that the actual grazing is the pressure or driver but that ultimately it is how humans manage those grazing lands (e.g. stocking density, rotational patterns) that degrades land and also may be used in restoration.
Peter Onorato	Chapter 3	14	355	14	355	goats but reindeer in more northern and alpaca in higher elevation grasslands.	This sentence was removed in the SOD.

Mekuria Argaw	Chapter 3	14	356	15	378	Grazing land definition may not hold true everywhere. What is extensive? It simply refers to uncontrolled or unlimited grazing (both in stock and intensity of grazing). But this may be confusing with the commonly understood categories of "free grazing" and "controlled grazing" or "managed" and "Unmanaged" rangelands. The case in African rangelands is that most are freely grazed and uncontrolled. The are overgrazed, meaning they accommodate over the allowable number of stock or above the natural carrying capacity. They are not controlled for grazing. Much of the degradation in rangelands is due to overgrazing or overexploitation. Thus, extensive and intensive categorization may not be appropriate. It does not reflect the reality.	This section was greatly expanded and now includes more detail on "extensive" versus "intensive" grazing lands. There are many definitions of grazing systems and livestock production systems. We chose to stratify by extensive and intensive grazing systems since it recognizes the multiple and differing use of the lands. It also shows that extensive grazing lands are the dominant type across the globe and the reason we focus on this type throughout much of this section. There is no statement on whether extensive versus intensive grazing lands are more degraded.
Mekuria Argaw	Chapter 3	15	359	15	359	The last part of the sub-title should be "...due to overgrazing" not .."land management"	Title were discussed at length by the CLAs and LAs. We were tasked to not only discuss land degradation but restoration of degraded lands throughout the assessment. As a result, we attempted to give title to each of the drivers showing that grazing land management can degrade land but grazing land management practices may also be used to restore lands. If we chose more degradation type language such as "overgrazing" or "deforestation," we are no longer able to describe practices in which "overgrazing" can be used to restore lands.
Mekuria Argaw	Chapter 3	15	359	16	408	The examples given are not enough. Overgrazing in rangelands is a serious problem in east Africa and west Africa.	Our challenge throughout the Chapter 3 sections on direct drivers has been to clearly describe extent and trends of the drivers without weighing in too strongly on the impacts or severity of the driver on the system. This information gets picked up in Chapter 4.
Monika Kopecka	Chapter 3	15	366	16	367	Text in the bottom of the map on Fig. 3.2 should be removed - wrong number Fig 1.1., endnotes with definitions of grazing land are not included	Fig 3.2 has been removed from the final draft. Instead, we have a line graph on " Global grazing lands and grazing land pressure across global regions" based on FAO data. You can find this now under Fig. 3.5 in the final draft.
Monika Kopecka	Chapter 3	15	366	16	367	Text in the bottom of the map on Fig. 3.2 should be removed - wrong number Fig 1.1., endnotes with definitions of grazing land are not included	Fig 3.2 has been removed from the final draft. Instead, we have a line graph on " Global grazing lands and grazing land pressure across global regions" based on FAO data. You can find this now under Fig. 3.5 in the final draft.
Elena Havlicek	Chapter 3	15	371	15	373	Soil sealing can not (as far as I know) be provoked by animal trampling. This leads to increased compaction and possibly to erosion.	This information has been removed and is now addressed in Chapter 4. During third author meeting in Rome (2017), the boundaries between Ch3 and Ch4 have been discussed further and this discussion was decided to be more suitable for Ch4.
Peter Onorato	Chapter 3	15	371	15	372	Sustained levels of high intensity grazing may result not only in changes in plants communities but significant declines in soil health.	This information has been removed and is now addressed in Chapter 4. During third author meeting in Rome (2017), the boundaries between Ch3 and Ch4 have been discussed further and this discussion was decided to be more suitable for Ch4.
Elena Havlicek	Chapter 3	15	372	15	372	soil "health" is an ambiguous term: in this case it should be replaced by "soil organic content/carbon"	This information has been removed and is now addressed in Chapter 4. During third author meeting in Rome (2017), the boundaries between Ch3 and Ch4 have been discussed further and this discussion was decided to be more suitable for Ch4.

Elena Havlicek	Chapter 3	16	382	16	388	Possible to add biological properties? Land degradation due to grazing also leads to the alteration of biological communities, lessening therefore the resistance or the resilience of the system	This information has been removed and is now addressed in Chapter 4. During third author meeting in Rome (2017), the boundaries between Ch3 and Ch4 have been discussed further and this discussion was decided to be more suitable for Ch4.
Nicola Dal Ferro	Chapter 3	16	391	16	392	The sentence seems not fully matching with the sentence just before. Do you mean savanna as a grassland of a particular area?	This information has been removed and is now addressed in Chapter 4.
Nicola Dal Ferro	Chapter 3	16	395	16	395	Maps that are shown in Figure 3.3 represents different things, although partially dealing with the same aspect, i.e. the impact of livestock in the world. I am not sure is precise enough to show them within the same caption, or maybe select just one out of two.	Fig 3.3 has been removed from the final draft. Instead, we have a line graph on " Global grazing lands and grazing land pressure across global regions" based on FAO data. You can find this now under Fig. 3.5 in the final draft.
Sandra Luque	Chapter 3	16	409	17	429	see also <a href="http://www.fao.org/docrep/008/y8344e/y8344e0j.htm">http://www.fao.org/docrep/008/y8344e/y8344e0j.htm</a>	Thank you for the reference. This reference is from 2005. In the final draft, we are now incorporate more recent FAO statistics from the 2013-2015 Statistical Yearbooks.
Nicola Dal Ferro	Chapter 3	16	418	16	421	I suggest to re-order the sentence. Start from data of the past, then general projections for the future and finally trends of slowing, reversing.	This section has been revised since the FOD.
Gengxing Zhao	Chapter 3	18	441	18	449	There seems too simple, should have a little more contents considering the Interactions Between Grazing Land Management and Other Direct Drivers.	This was a list of interactions among direct drivers that we wanted to flag for the SOD. This has now been expanded in a new section of "Interactions among direct drivers" section in Chapter 3
Shiping Wang	Chapter 3	18	442	18	443	Indirect effects of climate change should be addressed, especially the interaction between grazing and climate change due to their overlapping effects on grassland ecosystems. In addition, different regions with different grassland types should be different drives for the degradation. However, it is too weak to catch main concerns.	Grazing and climate change is now addressed in section 3.5 Climate Change and its exacerbating effect on other direct drivers. The severity, extent, and trend in land degradation direct drivers is evaluated in the SOD SPM Table 2. In the FGD 20 global regions will be evaluated across all direct drivers.
Shiping Wang	Chapter 3	18	445	18	446	Similar questions exist. Interaction among grazing, climate change and invasive species how to cause grassland degradation is lacking.	The interaction between grazing, climate change and invasive species is now addressed in the section 3.5 Climate Change and Its Exacerbating Effect on Other Direct Drivers
Peter Onorato	Chapter 3	18	445	18	446	Widespread degradation of North American rangelands due cheatgrass ( <i>Bromus tectorum</i> ) invasion and subsequent changes in the fire cycle.	This is now addressed in section 3.4 of the FGD on drivers of restoration and rehabilitation
Hamid Custovic (SPI)	Chapter 3	19	457		459	Edit sentence (data availability... may be available).	This section has been revised since the FOD.

