Comment No	From Page	From Line	To Page	To Line	Comment	Response
2386	0	0	0	0	General comment on the structure of the chapter: it is difficult to understand why there is no section explicitely dedicated on the impacts of climate change on each dimension of food security (4 pillars). Having such structure highly desirable to fully understand the notion of food security as stated in the Paris agrement. [Anne-Laure Sablé, France]	Accepted, See section 5.1.1.2
2404	0	0	0	0	The chapter on food security is not considering agroecology and agroecological food systems in its sections despite a converging consensus for such approach in addressing both mitigation and adaptation challenges. Source: IPES-Food. From uniformity fo diversity.2016 [Anne-Laure Sablé, France]	Accepted. More references to agroecology have been added
24406	0	0	0	0	This is a well-written and comprehensive chapter. From the perspective of the UNCCD, the clear entry point for policy making would be inclusion of Land Degradation Neutrality (LDN) as a response options. LDN, per definiton being a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems", needs to be included as a management option in this section. (See (decision 3/COP.12, UNCCD, 2015). For more compatibility of the approach taken for this chapter and LDN, please see (Orr et al 2017 https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al 2018 https://doi.org/10.1016/j.envsci.2017.10.011) [Barron Joseph Orr, Germany]	Accepted, LDN discussed in section 5.7
8716	0	0	0	0	need additional section based on recent papers on 1.5ºC - implication of the 1.5ºC temperature goal for food security (benefits & trade-offs) [Delphine Deryng, Germany]	Accepted, see section 5.2.3
1086	0	0	0	0	Recommend to add sub-section, be spoted on: The influence of the local policies in developing countries on the global food security. Discussing: 1) The conflicts of decision makers and its response for the food security system. 2) Ignoring the national strategic planning and its effects on the food security. 3) The Role of the Non-Governmental Organization to support the local food security system. 4) How the local media could support the public awarness to enhance the food security programs. [Essam Hassan Mohamed Ahmed, United States of America]	Accepted, see section 5.7 on Enabling Conditions
1088	0	0	0	0	Recommend to add sub-section, be spoted on: The influence of Regional conflicts and wars on the food security. Discussing: 1) The unstability of the regional political situation and its response on food security. 2) How the regional conflicts could affect the food security on short and long terms. 3) How the international and regional agencies could supprt to establish the food security system. [Essam Hassan Mohamed Ahmed, United States of America]	Comment repeated (1086)
7122	0	0	0	0	General comment on chapter 5: It would be useful to reflect on the findings of chp. 5 based on the findings of the other chapters and by means cross-referencing across chapters. This would also support the development of a common storyling through all chapters. [Mariam Akhtar-Schuster, Germany]	Accepted, added cross-chapter references
8132	0	0	0	0	This chapter is epic and the first order draft in general is very well written. The CLAs have done an excellent job putting together a compelling document. I feel like the work is very comprehensive. [Peter Neofotis, United States of America]	Noted. Thanks

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16140	0	0			Better articulation between historical analyses and projections in the future needed. In Chapter 5 authors focus on climate change impact only considering climate scenarios but make little reference to historical (already observed) impacts such as droughts, floods, heat waves etc. See for example FAO, 2016. Climate change and food security: risks and responses http://www.fao.org/3/a-i5188e.pdf . [Lorenzo Giovanni Bellù, Italy]	Accepted, revised and amplified section on Observed Climate Varibales and Observed Impacts on Crop Production
16142	0	0			Use of multiple indicators of food systems performance needed. In chapter 5, in relation to food systems, reference to some common underlying indicators is missing in order to compare across different food systems and to measure the scope of improvement along those metrics or indicators (e.g. balanced food intake, efficiency; energy consumption). An attempt to provide some indicators re the consumption stage of broad regional food systems inin terms of balanced dietary composition in future scenarios is provided in FAO 2018, (forthcoming) The future of food and agriculture - Alternative pathways to 2050 -Rome (chapter 4.6). For info re this FAO report please contact Lorenzo G. Bellù, FAO Global Perspectives Studies, at lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Accepted, indicators now discussed in Emissions sections
16148	0	0			Considering FAO SOFI 2017 (and 2018). Authors should consider SOFI 2017 (anf the forthcoming SOFI 2018, due in September) in addition to of HLPE report. (FAO, IFAD, UNICEF, WFP and WHO. 2017. The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome, FAO). [Lorenzo Giovanni Bellù, Italy]	Accepted. All these reports have been considered
16306	0	0			The chapter does not seem logically organised and contains overlapping parts whithin the Chapter and with other Chapters. After Section 5.3 on the impacts of food systems on climate change, better continue with the impacts of climate change on food systems (now section 5.6) and then continue on mitigation options. Section 5.8 repeats parts of Section 5.2, whereas Section 5.9 and 5.10 repeat parts of Chapter 6 and Chapter 7. Also Section 5.1.4 starts talking about climate change and the food system but does not complete the discussion; instead sections 5.3 and 5.6 are the continuation of section 5.1.4. [Lorenzo Giovanni Bellù, Italy]	Accepted. The chapter has been reorganised and repeated text deleted
16308	0	0			Part of this chapter is on mitigation but it does not explain what should be mitigated. There are different options depending on the different emission pathways. Which emission pathway do you have in mind? What is the starting point and what is the situation without mitigation? Also, when you discuss about mitigation options you have to consider the associated costs. How expensive is putting in practise mitigation options presented in this chapter and how can this be funded? what investments do we need, where and when? [Lorenzo Giovanni Bellù, Italy]	Accepted, Mitigation section revised. See Chapter 7 for costs and policies
16348	0	0			Important references for this Chapter, which are missing from the literature you reviewed are: 1) FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf; 2) FAO. 2016. The State of Food and Agriculture - Climate change, agriculture and food security. Available at http://www.fao.org/publications/sofa/2016/en/; 3)FAO (forthcoming) The future of food and agriculture -Alternative pathways to 2050. For info re this forthcoming report, please, contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies: lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Accepted. They are now included

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20898	0				The chapter is a satisfactory first draft, but it has several shortcomings that need to be addressed with priority if the chapter is to progress to a good second draft. One is that there is a lot of repetition in the chapter; even within many sections, the same statement is repeated several times - this greatly weakens the clarity of findings. I believe the chapter can and should be shortened by at least a third, without any loss of substance. I also found many sections do not present an ASSESSMENT of the literature, but merely state what individual studies have found - but lack the critical scrutiny to evaluate them, and in particular where studies differ in their findings, there is often little attempt to understand the differences. As a result many statements made in the report are not robust. This problem is heightened by the lack of the use of uncertainty language within the chapter (other than in the ES), which reflects the absence of a critical reflection of the validity of findings in individual studies. The authors need to significantly increase their efforts to move from a literature review to an assessment. Examples in additional comments. [Andy Reisinger, New Zealand]	Accepted, chapter reorganized, repetitions deleted, literature assessed, and uncertainty language included
20900	0				The chapter uses a lot of qualitative-emotive words without this being backed up by quantifications, and in some places this strays into policy-prescription. Please rigorously edit the next draft to avoid this (some examples in additional comments). [Andy Reisinger, New Zealand]	Noted, emotive words avoided. Qualitative statements are important since not everything can be quantified. Qualitative statements backed-up with references
20902	0				I find the structure of the chapter mostly good, but with two concerns. One is that integrative sections contain far too much detail that should have been (and often has been) dealt with already in earlier sections - this makes those sections loose the focus on integration and as a result, I found those sections to provide less value that they could and should. My second, possibly most substantive concern regarding structure, is the complete absence of a critical assessment of policies to achieve the various response options. E.g. how effective is GHG emissions pricing in achieving supply- or demand-side mitigation? What other evidence exists for the ability to achieve the demand-side shifts that the chapter outlines? What about the negative impacts of GHG emissions pricing - Hasegawa et al is mentioned briefly but there is a lot more literature on this, including on policies that could help avoid the negative impacts of blunt "price and forget" policies, but this is completely absent. If the chapter seeks to be policy relevant, it urgently needs to consider adding a section (and expertise, possibly through CAs) that deals with policy proposals and experiences to achieve the various adaptation and mitigation options. Otherwise the chapter remains an abstract text book that will help little in actual policy making. [Andy Reisinger, New Zealand]	Accepted, deleted repeats and added policy analysis
20904	0				I was struck that there is virtually no discussion of the advent of synthetic proteins and plant-based replacements of livestock products. I realise this is a rapidly developing area with limited academic literature, but if the chapter remains as silent about this as it is now, it risks omitting consideration of a major disruptive trend that will make the chapter appear dated before it is even completed. [Andy Reisinger, New Zealand]	Accepted, added in section 5.7.1 (sub section on Capital Markets)

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20906	0				In several places, the chapter gives the impression that food self-sufficiency and locally-sourced foods are better as a matter of principle. And yet, there are plenty of studies (approach me for examples) that show that additional emissions related to transport can be far outweighed by differences in emissions intensities of products produced at distance from their final consumption - meaning a GHG-efficient food system may have to rely more rather than less on long-distance trade. (This is not necessarily a robust conclusion either - but that question should be a focus of the assessment, not an assumption either way.). The same goes for food self-sufficiency - if all countries strive to be as self-sufficient as possible, this means that most countries will produce some foods inefficiently and thus with higher GHG emissions than an efficient trade-based system. Trade of course presents other risks, but again, the value of self-sufficiency should be assessed, not assumed. [Andy Reisinger, New Zealand]	Acepted. The text has been revised to critically assess localised food production
20908	0				The chapter uses a lot of unexplained units and acronyms - please either spell out at first use or ensure they are contained in an appendix to the report (and harmonised - avoid using different units for the same quantity). [Andy Reisinger, New Zealand]	Noted. Thanks
18436	0				The chapter could be re-organized from definitions, to impacts to responses. for now it goes in different directions on these three aspects. After Section 5.3 better continue with current section 5.6 (impacts on food systems); then to options starting with mitigation then on adaptation/resilience. [Aziz Elbehri, Italy]	Accepted. Chapter has been reorganised
18438	0				A forthcoming FAO report is worth consulting and citing: "The future of food and agriculture - Alternative pathways to 2050". The report is not yet released but the authors could contact the lead author: Lorenzo Giovanni Bellù (lorenzogiovanni.bellu@fao.org) [Aziz Elbehri, Italy]	Accepted, added reference
25834	0				please refer to IPCC style guide regarding use of acronyms [Hans Poertner and WGII TSU, Germany]	Noted. Thanks
25920	0				The chapter is still quite repetitive in certain sections. It could be more integrative, e.g., the sections on trends and status can be integrated in the subsequent sections in impacts etc. Also, the climate change-link is not always explicit or obvious, and impacts/adaptation could also be structured in a more integrative way. [Hans Poertner and WGII TSU, Germany]	Accepted. Chapter has been reorganised and more focused on climate change
25922	0				Suggest to strengthen global-regional perspective (regarding 5.3 and observations; in the projections section this is good). There are often very generalised and global statements, and few findings on the regional scale [Hans Poertner and WGII TSU, Germany]	Accepted, added more on regions
25924	0				Need for more cross-references across sections and SRCCL chapters [Hans Poertner and WGII TSU, Germany]	Accepted, added cross-chapter and section references
25926	0				Synergies and trade-offs with regards to ecosystems and biodiversity need to be discussed more explicitly [Hans Poertner and WGII TSU, Germany]	Accepted, added
25928	0				Specific links to the SDGs should be mentioned after their introduction in 5.1; i.e., in the impacts, mitigation and adaptation sections [Hans Poertner and WGII TSU, Germany]	Accepted, moved SDGs to Synergies and Trade-offs section

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26484	0				Several sections still lack confidence statements (e.g., impacts); sometimes wrong use of uncertainty language, e.g., combining evidence with confidence statements (instead of agreement) [Hans Poertner and WGII TSU, Germany]	Accepted, added confidence statements and fixed errors in uncertainty language
20534	0				1. Part 5.6 maybe moved after Part 5.3, which is better to consider as the impacts of climate change on food system verse the impacts of food system on climate change. [Huai Jianjun, China]	Noted. The chapter has been reorganised
20538	0				3. Part 5.7.4, 5.7.5 as well as 5.7.6 maybe have overlaped according to their titles, and they also are different from the three part of 5.7, which can be classified in to different organizational scale, suchas from international , country, regional ,communities to individuals. So I do not think it is belong to the same charpters [Huai Jianjun, China]	Noted. The chapter has been reorganised
20540	0				4. Part 5.8 includes too much adaptation or mitigations measurements and policies, but they should connected with some previous charpters, or else, it seem messy. [Huai Jianjun, China]	Accepted, in Synergies section (5.6), we connected with Adaptation (5.3) and Mitigation (5.5) sections
25372	0				The Food Security chapter lacks concreteness when it comes to action policymakers can take to make their food systems compatible with the Paris Agreement. It's all too general and conceptual, to be tangible enough for policymakers. This is especially true for policies and measures to tackle the demand side. [Kaisa Kosonen, Finland]	Accepted, added policy analysis section
9634	0				the rating of the findings is different from the other chapters ("confidence" ,whereas othe chapters rated also "evidence" and "agreement" [Markus Giger, Switzerland]	Accepted, added confidence statements and fixed errors in uncertainty language
8180	0				The chapter team deserves commendation for infusing new knowedge and gathering lierature on some novel approaches relating to demand and supply sides of the food system. [Muhammad Mohsin Iqbal, Pakistan]	Noted. Thanks
14538	0				A white paper entitled “Zero Net Land Degradation” presented by UNCCD at the Rio+20 meeting was the precursor of the UNCCD/SPI project “Land Degradation Neutrality” (LDN), and meticulously presented by Orr et al. (2017) and Cowie et al. (2018). Furthermore, the urgency to achieve global LDN by 2030 necessitates identification of key parameters and their critical limits in relation to productivity and use efficiency of essential inputs for different types and severity of land degradation. In addition, credible estimates of land degradation by different processes must be known by diverse processes at the landscape scale of 1:10,000. The impact of restoration processes on productivity and use efficiency of inputs must be known for site-specific conditions so that scientific data can be translated into policy actions, and land managers/farmers can be rewarded for strengthening of essential ecosystem services. Specific comments by members of UNCCD-SPI for detailed revision of the chapter are given below: [Rattan Lal, United States of America]	Accepted, LDN discussed in setion 5.7
14540	0				General coments: Impressed with the quality of this chapter. It's well structured with rich information. I congratulate the authors and editors for doing a splendid job. [Rattan Lal, United States of America]	Noted. Thanks

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3908	0				Please check: The discussuions on Impacts of observed and projected climate change on food and nutrition security and food production vis-à-vis impact of food and nutrition security on climate change may be illustrated in light of CO2 fertilization, elevated CO2 and O3 and their influence on photosynthesis, altered nature of photosynthates reserved in food grains, shifting nutritional qualities in food grains under changed climate, and average elevated nighttime temperature increase coupled with heat flux load on grain quality. [Suvadip Neogi, India]	Accepted, added
3910	0				Please check: Illustration of the discussion on climate smart and climate resilent agriculture incorporating positive aspects of conservation agriculture in tropical agroecosystems is relevant in context of sustainable land management, land-based mitigation options on food security, and synergies and trade-offs between adaptation and mitigation. This will help understand the utility of implementing low carbon resource conservation technologies in agriculture for natural resource management and ecosystem sustenance. In Agriculture sector climate change adaptation can go hand-in-hand with mitigation. Climate change adaptation and mitigation measures need to be integrated into overall developmental approaches and policies keeping in mind the food and nutritional security and environmental sustainability. [Suvadip Neogi, India]	Accepted. Conservation agriculture and other integrated and integrative approaches have been added
1238	0				A few resources authors might consider for this chapter: Loladze, Irakli, "Hidden shift of the ionome of plants exposed to elevated CO2 depletes minerals at the base of human nutrition." and World Bank, "The Cost of the Gender Gap in Agricultural Productivity" available at http://documents.worldbank.org/curated/en/847131467987832287/The-cost-of-the-gender-gap-in-agricultural-productivity-in-Malawi-Tanzania-and-Uganda [Tonya Rawe, United States of America]	Accepted, added references
9414	1	2	7	43	I would like to congratulate the authors for all their comprehensive research that has gone into this report. Their findings are very interesting and important. Taking a holistic approach to define the activities related to food and agriculture as a system is vital and helps to address the challenges affecting them (socio-ecological, economic and policy factors) in a more comprehensive manner. Similarly, the report's case for transformational change throughout the food system as an effective measure to adapt to climate change (in terms of resilience and reduction in GHG emissions), is an important and welcomed contribution. [Helena Shilomboleni, Canada]	Noted, thanks
9416	1	2	110	70	Considering these forward-thinking ideas, however, the report raises a few questions and concerns that I felt were not adequately addressed. More analysis on these would help bring about the transformational change in our food systems that the authors wish to see. [Helena Shilomboleni, Canada]	Noted, issues addressed more fully in SOD
440	1	1	151	1	Impressed by the whole system approach of the chapter - very important to cover full food supply chains and demand-side aspects as well as supply-side. Great to see. [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Noted, thanks
7174	1	1	151	1	Congratulations to the authors on this first draft of a very tough job. Really appreciate the attention devoted to social issues, impacts of extremes on food availability, boxed examples from all over the world with an emphasis on highly populated Africa. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Noted, thanks

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17640	2	4	2	10	Comparing the decision outline and the table of content of the draft report it was found that some of the sub-sections of section one of the decision outline were omitted namely, (farming systems including agroforestry and food-energy-water nexus). I am aware of the fact that authors consider the approved outline as 'indicative' but nevertheless it is important for the reader to understand the context and framing of these important concepts, so some explanation should be added at the start of this chapter. (nb the food-water-energy nexus is only explained in 5.8.6.5 on page 81). [Asia Adlan, Sudan]	Rejected, Framing and Context section shortened in SOD; but agroforestry and FEW sections in document
3096	2	15	2	15	Food consumption pattern in related to climate change should be considered regionally. The issues such as energy used and gas emitted for a unit of standard food production. [Mostafa Jafari, Iran]	Accepted, added text highlighting need to consider food consumption patterns regionally
10698	2	1	3	26	The chapter needs for integration between supply and demand sides to adress food security issues. There is a short section trying to adress this (5.8.2) but it should be way more central to the entire chapter as it is the core of the issue. Partial analuysis are very numerous but coprehensive one agregating all critical dimensions are lacing. [Anne Mottet, Italy]	Noted, supply and demand integrated more fully in SOD
10700	2	1	3	26	Why are Low-carbon and climate reislient livestock systems limited to a very short sub-section of the Hotpsot section 5.9? They aretructural to the chapter given the size of the sector, its role in food securitty, its vulnerability to climate change and its contribution to aoverall emissions. These systems have relevance in all se tcions of the report. Why are they singled out in the hotpot and not plam oil of soybean produciton for example? The logic is hard to see. [Anne Mottet, Italy]	Noted. Text changed Topic discussed now in section 5.4.3
9636	2	2	3	28	I think the summary is quite well balanced. [Markus Giger, Switzerland]	Noted, thanks
18546	4		1		The overall Executive Summary is disjointed, incomplete and could be better rearragned. It doesn't paint a complete set of messages and conclusions reflected in the chapter [Aziz Elbehri, Italy]	Taken into account, ES has been rearranged and expanded
26984	4	1	4	4	An effective take on the holistic approach to food production, supply and consumption. However, this view of holism is a bit limited in scope. Authors may like to look at agricultural innovation literature that discusses reductionist and hilistic perspective on food and agriculture in a much better way (e.g., farming systems research and extension, agricultural knowledge and information systems, agricultural innovation systems, agricultural knowledge and innovation systems, and adaptive transition systems. These literature also help to move beyond the demand and supply side issues and look at problelms from complex adaptive systems thinking. Klerkx, L., van Mierlo, B., & Leeuwis, C. (2012). Evolution of systems approaches to agricultural innovation: Concepts, analysis and interventions. In I. Darnhofer, D. Gibbon & B. Dedieu (Eds.), Farming Systems Research into the 21st century: the new dynamic (pp. 457-483). Dordrecht: Springer. Pant, L. P., & Hambly Odame, H. (2009). Innovation systems in renewable natural resource management and sustainable agriculture. African Journal of Science, Technology, Innovation, and Development, 1(1), 103-135. [Laxmi Pant, Canada]	Text removed
3234	4	1	4	25	The differnce between production and supply is not entirely clear an should be specified [Karlheinz Erb, Austria]	Accepted, clarified activities of food system