						<p>3.3.2.6 Opportunities to halt, reduce and mitigate grazing land degradation drivers and foster restoration</p> <p>ADD support for ILK/TEK as an opportunity, e.g.</p> <p>- Oguge 2016 (Kenya): ILK can provide regulation of natural resources through its traditional practices, e.g. through traditional laws on resource use; "Community elders are the custodians and enforce the law through penalties. Knowledge transmission is through folklore, songs and oral education."( Nicholas O. Oguge (2016). Landscape ethnoecological knowledge base and management of ecosystem services among the Samburu of Northern Kenya. )</p> <p>- Mburu and Kaguna 2016 (Kenya): ILK can provide regulation of natural resources through its traditional practices, e.g. through providing eco-spiritual protection for particular sites; "The Tharaka community believed that there is a strong connection between conservation of seeds and protection of sacred sites... The Kathita River, which has 14 sacred sites along its course, therefore becomes an important eco-spiritual phenomenon for the community. Protection of the sacred sites would lead to protection of the river." (Gathara Mburu and Sabella Kaguna (2016). Community dialogue on ILK relevant for food and water protection in Tharaka, Kenya.)</p> <p>- Shemdoe 2016 (Tanzania): " Traditional leaders play a key role in setting out rules to protect the landscape. "These people command a lot of respect and one of their key responsibilities is to set rules that should be followed and abided by the people. They gave examples of such rules as a prohibition on cutting down trees in certain areas such as water sources, and prohibiting cultivation close to water sources." (Riziki Silas Shemdoe (2016). Indigenous and local knowledge for biodiversity and ecosystem services in Tanzania: the case of two selected communities.)</p> <p>All above papers in: Marie Roué, Alfred Oteng-Yeboah, Peris Kariuki and Yao Adou (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in</p>	<p>This is a really good suggestion and associated references for further integrating ILK into the direct drivers. The information provided here isn't specific to grazing land management but to management of natural resources more broadly. We felt that this level of detail was more appropriate to Ch6, that deals with the multiplicity of responses to degraded land. The information has been passed on to CH6.</p>
Douglas Nakashima	Chapter 3	19	460				
German government	Chapter 3	19	460	19	461	<p>Ensure that the examples provided in section 3.3.2.6 clearly target either "restoration" or "rehabilitation" according to the definitions provided in section 1.1.2 (page 3) of this assessment.</p>	<p>Throughout the assessment restoration and rehabilitation are more clearly defined and discussed. Much of the section on restoration strategies in the grazing land section has now been moved to Chapter 4.</p>
Zhengshan JU	Chapter 3	19	462	20	501	<p>By sheep and other livestock grazing type range into captivity, it is a very effective way of active protection for the overgrazing region.</p>	<p>If I am to understand the comment correctly, I believe that this comment is related to fencing of livestock as a way to restore overgrazed regions. This section addresses fencing as a restoration strategies and now has been made available to chapter 4.</p>
Royal C. Gardner	Chapter 3	19	477	19	484	<p>The case study is from a 2005 publication, but is described as "presently being evaluated." Was the introduction of criollo cattle effective?</p>	<p>The section now more fully describes what influence criollo have on their environments. The Suttie et al. 2005 describes the research on criollo but the impacts of larger commercial herds is now being evaluated.</p>
Gunay Erpul	Chapter 3	20	491	20	492	<p>"to reduce soil erosion" is unnecessary repetition.</p>	<p>Change made</p>
Gengxing Zhao	Chapter 3	20	499	20	501	<p>Table 3.4 should be grazing land management strategies instead of simply description of the concept of related indicators.</p>	<p>This table was removed.</p>

Diane L. Douglas	Chapter 3	20	499	20	501	Table 3.4 identifies a range of methods that can be employed to manage grazing lands, adopted from Reid et al. 2008. While I think it is valuable to point out strategies that are being used, I think it is important to discuss risks associated with some of these methods. Fire regimes and controlled burns run the risk of wildfires that burn out of control, so mitigation measures should be identified for minimizing wildfires, or urban interface fires (e.g., burning during periods of low windspeeds, creating fire breaks prior to burning, ensuring good breaks between grazing lands to be burned and structures, etc.). For restoration planting there is of course a risk of using non-native species for stabilization. Perhaps link this to your discussion on Invasive species (Section 3.3.7). Fertilizers, pesticides and herbicides - if used without proper mitigation measures in place can result in spread of chemicals to adjacent soils, water, entering the food chain, etc.	This section has been revised since the FOD and the information in the table has been made available for use in Chapter 4. Due to space limitation, Ch4 chose not to use this graph directly.
Comerma (ITPS)	Chapter 3	20	500	table 3.4	500	In rotation we may include a practice CIAT has applied in the savannas, which includes rotating a degraded pasture with a crop resistant to low fertility like sorghum with some fertilizers for one year leaving a residual effect for the next pastures and restoring the grasslands	Information on restoration practices has been revised and moved to Chapter 6.
Nicola Dal Ferro	Chapter 3	20	502	22	554	This paragraph on cropland and agroforestry management sometimes confuses some parts with those in forest-related land degradation.	Much of the information from the Deforestation driver in the FOD and land use change in the Croplands driver has now been moved to a new section on "Interactions among Direct Drivers"
Sandra Luque	Chapter 3		502		585	see publications from Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture update and complete	In the SOD we have now included indicators from FAOStat and IPBES of land degradation in cropland ecosystems with a focus on nitrogen use efficiency by country and region.
Shiping Wang	Chapter 3	20	503	22	554	What are main factors affecting cropland degradation? For example, desertation, salinization?	A new section on indirect drivers has been included for each of the direct drivers. Chapter 4 focuses on degradation processes such as desertification and salinization.
Ashish Upadhyay	Chapter 3	20	504	24	704	Land degradation encompasses the whole environment but includes individual factors concerning soils, water resources (surface, ground), forests (woodlands), grasslands (rangelands), croplands (rainfed, irrigated) and biodiversity (animals, vegetative cover, soil) (FAO, 2005). On the other hand the NRC (1994) stressed that land degradation is complex and involves the interaction of changes in the physical, chemical and biological properties of the soil and vegetation. The complexity of land degradation means its definition differs from area to area, depending on the subject to be emphasized.	There are many definition of land degradation in the literature. For this assesment we were required to work with the definitions agreed in the conceptual framework and the scoping document for the assessment. While we cover variation in drivers among regions and biomes, we really can't recognize different definitions of land degradation for different geographic regions or biomes.
Gengxing Zhao	Chapter 3	21	514			"3.3.3.2. Extent of cropland and agroforestry management" should be "Extent of land degradation due to cropland and agroforestry management".	This section heading has been revised in the SOD.
Beverley Wemple	Chapter 3	21	515	21	531	This section doesn't have any description of agroforestry. Is agroforestry intended to be different from logging, included in another section? If intent is for section to speak to trees that produce food crops (i.e. coffee), this should be stated in this section	A clear definition of agroforestry is now included in the SOD and also in the Glossary.
Monika Kopecka	Chapter 3	21	521	21	521	Four of these cereal crops – maize, rice, wheat, and soybean... It is recommended to remove the word "cereal" - soybean is a category Graine legumes (or Pulses)	This comment was missed in preparation of the SOD. The change was made in the final draft.
Monika Kopecka	Chapter 3	21	522	21	522	Ray et al. (2013) is not included in the List of references	This reference was removed in the SOD
Nicola Dal Ferro	Chapter 3	20	524	20	526	This sentence is a bit misleading in the context of croplands, at least as it is presented	This sentence was removed in the SOD.

Gengxing Zhao	Chapter 3	21	527	21	531	The content of this section could be expanded on the effects of various agricultural practices on land degradation.	Additional information on the effects of conservation practices in agriculture was included in the FGD in the section "Past, present, and future extent and management of croplands and agroforestry"
Nicola Dal Ferro	Chapter 3	20	529	20	531	Is it fully correct to directly link land degradation with the intense use of resources? (N, P, water..)	This paragraph now precedes the nitrogen use efficiency data and does suggest that agricultural intensification does lead to greater land degradation but the direct link hasn't been made. We will flag this in the final draft to more directly make the link from agricultural intensification to land degradation.
Francesco Morari	Chapter 3	21	530	21	530	Potash is a K fertilizer, why citing here?	Agreed that this sentence is confusing. The sentence now reads "According to the FAO, approximately 108.4 M tonnes of nitrogen fertilizer, 46.2 M tonnes of phosphate fertilizer, and 37.1 M tonnes of potash fertilizer were used in agriculture in 2013."
Francesco Morari	Chapter 3	21	533	21	543	Data on forestry are general and already showed in section 3.3.1. I would recommend, if possible, to report more specific data on agroforestry	Section 3.3.1 has been removed due to content overlap.
Nicola Dal Ferro	Chapter 3	21	537	21	543	Forest information is a repetition of paragraph 3.3.1 and should not be included here.	Section 3.3.1 has been removed due to content overlap.
Hamid Custovic (SPI)	Chapter 3	21	537		543	This passage on extent of deforestation appears under the heading "Cropland and agroforestry management..." Are you saying that this deforestation is all caused by cropland expansion?	This section has been significantly revised for the FOD and no longer links all of the forest cover change trends to croplands. A new section on "Interactions among Direct Drivers" now addresses deforestation and agricultural expansion.
Francesco Morari	Chapter 3	21	544	21	547	I would recommend to report updated figures on fertilizer use	We have updated fertilizer figures and now report nitrogen use efficiency by region and country.
Gunay Erpul	Chapter 3	21	548	22	554	Expected 60% increase in food production by 2050 can be met by sustainable soil management without any need for extensification and intensification (FAO/GSP).	We were unable to find the reference to this work.
German government	Chapter 3	22	552	22	552	Regarding the statement "... accompanied by more than doubling of fertilizer and pesticide use ...": Insert a reference on the outcomes of the IPBES assessment report on "pollinators, pollination and food production" (D3a) regarding the impacts of the use of pesticides on biodiversity.	This sentence was removed in the SOD.
Hamid Custovic (SPI)	Chapter 3	22	565			The sentence acknowledges that closing the yield gap is critical to minimising deforestation associated with expansion of agriculture. To do so will require increasing inputs to agricultural production systems: definitely fertiliser - a mix of organic and chemical; possibly mechanisation, probably agrochemicals - pesticides, fungicides, possibly herbicides. Thus it is necessary to acknowledge throughout this report that agricultural inputs, when used strategically in a sustainable intensification approach, play an important role in conserving biodiversity and mitigating land degradation.	Thank you for this input. Sustainable intensification approach has been discussed in multiple chapters in the final report. The criteria for success (in restoring degraded land and avoiding further degradation) has also been developed in Ch1, which takes into account the elements expressed by the reviewer.
Gengxing Zhao	Chapter 3	22	568	22	578	There should have some content about effects of different land cover on land surface evaporation and temperature, which will affect local climate.	This is an interesting point but it's not clear how the effects on local climate will then feedback to land degradation unless changes in local climate result in warmer, drier and more drought like conditions. Due to lack of space we have not incorporated this idea.
Gunay Erpul	Chapter 3	22	568	22	578	more references that could be useful: Deluchi, 2012; Smith K.A., McTaggart I.P. and Tsuruta H. 1997.	The references are appreciated. This section was an outline of potential interactions between climate and cropland and agroforestry management and has been removed in the SOD.
Shiping Wang	Chapter 3	22	569	22	578	The contents just introduc the feedbacks of cropland management to climate change rather than the effects of climate change how to affect cropland degradation, latter should be paid more attention.	Information on the effects of climate change on croplands is in the "Climate Change as a Threat Multiplier of Degradation Drivers" section

Francesco Morari	Chapter 3	22	579	22	585	Please report also cropland statistics	Additional croplands statistics are reported in the SOD with a specific focus on indirect drivers of cropland management
Gengxing Zhao	Chapter 3	22	579	22	585	There should mention about remote sensing data.	The data availability section has been removed from all of the direct drivers in the SOD. Information on data availability is now dispersed throughout the direct drivers sections when appropriate.
Lim Li Ching	Chapter 3	22	586	23	608	Much more emphasis should be placed on agroecology's potential to halt, reduce and mitigate the impacts of agricultural production. This entails a paradigm shift from specialized industrial agriculture to diversified agroecological systems (IPES-Food, 2016). These are, of course, two ends of a wide spectrum, with most farms somewhere between. Whatever the starting point, the transition to diversified agroecological systems is necessary. Specialized industrial agriculture is a model characterised by monocultures, genetically uniform varieties, intensive use of external inputs, maximization of yield from a single or limited number of products, and production of large volumes of homogenous products typically within long value chains. Agroecology, on the other hand, applies ecological principles to the design and management of agroecosystems. Its practices diversify farms and farming landscapes, increase biodiversity, nurture soil health and soil biodiversity, and stimulate interactions between different species, such that the farm provides for its own soil organic matter, pest regulation and weed control, without resort to external chemical inputs. Agroecology aims to restore ecosystem functions, and is able to halt and reverse land degradation through its soil and water conservation, agroforestry, biodiversity-enhancing, non-chemical usage, and other practices.	A paragraph on restoration strategies on agricultural lands which includes agroecological type approaches in described in lines 1087-1099.
Francesco Morari	Chapter 3	22	586	23	606	With respect to the other drivers, information reported here is general and does not make reference to specific actions. I would suggest to harmonized the information	This is the final paragraph for this driver which discusses the more general framework for restoration. The previous paragraph in lines 1087-1099 were added to describe more cropland specific restoration.
Gunay Erpul	Chapter 3	22	586	23	606	Nachtergaele and Petri, 2011: The effect of land use on indicative factors for ecosystem goods and services	Thank you for this reference. This section has been revised in the SOD and much of the information on halting, reducing, and mitigating land degradation for each of the direct drivers has now been included in Chapter 6.
Hamid Custovic (SPI)	Chapter 3	22	586			Insert: Opportunities to halt, reduce and mitigate land degradation associated with cropland and agroforestry management.	This section has been removed in the SOD.
Shiping Wang	Chapter 3	22	588	23	606	This part should address how to restore degraded cropland and forest.	A paragraph specific to croplands has been added in line 1087-1099
Comerma (ITPS)	Chapter 3	23	588	section 3.3.3.6	606	There should be more emphasis on compaction as a consequence of poor tillage practices as well as the tendency for more conservation tillage	This information is covered in Chapter 4.
Sally Valdes	Chapter 3	23	610	24	667	This section includes s impacts of forestry practices. Perhaps could add section on effects of water quality, when harvested, and its effects on aquatic biodiversity (particularly the problem of excess sedimentation being washed into water bodies.)	Space restrictions preclude an in-depth treatment, but more attention was given to impacts on water in final draft. The impacts on water quality and biodiversity have been covered in more detail in Ch4.
Gengxing Zhao	Chapter 3	23	610			Some sentences in "3.3.4.1. Defining forest management" section could be moved to the next section.	Changed
Mekuria Argaw	Chapter 3	23	610	24	667	The text under the sub-section is more than a definition. It all discusses how management through different forms results in degradation thus much of should be treated in the next section.	Changed

D. Pennock (ITPS)	Chapter 3	23	610	24	667	The title of this section (Defining forest management is misleading; most of the section is on the impacts of forest management. Either the title should be changed or the content adjusted.	Changed
Comerma (ITPS)	Chapter 3	23	615	23		In the case of Venezuela and Colombia planted forest are very common in Savannahs as well as Forest biomes	Degradation arising from tree planting in savannas is now covered in some detail in Section 3.5, and briefly mentioned in Section 3.3.3.
Gunay Erpul	Chapter 3	23	629	24	644	Knoepp, J.D. & Swank, W.T. 1997. Forest management effects on surface soil carbon and nitrogen. Soil Sci. Soc. Am. J., 61: 928–935.	This reference is no longer in the final draft. More recent references are available on this topic.
Hamid Custovic (SPI)	Chapter 3	24	640			Have less impact than what?	Changed
Gunay Erpul	Chapter 3	24	645	24	652	Rab, 2004	We couldn't find the full reference for Rab 2004
Peter Onorato	Chapter 3	24	653	24	654	Forest management has impact on the biodiversity and this impact depend of the intensity of management (Koh and Gardner 2009).	Changed
Gunay Erpul	Chapter 3	24	657	24	662	Sombroek, W.G., Nachtergaele, F.O. & Hebel, A. 1993. Amounts, dynamics and sequestering of carbon in tropical and subtropical soils. Ambio, 22: 417-426	This reference is no longer in the final draft. More recent references are available on this topic.
Marina Rosales Benites de Franco	Chapter 3	24	662	24	662	.....are especially susceptible to extinction from over-harvesting of timber. Furthermore, it is more dangerous when the over- harvest is derived from illegal logging and weak governance, this is the case of mahogany.	Changed
Gunay Erpul	Chapter 3	24	663	24	667	Peatland and soil organic matter (Schils et al., 2008); Peat fires (Page et al., 2002; IPCC, 2014; Parish et al., 2007; Agus and Subiksa, 2008; Wosten et al., 2008).	Peatland text is no longer in the final draft, but it is covered in detail in Section 4.2.3 in Ch4.
Mark Schauer	Chapter 3	24	665	24	667	citation for this statement?	This text was removed in the SOD
German government	Chapter 3	24	665	24	667	Please include a reference/citation for this statement.	Changed
John Parrotta	Chapter 3	24	668	27	779	Missing from this discussion is a balanced consideration of the opportunities and constraints (with respect to biodiversity and ecosystem services) associated with planted forests. Specifically, it is necessary to consider both the prior site conditions (what are these planted forests replacing?) and the management practices employed (species selection, intensity of management) in evaluating whether or not, and to what extent, planted forests are actually degrading biodiversity and delivery of forest ecosystem services, and being honest by recognizing that under some conditions - reforestation of highly degraded lands, for example - such planted forests actually facilitate biodiversity recovery at various spatial scales and enhance provision of ecosystem services. I refer the authors to the following key publications on this topic: (1) Parrotta, J.A., Turnbull, J. and Jones, N. 1997. Catalyzing native forest regeneration on degraded tropical lands. Forest Ecology & Management 99(1-2): 1-8. (2) Lamb, D., Erskine. P., and Parrotta, J.A. 2005. Restoration of degraded tropical forest landscapes Science 310 (5754): 1628-1632. (3) Carnus, J-M, Parrotta, J., Brockerhoff, EG, Arbez, M, Jactel, H, Kremer, A., Lamb, D. O'Hara, K, and Walters, B. 2006. Planted forests and biodiversity. Journal of Forestry 104(2): 65-77. (4) Brockerhoff, E., Jactel, H., Parrotta, J.A., Quine, C. & Sayer, J. 2008. Plantation forests and biodiversity: oxymoron or opportunity? Biodiversity & Conservation 17(5): 925-951. (5) Brockerhoff, E., Jactel, H., Parrotta, J.A., Ferraz, S.F.B. 2013. Role of eucalypt and other planted forests in biodiversity conservation and the provision of biodiversity-related services. Forest Ecology and Management 301: 43–50.	More detail is now added on the role and management of planted forests, both in the tropical and temperate zones. We believe the treatment is now more balanced, within the space available. And we have included citations to a number of the recommended references.
Sandra Luque	Chapter 3	24	669	25	694	ATT!! The the need for industrial crops like palm oil; sugar cane for energy, and soy are among the main causes linked to deforestation Look at the statistics for increasing of soy plantations south america	Dealt with in context of other direct and indirect drivers
Gengxing Zhao	Chapter 3	25	679	25	680	There seems having lost some words.	Changed
Sandra Luque	Chapter 3		695		704	Update with FAO 2014 forest report	updated as suggested
Francesco Morari	Chapter 3	25	718	26	720	lines 718-720. This is a questionable sentence. Please provide reference	Removed