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20910	4	2	4	3	This is an example of emotive-prescriptive wording - "an important holistic approach" - important for who, how do you do, better than what - and is there evidence that the holistic approach can and has been applied effectively in practice? I'm not saying this is wrong, but I don't feel the chapter has provided the evidence of how this approach can be applied in practice to make better policy decisions or even understand trade-offs. [Andy Reisinger, New Zealand]	Accepted, text removed
3232	4	2	4	4	The first sentence, in particular the expression "is an important holistic" is too long and too complicated. Maybe reformulate, e.g. "Framing the food system as the mutual interdependence of production, supply and consuption is a precondition/allows/enables xx xx". Should not processing also be mentioned as part of the food system, as well as wastes/emissions? [Karlheinz Erb, Austria]	Noted, text changed
7148	4	2	4	9	Getting these messages right is the single most important thing to do in this long chapter - strongly reocommend allocating effort to this collective task. Avoid having an abstract conceptual message as the lead message from the chapter; show rather than tell a systems approach. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, rewrote lead paragraph
15732	4	3	4	3	Athrough which adresses [Maria del Pilar Salazar Vargas, Mexico]	Noted, text removed
15734	4	3	4	3	The changes in climate incts on the food system [Maria del Pilar Salazar Vargas, Mexico]	Rejected, unclear
570	4	4	4	4	planetary health is a specific term which should be further explained in the glossary. [Klaus Radunsky, Austria]	Accepted, deleted planetary health
17336	4	5	4	5	Climate change is not only affecting global food systems and their functions to deliver food, but also is excerbating global food inequality whereby while a large majority of the global population is having more than enough food, millions are still faced with starvation. Already about one in every 9 people globally (approximately 800 million people) are undernourished. Undernourishment as used here “is a state, lasting for at least one year, of inability to acquire enough food to meet dietary energy requirements for conducting an active and healthy life” (FAO, 2015) (pg 14). [Robert Ddamulira, United States of America]	Accepted, added statement "especially for the undernourished"
17376	4	5	4	9	I suggest: …food production systems…" instead of "…food system…" [Noureddine Benkeblia, Jamaica]	Rejected. The concept of food systems is used to encompass both production and consumption.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4308	4	10	4	11	Cross-check and reconcile figures on emissions from the current food system. For example, Line 11 says 12%-14% from land use change and on Page 12 (Lines 27 and 28) indicates 10%-12% directly and 24% indirectly from land use change. In the ExSum the number 15-17 % is for the 'food system ' (production/supply/consumption) while page 12 line 27/28 the 10-12 % is for 'agriculture only' so I assume only the 'production' side. The large number for LUC (24%) may be because of accounting for indirect land use (leading to deforestation and degraded land). It would help the reader if the authors clarify the system boundaries and show pie charts so it becomes more transparent where the percentages come from. [Charles Nhemachena, South Africa]	Accepted, emission numbers updated
25526	4	10	4	16	More a general comment than a criticism of this paragraph - there are many different figures for proprtions of GHG emissions throughout the chapter - it would be good to be clear on which the chapter is adopting as default figures for use in the summaries and headline statements [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, emission numbers updated
7150	4	10	4	40	Strongly recommend thoughtful work on these lead messages. Currently an over-emphasis on mitigation. Recommend a greater emphasis on demand-side and supply-side actions (including trade, processing etc) that deliver on both emissions reductions (mitigation) and climate resilience (adaptation). Aim for equal emphasis on WGII & WGIII type topics. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, reordered chapter and ES to put Impacts and Adaptation before Mitigation
16702	4	13	4	13	add a "," after "medium evidence". [Jing Wang, China]	Editorial, fixed
21308	4	17	4	20	Coinsider including quantfied values for given statements to make it more strong summary statement [Soora Naresh Kumar, India]	Accepted, quantified values given
20914	4	17	4	25	This is an example of a statement being repeated even within the same para (reduction in emissions intensity does not necessarily reduce absolute emissions). More importantly, the main policy-relevant question remains unanswered - what are the policy contexts under which reductions in emissions intensity can support reductions in absolute emissions, and where can a focus on emissions intensity be counterproductive? I also found the underlying chapter to leave this question largely unanswered. [Andy Reisinger, New Zealand]	Accepted, text changed
18542	4	17	4	25	Isn't it time to stop thinking about listing potential actions that we think will result in lower emissions and place mitigation options as part of integrated approaches that meet multiple objectives, including lower GHG but not GHG in isolation [Aziz Elbehri, Italy]	Rejected, beyond scope of chapter. See chapter 6
21218	4	17	4	25	Coinsider including quantfied values for given statements to make it more strong summary statement [Soora Naresh Kumar, India]	Accepted, added numbers
25376	4	26	4	27	"can help" seems way too cautious an expression here, and as such misleading. [Kaisa Kosonen, Finland]	Rejected, policy relevant not policy prescriptive
10704	4	26	4	32	Not only in the case of meat. See for example palm oil. Many products that experience incrased demand should be considered for demand management. [Anne Mottet, Italy]	Accepted, added vegetables oils to ES and palm oil in text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18440	4	26	4	32	The discussion should be more balanced; in addition to meat, consider also other products that are exanding demand wise like palm oil etc. All food products that are experiencing incrased demand should be explicitely treated within demand management. [Aziz Elbehri, Italy]	Noted, text changed
18442	4	26	4	32	The diet trends are moving opposite what is desirable from climate and mitigation perspective . A more important questions is really how to reverse the trend. As presented the message needs to be rethought [Aziz Elbehri, Italy]	Accepted, added text on reversing trends
25374	4	26	4	32	It would be important to quantify the mitigation potential of dietary changes here, based on section 5.5.3. (Also note that 6.9.2.7 defines the mitigation potential of sustainable healthy diets as 4.4 GtCO2yr-1.) [Kaisa Kosonen, Finland]	Accepted, added text
16152	4	26	4	32	Clearer messages on diet trends needed. The diet trends are moving opposite what is desirable from climate and mitigation perspective . A more important questions is really how to reverse the trend. As presented the message needs to be rethought. For alternative dietary patterns, and, more in gemeral, alternative food and agricultural systems, to 2050 and related impacts on GHG emissions, see The future of food and agriculture - Alternative patterns to 2050 - FAO Rome, section 4.13. For info re this forthcoming report, please contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies team, at lorenzogiovanni.bellu@fao.org. [Lorenzo Giovanni Bellù, Italy]	Accepted, added text
21220	4	26	4	32	Coinsider including quantfied values for given statements to make it more strong summary statementCoinsider including quantfied values for given [Soora Naresh Kumar, India]	Accepted, added more quantitative values
1240	4	26	4	32	Paragraph should be framed in terms of current # of hungry and malnourished, as a current challenge that must be addressed while also shifting consumption to sustainable diets (where they are currently not environmentally sustainable) [Tonya Rawe, United States of America]	Accepted, we have added numbers at top of ES
1692	4	29	4	30	It would be good to talk about meat and dairy consumption, as dairy consumption tends to have some of the same effects as meat consumption, even though the differences in GHG emissions are acknowledged. [Simone Lovera-Bilderbeek, Paraguay]	Accepted, added "livestock and animal products"
20916	4	30	4	31	add "on average" since I'm sure that some vegetarian diets that use e.g. greenhouse products produced locally during winter could have very high emissions. [Andy Reisinger, New Zealand]	Accepted, added "on average"
20918	4	31	4	32	Make clear at what scale and to whom those cost savings accrue - the problem is that the farmer who can no longer sell his or her emissions-intensive product is not the one who benefits equally from reduced societal health costs. [Andy Reisinger, New Zealand]	Accepted, added text
25378	4	31	4	32	"Cost savings due to healthy diets can be greater than costs of agriculture mitigation". This is an important finding for policymakers. Could it be among the highlighted (bolded) findings in the summary? [Kaisa Kosonen, Finland]	Rejected, not quantified at this time
7104	4	31	4	32	Clarification required: Where can the "cost savings" be achieved? What is agriculture mitigation? [Mariam Akhtar-Schuster, Germany]	Accepted, text removed
16704	4	32	4	32	change “;” into “,”. [Jing Wang, China]	Accepted, fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
572	4	33	4	33	Why intrroduce the term "GHG abatement"? Is it different from the term GHG mitigation? If not, it is strongly recommended to use already existing terms. If there is actual a difference, and there is no appropriate term already availabale in AR5, it is required to explain the term in the glossary. [Klaus Radunsky, Austria]	Accepted, changed to mitigation
17408	4	33	4	40	Please check the units: no full stop after the symbol with supperscript and space between the symbols: kcal cap-1 day-1 [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
1242	4	33	4	40	The paragraph is unclear on the distinction between food loss and food waste -- it references both and then goes into detail on the waste side only. [Tonya Rawe, United States of America]	Accepted, added definition of food loss and food waste
18544	4	33	4	43	The real question to posit for policy makers is a rigorous analysis of the costs to reduce food waste and loss even by half of the current rates [Aziz Elbehri, Italy]	Rejected due to lack of literature on cost to reduce food waste but added values on cost due to food waste and loss
25862	4	36	4	36	Could the "kcalcap-day" in the Executive Summary be translated in a unit/scale that non-experts are more familiar with? [Hans Poertner and WGII TSU, Germany]	Accepted, fixed
21222	4	37	4	37	consider revising this sentence.....particulary .....'producing wasted food..... [Soora Naresh Kumar, India]	Accepted, text changed
15736	4	38	4	39	The total carbon footprint of food loss and waste in 2011 was around 4.4 Gt CO2eyr-1 39 , taking for account the lifecycle of lost and wasted food [Maria del Pilar Salazar Vargas, Mexico]	Noted, text already changed
9552	4	38	4	40	It's surprising to see here that "food loss and waste in 2011 was around 4.4 Gt CO2e/yr, when chapter 2, page 9, lines 6-8 identify that "Reducing food and agricultural waste could reduce emission by 0.38 to 0.45 GtCO2e/yr". How do these numbers go together? [Dirk Nemitz, Germany]	Taken into account
25380	4	39	4	39	Please clarify here how the 4.4 Gt CO2eyr-1 compares to the overall food system emissions. [Kaisa Kosonen, Finland]	Accepted and compared with total anthropogenic GHG emissions
574	4	41	4	41	There are several ways in which climate change is affecting water (e.g. amount of precipitation, amount of evaporation, clouds, ground water levels, oxygen content). A greater specificity would be helpful. [Klaus Radunsky, Austria]	Accepted, text changed
1244	4	41	4	43	The bolding of the paragraph and the emphasis on impact on food production should be balanced with discussion of impacts of climate change on all aspects of food security (as previously found by the IPCC) -- in order to temper the continued overemphasis on food production. Utilization is recognized as also impacted, which is good (but this is where the bolding creates the wrong emphasis). Brief mention of the impact of climate change, felt through other socio-economic dynamics, on other aspects of food security (like access) could be made. Consideration of food security should reflect the four pillars of food security; and a balance between food security and food systems discussion should be maintained. [Tonya Rawe, United States of America]	Accepted, added four pillars to key message

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4076	4	41	4	47	add "and nutritional value" after "production" in line 41, and on line 47 add "there is now strong evidence, with high confidence, that protein content of plants is affected negatively by higher CO2 concentrations. In addition, some micronutrients, like iron and zinc will be less accumulated and less available in food." (from section 5.6.4.2, page 55, lines 23-27). Comment: This important statement - that crops will become less nutritious under climate change (even as, or perhaps because, they are growing faster) - is a critical finding. [Reid Detchon, United States of America]	Accepted, added text
576	4	42	4	42	Extreme events is again very unspecific. It is important to identify exactly which extreme events ha proven impacts on food production, based on the literature identified in the chapter. [Klaus Radunsky, Austria]	Accepted, added text
578	4	43	4	43	The statement: these impacts are projected to grow" is a very broad and general statement. Given that it is qualified as a staement with robust evidence and high agreement a greater specificity is required on the nature, the location and the time horizone and the scenario for which the literature studied provides such evidence in order to allow the reader to verify this statement based on the underlying chapter. [Klaus Radunsky, Austria]	Accepted, added projected changes per °C and effects on nutritional quality
8062	4	44	4	45	Disagree strongly. There is no evidence provided in the chapter for that sentence, remove "Extensive/mixed agroecosystems are higher in diversity and/or more resilient to climate change than highly specialised systems, such as mono-cropping (high evidence, medium agreement)." There is not enough scientific evidence for this statement yet. There are maybe three studies cited in the chapter that make some vague statemens about the resilience of diverse vs. mono-cropping systems, Costanzo and Barberi 2014, Remans et al. 2015 and Sibhatu et al. 2015. Remans et al. does not provide any results from original research, Sibhatu et al. is about the relationship between production and diet diversity only. [Katharina Waha, Australia]	Noted, address issue further in chapter
17092	4	1	5	5	Excellent Executive Summary. Can you include something about which SDGs are achieved? [Lourdes Tibig, Philippines]	New sections on SDGs added
10702	4	1	5	31	Definition of a food system is provided later, but it would be important to have one in exceutive summary as it is everywere. Also are we talking about food systems or A food system (singular). This bings confusion [Anne Mottet, Italy]	Accepted, food system now defined in Executive Summary. Food system is singular as a concept but there are many types which are discussed in the chapter

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6774	4	1	5	31	The Executive summary is well designed, but I would recommend the following additions as well as changes: The paragraphs can be shortened but need to have clearer key messages or recommendations. Estimation of crop yields loos per 1°C increase in global temperature and observation wheat yield loses should be added as a paragraph (Figure 5.19) (Other studies focusing on India have found that combinations of local air pollution and warming have reduced wheat yields by 5.2% from 1981 to 2009); -Plant sciences can contribute, to intensified crop productivity and to sustainable agriculture by developing new plant cultivars; -According to this comprehensive analysis, plant breeding innovation has contributed approximately three-quarters of the overall productivity in world arable farming; -GHG emissions associated with different diets are unneglectable. Nations have to raise awareness on this subject. So it should also take place in summaries; -Mismanagement of water sources could cause climate change like in Syria"s case; -World Bank's subsidies for Climate Changes should also be mentioned in summary; -Necessities for breeding new genotypes to mitigate impact of climate change to food security should also be emphasized in summary; -Considering animal health and welfare, cultured meat issue must be put in the research agenda of every nation; -SRCCL should also recommend to governments to reorganize their manpower and infrastructure for an effective agricultural research and food systems like Brazil did; -With debatable 20 km extents (why not 10 or 50km) urban issue, this theme seems not very necessary for summary; [Nazimi Acikgoz, Turkey]	Accepted, crop loss per 1°C increases and development of new plan cultivar added to ES. Other comments refer to enabling conditions section. Urban agriculture important for Exec Summ due to importance of consumers
3906	4	1	5	33	Please check: Executive summary: It will be pertinent to illustrate the issue of role of climate change on four pillars of food and nutritional security in line with availability (supply, production, distribution, and exchange), access (entitlement, affordability, allocation, and preference), utilisation (the body's ability to metabolise food nutrients, which might be impaired by illness, nutritional value, social value, and food safety) and stability (in the other three pillars). The four dimensions of food security will be affected by projected climate change. Anticipated and projected climate change will have an impact on human health, livelihood security, food production and distribution channels, as well as altering purchasing power and market flows. [Suvadip Neogi, India]	Accepted, four pillars now included in ES
26810	4	10	5	16	The GHGs emissions from food system are variable: emissions from food system in developping countries are different from developped countries, for example. And between continents and within continents, there is a variation. It could be more informative to highlight the regional variations in food system contributions to GHGs. [Alcade Segnon, Benin]	Rejected, focus in ES is on global numbers
25528	4	41	5	2	It might be worth saying, here or elsewhere, that climate impacts on non-food cash-crop production will impact the food security of smallholders [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, added text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18572	4		6		The chapter could be re-organized from definitions, to impacts to responses. for now it goes in different directions on these three aspects. After Section 5.3 better continue with current section 5.6 (impacts on food systems); then to options starting with mitigation then on adaptation/resilience. [Aziz Elbehri, Italy]	Taken into account, chapter restructured
18582	4		6		A forthcoming FAO report is worth consulting and citing: "The future of food and agriculture - Alternative pathways to 2050". The report is not yet released but the authors could contact the lead author: Lorenzo Giovanni Bellù (lorenzogiovanni.bellu@fao.org) [Aziz Elbehri, Italy]	Accepted, will include report when released
10568	4	1	106	12	in general there are some topics that were not mentioned/discussed as for examplemissing: "Food sovereignty", a term coined by members of Via Campesina in 1996, asserts that the people who produce, distribute, and consume food should control the mechanisms and policies of food production and distribution, rather than the corporations and market institutions they believe have come to dominate the global food system. It also encompasses the right of peoples to healthy and culturally appropriate food and their right to define their own food and agriculture systems. The phrase "culturally appropriate" signifies that the food that is available and accessible for the population should fit with the cultural background of the people consuming it." , also discussion about agro-ecology and the "right to food"is missing. Some FAO publications would be good references to include in the literature review for this chapter (e.g. FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf; FAO. 2016. The State of Food and Agriculture - Climate change, agriculture and food security. Available at: http://www.fao.org/publications/sofa/2016/en/; there are also relevant publications related to forests and soil , e.g. the Global Soil Organic Carbon Map by the Global Soil Partnership http://www.fao.org/3/a-i8195e.pdf State of the World's Forests 2018 would be relevant for Chapters 1, 6, and 7 http://www.fao.org/documents/card/en/c/I9535EN/ [Zitouni Ould-Dada, Italy]	Rejected, beyond scope of chapter. FAO 2018, 2017, and 2016 now included. Agroecology discussion added to the main text of the chapter
25830	4	1			in supporting statements please include regional and quantitative information, eg which regions, %, how many, by what time period, under which scenario... [Hans Poertner and WGII TSU, Germany]	Accepted, added regional and quantitative statements
25930	4	1			Executive Summary: Suggest to add a paragraph linking to vulnerable populations and sustainable development goals. Also synergies and trade-offs regarding ecosystem health are not really pointed out. [Hans Poertner and WGII TSU, Germany]	Accepted, added vulnerable populations. Will add SDGs if TSU gives ok. Added ecosystem health to synergies and tradeoffs
10302	4	5		6	The statement will be more understandable if the semi-colon in line 6 is full stop and the next word starts with capital letter [Bolanle Mutiat Titilola, Nigeria]	Noted, text removed
17784	4	10			Remove first "%", and take the same approach in the next two instances on this and the next line. [Donald Smith, Canada]	Editorial, fixed
17406	4	10			I suggest "…food systems…" rather than "…food system…" [Noureddine Benkeblia, Jamaica]	Rejected. The concept of food systems is used to encompass both production and consumption.
10304	4	19			Stating definition of emission intensity and increased emission in front of each and at this point will make the point clearer [Bolanle Mutiat Titilola, Nigeria]	Rejected, emission intensity defined at beginning of key methods section

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20912	4	21			Why reduction in pasture area? I have not found evidence for this statement in the chapter itself. Reducing stocking rates at constant pasture area could be a very effective approach to reducing emissions and potentially even inreasing profitability for some livestock systems. [Andy Reisinger, New Zealand]	Accepted, text changed
17094	4	22			What is meant by land sparing? How is this done? [Lourdes Tibig, Philippines]	Accepted, text removed in ES. See Cross-chapter Box on Land sharing and sparing
17786	4	41			Add "availability" after "water" [Donald Smith, Canada]	Accepted, added availability
17410	4	42			agroecosystems…. [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
17412	4	43			:"…to worsen…" rather than to grow because models are predicting worse scenarios [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
15738	5	3	5	3	There is a strong evidence [Maria del Pilar Salazar Vargas, Mexico]	Accepted, text changed
4310	5	3	5	4	Suggest "pests" should be added in the bold statement as dynamics of both pests and diseases are affected by climate change. [Charles Nhemachena, South Africa]	Accepted, added "pests"
580	5	3	5	4	Again this is a broad statement of high confidence. It needs to be made more specific in order to allow the reader to verify that such statement is based on specific studies for specific locations and specific diseases under specific weather conditions. Only if such studies are available such statement can be made. [Klaus Radunsky, Austria]	Rejected, difficult to generalize effects of climate change on pests and diseases due to multiple ecological factors
18548	5	3	5	9	The Executive Summary shifts between impacts and responses; the ES should better structured and organized [Aziz Elbehri, Italy]	Taken into account, ES restructured
25828	5	3	5	9	the supporting statements convey a broader picture then suggested in bold statement which only focuses on disease eg mismatch with pollinators [Hans Poertner and WGII TSU, Germany]	Accepted, added pollinators to bold statement
21224	5	3	5	9	Consider adding emergence of new pests, minor pests becoming major pests, re-emergence of past pests….and pest-predator relationship chnages may also be included [Soora Naresh Kumar, India]	Accepted, text added
6550	5	10	5	14	the technical interventions may have to consider the unique nature of regions and communities [Ojong.E nee Enokenwa Baa, South Africa]	Accepted, added text
17420	5	15	5	16	"…increasing and preserving agricultural biodiversity…" [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
24408	5	16	5	16	For effectively exploring synergies between land-based adaptation and mitigation, one could hereby consider Land Degradation Neutrality approaches, in line with SDG target 15.3. Actions to achieve LDN include sustainable land management approaches that avoid or reduce degradation, coupled with efforts to reverse degradation through restoration or rehabilitation of land that has lost productivity. [Barron Joseph Orr, Germany]	Rejected, it was agreed in plenary that we do not need to pay special attention to LDN in our chapter

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14542	5	16	5	16	All 196 country Parties of the UNCCD endorse Land Degradation Neutrality (LDN) in 2017. The framework has multiple entry points and emphasizes multiple benefits (one of the indicators is SOC), and it is part of SDG target 15.3. That said, LDN provides a framework for CC adaptation and mitigation within the context of land. Actions to achieve LDN include sustainable land management approaches that avoid or reduce degradation, coupled with efforts to reverse degradation through restoration or rehabilitation of land that has lost productivity. For relevant peer-reviewed references, see: Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality (https://doi.org/10.1016/j.envsci.2017.10.011) [Rattan Lal, United States of America]	Rejected, it was agreed in plenary that we do not need to pay special attention to LDN in our chapter
26812	5	17	5	21	The certainty and agreement statement on line 18-19 and 21 are not the same. In addition, certainty statement on Line 21 is not in italics like all statements in the chapter. Please clarify this. [Alcade Segnon, Benin]	Accepted, deleted statement on line 21
19654	5	17	5	21	To add here or in the chapter: Nevertheless, the urban and peri-urban agriculture is itself exposed to climate change impacts in cities. For example, weather extremes like heat waves lead to extended cyanobacteria blooms in aquifers. If these aquifers are used for irrigation of agricultural areas in cities, there is a risk of toxic's transfer (for example microcystin) into the fresh produce. The consumption would cause a considerable threat to the health of the respective people. (Food Research International. Lee; A., Jiang S. et al. Fresh produce and their soils accumulate cyanotoxins from irrigation water: Implications for public health and food security. Volume 102, December 2017, Pages 234-245). [Birgit Kuna, Germany]	Rejected, the described phenomenon also hold for rural agrilculture region.
3236	5	17	5	21	The passage could profit from quantitative information, or, a forumulation like: albeit limited in overall terms (15% of total food supply), urban and peri-urban agriculture contributes to food and nutrition security due to xxx, spelling out the mechanisms (multifunctional, short transport, proximity to consumers, sovereregnity, etc.) but also the challenges (urbanization expands into fertile soils). [Karlheinz Erb, Austria]	Taken in to account
7106	5	17	5	21	Chp. 2 outlines how urban green growth may positively affect the generation of urban heat. It may be useful to cross-link to this information as well. [Mariam Akhtar-Schuster, Germany]	Taken into account, in Urban section of chapter
1246	5	22	5	31	among the solutions, improved governance (esp of natural resources and in policy and budget setting processes) and measures to address gender inequlaity should also be highlighted. See report referenced above re: the Cost of the Gender Gap in Agricultural Productivity. [Tonya Rawe, United States of America]	Accepted, text added
24410	5	28	5	29	Suggestion to add underlined text within the following phrase: "[…] reducing waste," transforming unsustainable global value chains into inclusive environmental sound production networks "and changing diets". [Barron Joseph Orr, Germany]	Accepted, text added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21226	5	29	5	29	I think Changing food habits deserve one summary point as this aspect across the world has been, is and will determine the agricultural production systems and therefore the GHG emissions and land uses. [Soora Naresh Kumar, India]	Accepted, changed diets to "food habits"
7108	5	29	5	30	Please include 'local'. The sentence should read "… threaten indigenous and local knowledge particularly …". Rationale: Vast local knowledge is out there on agro-biodiversity, which cannot be considered indigenous, but which is also at risk of being lost. [Mariam Akhtar-Schuster, Germany]	Accepted added text
19656	5	32	5	32	The "supply chain"- issue does appear in the chapter but is not mentioned in the Executive Summary.The impact of (currently mainly) long supply chains on GHG emissions and on food quality and respective health outcomes is important (and vice versa: locally produced food contains more nutrients and micronutrients, vitamins etc.) So the implication at other points in the chapter regarding a future strategy containing both long and short supply chains in a smart combination is worth mentioning ... In addition: long supply chains are in general associated with few commodity crops (loss of diversity ...) [Birgit Kuna, Germany]	Accepted, added supply chain to ES
20920	5	3			An example of inadvertent use of a likelihood term that must be avoided. [Andy Reisinger, New Zealand]	Accepted, revised text
17414	5	3			…plants…" [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
1472	5	10			Jobbins and Henley (2015) is a review, but not a primary source of these statements? And not peer-reviewed. [Pytrik Reidsma, Netherlands]	Comment appears to be out of place. Jobbins and Henley reference removed from section 5.1
20922	5	11			"high evidence" should be "robust evidence" [Andy Reisinger, New Zealand]	Accepted, text changed
17416	5	14			Can the term "agro-climatic" be well defined in this section? What the authors mean [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
17418	5	15			Can we talk about "agro-meteorological disasters"? Why not meterological disasters? [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
17788	5	21			Put "robust evidence, high agreement" in Italics [Donald Smith, Canada]	Accepted, text removed
20924	5	32			As per my general comment, a critical para missing from this ES is about policies that can actually bring about the response options discussed here, and how to avoid trade-offs and inadvertent side-effects - the chapter should flag quite specifically here that and how first steps can be taken to move in the directions painted by this chapter. [Andy Reisinger, New Zealand]	Accepted, added to enabling conditions key message
24412	6	26	5	26	Kindly specify/ further elaborate on what is meant with "transformational changes", please. [Barron Joseph Orr, Germany]	Accepted, added definition and citation
14544	6	26	5	26	Define: transformative [Rattan Lal, United States of America]	Accepted, added definition and citation

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24414	6	31	5	31	After "[…] ameliorative responses to land degradation and desertification." the text flow calls for further specifying what is meant with such responses. Here, 2-3 lines on the land degradation neutrality response hierarchy, with SLM aimed to avoiding and reducing new degradation and restoration and rehabilitation aimed at reversing past degradation would enrich this section of chapter 5.1 -- see Orr et al. (2017) where you can also find Figure 1, which helps illustrating these 2-3 lines and could be used to further develop Figure 5.1 of chapter 5.1. [Barron Joseph Orr, Germany]	Accepted, added to Enabling Conditions section
14546	6	31	5	31	The LDN response hierarchy of actions to avoid and reduce (e.g., SLM), preventing new losses, as well as actions to reverse past degradation (restoration and rehabilitation) can be planned for gains (a no net less approach) -- see Orr et al. (2017) (https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf) where you can also find Figure 1, which helps to illustrate these 2-3 lines and could be used to further develop Figure 5.1 of chapter 5.1. [Rattan Lal, United States of America]	Accepted, added to Enabling conditionssection
3798	6	1	6	1	There are a few duplications between 5.1 (framing) and subsequent more detailed sections [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, 5.1 Framing and 5.2 Status and Current Trends are now combined and condensed
6776	6	1	6	1	The overall focus in the "Food security" chapter seems to be more on the impact of food systems on climate change as opposed to the impact of climate change on food systems. [Nazimi Acikgoz, Turkey]	Accepted, changed order of sections in chapter to put impacts of climate change on food systems earlier
4084	6	1	6	20	Introduction : I have gone through the text. Not withstanding , nor derogating any or all those are already enshrined in the report , I like to furnish my views as addition or amendment wherever applied and relates to. [Prafulla Kumar Mabdal, India]	Rejected, unclear
10706	6	1	6	31	Authors should consider SOFI 2017 and clear definition of food insecurity instead of HLPE report. FAO, IFAD, UNICEF, WFP and WHO. 2017. The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome, FAO. [Anne Mottet, Italy]	Accepted, We now include a table with different methods for estimating FI
7152	6	2	6	2	Align the food system definition with that provided in Chapter 1. Overall much closer alignment with Chapter 1 and other chapters is needed. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, we use the SRCCL Glossary definiton of food system in our chapter. Also aligned text with Chapter 1
18446	6	2	6	9	What is missing in this framing of the food system is the absence of some common underlying indicators to compare across different food systems, and to measure the scope of improvement along those metrics or indicators (efficiency; energy consumption; [Aziz Elbehri, Italy]	Rejected, beyond scope of chapter

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16310	6	5	6	9	While you are suggesting that it is possible to improve the funtion of the food system, you do not explain why this is needed. Improving as you suggest means “deliver nutrition for people, in efficient and profitable ways, with low environmental impact”. How does the food system function now? it does not deliver nutrition for people in efficient and profitable ways and with low environmental impact? Also profitable for whom? Efficient for whom? How do you count the environmental impact? – this is more than accounting for GHG emissions; it goes for example also to water and soil quality, to waste (not food waste but to waste associated with various activities like packing food in plastic bags at retail level, packing fertilizer in plastic bags, material used for agricultural constructions, noise from transportation etc) [Lorenzo Giovanni Bellù, Italy]	Accepted, added food system outcomes in first paragraph
4314	6	9	6	9	Make this sentence compatible with fig 5.1 so it reads ‘improving the functioning of the food system can therefore directly contribute to attaining health, livelihoods and well-being (Figure 5.1) [Charles Nhemachena, South Africa]	Accepted used suggested text
4312	6	11	6	11	Suggest the word "entwined" be replaced by "interlinked" which is more clear and easy for readers to understand. [Charles Nhemachena, South Africa]	Accepted, added suggested text
8138	6	15	6	15	period after 2017. [Peter Neofotis, United States of America]	Accepted
8140	6	15	6	15	suffer from overweight is an awkward phrase [Peter Neofotis, United States of America]	Accepted, moved to section 5.1.2.1 and changed to "are overweight"
18444	6	15	6	17	Please use the FAO source for this FAO, IFAD, UNICEF, WFP and WHO, 2017 (as cited in chapter 1). [Aziz Elbehri, Italy]	Text now removed, but FAO source supplemented by other estimates (especially of prevalence of obesity)
18574	6	15	6	17	Please use the FAO source for this FAO, IFAD, UNICEF, WFP and WHO, 2017 (as cited in chapter 1). [Aziz Elbehri, Italy]	Repeat, same as comment 18444
16312	6	15	6	17	Given that FAO is the custodian agency for the prevalence of undernourishment, please use the FAO estimates on this, as you are doing so in chapter 1, page 1-14, line 32 (namely the source: FAO, IFAD, UNICEF, WFP and WHO, 2017). [Lorenzo Giovanni Bellù, Italy]	Noted
19632	6	15	6	17	This finding of 800 million people that are undernourished whil 1.9 billion adults suffer from overweigh is an eyeopener; it should therfore be one of the headlines of this chapter,,and should be taken up in the SPM including conclusions about the relations with climate change [Meyer Leo, Netherlands]	Rejected, this is simply the state of food insecurity, not subject of chapter
1248	6	15	6	17	Reference should also be made in the framing to levels of micronutrient deficiency to better capture food and nutrition insecurity (and not reduce it to calorie count) and to recognize or tee up the issue of climate impacts on nutrient values in foods. [Tonya Rawe, United States of America]	Accepted, both now included in Framing section
438	6	16	6	16	should read 'suffer from being overweight' or simply' are overweight' [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Repeat of previous comment

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15620	6	17	6	20	include production inputs and storage after processing [Robert Onyeneke, Nigeria]	Accepted, added storage
7110	6	18	6	18	The list of items here doesn't include 'food storage', and analyse this both from the perspective of traditional /local knowledge and skills of food storage as well as from the perspective modern /requird food logistics (policy, industrial and commercial perspective) to ensure food security in the light of climate change. You may also wish to analyse the discussions on 'food storage' provided in chapter 6 (e.g. page 56, lines 15-46). [Mariam Akhtar-Schuster, Germany]	Accepted, added food storage in list. Further discussion of storage beyond scope of chapter.
24946	6	24	6	27	This sentence needs punctuation to improve readability [Michelle North, South Africa]	Accepted, text revised
15622	6	24	6	27	Cite examples of such literature from different parts of the world [Robert Onyeneke, Nigeria]	Accepted , added citation to AR5
16314	6	29	6	31	Not only land degradation and desertification is involved but also water quality. [Lorenzo Giovanni Bellù, Italy]	Accepted , added water quality
20260	6	9	8	20	please insert new para after line 9. Three more issues have been addressed in this chapter: one, the word sustainable makes the chapter linking with UN SDGs having 17 goals. Two, Food security or security of food explains Food Security in two broad ways: on one hand, impact of climate change on food security has been presented in terms of food production, supply, storage, price support or non-support, etc. On the other hand, Food Security in terms of adequate access and intake in calories has been presented from the point of view of low income population and African countries. Three, climate change induced by global warming includes mitigation and adaptation issues to address the climate change impacts on crops, livestock, and other agricultural practices in reducing CO2 and other hazardous GHG emissions. [Md Moazzem Hossain, Australia]	Accepted, added to Road Map section
10784	6		9		We need some metrics of indicators about efficiency, land-use, intensities, energy consumption… [Anne Mottet, Italy]	Rejected, beyond scope of chapter
27550	6	1	15	46	the work done here is substantive as delves on all issues concerned, this is highly commendable. [Daniel Mailumo, Nigeria]	Noted
15842	6	31	31	6	Figure 5.1 is not useful [Jean-Luc Chotte, France]	Noted, Figure revised
16832	6	31	31	6	Figure 5.1 is not useful [Rattan Lal, United States of America]	Repeat of comment 15842
3892	6		109		Overall I liked the chapter however I feel that there is some discussion on crop disease and food secruity is missing. I would suggest to authors to include some discussion on it in th ecurrent report. Further scale of the Fig. 5.18 on Page 44 needs to be drwan nicely as it looks very blurred in current version of the report. [Pushp Raj Tiwari, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, linked crop dieases to food security and added a higher resolution figure

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10306	6	7		8	The statement could be better as" …, and therefore achieve both mitigation and adaptation, as well as food and nutrition security." [Bolanle Mutiat Titilola, Nigeria]	Accepted used suggested text
17790	6	16			Add "being" after "from" [Donald Smith, Canada]	Taken into account, changed to "are overweight"
24942	6	16			Change "suffer from" to "are"; being overweight isn't a disease, it describes the condition of the people [Michelle North, South Africa]	Accepted, changed to "are overweight"
10308	6	21		22	Could be more understood if stated as "Many aspects of food and nutrition security (including food access, utilisation, and price stability) are potentially affected by projected climate changes. [Bolanle Mutiat Titilola, Nigeria]	Accepted, changed text
24944	6	23			"GHG" needs to be written out at first mention in this chapter [Michelle North, South Africa]	Accepted
19570	6	32		34	Please, remember the source of the figure (5.1) [Ibouraïma Yabi, Benin]	Rejected, it's an original figure
25582	7	1	7	35	With a strong declaration of interest as one of the CLAs, I think the authors could *consider* incorporating into this section findings from AR 5 Rural Areas (Dasgupta et al. 2014), particularly on the vulnerability of farm households in developing countries to climate change due to socio-economic characteristics and non-climate stressors, and the wide range of on-farm and off-farm adapations already being practiced. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, added text
16316	7	2	7	5	Also prior to AR5 there was literature looking at the effects of climate change on agriculture and food security. For example see: Alexandratos, N. 2011. Chapter 11 – Critical evaluation of selected projections. In: Conforti, P. (ed). Looking ahead in world food and agriculture: Perspectives to 2050. Agricultural Development Economics Division, Economic and Social Development Department, FAO, Rome. (also available at: http://www.fao.org/documents/card/en/c/671f4bf7-bc67-5837-a294-a52e108328e8/) [Lorenzo Giovanni Bellù, Italy]	Rejected, this chapter focuses on new work since AR5
18550	7	2	7	15	AR5 focused mostly on food production and not much on food supply or demand side (see the critiques of Porter et al.) - so this summary of AR5 need to be better relayed here [Aziz Elbehri, Italy]	Accepted, added text and cited Porter et al
15762	7	5	7	5	Please, use "Porter et al 2014a" first before "Porter et al 2014b". There is no Porter et al 2014a. [Robert Onyeneke, Nigeria]	Accepted, fixed
20926	7	7	7	9	As written this doesn't make enough sense to me: how can the AR5 have found something with high confidence if there was little evidence available? Review this wording and make clear if this was largely a theoretical postulate or otherwise clarify. [Andy Reisinger, New Zealand]	Accepted, reworded
2	7	17	7	17	the issue is not simply overconsumption per se but the consumption of unhealthy mass-produced foods high in sugar and fat. This is a vital point. Pointing only at overconsumption blames the consumer for overeating, whereas pointing at the poor quality of food consumed allocates blame where it belongs, with the suppliers of unhealthy foods [Thomas Reuter, Australia]	Accepted, added text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24950	7	21	7	22	Change "...are often aggravating factors to pre-exisiting..." to "…often aggrevate…" [Michelle North, South Africa]	Accepted, reworded
24952	7	22	7	23	"…and are difficult to separate from other non-climatic drivers that affect production and non-production aspects." [Michelle North, South Africa]	Accepted, reworded
17422	7	26	7	26	In this patragraph "losses and wastes of food" is in plural, while in the above sections, loss and waste is in singular. Please use uniform terminology, and losses and wastes is preffered [Noureddine Benkeblia, Jamaica]	Accepted, terms harmonised throughout
24954	7	26	7	27	Change "AR5 WG III AFOLU Chapter found..." to "They found that the AFOLU sector is responsible for..." [Michelle North, South Africa]	Accepted, reworded
10708	7	27	7	27	There has been an update published with a new figure of 21%. Tubiello, Francesco N., Mirella Salvatore, Alessandro F. Ferrara, Jo House, Sandro Federici, Simone Rossi, Riccardo Biancalani et al. "The contribution of agriculture, forestry and other land use activities to global warming, 1990–2012." Global change biology 21, no. 7 (2015): 2655-2660. [Anne Mottet, Italy]	Accepted, sentence removed
24956	7	28	7	29	Change to: "Mitigation options were assessed for both supply and demand." - and now the next (or rather, the sentence starting with "Yet, strong importance was given…" since it makes logical sense) sentence could be connected with this one if necessary. For example: "Mitigation options were assessed for both supply and demand, highlighting the fact that emphasis on demand could be an effective way of reducing emissions." or similar [Michelle North, South Africa]	Accepted, reworded
20928	7	29	7	33	Give the scale of mitigation that was assessed in the AR5 (e.g. emissions reductions relative to baseline for different carbon prices, for given years). Otherwise this qualitative statement has little practical meaning. [Andy Reisinger, New Zealand]	Accepted, text changed
18552	7	30	7	32	This sentence need revision. We can't say there was much emphasis on food demand; it lacked analysis of the economic drivers of changing demand. Mostly aggregate scenarios that were divorced from realistic underlying economic determinants of food demand [Aziz Elbehri, Italy]	Accepted text added
18448	7	32	7	33	This is an exclusive focus on technology driven solutions to food waste and loss. By themselves, they will not make a difference in food and waste problem. Need to pay more attention to economic underlying factors (and not just taxes – but attacking the food policies that result in food waste such as subsidized agriculture, cheap food and other indirect subsidies) [Aziz Elbehri, Italy]	Taken into account, it is included, we highlight it more in Food Loss and Waste section

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16138	7	32	7	33	More in depth consideration of instruments to adress FLW needed. Here there is an exclusive focus on technology driven solutions to food waste and loss. By themselves, they will not make a difference in food and waste problem. Need to pay more attention to economic underlying factors (and not just taxes – but attacking the food policies that result in food waste such as subsidized agriculture, cheap food and other indirect subsidies). A reference is needed here to: FAO, 2017 The Future of food and agriculture - Trends and challenges, Rome, particularly chapter 13, pp 115-117, where various measures to reduce FLW are considered. [Lorenzo Giovanni Bellù, Italy]	Taken into account, it is included, we highlight it more in Food Loss and Waste section
18554	7	34	7	34	This repeated focus in the chapter on the need to reduce animal consumption as a solution need to be contextualized. Obviously, in high income industrial cuontries, there is scope for reducing meat consumption (with tangible environmental benefits); but meat-based diets in developing countries is not nearly excesive and the scope for reductions may be limited; in most developing countries (apart from middle and high income populations segments) the need to reduce meat consumption may not apply; – so conclusions on this issue should be nuanced and not repeated as if a global solution valid everywhere [Aziz Elbehri, Italy]	Accepted, added text
4316	7	44	7	45	Please add a sentence describing the importance role of changes in temperature, water and CO2 concentration as these are highlighted in bold in the Executive Summary page 4 lines 41-42 as important factors affecting food production [Charles Nhemachena, South Africa]	Accepted, added sentence
24416	7	47	7	47	Kindly consider the following: The terms sustainable land management (SLM) and restoration seems to be used interchangably in this section however the definitions of SLM and restoration (and rehabilitation) differ. Furthermore, SML and restoration play a different role in the land degradation neutrality response hierarchy, with SLM aimed to avoiding and reducing new degradation and restoration and rehabilitation aimed at reversing past degradation -- see Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality [Barron Joseph Orr, Germany]	Accepted, text changed. Added LDN to enabling conditions section
14548	7	47	7	47	Though different definitions are provided, the way SLM and restoration are used in the text do not seem to differ very much. More precision is warranted here. [Rattan Lal, United States of America]	Accepted, use of SLM clarified
17642	7	37	8	5	Since the report will be compiled as one document and 'the roadmap to chapter' sub section is not included in all chapters, and in my view is not useful, I sugest to delete 'this roadmap section' from this chapter as well. [Asia Adlan, Sudan]	Rejected, useful for readers
6778	7	37	8	6	The roadmap can be simplified, it is currently over complicated. [Nazimi Acikgoz, Turkey]	Accepted, structure and roadmap are now streamlined
10786	7		32		Food waste and loss cannot be reduced by technologies or innovations only. Need to remove policis supporting them first. [Anne Mottet, Italy]	Taken into account, highlighted in food and waste section

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24948	7	1			"AFOLU" needs to be written out at first mention (similarly with AR5 and other IPCC reports). For this heading it may be better written as "Summary of previous reports on food systems and land use" [Michelle North, South Africa]	Accepted, changed section title
10310	7	14			Could be stated as" ...in food production, and that benefits from potential innovations…" [Bolanle Mutiat Titilola, Nigeria]	Accepted, reworded
17378	7	26			In this patragraph "losses and wastes of food" is in plural, while in the above sections, loss and waste is in singular. Please use uniform terminology, and losses and wastes is preffered [Noureddine Benkeblia, Jamaica]	Accepted, terms harmonised throughout
17424	7	32			Same as above, use wastes and losses rather than waste and loss [Noureddine Benkeblia, Jamaica]	Accepted, terms harmonised throughout
16706	8	3	8	4	Figure2: Heatwave will have significant impacts on food security under future warming scenarios. So, why do the hotspots only focus on drought and flood? [Jing Wang, China]	Take into account, chapter has been restructured, Hotspots section has been removed and the figure has been removed
2828	8	3	8	5	Figure 5.2: This figure does not seem very useful, instead, try and re-do your headings to reflect it in the table of contents. [Aditi Mukherji, Nepal]	Accepted, figure removed
7154	8	8	8	8	Replace "meeting energy, protein and nutrient needs" with either "meeting energy and nutrient needs" or "meeting energy, protein, fat and micro-nutrient needs" [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text modified in rewrite
20930	8	8	8	9	"Food and nutrition security… implicitly, includes the notion of nutrition security" - poor drafting that risk destroying the credibility of whatever follows as it simply presents a tautology. [Andy Reisinger, New Zealand]	accepted - caused by global change of term "food security" to "food and nutrition security". Now modified.
16318	8	8	8	9	Food and nutrition security explicitly includes the notion of nutrition security as the term suggests, not implicitly as you write in line 9. For the definition of food and nutrition security please make reference to the 39th session of the Committee on World Food Security (available at http://www.fao.org/docrep/meeting/026/MD776E.pdf) [Lorenzo Giovanni Bellù, Italy]	accepted - rewritten
25530	8	8	8	13	Food security also implies entitlement to obtain food from non-agricultural or cash-crop income. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted - it is implicit in the "access" bit of the definition
1250	8	8	8	13	the discussion of food and nutrition security and its components -- capturing more than calories and food production -- is welcome and should be the frame set at the beginning of the report to be carried through. [Tonya Rawe, United States of America]	Noted - section substantially shortened but the sense remains

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19488	8	8	8	23	In this section, it might be useful to include details about "limiting nutrients" in different types of diets. For e.g. certain diets might be limiting in lysine (an important amino acid); modern (homogeneous) diets are often calorie-dense but lacking in micronutrients. Food and nutrition security has always been looked upon from a broader perspective, if details of limiting nutrients and critical nutrients are included, nutrition security can be addressed from the perspective of local, indigenous food systems (IFS). IFS are often biodiverse, and can help curb the rising hidden-hunger pandemic. Aim here is to define "adequate nutrition". Adequate nutrition is synonymous with access to dietary diversity, local, seasonal food, and minimal consumption of (ultra-)processed foods, such a diet will help meet the recommended dietary allowance of nutrients of a given age/sex sub-group. [Prasannalakshmi (Lakshmi) Acharya (Dave), New Zealand]	Rejected, beyond scope of chapter
15740	8	10	8	10	and also includes, implicitly, secure [Maria del Pilar Salazar Vargas, Mexico]	Accepted. Rewritten
24	8	12	8	13	typo [Nathalie Jeanne Marie Hilmi, France]	Editorial
26986	8	14	8	17	Agriculture not only contributes but also mitigates greenhouse gas emission. This has to be reflected throughout this and other chapters on land-based climate change adaption and mitigation. [Laxmi Pant, Canada]	Noted but agric a far greater source than sink. Text modified in many places to emphasise
6552	8	15	8	17	could add after consumed.. And preserved can have significant effect.. Methods of preservation remains important for both the environment and human health [Ojong.E nee Enokenwa Baa, South Africa]	Text removed
8622	8	18	8	19	replace "stability dimensions of food and nutrition security" by "stability" to avoid repetition of food and nutrition security twice in the sentence [Delphine Deryng, Germany]	Accepted text modified
3800	8	18	8	19	The 4 pillars are introduced again on p 5.9 [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted text modified
15764	8	18	8	19	Provide source of the classification of the pillars of food and nutrition security [Robert Onyeneke, Nigeria]	Accepted
1252	8	18	8	21	Reference to the four pillars of food security is very welcome. [Tonya Rawe, United States of America]	Noted
24962	8	19	8	20	Delete this sentence - the next sentence conveys the same sentiment - if desired (and if appropriate), include these references with the next sentence [Michelle North, South Africa]	Text rewritten
4318	8	21	8	23	Delete "good nutrition" at the end of the sentence - what addiitonal value does the term add beyond achieving food and nutrition security which is before it. Also what is "good nutrition"? [Charles Nhemachena, South Africa]	Text removed
8624	8	21	8	23	be more specific. The sentence needs clarification [Delphine Deryng, Germany]	Text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20934	8	22	8	23	The drafting is illogical - what you want to say is "the reverse is not necessarily the case". I do think it is always the case that countries with high levels of undernourishment also have high levels of hidden hunger - but some countries that DON'T have high levels of undernourishments still have high levels of hidden hunger. [Andy Reisinger, New Zealand]	Text rewritten
20932	8	7	9	8	This section is the first of many that says the same things 2-3 times within the space of a few paragraphs. Much tighter drafting would help convey the messages much more clearly and with more authority. [Andy Reisinger, New Zealand]	Accepted, text simplified and reduced
24964	8	5			Change "is recognising that" to "recognises that" [Michelle North, South Africa]	Noted, text already removed
19572	8	7		13	Why not use the FAO definition already used in chapter 2 (section 2.3.3) of this same report? [Ibouraïma Yabi, Benin]	We are using definition across all chapters - see glossary
24958	8	9			Is "nutrition security" correct here? It doesn't seem right that nutrition security is defined using the same term, and doesn't seem to fit here anyway… Please check [Michelle North, South Africa]	Accepted. Rewritten
14550	8	17			UNDESA (2018) has issued a publication with a range of information to assist countries, considering that no uniform way of reporting on SDG-specific implementation in the voluntary national reviews (VNRs) exists, and countries chose numerous different methods depending on their national circumstances (the process of carrying out the voluntary national review should not be seen as separate from implementation of the SDG). Ref.: UNDESA, Handbook for the preparation of voluntary national reviews, DESA/DSD, January 2018 [online]: https://sustainabledevelopment.un.org/content/documents/17354VNR_handbook_2018.pdf [Rattan Lal, United States of America]	text removed in rewrite
24960	8	19			Delete "dimensions of food and nutrition security", is implied by "The four pillars of food and nutrition security" [Michelle North, South Africa]	Text rewritten
17380	8	23			I do not see wahy good nutrition since nutrition securirty was indicated to include good nutrition. [Noureddine Benkeblia, Jamaica]	Text removed
14552	8	26			In the ecosystemic approach, instead of dealing with segmented issues, the focus is on the “general phenomenon”, on the world-system, on the paradigms of growth, power, wealth, work and freedom embedded into the cultural, social, political and economical institutions, with its boundaries, structures, techno-economic paradigms, support groups and rules of legitimation (Pilon, 2018). Ref.: PILON, A. F., Governance, Science-Policy Interfaces, Societal Organisation and the Transition to an Ecosystemic Model of Culture, Univ. Lib. of Munich, MPRA Paper 85783, 2018 [on line]: https://mpra.ub.uni-muenchen.de/85783/1/MPRA_paper_85783.pdf Ref.:PILON, A. F., Returning the Land to Nature: an Ecosystemic Approach to Public Policies, Research Gate, 2018 [online]: https://www.researchgate.net/publication/326207939_Returning_the_Land_to_Nature_an_Ecosystemic_Approach_to_Public_Policies?channel=doi&linkId=5b3e1837a6fdcc8506f67e15&showFulltext=true [Rattan Lal, United States of America]	Noted - but not directly related to subject tackled here

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16320	9	1	9	6	The paragraph should move to the beginning of section 5.1.3 and should be merged with the first paragraph of this section. As it now stands it reads as repetition. [Lorenzo Giovanni Bellù, Italy]	Noted and section rewritten
4086	9	1	9	8	Food security implies -"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". (World Food Summit, 1996).It ensures availability of sufficient quantities of food of appropriate quality; access adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet; consumption through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met and Stability to be secure toi a population, household or individual adequate food at all times even in face of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). [Prafulla Kumar Mabdal, India]	Noted but this comment is not written as a suggested change nor whether it is a quote. Sense of new text sharpened.
4	9	6	9	6	change to "...sustainably produced, processed and distributed." [Thomas Reuter, Australia]	Text removed in rewrite
10710	9	10	9	42	It is important to have a definition of food system here. It is provided later but it is also needed here. [Anne Mottet, Italy]	Taken into account, Food System now defined earlier in chapter
18452	9	10	9	42	It is important to have a definition of food system here. It is provided later but it is also needed here. [Aziz Elbehri, Italy]	Repeat of comment 10710
3238	9	10	9	42	succinct definitions (and maybe a systematics) are needed for key terms such as undernutrition, undernourishment, malnutrition, "in the sense of hungry", [Karlheinz Erb, Austria]	Accepted - text rewritten extensively
15742	9	11	9	11	food and nutrition security are a situation [Maria del Pilar Salazar Vargas, Mexico]	Accepted, text edited
4088	9	11	9	42	Climate and agriculture:- The crops, domestic animals and aquatic animals are adapted, acclimatised in temperate, tropical, sub-tropical ,humid, sub-humid, per humid , arid, plateau climates and geographical conditions. The said plants and animals becomes incapacitated to acclaim to the changed climate and fail to give the desired production . It is not exception that in the extreme changed condition, species are extinct. Hence , there is straightway relation between the climate and the crop-animal living and production. [Prafulla Kumar Mabdal, India]	Reject, literature does not support crop and livestock specific extinction under changing climate conditions. Instead there will be changes in crop zonation
1254	9	13	9	14	In addition to equality between generations, reference to "all people at all times" implies a strong need to address the inequalities in food systems and that drive food insecurity. This is important to reference, is it isn't a problem for tomorrow or the direction we want to go but is a problem today and a reflection of the baseline from which we start in order to get to a place of all people at all times in the future. [Tonya Rawe, United States of America]	Accepted, further emphasized current inequality
8070	9	16	9	16	Change 'obesity' to 'overnutrition' [Katharina Waha, Australia]	Reject, Overnutrition includes both obesity and overweight. Obesity is part of malnutrition
16322	9	16	9	18	Please provide the reference. [Lorenzo Giovanni Bellù, Italy]	Sentence removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10508	9	16	9	19	there are different form of undernourishment (cronic size/age; global weight/age and severe weight/size) [Zitouni Ould-Dada, Italy]	noted - new text provided to the level of detail we feel appropriate
8066	9	19	9	19	Unclear: "…to the undernourished (in the sense of 'hungry'), undernourishment occurs.." [Katharina Waha, Australia]	Accepted, see comment 24968
1256	9	19	9	23	Reference should be made, given the focus of this section on the effects of climate change, on the impacts of climate change on the nutrient value of foods. See above referenced materials from Loladze, Irakli. [Tonya Rawe, United States of America]	Taken into account, see section 5.2
8068	9	19	9	31	The presentation of what malnutrition and undernutrition is confusing and misleading. Malnutrition includes both, over and undernutrition. Micronutrient malnutrition is one form of malnutrition - undernutrition. [Katharina Waha, Australia]	Taken into account, see definitions Table
17382	9	19	9	31	I think the authors refer to "malnutrition". I recommend the appropriate terminology be used. Malnourishement or malnutrition might be used for either nutrients deficiency or over-consumption. [Noureddine Benkeblia, Jamaica]	Taken into account, see definitions Table
19490	9	19	9	31	There is a need to highlight here the lack of dietary diversity in modern diets. A diverse diet will not just help prevent micronutrient deficiency and obesity, it will also help foster a diverse range of gut microbiota, which is now known to play a significant role in the prevention of myriad diseases. [Prasannalakshmi (Lakshmi) Acharya (Dave), New Zealand]	Taken into account, dietary diversity is discussed in section 5.3.1.3
2958	9	21	9	23	Clarify the meaning of the sentence. Do you mean that hidden hunger also affects developed countries? [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, text changed
3802	9	23	9	23	Reference? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Reference added
6	9	24	9	24	again, the "concept of overconsumption" is insufficient here. Many of th the issues of malnourishment are due to the quality rather than just the quantity of the food consumed., see also comment 1 [Thomas Reuter, Australia]	Accepted, added discussion of food quality
19492	9	24	9	31	Is there any data that shows that the increase in incidence of obesity is associated with the rise of monoculture? This could help explain that a dietary shift to homogeneous diets is an unhealthy trend. [Prasannalakshmi (Lakshmi) Acharya (Dave), New Zealand]	Comment noted. The data is summarised in various places but Khoury et al 2014 shows how the global diet has converged on a few commodity crops, and these are grown at scale
15766	9	27	9	27	Cite source for the association between obesity and cardiovascular disease and some cancer. If possible, can we have examples of the cancers? [Robert Onyeneke, Nigeria]	Source is cited: NCD-RISc paper is a primary route into the NCD literature
24972	9	27	9	29	Change this sentence to read: "There is growing recognition that obestity and related health issues are contributing a rapidly rising portion of the global burden of non-communicable diseases ()." or something similar. Please check to ensure I have retained the original meaning, taking into account the fact that the original sentence didn't make sense [Michelle North, South Africa]	Accepted, text changed
8182	9	28	9	28	Please see if the phrase 'over-weight and obesity on a global basis' can be changed to 'over-weightness and obesity on global level'? [Muhammad Mohsin Iqbal, Pakistan]	Taken into account, text already changed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27000	9	29	9	31	Sentence beginning "In 2001..." does not flow on directly from previous sentence regarding growing contribution of diet-related chronic disease to global mortality and global burden of disease. Recommend to disaggregate contribution of 'chronic diseases' into diet-related diseases if possible based on more recent Global Burden of Disease studies. References identified below. [Beau Damen, Thailand]	Accepted, removed sentence
27060	9	29	9	31	Reference used - WHO/FAO, 2003 - appears out of date as the global non-communicable disease study has been updated a number of times since this initial study was produced. For example, see: Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K., Adair-Rohani, H., … Ezzati, M. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010. The Lancet, 380(9859), 2224–2260. doi:10.1016/S0140-6736(12)61766-8 Lozano, R., Naghavi, M., Foreman, K., Lim, S., Shibuya, K., Aboyans, V., … Murray, C. J. L. (2012). Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: A systematic analysis for the Global Burden of Disease Study 2010. The Lancet, 380(9859), 2095–2128. doi:10.1016/S0140-6736(12)61728-0 Forouzanfar, M. H., Afshin, A., Alexander, L. T., Biryukov, S., Brauer, M., Cercy, K., … Zhu, J. (2016). Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. The Lancet, 388(10053), 1659–1724. doi:10.1016/S0140-6736(16)31679-8 [Beau Damen, Thailand]	Accepted, removed sentence
24974	9	29	9	31	This sentence doesn't make sense. I recommend changing it to: "In 2001, approximately 60% of the 56.5 million deaths reported globally were attibuted to chronic diseases like cancer and diabetes, with approximately 46% associated with non-communicable diseases ()", BUT, I'm not sure what you mean by "approx 46% of the global burden of disease - are you still referring to the global mortality stats (46% of all mortalities, or 46% of the 60% that were associated with chronic disease) or is this a whole new concept, global burden of disease not death? If so then the sentence really should be written differently or broken into two. [Michelle North, South Africa]	Accepted, removed sentence
15768	9	29	9	31	Statistics and literature cited are dated. Update the statistics. Check WHO's latest Global Disease Burden publication [Robert Onyeneke, Nigeria]	Accepted, removed sentence
10712	9	32	9	36	Use SOFI 2017 as reference for climate chane impact on Food security. FAO, IFAD, UNICEF, WFP and WHO. 2017. The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome, FAO. [Anne Mottet, Italy]	Accepted. Text rewritten
18454	9	32	9	36	Use SOFI 2017 as reference for climate chane impact on Food security. (citation: FAO, IFAD, UNICEF, WFP and WHO. 2017. The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome, FAO). [Aziz Elbehri, Italy]	Repeat of comment 10712