Mark Schauer	Chapter 3	25	718	26	722	citation for intensification of forest harvesting (whole-tree harvest) in Europe?	Removed
Mekuria Argaw	Chapter 3	25	718	26	722	EU policy of whole-tree harvest and climate change mitigation are contradictory. Please check	Removed
German government	Chapter 3	25	718	26	722	Please include a reference/citation for the statement on the intensification of forest harvesting (whole-tree harvest) in Europe.	statement removed
Adonia Kamukasa Adonia	Chapter 3	26	723	26	723	In 3.3.4.5 It is important to note that logging disturbance can facilitate the regeneration of certain species such as Entandrophragma species, Swietenia macrophylla and Cedela sp (Fredericksen & Putz, 2003)	In this global assessmentst we have limited space to look at specific regional examples. We were unable to incorporate this reference.
D. Pennock (ITPS)	Chapter 3	26	723	26	756	Again the title is misleading - the section is not about otther drivers, but about the impact of poor forest management.	All section subheadings were changed tin the SOD to 1) changes in the extent of the driver 2) indirect drivers of changes in the extent of the direct driver3) Past, present and future extent of the direct driver
Zhengshan JU	Chapter 3	26	731	26	732	I think the mechanical effect on the soil compaction may be ignored	The reference to soil compaction has been removed but it is treated in detail in Ch4, in accordance with its scoping.
Elena Havlicek	Chapter 3	26	731	26	732	soil compaction can exacerbate flooding: is this based on scientifically sound evidence/reference?	The reference to soil compaction has been removed but it is treated in detail in Ch4, in accordance with its scoping.
Francesco Morari	Chapter 3	26	754	26	756	I did not understand the reason to cite sulfide here	Removed
Francesco Morari	Chapter 3	26	755	26	755	All cited authors should be listed in the References cited (e.g. Andriesse and van Mensvoort (2006) is missing). Complete reference is Andriesse W, van Mensvoort MEF (2006) Acid sulfate soils: Distribution and extent. In 'Encyclopedia of soil science'. (electronic version). (Ed. R. Lal) pp. 14–19. (Taylor & Francis Group: New York)	Changed
Elena Havlicek	Chapter 3	26	755	26	755	Add Andriesse and van Mensvoort to References Cited	Changed
Samuel Nshutiyayesu	Chapter 3	26	756	26	756	Adding some information about the impacts of chemicals used in timber preservation could be important (e.g. Hington et al (2000), Leaching of chromated copper arsenate wood preservatives-a review; Coles (2014), Leaching of CCA from CCA-treated utility poles)	We agree that this is important but there is insufficient space in the LDRA for treatment of this issue.
Francesco Morari	Chapter 3	27	767	27	767	Please define the acronym of RIL	Changed
Penny van Oosterzee	Chapter 3	27	781			A recent Phd by Dr Luke Preece looks at this issue, amongst other things, for the Lower Mekong river including references, interviews and modeling different scenarios of extraction. Preece, L. 2013. Strategies for biodiversity conservation in the Lower Mekong. PhD Thesis Charles Darwin University.	Due to restrictions on word length, we have not been able to cover all aspects of NTFP extraction in detail, and have had to limit the number of different case studies we discuss. As a result, we have not been able to incorporate the results of this study in the revised version.
Meredith Root-Bernstein	Chapter 3	27	783		785	Not all definitions of non-timber forest products include fuel wood, to my knowledge. Perhaps provide a citation to what definition you are using.	This has been corrected in the final darft. We now clearly state that for the purposes of the assessment we include fuel wood and charcoal in our discussion of non-timber forest resources.
Josu G Alday	Chapter 3	27	784	27	784	I miss here a very important non-timber forest resource such as mushrooms, which is a very important seasonal economic value for certain areas.	Due to word length restrictions, we have only provided a broad coverage of non-timber forest resource extraction in this section, and have not discussed specific products in any detail.

Meredith Root-Bernstein	Chapter 3	27	792		793	I have tried to obtain information about medicinal plants endangered by overharvesting myself, without success. I thus checked this reference with interest. The Roberson 2008 report does not calculate its own figure of 15000 medicinal plants endangered by overharvesting. When I checked the two references given in Roberson 2008 to support this number, neither of those gives any such data or estimation. I thus believe that this number is unsubstantiated if not actually fabricated. In fact, I am not aware of any overview on the endangerment of medicinal plants, or the causes of any endangerment. Please check this issue carefully.	These numbers are from Schippermann et al. (2006), and are extrapolations based on the estimated number of medicinal plants used globally (~72,000) and the estimated number of plant species threatened worldwide (~21% - assuming this also holds true for medicinal plants). However, given the uncertainties in this estimate we have now removed it from the text
Samuel Nshutiyayesu	Chapter 3	28	800	28	800	Sections 3.3.5.2 and 3.3.5.3 (not 3.3.5.4) should be separate.	These have been separated in the revised version of the text
Mekuria Argaw	Chapter 3	27	800	28	821	Non-timber resource extraction/products includes mainly spices, medicinal extracts and honey production. These are actually positively contributing to the conservation of biodiversity and forest ecosystems through initiatives such as PFM (participatory forest management), in which communities are organized and given responsibility for managing forest resources at the same time generate livelihoods from non-timber forest products. Thus, extraction of NTFPs (non-timber forest products) promotes conservation. The emphasis on fuel wood as the main non-timber resource product is not correct. Wild fruits are major supplements of vitamins to many forest dependent communities and forests are conserved by communities for these products.	We have revised the section to provide a more balanced coverage of non-timber resource extraction, and the emphasis is no longer primarily on fuel-wood. Due to length restrictions, we have not discussed the role of participatory management on biodiversity and forest conservation in the current draft.
Samuel Nshutiyayesu	Chapter 3	28	801	28	803	There should be a reference for this statement	This sentence is no longer there in the revised draft.
Comerma (ITPS)	Chapter 3	28	802	28		We should include Caribbean islands as Haiti severely affected by deforestation for fuel	Due to length limitations, we have not discussed site/country specific patterns in any detail, but have focussed instead on large scale trends.
Peter Onorato	Chapter 3	28	813	28	813	Under low demographic pressure fuel wood collection can remain at sustainable level	This sentence is no longer there in the revised draft.
Penny van Oosterzee	Chapter 3	28	821			Need references for this and a bit of expansion.	This sentence is no longer there in the revised draft.
John Parrotta	Chapter 3	28	825	28	835	Missing from this section is a discussion of the role of traditional (indigenous and local) knowledge with respect to opportunities for halting, reducing and mitigating impacts. There is a vast literature on this aspect of biodiversity management by indigenous and local communities; the authors should dig a bit deeper into the available literature which will generally show that it is the activities of outside agents and/or influence of national, regional and global market forces that have resulted in the over-exploitation of many high-value medicinal plant species.	The role of ILK was expanded upon in the final report. We now include an example in Croplands of Fish-Rice and Duck-Rice agriculture in addition to Samburu and Maasai management of grazing lands in the grazing section.
Penny van Oosterzee	Chapter 3	28	830			This could be a case study. There has been a fair bit of interest in using cook stoves instead of fuel wood, and conflicting reports on its success. It's also a method under the CDM so would be useful to cover.	We agree this would make an interesting case study. However, we have not been able to include it in this draft because of space limitations
Penny van Oosterzee	Chapter 3	29	857			And how do you determine this?	We now note the limitations associated with determining 'natural' fire regimes. In the revised draft, we also provide a table with information on the extent to which fire regimes in different places are believed degraded based on expert opinion.
Gengxing Zhao	Chapter 3	29	858	30	914	This section should have some content about soil degradation, such as the changes of soil microorganism, soil nutrition etc.	Due to restrictions on word length, we have not been able to discuss all the multiple facets of land degradation arising from changes in fire regimes. More detail on degradation process can be found in Chapter 4 of the assessment.