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18576	9	32	9	36	Use SOFI 2017 as reference for climate chane impact on Food security. (citation: FAO, IFAD, UNICEF, WFP and WHO. 2017. The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome, FAO). [Aziz Elbehri, Italy]	Repeat of comment 10712
8064	9	34	9	34	There is no section 5.5.3.1. Should be 5.6.3.1. All other chapter numbers in this section probably wrong too. [Katharina Waha, Australia]	Taken into account, sections have now changed
18556	9	35	9	35	All food consumption has impacts on GHG in varying degrees- it is not a matter of which diets – although some food items have higher GHG footprints than others [Aziz Elbehri, Italy]	Accepted, text changed
18450	9	35	9	36	All food consumption has impacts on GHG in varying degrees- it is not a matter of which diets – although some food items have higher GHG footprints than others [Aziz Elbehri, Italy]	Repeat of comment 18556
24976	9	37	9	40	This paragraph is a repeat of (in more detail) that on page 8, lines 18-20. Please consider whether it is necessary to repeat the "four pillars" concept twice in two pages. The more detailed description here is more useful and interesting, consider removing the previous mention [Michelle North, South Africa]	Accepted, deleted repeat
8626	9	37	9	42	repetition of the four pillars from page 8 lines 18-19; revise to avoid repetition [Delphine Deryng, Germany]	Accepted, deleted repeat
8	9	38	9	38	"untilization" also should include food wastage and recycling [Thomas Reuter, Australia]	Rejected, utilization relates to food safety
6780	9	10	11	40	According to the FAO, food security covers 5 topics; food availability (is there enough?), access (can it be reached?), affordability (at a fair price), quality (is it edible?), nutrition (as part of a balanced diet) and safety (could it harm health?). However subtitle 5131 covers only 4 of them, quality and safety seems to have been ignored. The same is true for Table 5.1. [Nazimi Acikgoz, Turkey]	Rejected, SOFI 2018 lists availability, access, utilisation, and stability as the main dimensions of food security. We do mention safety and quality in bullets in Table 5.1
24982	9		12		Should these sections not include some uncertainty language? [Michelle North, South Africa]	Accepted, added uncertainty language
24968	9	19			Change "in the sense of “hungry”" to "not enough food", or "insufficient food" [Michelle North, South Africa]	Accepted, changed to insufficient food

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11498	9	24			Include “consumption of the wrong kinds of food” as obesity is often not a result of eating too much good food, but too much ‘junk food’. This is a problem globally, increasingly in low-income countries, because bad food is cheap and preparing good food is time/effort/energy costly. In many cases junk food is readily available (eg at small local shops) while good raw foods (fruit, vegetables, uncooked starches, eggs, raw meat, dairy etc) are not. Coupled with increasing urbanization and reduced local farming and local markets, this leads to malnutrition in larger populations. This is a growing systemic trend that also needs to be shown in the table on page 10. How do you get good food, in good condition, economically, reliably, to growing urban populations, in the face of informality, etc. … this is discussed to some extend on page 13ff. [Debra Roberts, South Africa]	Taken into account, discussion of junk food included. This Table focuses on climate change impacts only
24966	9	24			Change "bad nourishment" to "bad nutrition" [Michelle North, South Africa]	Accepted, changed text
24970	9	25			Delete "and morbidity", because "health issues" are the same as morbidity [Michelle North, South Africa]	Accepted, text changed
8072	10	1	10	1	Table 5.1. The table shows recent work since AR5 but there were certainly more studies published on each of these impact categories and not just one or two. Add "e.g." in front of every study or extent the list of studies. [Katharina Waha, Australia]	Accepted, added "examples of" to column heading
10	10	1	10	1	Why would we expect only "Temporary impacts on world market export prices". Permanannt increases are also likely, as well as greater frequency of price volatility (already well documented for rice, e.g). [Thomas Reuter, Australia]	Accepted, deleted temporary and added text on permanent increases
1258	10	1	10	1	Nutritional quality of food might also be included in the bulleted list re: "utilization" in the table. [Tonya Rawe, United States of America]	Rejected, already in table
19382	10	1	10	1	In table 5.1, impacts of climate change on transportation of food should be inluded in the table under Access [VILIAMU IESE, Fiji]	Accepted, added transportation
4322	10	1	10	2	Add reference/s to last point on Availability food and security pillar - all the points in the Table have references included [Charles Nhemachena, South Africa]	Noted, text removed
16708	10	1	10	2	change “including droughts” into “including droughts and heatwaves”. [Jing Wang, China]	Accepted, added heatwaves
16324	10	1	10	2	The sources are not complete; please also refer to: 1)the various publications of the AgMIP global economics group; 2)FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf; 3) FAO. 2016. The State of Food and Agriculture - Climate change, agriculture and food security. Available at http://www.fao.org/publications/sofa/2016/en/; 4)FAO (forthcoming) The future of food and agriculture -Alternative pathways to 2050. For info re this forthcoming report, please, contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies: lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Accepted, added additional references including FAO reports to Table 5.1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10510	10	1	10	2	access: loss of agricultural income aso leeeds to lack of resources to purchase food, especially a problem whe production is lost due to climate extremes [Zitouni Ould-Dada, Italy]	Accepted, added
7112	10	3	10	3	Question: Isn't 'food availablity or supply' also related to the capacity of being able to store food? [Mariam Akhtar-Schuster, Germany]	Rejected, already listed in Table
8718	10	3	10	15	impacts on fish, livestock and non-timber products is not mentioned in this section despite being mentioned in the Table 5.1; it also needs reference [Delphine Deryng, Germany]	Accepted, text removed
16326	10	6	10	15	Please note that there can be cases (in specific regions and for specific crops) where climate change leads to higher yields and not to reduced ones, depending on the specific climate change scenario and underlying assumptions. When are the effects that you are describing going to occur, under what assumptions and where? [Lorenzo Giovanni Bellù, Italy]	Accepted, added text on spefici regions and crops; added call-out to Section 5.3 for detailed explanation
8720	10	11	10	12	disruptions to food transport is also affecting stability of food systems [Delphine Deryng, Germany]	Accepted, added
8628	10	21	10	21	clarify link between nutrition and water quality and quantity [Delphine Deryng, Germany]	Accepted, added 'used to ´prepare food'
17096	10	1	11	40	I suggest to do away with Table 5.1 or with the succeeding text, since they are saying the same thing.. If you retain Table 5.1, use a short introductory paragraph [Lourdes Tibig, Philippines]	Accepted, kept table, removed paragrapoh
7156	10	1	11	40	This a very weak use of literature and references, particularly for an IPCC report. For example, there is a heavy over-reliance on Jobbins and Henley, which is non-peer-reviewed report that covers only one region (MENA). There is substantial high-quality peer-reviewed literature that could be used to populate this table and accompanying text. Strongly recommend putting the effort in. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, expanded use of peer-reviwed references. Removed Jobbins and Henley
8664	10	3	11	40	Jobbins and Henley is cited several times for each of the pillars - yet this reference only covers the Middle East and North Africa; add additional reference for other parts of the world for each pillars of food security & nutrition [Delphine Deryng, Germany]	Accepted, added other refrences and impacts in other regions. Removed Jobbins and Henley
25932	10	1			Table 5.1: suggest adding cross-references to chapter sections here and/or in following paragraphs [Hans Poertner and WGII TSU, Germany]	Accepted, paragraph removed but added reference to Section 5.2 as note on Table
24978	10	10			For all the examples the authors have provided an explanation of why/how this loss would take place; however, "higher post-harvest losses as a result of climate change" isn't explained (I assume from increased fungal / pest degradation of crops?). It would be nice if this were explained better, or incorporated with the previous "crop and livestock pests and diseases", or deleted outright [Michelle North, South Africa]	Accepted, added 'due to mycotoxins'

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17384	11	1	11	5	Food chain supply? [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
1260	11	1	11	5	Access is also impact in relation to social dynamics as food is allocated in families differently -- who is entitled to access food first? Climate change will impact food access doubly if food production decreases and if, when food is scarce, certain populations in a household (usually women and girl children) eat last. [Tonya Rawe, United States of America]	Accepted, added 'women and girls'
8630	11	6	11	7	This paragraph is general and does not fit the Access sub-section. Move to the beginning of sub-section 5.1.3.1? [Delphine Deryng, Germany]	Accepted, moved to introductort section
24988	11	6	11	9	This paragraph needs to move to the end (lines 30-40), with the section on stability (either before the paragraph on stability, introducing it, or incorporated into it) [Michelle North, South Africa]	Taken into account, text moved to introductory section
15626	11	10	11	29	What about the impact of climate change on food taboos? I strongly believe that there is a link. Please, explore that as we are going to learn something new. [Robert Onyeneke, Nigeria]	Rejected, beyond scope of chapter
3804	11	14	11	14	explain what aflatoxins are for the unititiated (e.g. lightly in brackets) [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text already removed
24418	11	16	11	16	Firstly, there might be a reference needed, if this sentence does not refer to the already cited Aberman and Tirado (2014). Secondly, this paragraph would benefit from exploring opportunities and challenges of food producing (developing) countries in complying to food safety, hygiene and respective laws as well as regulations e.g. from the EU. [Barron Joseph Orr, Germany]	Noted, text already removed
15624	11	16	11	18	Check grammar [Robert Onyeneke, Nigeria]	Noted, text already removed
442	11	17	11	17	delete: 'is a…' [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text already removed
8184	11	17	11	17	The words 'is a' may be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Noted, text already removed
17426	11	17	11	17	…change is a may require…? Please correct [Noureddine Benkeblia, Jamaica]	Noted, sentence restructured
8186	11	18	11	18	'- - - climate change is projected to increase the burden of diarrheal diseases - -'. Is this increase in food-related diarrheal diseases or otherwise? [Muhammad Mohsin Iqbal, Pakistan]	Accepted, added explanation
1262	11	18	11	19	The last sentence of this paragraph appears to be randomly inserted or is missing additional sentences to flesh out the point being made [Tonya Rawe, United States of America]	Noted, text already removed
24986	11	18	11	25	This sentence "Overall, climate change is projected to increase the burden of diarrheal diseases in low-income regions by approximately 2%–5% in 2020 (Aberman and Tirado 2014)." should go with/be incorporated into the sentence on line 25-26 about diarrheal diseases [Michelle North, South Africa]	Noted, text already removed
16328	11	20	11	21	What is the reference point for the impacts you are suggesting? Increased temperature compared to what? [Lorenzo Giovanni Bellù, Italy]	Noted, text already removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1264	11	22	11	23	Sentence re: diet pathways and nutrient content might also reference research into the impact of climate change (or CO2 elevation) on the nutrient value of crops. [Tonya Rawe, United States of America]	Noted, text already removed
16710	11	31	11	31	change “including droughts” into “including droughts and heatwaves”. [Jing Wang, China]	Noted, text already removed
8666	11	32	11	33	reference is not recent (2012); are they more recent study? Or delete the term "recent" [Delphine Deryng, Germany]	Noted, text already removed.
16712	11	37	11	37	add a “.” before “Most studies”. [Jing Wang, China]	Noted, text already removed.
24990	11	37	11	38	Delete "exceptional i.e.,", so that it just reads "conclude that the drought was the worst drought in the instrumental record" (or "the worst drought ever recorded") [Michelle North, South Africa]	Noted, text already removed.
24992	11	37	11	39	This sentence is reviewing the literature, not assessing it. Rather include the drought-Syria conflict sentence as an example of the stability concept, and include that it has been contested ("Several studies have considered…in Syria (ref ref ref), but (or however) the link to climate change has been contested (ref ref)." [Michelle North, South Africa]	Noted, text already removed.
16330	11	43	11	46	Please mainstream the definition of food system with the definition you used in Chapter 1 (page 1-14). [Lorenzo Giovanni Bellù, Italy]	Accepted, defintion now in section 5.1.1.1
24994	11	45	11	46	Include "preparation" in the list of non-production aspects ("preparation and consumption of food") [Michelle North, South Africa]	Noted, text already removed
24980	11	1			I don't understand how "loss of agricultural income" impacts on access to food? This surely affects availability? I would imagine that loss of income for the general consumer (which may or may not be linked to climate change) will certainly impact upon access. Please check whether the content here makes sense and modify accordingly [Michelle North, South Africa]	Accepted,text modified
10312	11	16		18	The correct version should be "The possible change in patterns of aflatoxin occurrence in crops due to climate change may require anticipatory actions (Battilani et al. 2016; Medina et al. 2014). [Bolanle Mutiat Titilola, Nigeria]	Noted, text already removed
24984	11	17			"is a may" - please correct [Michelle North, South Africa]	Noted, text already removed
17428	11	28			undernutrition is anoter term used. Please use unformised terminology to refer to "malnutrition". [Noureddine Benkeblia, Jamaica]	Noted, definitions harmonised
17432	11	37			Full stop after the reference [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
25934	11	42			Confusing section title - was the previous section not about the food system and climate change? Suggest to revise to 'Food systems and climate change' to stress the focus on different kinds of food systems. [Hans Poertner and WGII TSU, Germany]	Accepted, changed title

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24996	12	4	12	5	Change "in regard to both" to "including", and delete the "and" between impacts and adaptation so that it reads: "Climate change affects multipleaspects of the food system, including impacts, adaption and mitigation of greenhouse gases." [Michelle North, South Africa]	Accepted, text changed
3240	12	6	12	16	The passage does not really allow to understand what a "food system type" is. Maybe needs a definition, or examples. [Karlheinz Erb, Austria]	Noted, text already removed
24998	12	6	12	16	This paragraph can be made considerably more concise by deleting all the extraneous "in terms of", "in addressing", "different…different…different" etc. Please revise [Michelle North, South Africa]	Noted, text already removed
12	12	7	12	7	types [Thomas Reuter, Australia]	Noted, text already removed
24420	12	9	12	9	Suggestion to add underlined text within the following phrase: "[…] supply chains (long vs. short)" and (global) production networks (see e.g. Rainnie et al. 2013, Henderson et al. 2002 and Hudson 2002) "or trade networks". [Barron Joseph Orr, Germany]	Text already removed
14554	12	9	12	9	Suggest adding underlined text within the following phrase: "[…] supply chains (long vs. short)" and (global) production networks (see e.g. Rainnie et al. 2013, Henderson et al. 2002 and Hudson 2002) "or trade networks". [Rattan Lal, United States of America]	Noted, text already removed
1266	12	12	12	13	Reference is also being made in global discourse, increasingly, to territorial markets and food systems, to reflect a more localized or regional system with potentially a strong cultural element. Reference might also be made here to the discussion of food systems in HLPE report #12 on Nutrition and Food systems [Tonya Rawe, United States of America]	Noted, text already removed
18456	12	13	12	30	There is an over-emphasis on dietary choices in this entire chapter as if this is the predominant driver of food systems. A certain balance is required with respect to all possible options. For exmple other factors should also be given equal treatment, like income, prices, suitability to local climate and convenience etc not to mention socio-cultural norms (like acceptable and not acceptable food) [Aziz Elbehri, Italy]	Noted - but dietary choices should be implicity taken as "realised diets" what ever the drivers of access, availability, cultural prefs etc
16336	12	18	12	44	The structure is not clear: You start in section 5.1.4.1 to discuss about climage change interactions with food systems but instead of completing the discussion in this place you break it and you continue it in Sections 5.3.and 5.6. Section 5.1.4.1 reads, hence as rather redundant. Please revise the structure of the chapter. [Lorenzo Giovanni Bellù, Italy]	Rejected, this sets forth the framing and context for the whole chapter
16332	12	19	12	21	The first paragraph of Section 5.1.4.1 is a repetition of the first paragraph of Section 5.1.4 (page 11, lines 43-47). No need to repeat once more what food system is. Please mainstram the defitintion of food system with the definition you used in Chapter 1 (page 1-14). [Lorenzo Giovanni Bellù, Italy]	Accepted, section revised to define key terms only in section 5.1.1.1
15628	12	19	12	21	What about input providers/suppliers? Are they not part of the food system. I think these actors should be mentioned too. They are different from the farmers/producers who are involved in production. [Robert Onyeneke, Nigeria]	Accepted, added text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16334	12	25	12	25	On the effects of climate change on agricultural productivity, apart from Porter et al (2014b) and Rosenzweig et al (2014), please also refer to 1) FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf and 2) FAO (forthcoming) The future of food and agriculture -Alternative pathways to 2050. For info re this forthcoming report, please, contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies: lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Accepted, added references
4320	12	26	12	28	Cross-check and reconcile figures on emissions from the current food system. For example, Line 11 says 12%-14% from land use change and on Page 12 (Lines 27 and 28) indicates 10%-12% directly and 24% indirectly from land use change. In the ExSum the number 15-17 % is for the 'food system ' (production/supply/consumption) while page 12 line 27/28 the 10-12 % is for 'agriculture only' so I assume only the 'production' side. The large number for LUC (24%) may be because of accounting for indirect land use (leading to deforestation and degraded land). It would help the reader if the authors clarify the system boundaries and show pie charts so it becomes more transparent where the percentages come from. [Charles Nhemachena, South Africa]	Accepted, defined it as entire food system and removed numbers in this section
20936	12	27	12	28	The statement implies that ALL deforestation is related to agriculture (since 24% is the total AFOLU emissions as assessed in the AR5). This seems unlikely, given that timber is also a driver for deforestation. If that has been assessed and has been found to be indeed miniscule, it would be worth stating explicitly. [Andy Reisinger, New Zealand]	Accepted, took our %s, all numbers will be in section 5.4
1268	12	36	12	37	Can a very brief explanation of how climate change impacts the quality of food be included? The general refernece to impacts on quality is welcome but the lack of explanation weakens the point. One sentence would suffice. [Tonya Rawe, United States of America]	Accepted, added
10314	12	12		13	" Following Ericksen (2008), UNEP groups them into traditional, modern and intermediate" could be clearer as " Following Ericksen (2008), UNEP groups Dietry Choices into traditional, modern and intermediate" [Bolanle Mutiat Titilola, Nigeria]	Noted, text already removed
25936	12	18			Many of the statements here have been already made before, e.g., that climate change affects agriculture and vice versa.... suggest to cut some parts here or delete the whole section. [Hans Poertner and WGII TSU, Germany]	Noted, text removed
25000	12	19			"the entirety of" is verbose. Replace with something like "all" [Michelle North, South Africa]	Accepted, changed text
17792	12	27			Remove first % [Donald Smith, Canada]	Taken into acount, text already removed
16338	13	1	13	28	Economic nuance is missing from section 5.1.4.2 on socioeconomic aspects. There is a vast body of literature on consumer behaviour and on food demand, which is impossible to summarise in a comment. For an overview reading on poverty and inequality (which you have not mentioned anywhere!) and food insecurity as well as on nutrition and health please refer to the dedicated chapters of FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf [Lorenzo Giovanni Bellù, Italy]	Take into account, chapter restructed, this is now discussed in section 5.2.5

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1270	13	1	13	28	discussion might also be added regarding the gendered dimension of access to food. As the primary care givers and providers of food for family consumption, women often ensure others have plenty to eat and then themselves end up eating last -- which leaves them with the least nutritious or simply less food. See https://www.wfp.org/stories/10-facts-about-women-and-hunger and http://www.fao.org/docrep/meeting/023/mc065E.pdf [Tonya Rawe, United States of America]	Take into account, chapter restructed, this is now discussed in section 5.2.5
17434	13	4	13	4	Space between reference and They [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
16714	13	6	13	6	add a "." before "Whereas". [Jing Wang, China]	Noted, text already removed
20938	13	8	13	9	It seems very odd to make a statement about growing rates of anything and back this up with a reference that is more than 20 years old by now. The chapter itself in other places cites lots of more recent studies. [Andy Reisinger, New Zealand]	Noted, text already removed
14	13	10	13	20	food choices are nowadays strongly influenced (negatively) by heavy duty commercial advertising for unhealthy products. This should be mentioned somewhere in these two paragraphs. [Thomas Reuter, Australia]	Noted, text removed
9420	13	17	13	20	One cannot imagine transformation change in the food system without unpacking the structural underpinnings of these polices, and I suggest that the report address them in greater detail then simply alluding the them (as is the case on page 5-13 "the globalized food system is increasingly based on long-supply chains and a relatively small-number of commodity crops, often incentivized through domestic and international policies…."). [Helena Shilomboleni, Canada]	Taken into account, We will include exmaples in our chapter. Chapter 6 and 7 will deal with policy analysis
3806	13	21	13	26	Focus on a specific projection appropriate? Just the conclusion and a reference? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
20940	13	21	13	28	I consider it largely irrelevant for this section whether a certain research programme has a focus on socio-economic aspects - this section should be about evidence, not about research (which by definition implies a lack of knowledge). Replace the discussion of SUSFOOD with evidence from the real world. [Andy Reisinger, New Zealand]	Noted, text removed
16340	13	21	13	28	Why do you refer only to one specific research project? Either extend your review to cover ALL relevant research projects (after defining transparent criterial for what is relevant) or delete the paragraph. It feels more as if you are trying to do publicity. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
7158	13	21	13	28	Suggest delete references to projects. Instead use the definition established in Chapter 1. Also check the whole chapter for multiple definitions of food systems, as this is the third definition I've read in this chapter already. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
18558	13	25	13	25	replace "suitable" with "sustainable" [Aziz Elbehri, Italy]	Noted, text removed
2960	13	30	13	30	the title of this section is unclear. Please clarify that is meant by "nature" and "people" dimensions [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3098	13	30	13	30	Availability and easy access of food to the people should also be considered. [Mostafa Jafari, Iran]	Noted, text removed
7114	13	30	13	33	This brief outline on links to SDGs and Nature's Contributions to People will need to be very incluslve and list all the different relevant institutions and how they contribute to deliver food and nutrition security thereby especially supporting the implementation of SDGs (e.g. GFSI, New vision for agriculture /World Economic Forum, ...) [Mariam Akhtar-Schuster, Germany]	Accepted: a brief outline on SDGs is provided but the relevant institutions are not discussed. The discussion on the institutions is out of the scope of this section.
25002	13	38	13	40	Because the details of SDG2 and SDG13 are mentioned in the first sentence, it isn't necessary to repeat what they are here. Rather simplify to just say "Intra-and inter-linkages of SDG2, SDG13 and the other SDGs are shown..." [Michelle North, South Africa]	Accepted
8670	13	40	13	42	The trade-offs mentioned by Pradhan et al. (2017) were the result of an analysis done using historical data, and therefore, reflect traditional means of production (as the authors also mention on page 6 of the publication: "Most trade-offs described beforehand can be linked to the traditional nonsustainability development paradigm focusing on economic growth to generate human welfare at the expenses of environmental sustainability (Sen, 1983)."). This important perspective of the analysis should be part of the line mentioning the paper, and highlighted as much as possible when mentioning the results of the said paper, to avoid misleading messages. [Delphine Deryng, Germany]	Accepted
3808	13	42	13	45	Explain why [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and explained in preceeding text
16344	13	8	14	14	Please explain what Figure 5.3 shows. The caption as it now stands - despite being 5 lines long! - does not help to explain what shares are displayed (shares of what in what?), what the number of data means (what data? What does it mean 10 or 100 etc data?), what is the scale from -1 to +1 of the coloured line and what was the statistic quantification undertaken. Why are there trade offs within SDG 2 and 13 (e.g. boxes from vertical and horizontal axes on SGD 2 and 13 respectively) Also some lines on "the method of Pradhan" would help. [Lorenzo Giovanni Bellù, Italy]	Taken into account, figure already removed
16342	13	35	14	14	Please explain why there are trade offs between the SDGs. Please note that sustainability is a development process involving the entire economy. The SDGs identify where emphasis should be given within this development process and the SDG indicators help measuring this process. This means that development favoring one part of the economy, one aspect of life is not the sustainable development the SDGs are indicating. [Lorenzo Giovanni Bellù, Italy]	Accpeted: reasons for the trade offs are provided
8668	13	35	14	15	The Sub-section is based on one single article only. More references needed. [Delphine Deryng, Germany]	Accpeted: more literature is included