Penny van Oosterzee	Chapter 3	30	887			This may have changed recently: see <a href="https://www.theguardian.com/environment/2015/apr/02/northern-fires-caused-almost-quarter-global-forest-loss-study-shows">https://www.theguardian.com/environment/2015/apr/02/northern-fires-caused-almost-quarter-global-forest-loss-study-shows</a> and <a href="http://www.nytimes.com/2016/05/11/science/global-warming-cited-as-wildfires-increase-in-fragile-boreal-forest.html?_r=0">http://www.nytimes.com/2016/05/11/science/global-warming-cited-as-wildfires-increase-in-fragile-boreal-forest.html?_r=0</a> and	We have now acknowledged this by clarifying that increased fire frequency in these forests can lead to degradation.
Peter Onorato	Chapter 3	30	893	30	896	In Mediterranean forests, woodlands and scrub human-driven changes to ignition patterns, along with more frequent heat waves and droughts associated with climate change, are causing increases in the frequency, severity and extent of fires, often resulting in substantial damage to infrastructure and loss of human lives.	This text is no longer present in the updated version of the manuscript.
Gunay Erpul	Chapter 3	30	905	30	914	Wildfire events as a threat to soil biodiversity, are also predicted to increase because of climate change (Krawchuk et al., 2009).	Due to restrictions on word length, we are not able to discuss all aspects of degradation in detail and only mention overall impacts on soils.
Peter Onorato	Chapter 3	30	916	30	921	With increasing human impact on the planet, fire regimes have changed from being 'natural' to 'natural but human-influenced' (until 10000-1000 years ago) and then to 'human-created fire regimes' (Bowman et al. 2011). Nowadays, pyromes (i.e. regions with similar fire regimes) are distinct across the planet (for example, most fires in Australia are frequent, intense and large, whereas in Africa they are frequent, cool and small) and are strongly influenced by human activities (Archibald et al. 2013).	This sentence is no longer present in the current version of the chapter.
Gunay Erpul	Chapter 3	31	951	32	966	Many physical, chemical, mineralogical, and biological soil properties can be affected by forest fires depending on fire regime (Certini, 2005). Increased frequency of fires contributes to degradation forest fires depending on fire regime (Certini, 2005).	Interactions between different drivers are now discussed in a separate section, as is the role of climate change as a threat multiplier of different direct drivers.
Penny van Oosterzee	Chapter 3	32	971			Case study recommended for this.	Due to word length limitations, this is no longer mentioned in the current version of the chapter.
Comerma (ITPS)	Chapter 3	32	976			Is necessary to mention the use of remote sensors to assess fire. Is already being done	Due to restrictions on word length, we are not able to go into methodological details in depth.
Adonia Kamukasa Adonia	Chapter 3	32	984	32	997	Esteves, T.C.J., Kirkby, M. J., Soares J. A.A., Irvine, B. J., Ferreira, C.A.O., Coelho, C.	This is an interesting reference for post-fire management, but our focus here is on restoring fire regimes per se, rather than on managing fire impacts.
Francesco Morari	Chapter 3	32	984	32	997	Information reported is general and does not make reference to specific actions	Our focus here is on restoring fire regimes (rather than managing fire impacts). Unfortunately, due to length restrictions, we only discuss this at a very broad level and don't have enough space to provide more details on specific management tasks to achieve these objectives that are highly variable and differ between sites, landscapes and biomes.
Comerma (ITPS)	Chapter 3	32	994			Include in fire mitigation: education, organization of the communities, vigilance, incentives for protection, identification of risky areas.	We agree that these are relevant and important, but are unable to discuss these in depth given word length restrictions as they are too specific for our broad level coverage. And some of these aspects have been covered in the final draft of Ch6.
Penny van Oosterzee	Chapter 3	32	997			Savannah burning as part of carbon abatement in northern Australia would be a good case study here. Search for author Jeremy Russell-Smith will bring up the literature.	We have added mitigation of carbon emissions as one possible use of fire management, and have provided a reference for that.
Gunay Erpul	Chapter 3	32	999	33	1019	Gardi et al. (2013), (Gardi, Jeffery and Saltelli, 2013): intensive land exploitation x SOC x invasive species	While we have not been able to incorporate all suggested references (in this section and elsewhere) due to space limitations, we have included the most relevant references as appropriate in the text.

Sally Valdes	Chapter 3	32	1000	32	1001	Not all "non-natives" are considered invasive. Be careful how defined. May want to look at U.S. Executive Order on Invasives.	We agree that not all non-natives are invasive. This point is brought out in the latter part of the sentence "...that can establish and proliferate in ecosystems other than their native ones, often to the detriment of the invaded ecosystem". We also highlight in the next sentence that all non-natives do not become invasive.
Ashish Upadhyay	Chapter 3	32	1000			Communities used degradation indicators focused on agriculture, vegetation, soils, wild animals and insect indicators	Meaning of comment not clear
Penny van Oosterzee	Chapter 3	33	1026			A nice case study here or in the next subsection might be the Yellow Crazy Ant program on Christmas Island. The ant has wiped out species and impacting on the famous land crabs. Aerial baiting is proving effective I think.	A nice idea but difficult to include due to space restrictions
Gunay Erpul	Chapter 3	33	1027	33	1034	Bloemers et al., 1997; Eggleton et al., 2002; Dlamini and Haynes, 2004; Mulder et al., 2005; Postma-Blaauw et al., 2010; De Vries et al., 2013: Soil biodiversity x invasive species	We thank the reviewer for pointing out these, and other additional references, for this and other sections. While we have not been able to incorporate all suggested references due to space limitations, we have included the most relevant references as appropriate in the text.
Mekuria Argaw	Chapter 3	33	1035	35	1127	A Table with some examples of IAS (Invasive Alien Speices) in the different regions with the critical impact on biodiversity and ecosystems services would be more illustrative and sends direct message to the reader. As an example, water hayacine has singificantly reduced the fish population and navigability of Lake Victoria in Africa. Prosopis juliflora has wiped out local forage species of herbs and bushes in Ethiopia. Partinium has greatly reduced agr biodiversity in East African crop lands. These kinds of examples from the different regions would transmit more powerful message.	Great idea. Impacts is a topic for Chapter 4, so this idea was communicated to them.
Samuel Nshutiyayesu	Chapter 3	34	1061	34	1063	Tropical regions have high invasion rate but there's no enough information available about this due to some reasons such as the lack of awareness and access to critical information, etc. (Boy and Witt (2013), Invasive Alien Plants and their management in Africa))	We will highlight this information gap more clearly in the FGD
Penny van Oosterzee	Chapter 3	34	1061			What about the fact that Europe was covered by ice until around 12000 bp leaving it available for whole-sale species invasion. This could explain the fact that invasive species come from these regions. Australia has had human societies for 50000 years and there has been trade for several hundred years before European invasion.	Good point. Noted
Nicola Dal Ferro	Chapter 3	34	1064	34	1064	Define or explicit the definition of New and Old world	Revised
Nicola Dal Ferro	Chapter 3	35	1105			Figure 3.6: I am not sure this graphs will be easily understood. I think that roughly explain what was already reported in Fig. 3.5	Thank you for your comment. This figure was removed in the final draft.
Francesco Morari	Chapter 3	36	1118	36	1120	Please rephrase	Revised
Royal C. Gardner	Chapter 3	36	1121	36	1123	Perhaps don't lead with escaped pets as the lead example as that is not the leading cause of IAS.	Revised
Sally Valdes	Chapter 3	36	1121	36	1127	Historically, many species were introduced on purpose.	Noted, and is now explicitly referenced in the FGD.
Peter Onorato	Chapter 3	36	1141	36	1143	For low-income countries, future invasion risk is expected to increase as tourism and outward migration increase air traffic, shifting the main introduction points from seaports to airports, and to increase with the growth of economic activities.	Reference added
Francesco Morari	Chapter 3	37	1144	37	1160	please increase the size of the figure	All figures were revised to ensure highest possible quality and resolution.