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8672	13	44	14	2	There is a need to bridge the line on trade-offs and the line saying that SDG 2 requires sustainable production. Due to the nature of trade-offs being based on traditional ways, several innovative methods, such as site-specific nutrient management (Sarkar et al., 2017) and other methods towards Climate Smart Agriculture (Lipper et al., 2018), can be used to achieve sustainable food production that uses inputs efficiently, and lowers environmental impact; therefore ultimately achieving stronger synergy between SDG 2, SDG 12 and SDG 15. [Delphine Deryng, Germany]	Acceptted
19366	13	30	15	19	I do not find it relevant to add a section on '5.1.5 Links to Sustainable Development Goals and Nature's Contributions to People', it is not the job of IPPC report to search linkages such as with SDG which has just started and lack evidences to support linkages without resorting to subjective interpretation, and IPBES (readers can read IPBES instead). [Binaya Raj Shivakoti, Japan]	Rejected, SDGs and ecosystem services are global agenda and IPCC also needs to highlight the linkages between these global agenda and climate change.
19574	13	1		28	There are also aspects related to solidarity and mutual aid among the members of the Community in the process of production and distribution of foodstuffs, especially in the context of African rural societies. [Ibouraïma Yabi, Benin]	Take into account, chapter restructed, this is now discussed in section 5.2.5
17386	13	4			Space between reference and They [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
14556	13	17			"The devolution of responsibility for sustainability to citizens, in their roles as consumers on the free market, has failed to produce significant change; even those most committed to sustainable living confront structural barriers that they do not have the power to overcome" (Isenhour, 2010). Ref.: Isenhour, C. Building Sustainable Societies: Exploring Sustainability Policy and Practice in the Age of High Consumption, Ph. D. Dissertation, University of Kentucky, 2010 [on line]: http://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1000&context=gradschool_diss [Rattan Lal, United States of America]	Noted, text removed
1474	13	22			suitable should be sustainable [Pytrik Reidsma, Netherlands]	Noted, text removed
14558	13	26			The role of the advertising, of the media, in conforming public opinion and induce consumers' choices should be stressed. Consumerism as concept can not be understood using ethical formulations and can not be analysed outside of the socio-technical systems (Holt, 2012). Ref.: Holt, D. B., Constructing Sustainable Consumption. From Ethical Values to the Cultural Transformation of Unsustainable Markets, The ANNALS of the American Academy of Political and Social Science, 3, 2012 [on line]: http://ann.sagepub.com/content/644/1/236 [Rattan Lal, United States of America]	Rejected, outside scope of chapter
14560	13	42			Cross-cutting programmes on sustainable development imply a worldwide change of focus and procedures in different areas of production, distribution, consumption and discard to move away from human behaviour approaches and techno-economic paradigms that obscure government's role in sustaining unsustainable economic institutions and ways of life (Shove et al., 2012). Ref.: Shove, E., et al., The Dynamics of Social Practice: Everyday life and how it changes, London: Sage, 2012. [Rattan Lal, United States of America]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8632	14	3	14	4	Sentence is unclear: "Past data show mostly trade-offs between SDG 13 and other goals based on the limited number of indicators provided for this goal." [Delphine Deryng, Germany]	Accepted and revised
8674	14	4	14	5	"For example, trade-offs were observed between SDG 2 and SDG 13 for around 50% of the cases." Source(s) for this claim missing. [Delphine Deryng, Germany]	Accepted
24422	14	8	14	8	Are there really no trade-offs at all between SDG 11 and SDG 13 as is depicted in Figure 5.3? [Barron Joseph Orr, Germany]	Accepted, explained in the figure caption
1272	14	8	14	8	The graphic of tradeoffs and benefits is unclear. It can be taken as an expression of the potential trade offs between two SDGs…yet how, then, are there benefits and tradeoffs between SDG2 and SDG2? [Tonya Rawe, United States of America]	Accepted, explained in the figure caption
21106	14	8	14	14	why are there trade offs between SDG2 and SDG2 ? Why aren't there 100 % synergies between SDG13 and itself ? Why are SDG14 and 16 not completed ? Maybe there could be some explanations for this figure [Valerie Dermaux, France]	Accepted, explained in the figure caption
3810	14	9	14	9	Why do SDGs 2 and 13 have trade-offs with themselves? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, explained in the figure caption
3812	14	12	14	13	Is this policy prescriptive sentence needed in a figure note? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and rewritten
15844	14	14	14	14	Pradhan et al 2017 reference not found, incorrect doi ? [Jean-Luc Chotte, France]	Noted, reference provided with correct doi
16834	14	14	14	14	Pradhan et al 2017 reference not found, incorrect doi ? [Rattan Lal, United States of America]	Noted, reference provided with correct doi
15846	14	16	14	16	Nature Contribution to People compared to Ecosystem services is not a well adopted Concept, I would suggest to use Ecosystem services [Jean-Luc Chotte, France]	Noted, text removed
16836	14	16	14	16	Nature Contribution to People compared to Ecosystem services is not a well adopted Concept, I would suggest to use Ecosystem services [Rattan Lal, United States of America]	Noted, text removed
7160	14	16	14	18	Unhelpful to introduce the NCP concept. Suggest delete. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
15848	14	17	14	18	put " NPCs are all the contributions…" because this sentence is the one proposed by Diaz et al (2018).. But deleted all reference to NCP see my previous comment [Jean-Luc Chotte, France]	Noted, text removed
16838	14	17	14	18	put " NPCs are all the contributions…" because this sentence is the one proposed by Diaz et al (2018).. But deleted all reference to NCP see my previous comment [Rattan Lal, United States of America]	Noted, text removed
17568	14	15	15	9	what stated here on genetic engineering is to the least, ungenerous. GE crops have been used for over 20 years and now account for some 190 million hectares globally. See also what mentioned above in comment 8 regarding cultural, ideological, ethical biases. [TURI FILECCIA, Italy]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26816	14	16	15	19	The content of the paragraphs under the section 5.1.5.2 does not sufficiently reflect the title of the sections. For instance, food and nutrition security in the title is missing in the paragraphs. Based in the title of the section, the reader might be expecting, for instance, how agrobiodiversity (as part/component of Nature) contributes to food and nutrition security under changing climate. I suggest some references which might be useful to illustrate the point Penafiel, D., Lachat, C., Espinel, R., Van Damme, P., & Kolsteren, P. (2011). A Systematic Review on the Contributions of Edible Plant and Animal Biodiversity to Human Diets. EcoHealth, 8(3), 381-399. doi: 10.1007/s10393-011-0700-3 Segnon, A. C., & Achigan-Dako, E. G. (2014). Comparative analysis of diversity and utilization of edible plants in arid and semi-arid areas in Benin. Journal of Ethnobiology and Ethnomedicine, 10(1), 80. doi: 10.1186/1746-4269-10-80 Powell, B., Thilsted, S., Ickowitz, A., Termote, C., Sunderland, T., & Herforth, A. (2015). Improving diets with wild and cultivated biodiversity from across the landscape. Food Security, 7(3), 535-554. doi: 10.1007/s12571-015-0466-5 Chadare, F. J., Fanou Fogny, N., Madode, Y. E., Ayosso, J. O. G., Honfo, S. H., Kayodé, F. P. P., . . . Hounhouigan, D. J. (2018). Local agro-ecological condition-based food resources to promote infant food security: a case study from Benin. Food Security. doi: 10.1007/s12571-018-0819-y [Alcade Segnon, Benin]	Noted, text removed
18590	14	16	15	19	Section 5.1.5.2 will be more useful if it will focus on how nature contributes to people through agrobiodiversity, how climate change affects these contributions, and how these contributions could enhance ecosystem services and contribute to climate change adaptation, mitigation and resilience. Please consult FAO, 2009: CLIMATE CHANGE AND BIODIVERSITY FOR FOOD AND AGRICULTURE': http://www.fao.org/uploads/media/FAO_2008a_climate_change_and_biodiversity_02.pdf [Asia Adlan, Sudan]	Noted, text removed
19628	14	16	15	19	Section 5.1.5.2 will be more useful if it will focus on how nature contributes to people through agrobiodiversity, how climate change affects these contributions, and how these contributions could enhance ecosystem services and contribute to climate change adaptation, mitigation and resilience. Please consult FAO, 2009: CLIMATE CHANGE AND BIODIVERSITY FOR FOOD AND AGRICULTURE': http://www.fao.org/uploads/media/FAO_2008a_climate_change_and_biodiversity_02.pdf [Asia Adlan, Sudan]	Noted, text removed
16346	14	16	15	19	How does sub-section 5.1.5.2 connect to section 5.1.5? Page 13, lines 32 and 33 suggest you would explain the SDGs and IPBES. Sub-section 5.1.5.1 was - as expected - on the SDGs but following what you wrote, sub-section 5.1.5.2 should be on IPBES, not on "nature's contributions to people". [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
6782	14	16	15	19	1.5.2 The title "Climate change, food and nutrition security, and Nature's Contributions to People" does not align with the text. Plant breeding, genetic improvement for nitrogen use efficiency, abiotic stress tolerance, disease and pest reduction and yield and yield stability are not nature's contributions to people but human's contribution to nature. [Nazimi Acikgoz, Turkey]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17644	14	17	15	1	The NCPs are defined twice in this chapter: in section 5.1 on page 6, line 13-15, and in 5.1.5.2, page 14 line 17 and on. In section 5.1 the definition is quoted from Pascual et al. 2017, and referenced as (Díaz et al. 2018; Pascual et al. 2017), while in section 5.1.5.2 the definition is quoted from Díaz et al. 2018. Please check these references, and as the two definitions are not really different, I suggest to introduce just one of them in section 5.1 line 13-15, when NCPs are mentioned for the first time. [Asia Adlan, Sudan]	Noted, text removed
15850	14	17	15	19	the paragraph starts with NCPs…. I would recommend to use Ecosystem Services. The text of this paragraph does not demonstrate the added-value by using NCPs; moreover all cited articles in this paragraph refer to Ecosystems Services (see Reed et al . 2015) [Jean-Luc Chotte, France]	Noted, text removed
1478	14	17	15	19	The term NCPs is used, which is fine. However, the term ecosystem services is used much more often, so good to at least refer to 'ecosystem services'. [Pytrik Reidsma, Netherlands]	Noted, text removed
16840	14	17	15	19	The paragraph starts with NCPs…. I would recommend to use Ecosystem Services. The text of this paragraph does not demonstrate the added-value by using NCPs; moreover all cited articles in this paragraph refer to Ecosystems Services (see Reed et al . 2015) [Rattan Lal, United States of America]	Noted, text removed
10512	14	1			equal access to land and other productive assets like advisory services, credit, markets, etc [Zitouni Ould-Dada, Italy]	Accepted
17098	14	8			Figure 5.3 is difficult to understand. [Lourdes Tibig, Philippines]	Accepted, explained in the figure caption
25938	14	9			Figure 5.3: the figure is nice, but leaves to many questions unanswered. Why are the more tradeoffs with one than the other SDG? What is the yellow category? What kind of data has been used for this and what are the limitations of quantifying? This figure certainly needs more explanation and is not suitable as a mere illustration. [Hans Poertner and WGII TSU, Germany]	Accepted, explained in the figure caption
25004	14	9			In figure 5.3, why are the SDG14 and SDG16 blocks grey? Please note the reason in the figure caption [Michelle North, South Africa]	Accepted, explained in the figure caption
26814	15	1	15	3	I will suggest the use of the reference below which are more relevant to illustrate the idea in the sentence than Costanzo and Barberi 2014. Costanzo and Barberi 2014 focused their review on agrobiodiversity and ecosystem services for sustainable wheat production Altieri, M. A., Funes-Monzote, F. R., & Petersen, P. (2012). Agroecologically efficient agricultural systems for smallholder farmers: contributions to food sovereignty. Agronomy for Sustainable Development, 32(1), 1-13. doi: 10.1007/s13593-011-0065-6 Altieri, M. A., Nicholls, C. I., Henao, A., & Lana, M. A. (2015). Agroecology and the design of climate change-resilient farming systems. Agronomy for Sustainable Development, 35(3), 869-890. doi: 10.1007/s13593-015-0285-2 Altieri, M. A., & Nicholls, C. I. (2017). The adaptation and mitigation potential of traditional agriculture in a changing climate. Climatic Change, 140(1), 33-45. doi: 10.1007/s10584-013-0909-y [Alcade Segnon, Benin]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10514	15	1	15	6	genetic resource/local varieties, as well as traditional knowledge exist. Many local varieties have been lost because of promotion of high yielding hybrid varieties [Zitouni Ould-Dada, Italy]	Noted, text removed
17436	15	5	15	6	Give some references [Noureddine Benkeblia, Jamaica]	Accepted. References added.
1274	15	8	15	10	Reference might be made (as a nuance of intellectual property rights) to equity considerations in access to genetically enginerred resources. IP is what the corporate entity might be looking for; a small-scale farmer will be looking for equitable access, when s/he cannot afford to buy new seeds every year. [Tonya Rawe, United States of America]	Noted, text removed
10714	15	14	15	19	Use FAO. 2015. The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture, edited by B.D. Scherf & D. Pilling. FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome (available at http://www.fao.org/3/a-i4787e/index.html). [Anne Mottet, Italy]	Noted, text removed
18458	15	14	15	19	Use FAO. 2015. The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture, edited by B.D. Scherf & D. Pilling. FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome (available at http://www.fao.org/3/a-i4787e/index.html). [Aziz Elbehri, Italy]	Noted, text removed
18578	15	14	15	19	Use FAO. 2015. The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture, edited by B.D. Scherf & D. Pilling. FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome (available at http://www.fao.org/3/a-i4787e/index.html). [Aziz Elbehri, Italy]	Noted, text removed
15770	15	16	15	18	Cite source of the statistics (20% of local livestock breeds) and another 16% of breeds are stable [Robert Onyeneke, Nigeria]	Noted, text removed
24424	15	24	15	24	Please add reference to UNCCD (2017): Global Land Outlook, first edition. Bonn, Germany https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf [Barron Joseph Orr, Germany]	Noted, text removed
14562	15	24	15	24	UNCCD (2017): Global Land Outlook, first edition. Bonn, Germany https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf [Rattan Lal, United States of America]	Noted, text removed
24426	15	28	15	28	Please consider including the following directly related reference: Sanz et al 2017. Sustainable Land Management contribution to successful land-based climate change adaptation and mitigation. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. https://www.unccd.int/sites/default/files/documents/2017-09/UNCCD_Report_SLM_web_v2.pdf [Barron Joseph Orr, Germany]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14564	15	28	15	28	Sanz et al. 2017. Sustainable Land Management contribution to successful land-based climate change adaptation and mitigation. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. https://www.unccd.int/sites/default/files/documents/2017-09/UNCCD_Report_SLM_web_v2.pdf [Rattan Lal, United States of America]	Noted, text removed
16350	15	30	15	30	Please name the "new mechanisms". [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
18560	15	32	15	32	What are these mechanisms? [Aziz Elbehri, Italy]	Noted, text removed
18562	15	37	15	37	This sentence doesn't make sense. Desertification and degradation are slow moving processes (counted in years); market volatility is short term phenomenon (in months)! [Aziz Elbehri, Italy]	Noted, text removed
16352	15	38	15	40	Please explain what happened in 2015, which threatened the livelihood of 20% of the global population (!!!!) and reduced GDP in many counties (how many?)? [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
1276	15	38	15	40	Can reference be made to any geographic hotspots -- as reference is made to an impact on 20% of the global population and to a reduction in national productivity "in many countries" [Tonya Rawe, United States of America]	Noted, text removed
24428	15	40	15	40	Please consider adding reference to Nkonya et al. Eds. (2017): Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development. Springer. As well as https://www.unccd.int/news-events/poor-land-use-costs-countries-9-percent-equivalent-their-gdp (additional current figures/information). [Barron Joseph Orr, Germany]	Noted, text removed
14566	15	40	15	40	Nkonya et al. Eds. (2017): Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development. Springer. As well as https://www.unccd.int/news-events/poor-land-use-costs-countries-9-percent-equivalent-their-gdp (additional current figures/information). [Rattan Lal, United States of America]	Noted, text removed
16000	15	40	15	40	"...and reduced national productivity (GDP) in many countries (Siegel 2016)." As written, it seems that GDP is the acrostic of reduced national productivity, maybe it should be written "(i.e., GDP) [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
19368	15	21	16	45	Suggested deleting 5.1.6 Links to desertification and land degradation as desertification and degradation topices are well covered in respective chapters. Since the report is already inflated, it is advisable to reduce the lengh [Binaya Raj Shivakoti, Japan]	Noted, text removed
18884	15	21	16	45	desertification and land degradation will influence the food production, and food production will influence the desertification and land degradation, so interaction of desertification and land degradation with food production systems [Jianguo Wu, China]	Noted, text removed
1476	15	6			A statement is made, but no reference included [Pytrik Reidsma, Netherlands]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17794	15	8			There is now good evidence that members of the phytomicrobiome, or materials produced by them, can help plants deal with stress. If it is helpful I can provide one or two concise sentences on this. [Donald Smith, Canada]	Noted, text removed
14568	15	42			Monetising or valuing nature turns it into a commodity, the economic invisibility of resource depletion and pollution leads to systemic failures in all public spheres of decision, green innovations and new practices (in behaviour and policy) face an uphill battle, played out on economic, technical, political, scientific, and cultural dimensions: transport, energy, agri-food systems, stabilized by vested interests and favourable institutions lead to path dependence and entrapment: (Sustainability Transitions Research Network (2010). Ref.: Sustainability Transitions Research Network, 2010 [on line]: http://www.transitionsnetwork.org/files/STRN_research_agenda_20_August_2010(2).pdf [Rattan Lal, United States of America]	Noted, text removed
14570	15	46			Concern about the environmental impact of repeated pesticide use has prompted research into the environmental fate of these agents, which can emigrate from treated fields to air, other land and water bodies. [Rattan Lal, United States of America]	Noted, text removed
15856	16	13	6	13	add "sustainable" in between "forms of SUSTAINABLE intensification [Jean-Luc Chotte, France]	Noted, text removed
16846	16	13	6	13	Add "sustainable" in between "forms of SUSTAINABLE intensification [Rattan Lal, United States of America]	Noted, text removed
16354	16	2	16	2	Please explain how the GEP is measured and to which period exactly the estimates refer to. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
24430	16	3	16	4	Firstly, Land Degradation Neutrality (LDN) can be hereby referred to as an approach to consider different contexts towards achieving no-net loss of healthy land as well as respective natural capital and related provision of ecosystem services, functions and goods within landscapes/ watersheds (see Orr et al. 2017 and Cowie et al. 2018). Secondly, potential solutions can further include Land Degradation Neutrality approaches, in line with SDG target 15.3. Actions to achieve LDN include sustainable land management approaches that avoid or reduce degradation, coupled with efforts to reverse degradation through restoration or rehabilitation of land that has lost productivity. [Barron Joseph Orr, Germany]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14572	16	3	16	4	Firstly, Land Degradation Neutrality (LDN) can be hereby referred to as an approach to consider different contexts towards achieving no-net loss of healthy land as well as respective natural capital and related provision of ecosystem services, functions and goods within landscapes/ watersheds (see Orr et al. 2017 and Cowie et al. 2018). Secondly, potential solutions can further include Land Degradation Neutrality approaches, in line with SDG target 15.3. Actions to achieve LDN include sustainable land management approaches that avoid or reduce degradation, coupled with efforts to reverse degradation through restoration or rehabilitation of land that has lost productivity. See: Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality (https://doi.org/10.1016/j.envsci.2017.10.011) [Rattan Lal, United States of America]	Noted, text removed
14574	16	3	16	4	It might be worth pointing out that preventing/avoiding is more cost-effective than degradation reducing. Actual restoration of badly degraded areas is sometimes being extremely costly. [Rattan Lal, United States of America]	Noted, text removed
14576	16	5	16	5	Degradation often leads to food production declines, however this is sometimes masked by the use of increased levels of inputs. [Rattan Lal, United States of America]	Noted, text removed
15852	16	11	16	11	change "slowing" by "..avoiding, reducing and reversing" [Jean-Luc Chotte, France]	Noted, text removed
15854	16	11	16	11	change "..by agricultural intensification" by "..by sustainable land management" [Jean-Luc Chotte, France]	Noted, text removed
16842	16	11	16	11	Change "slowing" by "..avoiding, reducing and reversing" [Rattan Lal, United States of America]	Noted, text removed
16844	16	11	16	11	Change "..by agricultural intensification" by "..by sustainable land management" [Rattan Lal, United States of America]	Noted, text removed
16716	16	11	16	12	Agricultural intensification may accelerate land degradation. Here we should provide more information and references to support the conclusion. [Jing Wang, China]	Noted, text removed
20942	16	11	16	22	This discussion is important, but should be expanded as it is central to the question to what extent intensification can ever be sustainble, and what policies are needed to turn the benefits of intensification (which often means reduced emissions intensity) into actual climate benefits. Also this discussion needs to be linked up with the later discussion in various other places on this topic (parts of 5.4, 5.8, 5.10). [Andy Reisinger, New Zealand]	Noted, text removed
27002	16	18	16	18	Reference in this sentence to 'agrobusiness' is not clear. As all farmers are in a sense an 'agrobusiness' it may be useful to define the scale or type of agrobusiness being referred to if a distinction is intended. Otherwise the information in parantheses may be redundant. [Beau Damen, Thailand]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2962	16	20	16	23	Need a reference for this strong statement. Also refer to the uncertainty language guidelines. [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
3814	16	21	16	21	Explain "sparing" (lightly) [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
3242	16	23	16	35	The examples selected appear arbitrary. Why land-sparing / sharing only for Africa, or forest degradation in the Himalaya region? Examples should be better introduced, and uncertainty language followed [Karlheinz Erb, Austria]	Noted, text removed
17388	16	25	16	26	agroecosystem is preferable to ecosystem. [Noureddine Benkeblia, Jamaica]	Noted, text removed
8188	16	41	16	41	Please see if the word 'how' is actually 'show'? [Muhammad Mohsin Iqbal, Pakistan]	Noted, text removed
1278	16	41	16	45	Can brief discussion or mention be included of the implications of the geographic shift in suitable cropland for countries whose economies are currently highly dependent on agriculture? [Tonya Rawe, United States of America]	Accepted, added to section 5.1.1.3
17444	16	43	16	45	Unclear sentence. Something seems missing. [Noureddine Benkeblia, Jamaica]	Noted, text removed
17442	16	12			Do you mean agroecosystem? [Noureddine Benkeblia, Jamaica]	Noted, text removed
17796	16	45			It should be noted that further north temperature shift is important, but in some regions, such as eastern Canada, there is a lack of soil. [Donald Smith, Canada]	Noted, text removed
26988	17	1	5	17	It would be an oversimplification to assume the cheap food paradigm as a public good. It could have elements of all types of goods depending on the local context - private good, club good, common good and public good. Reports of this scale should make these concepts crystal clear with emperical case studies/examples. [Laxmi Pant, Canada]	Taken into account - section rewritten and this no longer discussed
9418	17	1	17	29	First, it's good that the report recognizes that different food systems exist, and calls out the unsustainable practices that are associated with the industrial food system (e.g., concentration of production in a few commodity crops, homogenized global diets, increased systemic risks into the environment and health sectors, etc.). These unstainable practices and the negative outcomes they carry are well known and have been extensively documented in research and policy. However, the report does not effectively address the question of what is keeping these unsustainable practices of the dominant industrial food system in place. The FAO's IPES-Food (2015) eloquently addresses these issues and this report could benefit from engaging with ideas presented in that publication. IPES-Food points to a set of lock-ins and path dependencies that reinforce the modes of farming in industrial agriculture: subsidies for specific commodity crops; policies to keep fossil energy cheap; bulk supply contracts from retailers; trade liberalization measures and trade agreements, etc. [Helena Shilomboleni, Canada]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9424	17	1	17	29	Clapp argues that these early-post war policies laid the ground work for the highly globalized world food economy we have today, and the uneven agricultural trade patterns, where rich countries hold the balance of power and norms in shaping/influencing food systems around the world to resemble industrial agriculture (p. 27), and increasingly subsuming family farming or traditional agriculture within the commercial and technological logics of industrialization (Pritchard 2016, p. 8). Unpacking these polices helps us to understand why we have a concentration of production in a few regions, and in fewer commodity crops, as well as why many of the world's poorest countries became highly dependent on food imports (the food security risks of such an arrangement should not be underestimated). [Helena Shilomboleni, Canada]	Taken into account during rewriting of section. However focus sharpened onto climate and food systems rather than description of food system alone, so comment now laregely superceded
15744	17	1	17	29	Include the GHG prudcduces by organic waste disposal [Maria del Pilar Salazar Vargas, Mexico]	Noted, text removed
5176	17	2	17	3	The opening sentence appears to provide quite an incomplete, as well as unbalanced statement about how ''food systems'' developed historically. This is an area where a lot has been written of course, including in flagship FAO publications. Kindly expand your literature search beyond the McKeon reference, striving to offer a more complete and balanced view. IPCC should offer a neutral, comprehensinve sysnthesis on the subject. [Francesco Nicola Tubiello, Italy]	Noted but section refocussed so comment superceeded
19370	17	2	17	13	Could be delected, this background is not necessary, better to focus on main points only. Nobody is interested in knowing how food system evolved over time. [Binaya Raj Shivakoti, Japan]	Accepted - background no longer given
9422	17	2	17	13	To help further this discussion, the work of Jennifer Clapp (Food 2015) comes to mind. The author traces the rise of the global food system to the period after World War II, whereby influential world powers, primarily the USA, influenced global outcomes in the sector—through subsidizing their farmers to produce more, and developing export markets (and food aid measures) to get rid of their surplus grain. Frieddmann and Michael (1989) calls this global food and agricultural arrangement the food regime. [Helena Shilomboleni, Canada]	Taken into account - section rewritten and this no longer discussed
25532	17	2	17	13	The food system also promoted research and development in crop breeding, allowing the Green revoloution with massive benefits in South Asia [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted but section rewritten
1280	17	2	17	13	the frank portayal of the impacts of changes in global food systems -- the negative impacts and trends -- is welcome. [Tonya Rawe, United States of America]	Noted - tried to retain "frank protrayal" in rewriting
18462	17	3	17	13	Consider expanding references for the concepts in this section and review FAO flagship publications including relevant SOFA, SOFI, Perspective Studies Reports. [Aziz Elbehri, Italy]	Accepted - many of these publications were already refereed too and these retained in rewrite
5178	17	3	17	13	The concepts expressed herein appear to be based on a limited, selective set of references, with the result of oversimplifying the issue or worse describe it in a partial, thus incomplete manner. Among others, kindly refer to extensive FAO flagship publications including relevant SOFA, SOFI, Perspective Studies Reports. [Francesco Nicola Tubiello, Italy]	Taken into account in rewrite but also note that FAO publications also present partial systemic analyses, some reasons gven in new text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7162	17	14	17	16	Unclear text. Delete or rewrite. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and rewritten
5180	17	14	17	21	The statements offered appear to be oversimplifying the issue by relaying information from a limited, incomplete set of references. In this specific case, although climate extremes had a role in the regions indicated, the text appears to imply that these were the root causes of food crises and that a number of additional factors let to amplifications. Many authors and analysts of the food system would actually argue the opposite: there were a number of non-climate related, socio-economic, financial, and structural factors that created overall weakness in the system, with the crisis generated by amplifications from other factors, one of which was climate extremes. Please take a look at relevant papers and reports in the food policy arena and in the UN system, for instance the FAO publication on trends and challenges (http://www.fao.org/3/a-i6583e.pdf). [Francesco Nicola Tubiello, Italy]	Noted but based on misrepresentation of the existing text, as comment is correct and discussions pointed to in this summary text refers to systemic risk and fragility of food system. Comments taken into account in revision.
25940	17	19	17	20	Specify 'the worldwide consequences thereafter' briefly. [Hans Poertner and WGII TSU, Germany]	Noted but section removed in rewrite
3100	17	31	17	31	Type of food as main source or supporting material should be mentioned. [Mostafa Jafari, Iran]	Noted but section removed in rewrite
26	17	31	17	31	The World Bank has many publications about poverty and food security. [Nathalie Jeanne Marie Hilmi, France]	Noted but section removed in rewrite
19614	17	31	17	45	Excessive use of land is not the only way to offset food shortages. Given that increasing the consumption of food is one of the factors that exacerbate climate change, therefore, it is necessary to present climate change reports and to communicate with scientific and research centers that are working to improve the quality of nutrition. This can lead to the production of low-volume and high-energy foods. [sadegh ziayan, Iran]	Noted but section removed in rewrite
18464	17	32	17	45	The statements provided in this opening section are incorrect. please consider expanding the scope of the discussion which is quite narrow here. The official source is the FAO SOFI which has the original data and analysis source for the number of the undernourished. This publication is not restricted to developing countries as the authors claim, but is rather global and cover the entire work, addressing both under- and over- nourishment. [Aziz Elbehri, Italy]	Noted but section substantially rewritten including a justification of why SOFI underestimates FI people in some circumstances.
5182	17	32	17	45	The statements provided in this opening section are incorrect. Furthermore, the presentation of the topic is narrow and again offers specific, debatable interpretation based on select literature. First, please use the FAO SOFI as the original data and analysis source for the number of the undernourished. Second, it is incorrect to say that the UN study --which refers to SOFI--focuses only on developing countries. The FAO SOFI report covers the entire world, addressing both under- and over- nourishment. Third, I would opine that the importance of the data summarized are in highlighting numbers of people undernourished in specific points in time and place over a time series. These numbers should be highlighted and not be ''paved over'' by generic statements on long-term average trends as offered herein. [Francesco Nicola Tubiello, Italy]	Noted but section substantially rewritten including a justification of why SOFI underestimates FI people in some circumstances.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16356	17	34	17	39	Please explain why the FAO et al estimates of prevalence of undernourishment and the number of undernourished underestimate "the trends and the number of undernourished" worldwide. [Lorenzo Giovanni Bellù, Italy]	Accepted - section rewritten and explanations added
25534	17	36	17	37	Does the "global undernourished population" include only those showing undernourishment at a point in time, or also those at risk of undernourishment from transient food crises? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted but section removed in rewrite. PoU is undernourished which may differ from those at risk of undernourishment due to potential food insecurity
10716	17	37	17	37	Number of undernourished people has increased recently, not decreased. See SOFI 2017. [Anne Mottet, Italy]	Accepted but trend this century has been decrease. New text supplied to clarify
18460	17	37	17	37	Please update this statement as the number of undernourished people has increased recently, not decreased. See SOFI 2017. [Aziz Elbehri, Italy]	Accepted but trend this century has been decrease. New text supplied to clarify
5184	17	39	17	45	This section highlights a serious weakness in the writing team on food security issues, one that should be perhaps addressed by calling upon a specialist on the subject matter. FAO and others have published extensively on the pros and cons of the PoU method, including the development of alternative indicators, such as the Food Insecurity Experience Scale, addressing precisely the type of observations made in this section. Finally, I suggest to make comprehensive statements on the pro and cons of existing methods, rather than offering select, incomplete, and possibly ill posed examples honing on a specific story in a specific country. If that is relevant, then put it in a box. [Francesco Nicola Tubiello, Italy]	Noted but section substantially rewritten including a justification of why SOFI underestimates FI people in some circumstances.
1282	17	43	17	45	the direct reference to the need to consider the impact of inequality on food and nutrition security is very welcome and should inform the framing of solutions discussed later in the report. [Tonya Rawe, United States of America]	Noted
19372	17	1	23	36	Changing climate is weakly addressed (except in 5.2.5 Food loss and waste) in the entire section '5.2 Status and current trends of the food system under a changing climate' is weak. Suggest either completely delete the entire section or trip down the length to around 1 page. Again it is not IPCCjob to write about food system but more on the contribution to and impact of Climate Change. [Binaya Raj Shivakoti, Japan]	Accepted - section rewritten and focussed
18886	17	1	23	36	section 5.2 Status and current trends of the food system under a changing climate, but there is no information about the Attribution of food system change over the past years [Jianguo Wu, China]	Accepted - section rewritten and focussed
698	17	1	23	36	How to assess the current "Status and current trends of the food system under a changing climate"? Can you display a set of indicators (and technical approaches) that assess the status and the trends? [Roberto Abeldaño, Mexico]	Taken into account during rewriting of section. However focus sharpened onto climate and food systems rather than description of food system alone, so comment now laregely superceded, but table added on how to assess food security
16070	17	41	23	29	IPCC needs to enhance links with transversales disciplines. Involvement of experts from a more diverse set of social-scientific communities in the scoping meeting and the future activities could enhance the quality of the Work-Group outines and reports. [Youssouph Sane, Senegal]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25942	17	31			UK very often as representative for developed countries - are there no other examples available - Germany, France, USA...? [Hans Poertner and WGII TSU, Germany]	Noted but section removed in rewrite
5186	18	1	18	6	The authors appear to create a false narrative on published UN undernourished numbers based on personal opinion. The authors should rather review the existing literature and propose a neutral, synthesis set of statements solidly based on published literature. The observations made herein have in fact already been made in relevant FAO flagship publications (SOFI) and other literature. Kindly expand the team of CAs to more properly address these fundamental issues. [Francesco Nicola Tubiello, Italy]	Noted but section substantially rewritten including a justification of why SOFI underestimates FI people in some circumstances.
10516	18	8	18	8	the importance of women in the food producton system is not reflected adecuately [Zitouni Ould-Dada, Italy]	Noted, text removed
10718	18	8	18	20	There is no real concensus on how much is produced by small scale farmers. See for example the recent sudy Ricciardi, Vincent, Navin Ramankutty, Zia Mehrabi, Larissa Jarvis, and Brenton Chookolingo. "How much of the world's food do smallholders produce?." Global Food Security 17 (2018): 64-72. Also livestock are usually not wll acoutned for in these studies that focus on crops. [Anne Mottet, Italy]	Noted, text removed
18466	18	8	18	20	There is not much concensus on how much is produced by small scale farmers. Moreover, livestock is not properly accounted for in the available literature that focuses mostly on crops (for citation, see: Ricciardi, Vincent, Navin Ramankutty, Zia Mehrabi, Larissa Jarvis, and Brenton Chookolingo. "How much of the world's food do smallholders produce?." Global Food Security 17 (2018): 64-72.) [Aziz Elbehri, Italy]	Noted, text removed
16358	18	8	18	24	Section 5.2.2 is rather underdeveloped and instead of describing the food production system it talks about the number of farms and its distribution. Please refer to FAO. 2014. The State of Food and Agriculture - Innovation in family farming. Available at http://www.fao.org/publications/sofa/2014/en/. Please rename the title of the section and develop it further getting inputs from the FAO 2014 publication. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
25536	18	9	18	9	what is the definition of "farm"? It is not straightforward [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
8190	18	9	18	9	The words 'to be' after estimated afe suggested to be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18468	18	9	18	12	When it comes to fundamental statistics and trends analysis on food and agriculture, and in particular on hunger, smallholder farm distribution, linkages to total world food supply etc., the basic data and reports that everyone uses in the literature are generated for the most part by FAO. With reference to the fundamental trends indicated herein. Therefore, in addition to refering the authors that referenced FAO data for their analysis, it is important to also reference th original FAO source reference. For example, Herrero et al, (cited abundantly) rely on FAO data and their secondary re-analysis; thereofre it is advisable to also quote the original source of data and trends analysis, for instance the well-recognized FAO SOFA, SOFI and Perspective Studies reports (as well as http://www.fao.org/3/a-i6583e.pdf). [Aziz Elbehri, Italy]	Noted, text removed
5188	18	9	18	12	General Comment # 11 to Section 5.3--as well as specific to these pg line numbers. When it comes to fundamental statistics and trends analysis on food and agriculture, and in particular on hunger, smallholder farm distribution, linkages to total world food supply etc., the basic data and reports that everyone uses in the literature are generated for the most part by FAO. With reference to the fundamental trends indicated herein, it seems a bit of an overstretch to reference the source of information to any single author, in this case Herrero et al, who very likely had to rely on FAO data and their secondary re-analysis in the literature. It is suggested to always also quote the original source of data and trends analysis, for instance the well-recognized FAO SOFA, SOFI and Perspective Studies reports (as well as http://www.fao.org/3/a-i6583e.pdf). [Francesco Nicola Tubiello, Italy]	Noted, text removed
4090	18	9	18	24	The forecast of United Nation (UN).- The UN has forecasted that , the world human population of current 7.6 billion will expected to reach to 8.6 billion in 2030 to 9.8 billion in 2050 and to 11.2 billion in 2100. The number of hungry people in the world is around 795 million. The Food and Agriculture Organisation (FAO) is of the view that , to feed this larger population, food production must be increase by 70 percent. Annual cereal production will need to rise to about 3 billion tonnes from 2.1 billion of to day and annual meat production from 200 million tonnes to 470 million tonnes. Thus along with the increase of population the demand of the food (cereals and pulses) , fruits, vegetables, sugar and jaggery, tubers, commercial crops , fodder & forage , oil seeds (edible and non-edible) , medicinal plants, aromatic plants , plantation crops, flowers ,raw materials of agri-based industries, structural wood And timbers, bamboos, spices and condiments etc many others are in the rise day by day. To ensure food security, the annual production should be at the quantity to meet the demand and buffer stock. It has been spelt out that , “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”. (World Food Summit, 1996). All these should be produced on the arable land with productive soil and optimum fresh water. But, the arable land has been subjected to various kinds of degradation and accelerated soil erosion and the arable land area is decreasing for use in various non-agricultural sectors and urbanization. Soil not only is the foundation of plants but filters and clean tens of thousands of cubic kilometres of water each year. [Prafulla Kumar Mabdal, India]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8192	18	10	18	10	Please see if the phrase 'food groups for human consumption' can be changed to 'food commodities'?f [Muhammad Mohsin Iqbal, Pakistan]	Noted, text removed
8194	18	11	18	11	The phrase '- - - comes from farms less than 50 ha - -' is suggested to be changed to '- - - comes from farms of size less than 50 ha - -'. [Muhammad Mohsin Iqbal, Pakistan]	Noted, text removed
25538	18	12	18	12	50 ha seems a high threshold for "small farmers" and how is it defined? Including grazing land? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
216	18	13	18	14	for SOME countries over 50% of labour is in agriculture: This is very weakly expressed, as the least developed countries (and these may not be just 'SOME') have over 75% of labour in agriculture. In my opinion, this statement can be more specific, so possibly dedicate some extra sentences clarifying the global siutation. [Eline Vanuytrecht, Belgium]	Noted, text removed
5190	18	13	18	14	General Comment # 12 to Section 5.3--as well as specific to these pg line numbers. In the exact opposite concept expressed above, when the authors of this chapter use FAO (FAOSTAT) data for their own, unpublished secondary analyses, they should not reference the results to FAOSTAT. Ideally, they should rather quote any FAO report --or related scientific paper--that may already have made the analysis in question. If instead, the authors used FAOSTAT statistics to make their own analysis, my next question would be: did they contact the actual FAOSTAT data owners to have a sense of the data quality, uncertainty and applicability to specific questions? I suggest that the authors do this routinely and extensively for all FAOSTAT data used. In fact, in my view this is best done by including relevant FAO staff in the overall data team of the SRCCL, or at least as CAs in relevant sections. [Francesco Nicola Tubiello, Italy]	Noted, text removed
15772	18	14	18	15	Cite the source of "estimated 70% of the poorest in the world live in rural areas" [Robert Onyeneke, Nigeria]	Noted, text removed
25540	18	15	18	15	How are "small farmers" defined her? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
5192	18	15	18	16	The Samberg et al reference does not appear to be the original, nor in any case the authorative source, for this information on small farmers. Please add a relevant FAO reference as well, possibly from the FAO SOFA flagship publications. [Francesco Nicola Tubiello, Italy]	Noted, text removed
16952	18	15	18	20	Here I would add also the positive role played by small-scale agriculture towards sustainable land management, above all in areas facing land abandonment and loss of Traditional Ecological Knowledge (and other consequent negative effects). [Vincenza Ferrara, Italy]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20944	18	16	18	18	Really: those numbers would suggest that food production by smallholders is extraordinarily efficient, if they produce 70% of food calories using only 30% of agricultural land. Please double check this statement. If true, why are there more intensive commercial farms that apparently produce food much less efficiently? [Andy Reisinger, New Zealand]	Noted, text removed
15774	18	16	18	18	Cite the source of "They support the livelihoods of many of the most marginalised populations and also produce more than 70% of the food calories produced in Latin America, sub-Saharan Africa and South- East- Asia, using only 30% of the agricultural land." [Robert Onyeneke, Nigeria]	Noted, text removed
5194	18	16	18	20	Please provide adequate references for these statements. If the reference is the one used above, then same comment above applies. Integrate this statement with a relevant FAO publication reference. [Francesco Nicola Tubiello, Italy]	Noted, text removed
15776	18	18	18	20	Cite the source of "Farmers in these densely populated regions are responsible for more than half of the food calories produced globally, as well as more than half of global production of several major food crops." [Robert Onyeneke, Nigeria]	Noted, text removed
5196	18	21	18	24	The text as written is quite ambiguous. How is ''the fight against hunger has progressed over the past 15 years'' linked to the previous sentence? The text seems to imply that one is related to the other, however these are complex socio-economic issues that are hardly explained by doing the algebra on comparing supply with population growth. Secondly, how do the authors conclude that the fight against hunger has progressed over the past 15 years (2004-2018, basically)? The recent dent in number of malnourished indicates--within statistical uncertainty of course--as well as recent trends in migrations and overall insecurity, that this is not necessarily the case any longer. [Francesco Nicola Tubiello, Italy]	Noted, text removed
8196	18	23	18	23	The phrase 'growth of' is suggested to be changed to 'growth being'. [Muhammad Mohsin Iqbal, Pakistan]	Noted, text removed
5200	18	6	19	7	The calorie conversion of food is done routinely by FAO and disseminated in FAOSTAT alongside the other data being presented here. Why would you then publish a mix of statistics that run the risk of not being seriously inconsistent? Please contact the FAO Statisitcs Division, Food Balance Sheet Unit, to check that the conversion used herein is acceptable. [Francesco Nicola Tubiello, Italy]	Noted, contacted FAO's statistics division and revised figure
1284	18	9	20		The clear discussion of the make up of farms on a global basis and the contribution of small farms to global food production, the predominance of agriculture-based livelihoods among poor populations -- this paragraph is very welcome as a means of emphasizing where attention should be focused -- and flagging the complex dynamics between climate, agriculture, food security, and poverty (with inequality in access to resources and power as an underlying factor). [Tonya Rawe, United States of America]	Noted, text removed
25944	18	8			Needs explicit link to climate change, e.g., smallholder farmers more vulnerable to cc, but their production potentially more sustainable? [Hans Poertner and WGII TSU, Germany]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5198	19	2	19	7	Please better indicate which graphs or data come from which source, from (a) to (f). Secondly, for data taken directly from FAOSTAT, it is recommended that the authors contact the actual FAOSTAT data owners, to discuss data uncertainty, quality, applicability, etc., in order to best elaborate and present the original data. Third, data taken from FAOSTAT should be referenced as FAOSTAT, rather than FAO. In any case, FAO (2017) does not appear in the reference list. Finally on graph (f), the symbol for ton is t, not T. Be aware that it is not a SI metric. [Francesco Nicola Tubiello, Italy]	Accepted and noted.
25542	19	3	19	3	Why have animal products been converted to calories when these are not generally what people eat them for? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. Although we agree with your comment, we plot the animal products in calories so that we can compare them with crop production and feed use.
25544	19	5	19	5	GHG emissions for agriculture, including land-use change or not? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. It does not include land-use change
20946	19				Figure 5.4: panel f: why ios the upward kink in total emissions in 1990 much larger than for agricultural soils, and absent in enteric fermentation - what else has caused the kink? Seems like a data error to me. Plus there needs to be a discussion somewhere in this chapter of different data sources (given that FAOSTAT has known shortcomings in the data it uses. Note FAO (2017) is cited but the references have this as FAO (2018). [Andy Reisinger, New Zealand]	Accepted and taken into account. Discussion on different data sources of GHG emission is provided in mitigation section.
11500	19				What a fascinating diagram! What would be most illuminating would be a global map showing the regional trends in these global averages. For each graph it would be fascinating to see how these global trends are created from regional data. [Debra Roberts, South Africa]	Noted many thanks. However, we do not include the regional trends in a global map due to the creation of too many panels (36).
16360	20	3	20	4	Please give the references of the statement you are making. Please note that trade liberalization took only partially place during the last decades. There have been several bilateral trade agreements, while multilateral trade liberalization is rather stagnated. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
3246	20	3	20	14	Population density a major determinant of the direction of flow should be mentioned (Erb K-H, Krausmann F, Lucht W, Haberl H (2009) Embodied HANPP: Mapping the spatial disconnect between global biomass production and consumption. Ecological Economics 69:328–334). Furthermore, Kastner T, Erb K-H, Haberl H (2014) Rapid growth in agricultural trade: effects on global area efficiency and the role of management. Environ Res Lett 9:034015. doi: 10.1088/1748-9326/9/3/034015 show that while biomass flows from higher-to-lower productive regions, and thus increases global area efficiency of consumption, it also trade shows lower potentials than increasing production by closing yield gaps for improved area efficiency. The following report might add some facets on the interrelation of livestock intensification and food security and trade: Erb K-H, Mayer A, Kastner T, et al (2012) The impact of industiral grain fed livestock production on food security: an extented literature review. Commissioned by Compassion in World Farming, The Tubney Charitable Trust and World Society for the Protection of Animals. Social Ecology Working Paper. Institute of Social Ecology, Vienna (https://www.wiso.boku.ac.at/fileadmin/data/H03000/H73000/H73700/Publikationen/Working_Papers/working-paper-136-web.pdf) [Karlheinz Erb, Austria]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
32	20	4	20	5	The international trade is mainly done in three regions (ASEAS, EU, ALENA) as intraregional trade. The inter-regional trade between those regions exclude some areas like Africa (reference: UNCTAD) [Nathalie Jeanne Marie Hilmi, France]	Noted, text removed
16362	20	5	20	6	You seem to neglect re-exports. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
16364	20	5	20	14	Please define what products you refer to under "agriculture produce". Please do your own search and retrieve the data on your own from dedicated databases (such as UN COMTRADE) rather than from a source which uses somebody elses data. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
3244	20	6	20	6	expression: "from very high", delete the "very", as it would need a quantification. I also think it should not be "production", but productivity (e.g. production per unit area) which is the case on average (Kastner T, Erb K-H, Haberl H (2014) Rapid growth in agricultural trade: effects on global area efficiency and the role of management. Environ Res Lett 9:034015. doi: 10.1088/1748-9326/9/3/034015) - it is obvious (and a precondition) that trade will flow from a region of "surplus" (higher production) to a region wiht "deficit" (lower production), but the same does not hold true for productivity. [Karlheinz Erb, Austria]	Noted, text removed
27062	20	6	20	8	Tthe statement would benefit from a supporting reference. Chen et al 2018 indicates that the substance of this statement is correct, but on a per capita, not absolute, basis. Full reference to Chen et al 2018 is as follows: Chen, B., Han, M. Y., Peng, K., Zhou, S. L., Shao, L., Wu, X. F., … Chen, G. Q. (2018). Global land-water nexus: Agricultural land and freshwater use embodied in worldwide supply chains. Science of the Total Environment, 613–614, 931–943. doi:10.1016/j.scitotenv.2017.09.138 [Beau Damen, Thailand]	Noted, text removed
25546	20	6	20	8	a) Given that africa is not itself a major food exporting region, as represented in the figure, this represents a logical jump b) the phraseology does not quite capture the subtelties of the "virtual water" argument. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
20948	20	6	20	9	Clarify what is meant by "nutrient poor" countries - if they are capable of producing nutrient rich foods, who are those countries nutrient poor? Do you mean the population in those countries misses out on food that is produced in those countries and thus misses out on nutrients? [Andy Reisinger, New Zealand]	Noted, text removed
15858	20	6	20	9	I do not understand the science based evidences to support 'are being moved from nutrient poor regions (Africa) to nutrient rich countries…" does this means that poor nutrient regions are exporting food they produced ? [Jean-Luc Chotte, France]	Noted, text removed
16848	20	6	20	9	I do not understand the science based evidences to support 'are being moved from nutrient poor regions (Africa) to nutrient rich countries…" does this means that poor nutrient regions are exporting food they produced ? [Rattan Lal, United States of America]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24432	20	9	20	9	Please consider adding reference to IPBES LDRA 2018 (https://www.ipbes.net/assessment-reports/ldr). Verburg et al. (2015): Land system science and sustainable development of the earth system: A global land project perspective; and/or Niewoehner et al. Eds (2016) Land Use Competition: Ecological, Economic and Social Perspectives. [Barron Joseph Orr, Germany]	Noted, text removed
14578	20	9	20	9	Cited elsewhere, these references are relevant here: Verburg et al. (2015), IPBES (2018). [Rattan Lal, United States of America]	Noted, text removed
20536	20	15	20	20	2. Figure 5.5 is unreadable without more explainning [Huai Jianjun, China]	Noted, text removed
218	20	21	20	32	How is climate change expected to affect this even more? Elevated atmospheric CO2 concentrations favour N-fixers as N limitation may lead to acclimation to elevated CO2 concentrations and thus reduction of the CO2 fertilization effect. As N fixers, like pulses, do not face N limitation, they may experience a comparative advantage compared to other crops. [Eline Vanuytrecht, Belgium]	Noted, text removed
28	20	22	20	25	international division of labor [Nathalie Jeanne Marie Hilmi, France]	Noted, text removed
16366	20	22	20	32	Please name the source of the statistics you are citing and specify the exact time period these statistics refer to. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
1286	20	22	20	32	Are there not implications for resilience of this concentration of production in fewer commodity crops, in light of potential climate impacts? Redundancy is a contributor to resilience, whereas concentration in fewer crops can increase vulnerability. And is there any potential discussion of the geography of this concentration in fewer crops and how that overlaps or does not with current land degradation or impacts? Any connection or overlap here can point to potential or existing hot spots or problem areas. [Tonya Rawe, United States of America]	Noted, text removed
30	20	25	20	32	The economic and social problems due to mono-cropping or few crops in Africa is reeally challenging [Nathalie Jeanne Marie Hilmi, France]	Noted, text removed
25548	20	28	20	29	I find the omission of cassava surprising, given the often repeated claim that is is *the* staple for 600-800 million people (e.g. http://www.fao.org/3/a-i3278e.pdf) [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
6784	20	1	21	19	5.2.2 Food production system: In this sub chapter there is one sub-sub title: Food consumption and demand. You might want to enrich the text under the sub title answering the following question: "HOW WILL FOOD CONSUMPTION HABITS CHANGE IN 2050's" (https://nacikgoz.blogactiv.eu/2014/01/28/how-will-food-consumption-habits-change-in-2050%E2%80%99s/).. [Nazimi Acikgoz, Turkey]	Noted, text removed
17446	20	1			Food Chains Supply [Noureddine Benkeblia, Jamaica]	Noted, text removed
25946	20	2			Add something on the role of trade for GHG emissions - how has that developed? [Hans Poertner and WGII TSU, Germany]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14580	20	22			The growing influence of food corporates on the global food system has raised public and media concerns about sustainability in relation to hunger, obesity, GMOs, resource depletion and land grabbing. The question encompasses policy makers, academia, market-place and vested interests in different areas: economic, political, educational, cultural (press, media, arts, entertainment). [Rattan Lal, United States of America]	Noted, text removed
10316	20	25			Removing the "producing" will make the sentence more simple [Bolanle Mutiat Titilola, Nigeria]	Noted, text removed
17798	20	27			Change "global" to "world wide" [Donald Smith, Canada]	Noted, text removed
2964	21	0	21	0	Fig 5.4 should come closer to the text where it is mentioned. [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
34	21	12	21	12	social only or economic too? Maybe societal? [Nathalie Jeanne Marie Hilmi, France]	Noted, text removed
7116	21	27	21	29	But often also low-income consumers consume cheaply available food which is full of calories? [Mariam Akhtar-Schuster, Germany]	Noted, text removed
27064	21	27	21	34	An additional, potentially useful supporting reference here would be Alexander et al 2015, which found that, over the period from 1961-2011, population expansion had been the largest driver for agricultural land use change, but dietary changes are a significant and growing driver in recent times - particularly for meat and dairy production. Full reference as follows: Alexander, P., Rounsevell, M. D. A., Dislich, C., Dodson, J. R., Engström, K., & Moran, D. (2015). Drivers for global agricultural land use change: The nexus of diet, population, yield and bioenergy. Global Environmental Change, 35, 138–147. doi:10.1016/j.gloenvcha.2015.08.011 [Beau Damen, Thailand]	Noted, text removed
16368	21	27	21	34	The authors seem to ignore literature on consumer behaviour as well as the economic theory on consumer demand. Kindly note that while there are empirical regularities in relation to food demand (e.g. Engel's and Bennett's law) there is also a so-called saturation point reached and is expressed in several non-linear demand systems. So after a certain increase of per capita income food consumption remains rather stable, while consumers direct their additional income to the consumption of non-food items (like services, manufacturing goods or even savings and investment). Please revise your statements and make reference to consumer theory. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
7164	21	27	21	34	Includes multiple unelaborated assumptions, particularly that animal products mean high emissions. I guess it comes later, but any IPCC report needs to provide careful evidence of this type of causal link. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
19386	21	28	21	30	This is a general relative assumption but it does not apply to all. Increase income is not the only indicator for eating more. In Developing countries, increasing income comes with increasing non-food commitments such as housing, education, socio-cultural-religious commitments. Whatever income that is left is used on food. [VILIAMU IESE, Fiji]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16370	21	30	21	30	Why income growth implies higher food waste? How do you know? To repeat, after a certain increase of per capita income food consumption remains rather stable, while consumers direct their additional income to the consumption of non-food items (like services, manufacturing goods or even savings and investment). [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
36	21	30	21	31	any reference? [Nathalie Jeanne Marie Hilmi, France]	Noted, text removed
25550	21	31	21	32	Developing countries undergoing a transition to higher meat-eating do not necessarily do so by markedly increasing use of cultivated feeds - Ethiopia seems to be doing so mainly on the basis of open grazing in marginal areas [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
24434	21	32	21	34	Please elaborate more on how to make the transition from "increasing consumption of animal products […] towards low carbon diets". [Barron Joseph Orr, Germany]	Noted, text removed
38	21	33	21	33	any example of future dietary changes? [Nathalie Jeanne Marie Hilmi, France]	Noted, text removed
3248	21	21	22	14	Kastner T, Rivas MJI, Koch W, Nonhebel S (2012) Global changes in diets and the consequences for land requirements for food. Proceedings of the National Academy of Sciences 109:6868–6872. doi: 10.1073/pnas.1117054109 provide some quantitative information on the development of diets and associated land demand. [Karlheinz Erb, Austria]	Noted, text removed
6786	21	36	22	14	5.2.4.1 Dietary diversity: Yu might want to consider taking thıs paragraph out as it is pretty common knowledge. [Nazimi Acikgoz, Turkey]	Noted, text removed
1288	21	37	22	14	Is there a geographic distrubition of these dietary shifts that can be discussed? To also then acknowledge that there is also inequity within countries, especially MICs, as it relates to diet and access to an adequate diverse, nutritious diet? The equity (or inequity) within dietary shifts is important to note to ensure that consideration is given to populations who need to increase both the caloric value and diversity of diets -- while other populations need to be the first to decrease their (over)consumption. [Tonya Rawe, United States of America]	Noted, text removed
2966	21	21	23	6	section 5.3.4 needs to be more focused on climate change. As it is the food consumption and demand is not related to climate change. [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
27552	21	21	27	46	The work done here is substantive as climate change has been adjudged the defining challenge of modern age. In Africa especially, this is expected to have a drastic impact on agricultural production thereby bring food insucurity for the region and other places and this calls for an improved well-being and social equity, while significantly reducing environmental risks. Here, climate smart agriculture is seriously needed as a way forward for food security in a developing climate which aims to improve fod security. [Daniel Mailumo, Nigeria]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20950	21	7			Explain what those endogenous factors are (endogenous presumably simply means anything outside the food system - which is meaningless without clarification). [Andy Reisinger, New Zealand]	Noted, text removed
1480	21	40			should be Biodiversity International [Pytrik Reidsma, Netherlands]	Noted, text removed
10518	21	45			"poor people in the Andes can no longer afford to eat quinoaas because of the high demand in rich countries, the prices went up." Further the the development of new varieties, which makes that quinoa can now be planted in non-andean countries, using inputs poor farmers in the Andes cannot afford, made that quinoa production in Andean countries is no longer competitive [Zitouni Ould-Dada, Italy]	Noted, text removed
15778	22	5	22	5	There is no "Khoury et al. 2014". Why? [Robert Onyeneke, Nigeria]	Noted, text removed
7118	22	9	22	9	It could be very useful to visualise the '16 dietary patterns' in a graph. [Mariam Akhtar-Schuster, Germany]	Noted, text removed
25948	22	9	22	14	is there also a correlation with climate change/GHG emissions, etc.? [Hans Poertner and WGII TSU, Germany]	Noted, text removed
25552	22	9	22	14	Not clear why the 16 patterns are even mentioned if they are immediately subsumed into 4 [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
15630	22	10	22	13	Let us know the source of the classification of the dietary patterns [Robert Onyeneke, Nigeria]	Noted, text removed
17448	22	11	22	12	Units: kcal cap-1 day-1 [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
1290	22	17	22	31	Discussion of impacts on nutrient content and food quality is welcome. Can a staple food be included among the examples given the high level of dependence on staples currently to meet food (albeit, only calorie) needs? This is also useful to tee up any discussion later of bias in breeding of new varieties for yield potential rather than for nutrient content. [Tonya Rawe, United States of America]	Noted, text removed
26548	22	21	22	24	There may be additional references associated with the WorldFish programme in Bangladesh [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
8142	22	22	22	24	I am wary of this example because B12 is not produced by the actual fish, but the gut bacteria of the fish. [Peter Neofotis, United States of America]	Noted, text removed
8148	22	25	22	25	not all carotenoids are precursors to vitamin A. Just say carotenoids, which include vitamin A precursors and antioxidants, [Peter Neofotis, United States of America]	Noted, text removed
27066	22	28	22	30	It would be useful if a supporting reference could be cited documenting the differences in property rights regimes as they apply to indigenous breeds and varieties and more common or introduced breeds and varieties. [Beau Damen, Thailand]	Noted, text removed
25554	22	30	22	30	Please clarify that property rights regime refers to intellectual propoerty, otherwise sentence is confusing [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27068	22	30	22	31	It would be useful if a supporting reference could be cited documenting the practical contributions of indigenous breeds and varieties. [Beau Damen, Thailand]	Noted, text removed and more references on the importance of indigenous breeds added
15860	22	35	22	37	the sentence "agro-ecological research demonstrate…., or price shocks) should be put in " " since this sentence is similar to one sentence in the article Remans et al. 2015. More this sentence seems to be adapted form Woods S et al 2015 not cited in this paragraph [Jean-Luc Chotte, France]	Noted, text removed
16850	22	35	22	37	The sentence "agro-ecological research demonstrate…., or price shocks) should be put in " " since this sentence is similar to one sentence in the article Remans et al. 2015. More this sentence seems to be adapted form Woods S et al 2015 not cited in this paragraph [Rattan Lal, United States of America]	Noted, text removed
25556	22	43	22	45	Some quality characteristics are specific to social or cultural groups or categories - chewability of meat or root crops - so not absolute [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
10720	22	16	23	6	There is generally a lack of nutrient focus in scenario analysis of land use and food security issues. They usually focus on kcal and sometmes on protein, but hardly ever include iron, zinc, calcium, vitamin A, B etc… [Anne Mottet, Italy]	Noted, text removed
18470	22	16	23	6	The unbalanced treament of nutrition in scenarion analysis needs to be highlighted. Most scenario analysis of land use and food security issues tend to report only on kcal and sometmes on protein, but hardly ever include iron, zinc, calcium, vitamin A, B etc… [Aziz Elbehri, Italy]	Noted, text removed
25558	22	47	23	1	over what time period? Every year? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
17800	22	17			change "to" to "of" [Donald Smith, Canada]	Noted, text removed
17802	22	29			Insert "any" after "on" [Donald Smith, Canada]	Noted, text removed
15782	23	2	23	2	There is no "WHO 2015a" before WHO 2015b. [Robert Onyeneke, Nigeria]	Noted, text removed
15780	23	2	23	3	Provide source for this statement "420,000 people die every year after eating unsafe food." [Robert Onyeneke, Nigeria]	Noted, text removed
19388	23	2	23	3	"420,000 people die every year from eating unsafe food" - What is the timeline for this statistic? From when to when? Is it global or specific to a region? [VILIAMU IESE, Fiji]	Noted, text removed
10520	23	2	23	6	safe water and preparation of food also play an important role - training, especially of women in safe food preparation make an important difference [Zitouni Ould-Dada, Italy]	Noted, text removed
17450	23	8	23	8	Food loss should be in plural form: Food losses. [Noureddine Benkeblia, Jamaica]	Noted, terminology harmonised throughout text
15632	23	9	23	10	Reduction of edible during storage should be part of food loss [Robert Onyeneke, Nigeria]	Noted: However, in the revised version we do not provide the definition due to page limitation.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1292	23	9	23	10	Can food loss be further unpacked? Food loss in distrubution in a developed country can result from consumer attitudes toward cosmetic or aesthetic requirements/preferences that have nothing to do with quality of food. These kinds of regulations and behaviors are a key entry point for change (and why some small businesses have been started to recover food that would otherwise be rejected by supermarkets because of appearance ... ugly produce is still edible produce.). [Tonya Rawe, United States of America]	Partly accepted: the comment has been taken into account stating emission from discarded food in EU due to aesthetic purpose. However, the revised version we do not provide the definition due to page limitation.
26550	23	9	23	36	see the APHLIS website for referenced and quantified estimates by country and cereal species, currently for mali, Sierra Leone and Botswana [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
20952	23	21	23	36	Harmonise numbers, units, uncertainties. If food loss and waste is 20-30% of a total, the emissions associated with this loss cannot be a single number (4.4. Gt CO2e). Also in the last two lines, complete avoidance of food loss isn't a meaningful prospect I think, hence not clear what value this figure has here. Ideally express all figures as percentages of the total agriculture/food system emissions (or even total global emissions) to give a sense of scale. [Andy Reisinger, New Zealand]	Accepted but we kept the complete avoidance of food loss. We also remove the statement on 20-35% of food waste and gave only one value.
3816	23	21	23	36	Units mixed Gt and Tg - stick to tonnes. If 1 Tg sounds too small convert to CO2eq as well [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
17392	23	27	23	30	Units should be written correctly [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
17452	23	27	23	30	Units should be written correctly. [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
21108	23	28	23	29	in which unit are these increase ? [Valerie Dermaux, France]	Noted: The statement is deleted in the revised version
18474	23	40	23	40	It would be very importan to clearly differentiate in this chapter the emissions from ''AFOLU'' and emissions from ''food systems'' as these are two different things and they must not be confused. A clear explanatory paragraph describing precisely the contours of each is is essential. The emissions for AFOLU are well established within IPCC literature but emissions for food sustems would be new and near precise definition. [Aziz Elbehri, Italy]	Accepted Edits to 5.3.1 addressed this comment by providing an operational definition of emissions across the continuum from within the farm gate to land use to supply chains.
5202	23	40	23	40	General Comment # 13 to Section 5.3--Terminology. It is not clear what is the definition of ''food system,'' nor how the definition may be operationally applied to relevant sub-sections of this chapter. Clarifications are needed at the outset of the SRCCL in order to reduce definitional inconsistencies and related ambiguity (or plain errors) in data analysis. For instance, what is the link between ""Food Systems'' and ''AFOLU''. Chapter 5.3 should provide a clear grasp to the reader that not all AFOLU is related to ''Food Systems. For instance, ''forestry'' is not, or not entirely. Also, its subcategory ''Other land use'' includes many economic sectors that use land, but are outside the food systems. [Francesco Nicola Tubiello, Italy]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5216	23	40	23	40	General Comment # 15 to Section 5.3. Kindly consider that emissions from ''AFOLU'' and emissions from ''food systems'' are two very different things. At the same time, the former is very well defined, for instance within IPCC 2006 guidelines, while the latter suffers from a range of subjective interpretations. Even if a definition of ''food systems'' is provided in the text and in the glossary, still, one should complement it with an operational definition of how to apply it to emissions. In other words, this chapter should define what ''emissions from food systems'' are. [Francesco Nicola Tubiello, Italy]	Noted, text removed
5204	23	41	23	42	First, AFOLU stands for ''Agriculture, Forestry and Other Land Use''. Second, when indicating a range for the absolute AFOLU emissions to be used in the denominator of this percentage share indicator, then convey the ensuing range in the indicator. With reference to the AR5 total of 49 Gt CO2eq, the stated range should be 20-24%. Finally, please use numerators and denominators that correspond to the same year and indicate which year. The last such year for which any such shares have been consistently computed and published is 2010 (IPCC AR5 WGIII Ch. 11; Tubiello et al., 2015, GCB). [Francesco Nicola Tubiello, Italy]	accepted Edits to 5.3.1 addressed this comment by providing an operational definition of emissions across the continuum from within the farm gate to land use to supply chains. Proposed references have been included
10722	23	41	23	44	There has been an update published with a new figure of 21%. Tubiello, Francesco N., Mirella Salvatore, Alessandro F. Ferrara, Jo House, Sandro Federici, Simone Rossi, Riccardo Biancalani et al. "The contribution of agriculture, forestry and other land use activities to global warming, 1990–2012." Global change biology 21, no. 7 (2015): 2655-2660. [Anne Mottet, Italy]	accepted Reference included as suggested
18472	23	41	23	44	Please refer to the updated source that report a new figure of 21% (source: Tubiello, Francesco N., Mirella Salvatore, Alessandro F. Ferrara, Jo House, Sandro Federici, Simone Rossi, Riccardo Biancalani et al. "The contribution of agriculture, forestry and other land use activities to global warming, 1990–2012." Global change biology 21, no. 7 (2015): 2655-2660.) [Aziz Elbehri, Italy]	accepted Reference included as suggested
17454	23	42	23	44	Units should be written correctly. This should be done through the text. [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
5206	23	43	23	43	Kindly use ''yr-1'' to indicate an annual flux. This comment applies to many places including on this page at line 44. Kindly revise editorially accordingly. [Francesco Nicola Tubiello, Italy]	accepted edited throughout 5.3.1-5.3.3 as needed
5208	23	43	23	43	Kindly note that the ''4.3-5.5'' range given herein refers to emissions from ''Forestry and Other Land Use'' (FOLU in AR5 WGIII; LULUCF in UNFCCC inventories), and not only from ''land use changes.'' [Francesco Nicola Tubiello, Italy]	noted No longer needed due to editorial changes. In any case reference to the full acronym has been corrected as needed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5210	23	44	23	44	General Comment #14 to Section 5.3. AR5 WGIII Ch. 11 used the FAOSTAT emissions database (http://www.fao.org/faostat/en/#data/GT/visualize) as one of only three data sources for Agriculture emissions, and as a respected source among several for the ''FOLU'' emissions, including as the only source for peatland drainage. The ongoing 2019 revision of the IPCC 2006 GL will explicitly refer to the FAOSTAT database for use in national GHG inventories processes. The international data community uses it extensively. CAIT and ClimateWatch republish FAO data; the Global Carbon Project employs FAOSTAT for its analyses of CO2, CH4 and N2O assessments. Considering that the FAOSTAT emissions database is regularly maintained and updated by FAO (currently to 2016), it is suggested that it can be a useful, systematic reference database in SRCCL, providing an updated and coherent analysis of the most recent emissions numbers in AFOLU. Relevant FAO staff is available to support 5.3 authors. [Francesco Nicola Tubiello, Italy]	accepted GHG estimates from FAOSTAT have been included in sections 5.3.1-5.3.3, where relevant
16372	23	40	24	7	As you have explained both in Chapter 1 and in Chapter 5 (albeit using different definitions) food systems encompass everything, production, processing and final demand. The sub-sections inside section 5.3 seem to deal with a specific activity within the food systems. Sub-section 5.3.1 however does not follow this principle as it deals with the overarching term, namely food systems and so it sounds as double-counting. It is better that you either delete section 5.3.1 (and maybe move its context as an introduction to section 5.3) or rename it. [Lorenzo Giovanni Bellù, Italy]	accepted Edits to 5.3.1 addressed this comment by providing an operational definition of emissions across the continuum from within the farm gate to land use to supply chains.
17338	23	44	24	2	Reference is missing to back-up observation that "major sources of emissions remain deforestation, enteric fermentation..." [Robert Ddamulira, United States of America]	accepted Reference inserted in 5.3.1 to support main sources of emissions. Note that orginal text has changed nonetheless.
10788	23	38	26	29	The report should better rely on IPCC guidelines and classification of emissions. Please ensure consistency with latest IPCC emissions. [Anne Mottet, Italy]	Accepted Section 5.3.1 modified to better align with IPCC AR5 and IPCC definitions
5156	23	38	26	30	General Comment #1 to Section 5.3. The ‘‘new’’ SRCCL estimated range of AFOLU GHG emissions is plain wrong. In their quest to provide ‘‘new’’ numbers past AR5, the LAs make the mistake of not following consistently the very IPCC classifications that are at the core of both previous IPCC AR publications as well as IPCC guidelines for GHG inventories. As a result, the GHG agriculture estimates they derive, by combining ‘‘cropland’’ and ‘‘livestock’’ emissions (4.0-6.2 Gt CO2eq yr-1) in reality overlap with FOLU, since they contain CO2 emissions related to land use and land use change, for instance those from drained peatlands and some from deforestation. They then maintain that the previous AR5 estimates for FOLU remain the same, and sum agriculture and FOLU together to derive a ‘‘new’’ AFOLU estimated range. Very wrong: the sum of the two ranges is indeed larger than what AR5 had previously published, but this is only an artifact of improperly done accounting with double-counting--not an indication of real physical change in emissions from recent literature. [Francesco Nicola Tubiello, Italy]	Accepted Section 5.3.1 modified to better align with IPCC AR5 and IPCC definitions. Secondly, updates using available AR5 sources were used to provide new overall AFOLU estimates. Third, sections 5.3.2 and 5.3.3 modified in order to be consistent with numbers in 5.3.1.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5158	23	38	26	30	General Comment #2 to Section 5.3. The way to account for GHG AFOLU emission properly is two-fold. First, use consistent definitions throughout the chapter, so to ensure there is no overlap between stated numbers. Of course, any set of definitions would do, as long as they are applied systematically throughout the chapter. Yet, considering this is an IPCC report, it is suggested that the preferred way to do this would be through use of the internationally accepted IPCC guidelines. By contrast, this section and indeed the entire SRCCL publication suffer from the use of data that relate to a mix of definitions from land use, emissions, economic sectors, etc., which are often non-IPCC definitions. It should be noted that, without refereeing to a unique classification, the definitions underlying the different published papers used as data sources in this report are likely inconsistent. [Francesco Nicola Tubiello, Italy]	Accepted Section 5.3.1, 5.3.2 and 5.3.3 have been edited by using consistent IPCC language and definitions. Additionally, emissoins witin the farm gate, beyond the farm gate I nrelation to land use, and along supply chains, have been better defined.
5160	23	38	26	30	General Comment #3 to Section 5.3. The way to account for GHG AFOLU emission properly is two-fold. Second, use fully consistent AFOLU emissions databases, which are aligned to, and consistently apply, accepted international definitions (better if aligned to IPCC). To this end, it is suggested to start from the very databases that were used in AR5 as a basis for analysis of AFOLU emissions, aligned to IPCC guidelines. For agriculture, these were FAOSTAT, EDGAR and US EPA. It is noted that of these three, only FAOSTAT currently provides updated emissions to 2016 for both agriculture and FOLU (FAO, 2018, FAOSTAT Emissions database, FAO, Rome; Tubiello, 2018—in press; uncorrected proof PDF can be provided on demand). [Francesco Nicola Tubiello, Italy]	accepted Comments fully implemented in 5.3.1 5.3.2 and 5.3.3
5162	23	38	26	30	General Comment #4 to Section 5.3. Another key observation is that the authors tend to quote emissions data from recent literature and then express them as a percentage of total, economy-wide emissions (total for all sectors). This exercise can only be done of course if the reference year for the emissions used in the numerator and the reference year for total emissions used in the denominator are the same. Furthermore, the reference year should always be quoted. By contrast, relevant parts of section 5.3.1 fail to do this, as they tend to use recent data for AFOLU emissions, past AR5, but it is unclear what they are using for total emissions. In fact, is there any published estimate of total world GHG emissions, consistent across sectors than the 49 Gt CO2eq yr-1 for 2010, published by the IPCC AR5? [Francesco Nicola Tubiello, Italy]	accepted Percentage emission contributions were edited to refer to specific periods for which data existed, such as in relation to AR5. See secton 5.3.1
5164	23	38	26	30	General Comment # 5 to section 5.3. Section 5.3. In terms of updated estimates of percentage contribution of AFOLU to total global emissions, which are well-defined in accordance to the above comment, it is suggested to consider information provided, for the year 2010, in FAO, 2014 (link) and Tubiello et al., 2015, GCB. [Francesco Nicola Tubiello, Italy]	Accepted