Sandra Luque	Chapter 3	38	1194	39	1225	Use more recent relevant references see 1. Latombe, G., et al. (2016) A vision for global monitoring of biological invasions. Biological Conservation in press. 2. Simberloff, D. et al. (2013) Impacts of biological invasions: what's what and the way forward. Trends in Ecology and Evolution 28, 58-66. 3. van Kleunen, M., et al., (2015) Global exchange and accumulation of non-native plants. Nature.	Were incorporated into final draft
Peter Onorato	Chapter 3	38	1200	38	1201	The elimination or control of invasive species depends on the species and the environment in which it has become established	fixed
Sally Valdes	Chapter 3	38	1204	38	1210	a good "defense" can be effective—well-established native may be better able to withstand invasives than in areas of high disturbance.	Treatment strategies for invasive species has been moved to Chapter 4 . It is now in section 4.3.7
Sally Valdes	Chapter 3	38	1206	38	1209	Pesticides/herbicides can be effective but I think it is important to thoroughly examine their downsides when making the decision to apply to "restore" lands.	Treatment strategies for invasive species has been moved to Chapter 4 . It is now in section 4.3.7
Peter Onorato	Chapter 3	39	1224	39	1225	Unfortunately, shortfalls in response capacities can often correlate with the greatest vulnerability to new invasions.	This comment is the sentence from these line numbers. There is not comment on how to respond to this sentence.
Sandra Luque	Chapter 3	39	1226			Transitional systems should be also presented here as this constitute one of the most important issues in land degradation - this was discussed in COP21 Several publicatiosn exist	Land abandonment is no longer treated as a separate driver in the revised draft. Land abandonment is now being addressed within each of the 8 direct drivers and is dealt with most comprehensively in the Cropland and Agroforestry section of the FGD.
Mekuria Argaw	Chapter 3	39	1226	40	1305	Land Abandonment in Africa is a positive contributor to land rehabilitation or curbing degradation. Abandoned land is left for recovery. It is part of a traditional shifting cultivation practice and also common phenomena when land is weak or impaired in its productive capacity. Therefore, is should be treated differently here.	Land abandonment is no longer treated as a separate driver in the revised draft. Land abandonment is now being addressed within each of the 8 direct drivers and is dealt with most comprehensively in the Cropland and Agroforestry section of the FGD.
Ben ten Brink	Chapter 3	39	1226	42	1347	Land abandonment is a strange driver in the list (see remark above). It seems to be a policy option, not a driver, unless land abandonment leads to more conversion such as in shifting culture. Or is abandonment a threat to a particular type of agrobiodiversity? But then this also applies for extensive forms of urbanization and forestry. We should be explicit and specific on this, or delete this from the drivers list.	Land abandonment is no longer treated as a separate driver in the revised draft
Elena Havlicek	Chapter 3	39	1226	43		Land abandonment: this chapter is rather ambiguous as (explained later in the text) land abandonment has more positive impacts on biodiversity, soils, etc. as negative impacts. The text "for the purposes... services" (lines 1272-1274) should be placed at the beginning, just after "They are considered...(Kosmas et al. 2013)" (lines 1229-1231). Globally this chapter seems to need a better structure (sorry I cannot provide it, not a specialist in this field)	Land abandonment is no longer treated as a separate driver in the revised draft
Francesco Morari	Chapter 3	39	1227	39	1227	As already emphasized in the text, this is a controversial driver since the effects on environmental indicators are not always consistent. I work in a Mediterranean country and not always the land abandonment caused a loss of biodiversity and increased runoff and erosion. Sometimes we observed the reverse effects	Land abandonment is no longer treated as a separate driver in the revised draft
Elena Havlicek	Chapter 3	39	1227	39	1227	Defining and understanding land abandonment: typing mistake	This text is no longer there in the revised draft
Comerma (ITPS)	Chapter 3	39	1227			Definition of land abandonment could be shortened as it now contains arguments that will vary in different regions. Be more general	Land abandonment is no longer treated as a separate driver in the revised draft. The definition is now in the Glossary.
Brajendra (ITPS)	Chapter 3	39	1227	39	same line	spelling of abandonment wrongly written	This text is no longer there in the revised draft but final editing has been done to the text.
Peter Onorato	Chapter 3	39	1227	39	1227	3.3.8.1 Defing and understanding land abandonmnet	This text is no longer there in the revised draft

Meredith Root-Bernstein	Chapter 3	39	1228		1221	How can land abandonment be a " Direct driver of degradation" ? It doesn't make sense for land abandonment to be "treated as an important indicator of land degradation" when abandonment refers to cessation of productive (potentially degradation-causing) activities and gradual return to "natural" dynamics. If anything this could be an indicator of natural restoration. Again, maybe this is a definitional issue but it needs to be explained better. The comments in line 1272-1277 could be moved to the top of this section.	Land abandonment is no longer treated as a separate driver in the revised draft. Land abandonment is now being addressed within each of the 8 direct drivers and is dealt with most comprehensively in the Cropland and Agroforestry section of the FGD.
Hamid Custovic (SPI)	Chapter 3	39	1229			The ambiguity over whether land abandonment is a degrading or restorative process - mentioned in line 1263-4 and 1303- should be acknowledged here.	Land abandonment is no longer treated as a separate driver in the revised draft
Brajendra (ITPS)	Chapter 3	39	1232	39	same line	should be driven by instead of driven my	This text is no longer there in the revised draft, but thorough editing has been done on the final report.
Peter Onorato	Chapter 3	39	1232	39	1232	driven my multiple causes including decreased productivity, rural-urban migration in areas where	This text is no longer there in the revised draft
Sally Valdes	Chapter 3	39	1238	39	1240	The recovery of abandoned lands is very dependent on proximity to sources of native flora and fauna for recolonization.	This text is no longer there in the revised draft
Beverley Wemple	Chapter 3	39	1245	40	1271	Two paragraphs of this section give conflicting reports of role of land abandonment on runoff and soil erosion. It's not clear to me why land abandonment might increase runoff and erosion. If so, it would be helpful o clarify.	This text is no longer there in the revised draft
Gengxing Zhao	Chapter 3	39	1245	39	1256	The content there seems belong to the next (3.3.8.2) section.	This text is no longer there in the revised draft
Elena Havlicek	Chapter 3	39	1245	39	1261	Regarding the impact of land abandonment on soils, there are contradictory declarations > line 1245: increased soil loss (references?), but line 1248: decrease in soil erosion and line 1259: reduced soil erosion.	This text is no longer there in the revised draft
Monika Kopecka	Chapter 3	39	1245	39	1245	Negative impacts of land abandonment include increased runoff and erosion, increased soil loss... generally, ending wrong management practices (eg. tillage on steep slopes ) decrease soil erosion. The sentence also contrasts with the statement on page 43 lines 1371 - 1372 "For example, in China, farmland abandonment has been part of the management policy in the Loess Plateau to try and avoid further soil erosion (Jiao et al. 2007; Hou et al. 2014)."	Land abandonment is no longer treated as a separate driver in the revised draft. Land abandonment is now being addressed within each of the 8 direct drivers and is dealt with most comprehensively in the Cropland and Agroforestry section of the FGD.
Monika Kopecka	Chapter 3	39	1245	39	1245	Negative impacts of land abandonment include increased runoff and erosion, increased soil loss... generally, ending wrong management practices (eg. tillage on steep slopes ) decrease soil erosion. The sentence also contrasts with the statement on page 43 lines 1371 - 1372 "For example, in China, farmland abandonment has been part of the management policy in the Loess Plateau to try and avoid further soil erosion (Jiao et al. 2007; Hou et al. 2014)."	Land abandonment is no longer treated as a separate driver in the revised draft. Land abandonment is now being addressed within each of the 8 direct drivers and is dealt with most comprehensively in the Cropland and Agroforestry section of the FGD.
Meredith Root-Bernstein	Chapter 3	39	1249		1256	In Chapter 2, it is unclear whether cultural landscapes are by definition degraded or not. Here, you seem to assume that cultural landscapes are not degraded and abandonment of them can lead to degradation. There is clearly an argument in support of this view (at least in some circumstances), but please coordinate your points of view across chapters.	Land abandonment is no longer treated as a separate driver in the revised draft
Monika Kopecka	Chapter 3	40	1267	40	1267	6 Pg C to the atmosphere... Not common unit, better expression "6 petagrams of carbon"	This text is no longer there in the revised draft, but all units have been standardized across the report.
Monika Kopecka	Chapter 3	40	1267	40	1267	6 Pg C to the atmosphere... Not common unit, better expression "6 petagrams of carbon"	This text is no longer there in the revised draft, but all units have been standardized across the report.
Gunay Erpul	Chapter 3	40	1278	40	1305	The World Bank (2011); Nefedova, 2013; Visser and Spoor, 2010; Ukraine, Russia and Kazakhstan, under - and unused land and food security.	Land abandonment is no longer treated as a separate driver in the revised draft
Zhengshan JU	Chapter 3	40	1279	40	1305	suggest to consider: in arid or half-arid areas, soil secondary salinization cause land abandoned is a kind of typical ecological degradation	Land abandonment is no longer treated as a separate driver in the revised draft
Monika Kopecka	Chapter 3	40	1279	40	1280	How were the regions with strong impact of land degradation identified?	This text is no longer there in the revised draft

D. Pennock (ITPS)	Chapter 3	40	1279	42	1344	There is a disconnect between these two sections. The first identifies two regions where land degradation due to land abandonment occurs; the second discusses a number of other regions (e.g. North America). Should be consistent across the two sections.	This text is no longer there in the revised draft
Monika Kopecka	Chapter 3	40	1279	40	1280	How were the regions with strong impact of land degradation identified?	This text is no longer there in the revised draft
Gengxing Zhao	Chapter 3	40	1306	42	1344	The content is mostly about "past trends", there should have some content on "future trajectories" of land abandonment.	Land abandonment is no longer treated as a separate driver in the revised draft
Nicola Dal Ferro	Chapter 3	42	1326	42	1329	"Main regions": in which sense? Extension? Do you mean that, nowadays, Mediterranean areas are not suffering land abandonment since the phenomenon already happened in the past? Since the paragraph deals also with past trends, I suggest to better clarify it and make it coherent with what reported before in 3.3.8.2	This text is no longer there in the revised draft
Peter Onorato	Chapter 3	42	1326	42	1329	The main regions affected by land abandonment are located in North America, Western Europe, Eastern Asia, parts of South America and eastern Australia (in the latter, mostly on grazing lands). However, not all of these areas can be assumed to be degraded (Gibbs and Salmon 2015), as the impacts of abandonment can vary widely across regions and are not always adequately quantified.	Land abandonment is no longer treated as a separate driver in the revised draft. Land abandonment is now being addressed within each of the 8 direct drivers and is dealt with most comprehensively in the Cropland and Agroforestry section of the FGD.
Nicola Dal Ferro	Chapter 3	42	1345	43	1353	I am not a specialist on the global dynamics in terms of land abandonment. However, since globally people are moving from countryside to urban centres, I was wondering whether land abandonment is somehow related with "infrastructure, urbanization eetc." driver and therefore should be included	Land abandonment is no longer treated as a separate driver in the revised draft. Land abandonment is now being addressed within each of the 8 direct drivers and is dealt with most comprehensively in the Cropland and Agroforestry section of the FGD.
Gengxing Zhao	Chapter 3	42	1345	43	1353	There should address the interaction of land abandonment with related social and economic drivers.	Land abandonment is no longer treated as a separate driver in the revised draft
Penny van Oosterzee	Chapter 3	43	1353			What about increase in degradation in other areas of the globe as a result of "leakage"? I see this is covered further down, but should be flagged here.	Issues related to land abandonment and leakage are now covered in Chapter 4
Gengxing Zhao	Chapter 3	43	1354	43	1357	The content of this section seems too simple.	This text is no longer there in the revised draft. This section was removed as a stand alone section for all drivers and incorporated throughout the text as appropriate. This allowed for a more in-depth treatment in sections where it was relevant and also avoided overlap.
Monika Kopecka	Chapter 3	43	1355	43	1357	Some information about the data would be suitable For example: Assessment of abandonment based on CORINE Land Cover database - (presented by PAZÚR et al (2014). Spatial determinants of abandonment of large-scale arable lands and managed grasslands in Slovakia during the periods of post-socialist transition and European Union accession. In Applied Geography, 2014, vol. 54, p. 118-128.	Due to lack of space in the assessment, data availability and confidence is no longer addressed within each direct driver.
Monika Kopecka	Chapter 3	43	1355	43	1357	Some information about the data would be suitable For example: Assessment of abandonment based on CORINE Land Cover database - (presented by PAZÚR et al (2014). Spatial determinants of abandonment of large-scale arable lands and managed grasslands in Slovakia during the periods of post-socialist transition and European Union accession. In Applied Geography, 2014, vol. 54, p. 118-128.	This text is no longer there in the revised draft, as land abandonment is no longer treated as a separate driver
Mekuria Argaw	Chapter 3	43	1358	43	1374	Opportunities to halt abandonment is not appropriate. What is actually discussed under the title is how to rehabilitate or reinvigorate an abandoned land. Therefore, land abandonment by itself is not a cause or driver for degradation. It is rather one way of giving a break to a degrading land, creating an opportunity for natural or assisted recovery of the land. This is not emphasized in the text.	Land abandonment is no longer treated as a separate driver in the revised draft

John Parrotta	Chapter 3	43	1358	43	1374	The authors need to consider the broader spectrum of approaches that can (and are) used to restore forests, grasslands and other terrestrial ecosystems on abandoned agricultural lands. For forests, I would recommend considering the various approaches outlined in: Lamb, D., Erskine. P., and Parrotta, J.A. 2005. Restoration of degraded tropical forest landscapes Science 310 (5754): 1628-1632.	The broader spectrum of approaches to restore degraded lands is developed in Chapter 6 on responses to land degradation
Penny van Oosterzee	Chapter 3	43	1365			Case study recommended for this.	Land abandonment is no longer treated as a separate driver in the revised draft. Case studies have been incorporated in the final draft, as relevant.
Peter Onorato	Chapter 3	43	1365	43	1366	However, rewilding of abandoned lands is also being increasingly argued for.	The broader spectrum of approaches to restore degraded lands is developed in Chapter 6 on responses to land degradation
Josu G Alday	Chapter 3	43	1375	43	1375	It is a pity that the mineral resource extraction section has not been developed yet.	This section has now been developed in more detail
John Parrotta	Chapter 3	43	1376			I am disappointed not to see any text on these extremely important activities that have such dramatic and far-reaching impacts on biodiversity and ecosystem services worldwide. However, as this text is being prepared, in the section that will discuss opportunities to mitigate the impacts of mineral resource extraction, I would encourage the authors to consider the extremely effective native (tropical) forest restoration practices that has been employed by one bauxite mining company in the Brazilian Amazon - at least at the time when I was studying it (well over a decade ago), it was perhaps unique, and dramatically effective - see: (1) Parrotta, J.A. and Knowles, O.H. 2001. Restoring tropical forests on bauxite mined lands: lessons from the Brazilian Amazon. Ecological Engineering, 17 (2-3): 219-239, (2) Parrotta, J.A and Knowles, O.H. 1999. Restoration of tropical moist forest on bauxite mined lands in the Brazilian Amazon. Restoration Ecology 7(2): 103-116. and (3) Knowles, O.H. and Parrotta, J.A. 1995. Amazonian forest restoration: an innovative system for native species selection based on phenological data and performance indices. Commonwealth Forestry Review 74(3): 230-243.	We have not discussed opportunities for restoration in any detail in the current draft, and these are treated explicitly in Chapter 6. To avoid redundancy and repetition Chapter 3 is focused on treatment of degradation drivers.
German government	Chapter 3	43	1377	47		Chapter 3.3.10: Infrastructure, such as roads, railways and waterways, are not only a result of urbanization. They also serve to connect different residential areas (such as major centers with sub-centers). Therefore, the area-effect of such transport infrastructure should also be appreciated and taken into account. In addition, we request the consideration of the effects of the expansion of renewable energies in the discussions. This concerns in particular the effects of wind farms, the use of solar energy and hydropower. In this context, please also discuss the effects of cross-regional power lines.	Agreed that infrastructure is not urbanization. This is the reason that this section is titled "Infrastructure, industry, and urbanization" as separate but interacting direct drivers of land degradation. Due to space limitations an analysis of renewable energies is likely beyond the scope of this assessment. In the final draft, however, we may consider including a several sentences on future trends in renewable energy development
Elena Havlicek	Chapter 3	43	1385	43	1387	Definition of artificial areas : when they are constituted with more than 50% of built-up or impervious surfaces. > Is it not in contradiction with the lines 1410-1412: "Global artificial areas occupy about 3% of world surface [...] of which 0.65% is built-up area with 0.45% consists of impervious surfaces"? 0.65% is not 50% of 3%, neither 1,1% (built-up + impervious surfaces).	The term "artificial areas" has been eliminated from the SOD. We now refer to "built up areas" that are highly visible and easily monitored by remote sensing technologies. This has helped to resolve statistical inconsistencies
Gunay Erpul	Chapter 3	44	1388	44	1395	(EC, 2011); Huber et al. (2008); EEA, 2010; Umweltbundesamt, 2007: soil sealing monitoring. Ben-Mahmoud, Mansur and Al-Gomati, 2000: infrastructure development and soil compaction	Due to space limitations we have focused on extent and trend in built up areas. Chapter 4 will pick up on the impacts of these changes.
Gunay Erpul	Chapter 3	44	1388	44	1395	Schneider, A., Friedl, M.A. & Potere, D. 2009. A new map of global urban extent from MODIS satellite data. Environ. Res. Lett., 4(044003): 1-11.	Reference included