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5166	23	38	26	30	General Comment # 6 to section 5.3. Similarly to the need to always provide a reference for the year and the absolute amount of GHG emissions used in the denominator of any percentage share figure, the LAs are cautioned that GHG emission data published literature in terms of CO2eq often refer to different GWPs. So for instance, all the figures in AR5 WGIII Ch. 11 use the GWPs from the SAR, consistently with recommended use by developing countries in their national GHG inventories. By contrast, many recent figures in the literature may quote emissions in CO2eq using more recent GWP values. This reviewer is familiar with livestock emissions data for the GLEAM model, which are based on a GWP (CH4)=28, nearly 40% higher than the SAR GWP of 21. This has important repercussions for how numbers from the literature are synthesized into a coherent range of values. [Francesco Nicola Tubiello, Italy]	accepted Percentage shares of emissoins have been linked to a specific period. There was no need to specify GWP in the edited text, as no significant inconsistencies are now present. However in 5.3.3 a range of estimtes for livestock emissions is presented and distinguished at least in terms of associated IPCC Tier approach.
5168	23	38	26	30	General Comment # 7 to section 5.3. The GHG emission range provided is based on a very limited number of references. It is suggested to conduct a more extensive literature search and to include information from internationally recognized databases in order to best arrive at a comprehensive and unbiased IPCC ''synthesis.'' [Francesco Nicola Tubiello, Italy]	accepted Additional references have been included in 5.3.1, 5.3.2 and 5.3.3 as suggested.
5170	23	38	26	30	General Comment # 8 to section 5.3. The entire section suffers from a problem of definitions. For instance, in the title, GHG from ''food systems'' is highlighted as the subject matter. It is acknowledged that ''Food systems'' was defined in Section 1., as well as in the glossary, using a very wide-ranging FAO definition. However, what does it mean operationally for applications throughout this special report? In this case in particular, what does in mean in terms of defining its associated emissions, unambiguously? How are ''emissions from food systems'' defined? It is suggested that such an operational definition –either taken from the literature or constructed for the purpose of this special report--is a necessary condition for synthesizing data from the literature in a consistent way. It is also suggested that this is a fundamental gap in the current FOD. Additionally, emissoins form aquaculture are discussed, but waht about emissions from fisheries (fishing vessels)? [Francesco Nicola Tubiello, Italy]	accepted text in 5.3.1 has been edited to clearly distinguish the range of emissions from with the farm gate, to beyond ncluding land use and change, as well as supply chain and consumption. However it is also noted that there is insufficient post-SR5 literature to assess teh full range, and that most estimates are related to farm gate and land use/change.
5172	23	38	26	30	General Comment # 9 to section 5.3. It is suggested to consult the economic-environmental literature in order to define a proper framework for the consistent description of food-related GHG emissions. Such frameworks, within in a full economic context, facilitate analysis of sectoral emissions across food production and consumption processes beyond the IPCC guidelines worldview, for instance via life cycle analysis or carbon footprint approaches. One place where to start is the IPCC WGIII Ch. 10, where IPCC inventory data were successfully combined to describe ''food-related'' emissions (as well as for other sectors), within a fuller economy-wide approach, via the use of SANKEY diagrams. A second suggestion is to review the Air Emissions Accounts developed under the aegis of the UN Statistical Commission, compiled annually in many countries and especially in the European Union, offering a statistically-consistent framework for estimating food related emissions (see: System of Environmental-Economic Accounts, SEEA CF, 2012 https://seea.un.org/; and SEEA Agriculture, Forestry and Fisheries, 2018 -- http://www.fao.org/economic/ess/environment/methodology/en/). [Francesco Nicola Tubiello, Italy]	accepted-partially The edits in 5.3.1-5.3.3 fully address the spirit and specifics of this comment, without the need to explicitly include a reference to the SEEA literature.