Gunay Erpul	Chapter 3	44	1404	44	1407	Contamination from Persistent Organic Pollutants (POPs) mainly occurs in urban areas and around industries.	This section has been revised and no longer includes impacts (e.g. pollutants) but focuses on the trend and extent of the driver.
Gengxing Zhao	Chapter 3	44	1408			"3.3.10.2 Extent of infrastructure, industry, urbanization" should be "3.3.10.2 Extent of land degradation due to infrastructure, industry, urbanization"? The decrease of arable land due to expansion of artificial area should be addressed.	The new heading is now "Changes in the extent of infrastructure, industrial development, and urbanization." Text on the decrease in arable land due to IUU would be in "Interactions among Direct Drivers." IUU is mentioned briefly in this section in the SOD but may be expanded on the later draft if space allows.
Zhengshan JU	Chapter 3	44	1409	40	1416	As a global perspective, especially in developing countries with more population pressure, urbanization should be a kind of protection compared to scattered living before urbanization. Because scattered living may cause more damage to the land	This comment would fall under the importance of urban planning and design as a response to land degradation. This information on responses would be located in Chapter 6.
Monika Kopecka	Chapter 3	45	1418	45	1419	Fig- 3.10 Map of BUILT_UP land? Definitions of the classes Impervious, Built-up and Urban area are not clear. According to definition in page 43 lines -1386- 1387 artificial areas constituted with more than 50% of built-up areas or impervious surfaces. What is the difference between built-up and impervious in Fig 3.10? Does urban areas in fig. 3.10 include also industrial areas (defined in line 1380)?	The term "artificial areas" has been eliminated from the SOD. We now refer to "built up areas" that are highly visible and easily monitored by remote sensing technologies. In the FGD we will more clearly define the different terms used in the introduction of infrastructure, urbanization and infrastructure
D. Pennock (ITPS)	Chapter 3	45	1422	45	1431	Soil sealing due to urban growth etc. was identified as the #1 threat to soil functions in Europe in the Status of the World's Soil Resources report - this should be referenced here.	Status of soils, plants, water, biodiversity is covered in Chapter 4.
Samuel Nshutiyayesu	Chapter 3	45	1423	45	1433	There should be some information/data about the pressure on green spaces due to urbanisation	Due to space limitations we can not expand into a detailed discussion of urbanisation pressure on green spaces, but we have elaborated on it in the final draft.
Francesco Morari	Chapter 3	45	1432	45	1432	It would be useful to report also the interactions with other drivers	This is a new section in this chapter (3.5 Interactions among Direct Drivers of Land Degradation)
Nicola Dal Ferro	Chapter 3	45	1432	45	1440	I suggest to consider also "land abandonment" as a driver that interacts with "infrastructure, industry, urbanization"	Land abandonment is mostly located within the Croplands section of the final draft.
Gunay Erpul	Chapter 3	45	1432	45	1432	Loss of biodiversity is expected in the most urbanized and contaminated areas.	Biodiversity loss is covered in Chapter 4.
Penny van Oosterzee	Chapter 3	46	1450			Not sure of the value of these two tables. Compared with other data availability section this appears overkill.	Removed
German government	Chapter 3	46	1450			Table 3.6: This table is not really necessary. Consider removing it.	Removed
Comerma (ITPS)	Chapter 3	47	1451			In mitigation of infrastructures , urbanization and industry we should mention the legao preservation of the best agricultural lands for that purpose	Mitigation approaches are covered in later chapters, and more specifically in CH6, which has the scope to do so.
Elena Havlicek	Chapter 3	47	1456	47	1456	European Environment Agency Report 2016 "Soil resource efficiency in urbanised areas" could also be cited	This section has been removed in the SOD in Chapter 6.
Francesco Morari	Chapter 3	47	1472	47	1473	I would cite also the opportunities given by the vertical farming	Interactions among direct drivers is no longer a section in the final draft.
Mekuria Argaw	Chapter 3	47	1474	47	1474	The direct natural drivers also include Tsunamis, Floods, Natural Fires, Huricans, Tornados, climate change, etc...	The section on 'Natural drivers' has been removed in the revised draft, and we no longer discuss natural drivers in any detail
Gengxing Zhao	Chapter 3	47	1475	47	1492	The drought, flood, seawater invasion could be considered in this section.	This section has been removed in the revised draft

Gunay Erpul	Chapter 3	47	1481	47	1484	Pla, 2003, 1996a, 2011; Restrepo et al., 2006: flooding x landslides x sedimentation.	We have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Gunay Erpul	Chapter 3	47	1481	47	1484	Tropical cyclones x intense rainstorms x steep slopes and landslides	We have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Gunay Erpul	Chapter 3	47	1481	47	1484	(Page et al., 2004) (Parfitt et al., 2013): Sheet erosion by water x landslides x carbon stocks	We have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Gunay Erpul	Chapter 3	47	1481	47	1484	Dymond (2010): tectonic x soil erosion x biological productivity	We have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Comerma (ITPS)	Chapter 3	48	1497			Risk of land slides is more pronounced in areas that receive concentrated high amounts of rainfall superating the capacity of water saturation of soils	The role of extreme events in influencing processes such as landslides is discussed briefly in section 3.4 (Climate change as a threat multiplier of degradation drivers)
Monika Kopecka	Chapter 3	48	1501	48	1501	...few studies evaluate landslides as a direct driver of land degradation References?	This text is no longer there in the revised draft
Monika Kopecka	Chapter 3	48	1501	48	1501	...few studies evaluate landslides as a direct driver of land degradation References?	This text is no longer there in the revised draft
Beverly Wemple	Chapter 3	48	1504			My guess is that any increase in landslide activity would likely be associated with other forms of development or climate change. Typically landslides are so limited in spatial extent that I wouldn't think of them as a form of land degradation themselves, but rather a threat to infrastructure or human life, such as the case you describe in Fig 3.12 page 50.	We have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Shiping Wang	Chapter 3	48	1513	48	1516	Climate change especially extreme climate events such as increased frequency of rain storms how to affect landslides in the future should be addressed.	The role of extreme events in influencing processes such as landslides is discussed briefly in section 3.4 (Climate change as a threat multiplier of degradation drivers)
Gunay Erpul	Chapter 3	48	1518	48	1525	van der Putten et al., 2004; Bardgett and van der Putten, 2014: pests and pathogens x below ground biodiversity	This section has been removed in the revised draft

Adonia Kamukasa Adonia	<b>Chapter 3</b>	49	1566	49	1566	Include the aspect of early warning system for disaster risk reduction, ecosystem resilience in section 3.3.11.6. (Mercy Corps Nepal (2010))	We have removed the section on 'Natural drivers' in the revised version of the chapter due to limited space and to prioritize and focus on human actions or anthropogenic direct drivers. We introduced the idea briefly in the FOD since some natural drivers (e.g. landslides) interact with other anthropogenic direct drivers (forest management) in a way that promotes land degradation.
Lim Li Ching	<b>Chapter 3</b>	49	1566	50	1578	The role of agricultural chemicals and genetically modified organisms (GMOs) in causing pest explosions, e.g. development of resistance, resurgence in secondary pests, could be further explored and analysed.	This section has been removed in the revised draft
Samuel Nshutiyayesu	<b>Chapter 3</b>	50	1583	50	1585	When did this happen? (provide the date)	We have provided a date for the figure, which has now been moved to the section on climate change (3.4)
Penny van Oosterzee	<b>Chapter 3</b>	50	1583			Date for image	We have provided a date for the figure, which has now been moved to the section on climate change (3.4)
Penny van Oosterzee	<b>Chapter 3</b>	52	1603			I don't find this diagram self-explanatory. Maybe something simpler or delete?	This figure has been removed from the revised draft