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5174	23	38	26	30	General Comment # 10 to section 5.3. Sub-section, 5.3.3.1 offering a number of statements on the nature of IPCC Tier approaches, which appear to be the personal opinion of the LAs, and are in fact often in contrast to the 2006 IPCC Guidelines (see detailed comments below). [Francesco Nicola Tubiello, Italy]	Accepted, Emissions section revised
18888	23	38	29	30	the section 5.3 Impacts of food systems on climate change, only the Greenhouse gas emissions from food system have been assessed, and there is no review on the albedo-related impacts and other biophysical impacts [Jianguo Wu, China]	noted
8722	23	1	37	21	why dividing supply-side and demand-side for the section on mitigation but not for the sections on impacts and adaptation? Suggest combine section 5.4 and 5.5 to also reduce length of the chapter [Delphine Deryng, Germany]	Noted, text removed
17390	23	8			Food loss should be in plural form: Food losses [Noureddine Benkeblia, Jamaica]	Noted, terminology harmonised throughout text
19576	23	9		20	In developing countries such as Benin, the problem of food preservation is acute. During the harvest period there is an overabundance of products. But an important part rotten lack of means of conservation and a few months later, it is the shortage. Even large producers who are theoretically in surplus are not spared. Fruits and vegetables are the most affected by this paradoxical situation. [Ibouraïma Yabi, Benin]	Noted: We agree, however due to page limitation we do not discuss different food preservation technology to reduce food waste.
17804	23	22			Remove first % [Donald Smith, Canada]	Not-relevant due to removal of statement.
1482	23	26			I assume this should read 300 and 500 kcal cap-1 day-1? Cap-1 is missing [Pytrik Reidsma, Netherlands]	Accepted
5212	24	1	24	2	Kindly indicate that these are global features. The order of importance of specific emissions varies already at regional level, with some emission sources not mentioned here actually very important in Africa (savannah fires) or south east Asia (peatland fires and degradation). [Francesco Nicola Tubiello, Italy]	accepted done
15634	24	2	24	4	Increase the resolution and size of Figure 5.6. It is not clear [Robert Onyeneke, Nigeria]	Noted.
21110	24	3	24	4	CO2eq and not CO2 ? Is the soil carbon accounted ? Please precise it, in both cases [Valerie Dermaux, France]	accepted the text in 5.3.2 has been edited to specify that the figure does not include soil C stock change. The general form to express emissions remians however CO2eq.
25950	24	5	24	5	need to explain 'emission intensity' and why it is important. [Hans Poertner and WGII TSU, Germany]	Accepted, added definition and indicators
5214	24	5	24	6	The small text and graph on GHG intensities by commodity shown here appears too early, requiring substantial explanations guiding the reader from absolute to ''relative'' emissions. As more work proceeds towards the SOD, kindly consider contacting relevant FAO staff responsible for these data, to learn more about quality issues, uncertainties, and applicability. Finally the FAO(2017) reference is missing in the reference list. [Francesco Nicola Tubiello, Italy]	Accepted. Section moved after 5.3.3

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5218	24	9	24	9	General Comment #16 to Section #5.3. Sub-section 5.3.2 and 5.3.3 are seriously affected by inconsistency in the use of definitions. In IPCC, both AR5 WGIII and 2006 GLs, ''cropland'' is a FOLU (LULUCF) category, separate from ''agriculture'' insofar as the former refers to CO2 emissions, the latter to non-CO2 emissions. Same applies to ''soils''. The N2O component of soils is reported under ''agriculture'', while the CO2 component under FOLU (or LULUCF). The references used to derive updated emissions appear to mix ''agriculture'' and ''FOLU'' emissions. The authors should be full attention not to generate faulty numbers as a result. Furthermore, the numbering of 5.3.2 and 5.3.3 appears to be incorrect, in the sense that they should be sub-sections of 5.3.1, because the subject matter is a sub-component of food systems. [Francesco Nicola Tubiello, Italy]	Accepted The problem of inconsistent definitions and related potential double counted has been fully addressed through edits in 5.3.1-5.3.3, which define the emission boundaries of interest to the synthesis, and provide crop and livestock emission information in the context of teh overall emission assessment provided in 5.3.1
18476	24	10	24	16	Consider broadening your synthesis to include availbale GHG databases and assocaited published analysis, including from FAO. [Aziz Elbehri, Italy]	Accepted Information in 5.3.1-5.3.3 includes multiple additional data sources from FAO. Other databases that were used in AR5, i.e., EPA and EDGAR, are not updated past AR5 (year 2010) and were thus not used.
5220	24	10	24	16	Please extend your synthesis to include availbale GHG databases and assocaited published analysis, including from FAO. [Francesco Nicola Tubiello, Italy]	Accepted Information in 5.3.1-5.3.3 includes multiple additional data sources from FAO. Other databases that were used in AR5, i.e., EPA and EDGAR, are not updated past AR5 (year 2010) and were thus not used.
5222	24	10	24	16	Same comment as made above. The figures quoted here are a mix of non-co2 and co2 emissions, and the ensuing analysis is not consistent with IPCC classifications. [Francesco Nicola Tubiello, Italy]	Accepted New analysis and framework introduced in 5.3.1-5.3.3 that fully addresses this inconsistency
5224	24	11	24	11	How can 48% of methane emissions from rice correspond to the quoted figure of 2-3Gt CO2eq yr-1, when these are no more than 0.5-0.7 GtCO2 eq yr-1 in most published references? [Francesco Nicola Tubiello, Italy]	accepted this sentence has been modified to include additional estimates from FAO, by adding a reference, and by avoiding to provide percentage figures that in any case are only relevant globally.
5226	24	11	24	11	How can peatland cultivation be 32% of 2-3 Gt CO2eq, when the estimated emissions in AR5 (FAO sources) are some 0.8 GtCO2, plus another similar amount from peatland fires? Again, what is being considered here as ''cropland"? You cannot take a single author's own definitions and present them within a IPCC structured report, in contrast to established IPCC land use classification. [Francesco Nicola Tubiello, Italy]	accepted this sentence has been modified to include additional estimates from FAO, by adding a reference, and by avoiding to provide percentage figures that in any case are only relevant globally.
5228	24	12	24	12	The emission sources given do not sum to 100% of cropland emissions. Emissions from manure applied to soils provide some inputs, and definitely a lot more when pastures are included (more on this in the next comment). [Francesco Nicola Tubiello, Italy]	accepted this sentence has been modified to include additional estimates from FAO, by adding a reference, and by avoiding to provide percentage figures that in any case are only relevant globally.
5232	24	14	24	15	The statement on the degree of association between cropland production intensity and GHG emissions cannot be based on one study--especially when many other publications find exactly the opposite (see AR5 WGIII ch. 11; Tubiello et al., 2018 in press). [Francesco Nicola Tubiello, Italy]	Accepted The specific statement has been removed, as not useful to the analysis of absolute emissions provided in the section

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26818	24	9	25	2	The entire section 5.3.2 Greenhouse gas emissions from croplands and soils is based on one reference (Carlson et 2017). It will be great if more source of estimations of GHG from agriculture is added, of course if it exists. I found the manuscript below has a section on GHG emissions from smallholder agriculture. It may be useful Cohn, A. S., Newton, P., Gil, J. D. B., Kuhl, L., Samberg, L., Ricciardi, V., . . . Northrop, S. (2017). Smallholder Agriculture and Climate Change. Annual Review of Environment and Resources, 42(1), 347-375. doi: 10.1146/annurev-environ-102016-060946 [Alcade Segnon, Benin]	Accepted Several additional relevant references have been added to 5.3.1-5.3.3, as needed. The reference proposed is useful but does not provide the global information needed to the synthesis provided in 5.3.1-5.3.3
26826	24	9	25	2	Key uncertainties in quantification of emissions from agriculture need to be highlighted (see 5.3.3.1. for livestock production). The reference below might be helpful Reay, D. S., Davidson, E. A., Smith, K. A., Smith, P., Melillo, J. M., Dentener, F., & Crutzen, P. J. (2012). Global agriculture and nitrous oxide emissions. Nature Climate Change, 2, 410. doi: 10.1038/nclimate1458 [Alcade Segnon, Benin]	Accepted Uncertainties have been added to emission estimates where possible, referencing back to IPCC AR5. No need to include this reference
24436	24	9	25	3	Please further explain Figure 5.7. [Barron Joseph Orr, Germany]	Noted For CLAs to investigate
1484	24	3			GHG emmission intensity per product is one side, GHG emission intensity per ha another. The picture would be more complete if a figure with GHG emission intensity ha-1 would be added as well. [Pytrik Reidsma, Netherlands]	rejected Although the reviewer is correct that the two indicators are different, it is relevant to discuss intensity by commodity in relation to absolute emissions, as this relates more strongly to food. Emissions per ha relate largely to eitehr emission factors or livestock density, and are thus less informative in the context of the chapter discussion
20954	24	5			I consider it fundamentally inappropriate to use FAOSTAT to present emission intensities - because FAOSTAT uses a Tier 1 approach (which on purpose is ignorant of the actual productivity of a system), any expression of emissions intensity (which is emissions per unit product) is flawed. More importantly, I'm missing a section and figures here of trends and projections in emissions - it would be very helpful to have an overview of baseline trends in emissions and emissions intensities of different agricultural products (e.g. cow milk, cattle meat, cereals, rice). Good way to compare results from different studies and show the diversity of projected future changes - without which all later discussion of mitigation potentials remains unhelpfully qualitative. [Andy Reisinger, New Zealand]	noted It is accepted that this sectio nneeds t obe moved after a fuller discussion of absolute emissions has been completed through 5.3.1-5.3.3. However the FAOSTAT emissions intensity figures were used in AR5 and are, within stated limitations, apporpriate for use alongside other references
11502	24				Figure 5.6 A visual aid that portrays West Africa, Ethiopia, Sudan and Mozambique, Saudi, Botswana, Papua New Guinea as ‘problem areas’ while USA, Europe, Russia, China, Australia and other mega-emitters are painted ‘green everything is ok’ is very misleading. Emission intensity is a useless statistic at this level of measurement. It makes sense within a country, to highlight which products are more and less Carbon-efficient. At this global level what matters is the total emission from a particular product, by country, per capita. Or at the very least multiply it with the number of cattle per country. [Debra Roberts, South Africa]	Accepted, figure removed

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5230	25	2	25	2	What is ''cropland'' herein? The figure shown indicates a lot of areas (see i.e. the US, but also India, argentina brazil uruguay DRC etc, where the pixels are actually on ''grassland'' otherwise known as permanent meadows and pastures. [Francesco Nicola Tubiello, Italy]	Noted Further action needed. The Carlson et al paper and results needs to be further evaluated before extensive use to drive the main synthesis in this report
16718	25	2	25	2	Change “Global emissions” into “Global GHG emissions”. [Jing Wang, China]	rejected The context is clear from the subject matter being treated in sections 5.3.1-5.3.3
5234	25	4	25	4	Please define emissions from livestock. I suppose--but the reader should be clearly informed--we are back to the IPCC agriculture guidelines for which this is enteric fermentation and manure management, non-CO2 gases only? [Francesco Nicola Tubiello, Italy]	accepted text modified accordingly fo rincreased clarity
5242	25	4	25	4	Does this section include manure left on pasture and applied to soils? Why not? Is it included under cropland? It did not seem so. [Francesco Nicola Tubiello, Italy]	accepted text modified accordingly fo rincreased clarity. Emissions do include manure component
5236	25	5	25	6	Unless you use a comprehensive and consistent database that has all the AFOLU pieces well defined, you will run the risk of putting forward perfectly good, scientifically speaking, sub-sectoral numbers, but that however do not add up to a coherent picture. Again, please consider using the FAOSTAT emissions agriculture and land use database to aid in such task. As an example, your stated cropland and livestock emissions sum to 4-6.6 Gt CO2eq yr-1. How can that be, when current total emissions from agriculture are no more than 5.3Gt (see available 2016 FAOSTAT/EDGAR/EPA figures)? Perhaps it will all make sense once clear definitions of what is included or not in these various sub-sections is better explained. [Francesco Nicola Tubiello, Italy]	Accepted A consistent database (FAOSTAT) has been used in sectoin 5.3.1 to describe a coherent picture of overall emissions from agriculture, including land use and land use change. These edited subsections 5.3.2 and 5.3.3 now provide sectoral information as a subset of the overall 5.3.1 total, to avoid inconsistencies. No information fro mthese subsectoins is used to derive 5.3.1 totals --eliminating the problem highlighted by the reviewer.
5238	25	5	25	6	I suggest you complement the information from this single study with a more extensive search, including figures from the FAOSTAT database. [Francesco Nicola Tubiello, Italy]	accepted additional data sources included from FAOSTAT as well as other FAO studies.
10724	25	5	25	18	This paragraph is mixing two different approaches to GHG emisions: the sectorial approach used so far by IPCC and the Life Cycle Approach which is usually porefered by scientists to assess environmental impacts. More references are needed, incuding Gerber, Pierre J., Henning Steinfeld, Benjamin Henderson, Anne Mottet, Carolyn Opio, Jeroen Dijkman, Allessandra Falcucci, and Giuseppe Tempio. Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO), 2013. [Anne Mottet, Italy]	accepted tier2 estimates with life-cycle analysis included in the text, as well as propsoed reference.
18480	25	5	25	18	This paragraph is mixing two different approaches to GHG emisions: the sectorial approach used so far by IPCC and the Life Cycle Approach which is usually preferred by scientists to assess environmental impacts. Please consult the citation: Gerber, Pierre J., Henning Steinfeld, Benjamin Henderson, Anne Mottet, Carolyn Opio, Jeroen Dijkman, Allessandra Falcucci, and Giuseppe Tempio. Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO), 2013). [Aziz Elbehri, Italy]	accepted tier2 estimates with life-cycle analysis included in the text, as well as propsoed reference.
5240	25	7	25	7	Perhaps the FAO, 2013 reference should be Tubiello et al., 2013. Better and more updated figures are available in FAOSTAT, Tubiello et al, 2015 GCB, Tubiello et al 2018 (in press). [Francesco Nicola Tubiello, Italy]	Accepted References updated as suggested

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18484	25	7	25	13	The authors need to ne more consistent in their narrative. First discuss global trends and then reference relevant regional stories where applicable. This will make a more structured story. [Aziz Elbehri, Italy]	Noted
5250	25	7	25	13	Please make an effort to indicate when you refer to global trends and when the trend is more regionally specific. I would suggest to develop a more structured story, first focusing on global trends, then relaying relevant regional stories where applicable. [Francesco Nicola Tubiello, Italy]	Noted
1294	25	8	25	10	Can the 70% figure be broken into the percentage for low income and for middle income countries? There are a few middle income countries that have livestock-dominated agriculture industries, whereas the nature of livestock production in a low income country can be quite different than the middle income country ag industry. [Tonya Rawe, United States of America]	noted no action yet taken
15784	25	8	25	13	Provide source(s) of the statistics quoted [Robert Onyeneke, Nigeria]	Accepted, added sources
5244	25	11	25	11	As a consequence of lack of definitions, some statements appear inconsistent. How do mixed crop-livestock systems contribute to ''livestock'' emissions (58%)--again, what is included in these emissions and what is not. [Francesco Nicola Tubiello, Italy]	accepted the sentence in question has been eliminated, since it depends on one single source only and it is unclear as to how these percentagegs were computed, nor how they relate to the totals provided at the beginning of this section
5246	25	14	25	14	Again, relying on a single source for IPCC synthesis statements is weak. You already showed the FAOSTAT graph for emissions intensities of products. That source is a full database for the entire period 1961-2016 with global coverage (http://www.fao.org/faostat/en/#data/EI/visualize). I suggest you work with relevant FAOSTAT and other FAO staff to extend the current analysis. [Francesco Nicola Tubiello, Italy]	Accepted, added reference to FAOSTAT
10726	25	15	25	16	Emissions per kg of products are one metric among several that need to be considered. Absolute emissions, emissions per ha, emissions per person are also essential. For example, extensive grazing systems are vital to hundreds of millions of people for their food security, nutrition and livelihoods. But they have higher emissions per kg. However, they have very low absolute emissions and very low emissions per ha or per person. Another key metric is the amount of protein produced per protein consumed. See for example Mottet, A., de Haan, C., Falcucci, A., Tempio, G., Opio, C., & Gerber, P. (2017). Livestock: On our plates or eating at our table? A new analysis of the feed/food debate. Global Food Security, 14, 1-8. [Anne Mottet, Italy]	Accepted, added text
18478	25	15	25	16	We need to approach the emissions footprint more holistically when it comes to livestock systems globally. Emissions per kg of products are one metric among several that need to be considered. Absolute emissions, emissions per ha, emissions per person are also essential. Taking a global perspective, extensive grazing systems are vital to hundreds of millions of people for their food security, nutrition and livelihoods. But they have higher emissions per kg. However, they have very low absolute emissions and very low emissions per ha or per person. Another key metric is the amount of protein produced per protein consumed. See for example Mottet, A., de Haan, C., Falcucci, A., Tempio, G., Opio, C., & Gerber, P. (2017). Livestock: On our plates or eating at our table? A new analysis of the feed/food debate. Global Food Security, 14, 1-8. [Aziz Elbehri, Italy]	Repeat of comment 18564

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5248	25	21	25	21	Why report 2005 data in a 2018 IPCC special report? There is plenty of information up to 2016, for instance in FAOSTAT,as well as in the literature. [Francesco Nicola Tubiello, Italy]	accepted 2005 reference eliminated for the time being from figure legend.
10728	25	4	26	3	This subsection needs to take better account of the diversity of production systems. It has a very generic approach but livestock are diverse, from chichen to camels, and are raised in very diverse environements, from high mountains to semi arid lands, and for very different reasons, from milk, meat and egg productin to animal traction. See for example Mottet, Anne, Benjamin Henderson, Carolyn Opio, Alessandra Falcucci, Giuseppe Tempio, Silvia Silvestri, Sabrina Chesterman, and Pierre J. Gerber. "Climate change mitigation and productivity gains in livestock supply chains: insights from regional case studies." Regional environmental change 17, no. 1 (2017): 129-141. And also Assouma, M. H., P. Lecomte, P. Hiernaux, A. Ickowicz, C. Corniaux, V. Decruyenaere, A. R. Diarra, and J. Vayssières. "How to better account for livestock diversity and fodder seasonality in assessing the fodder intake of livestock grazing semi-arid sub-Saharan Africa rangelands." Livestock Science (2018). [Anne Mottet, Italy]	Accepted, added statement about diversity of livestock systems and added references
18482	25	4	26	3	This section needs to provide a better appreciation of the diversity of livestock production systems. As presented it offers a very generic approach to livestock. The latter is of course quite diverse and cover chichen up to camels. These animals are moreover raised in very diverse environements, from high mountains to semi arid lands, and for very different reasons, from milk, meat and egg productin to animal traction. (for reference see: Mottet, Anne, Benjamin Henderson, Carolyn Opio, Alessandra Falcucci, Giuseppe Tempio, Silvia Silvestri, Sabrina Chesterman, and Pierre J. Gerber. "Climate change mitigation and productivity gains in livestock supply chains: insights from regional case studies." Regional environmental change 17, no. 1 (2017): 129-141. See also the citation: Assouma, M. H., P. Lecomte, P. Hiernaux, A. Ickowicz, C. Corniaux, V. Decruyenaere, A. R. Diarra, and J. Vayssières. "How to better account for livestock diversity and fodder seasonality in assessing the fodder intake of livestock grazing semi-arid sub-Saharan Africa rangelands." Livestock Science (2018). [Aziz Elbehri, Italy]	Repeat of comment 10728
16150	25	4	26	3	Diversity of livestock food systems to be considered. This subsection needs to take better account of the diversity of livestock production systems. It has a very generic approach but livestock are diverse, from chichen to camels, and are raised in very diverse environements, from high mountains to semi arid lands, and for very different reasons, from milk, meat and egg productin to animal traction. See for example Mottet, Anne, Benjamin Henderson, Carolyn Opio, Alessandra Falcucci, Giuseppe Tempio, Silvia Silvestri, Sabrina Chesterman, and Pierre J. Gerber. "Climate change mitigation and productivity gains in livestock supply chains: insights from regional case studies." Regional environmental change 17, no. 1 (2017): 129-141. Findings of this work have been recently used by FAO to prepare alternative future scenarios for food and agriculture, where the future patterns of the different livestock systems have been projected to 2050 and related GHG emissions have been calculated. For this, see FAO 2018, The future of food and agriculture - Alternative patterns to 2050 - FAO Rome. For info re this forthcoming report, please contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies team, at lorenzogiovanni.bellu@fao.org. [Lorenzo Giovanni Bellù, Italy]	Repeat of comment 10728

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17806	25	7			Remove first % [Donald Smith, Canada]	accepted done
11506	25				Figures: Due to global food trade, as you discussed, food is not consumed where it is produced and therefore similar emissions maps (by country, per capita) of consumption would be very illuminating, especially in the light of the comment that “Livestock in low and middle income countries contribute 70% of the emissions” (line8). It is worth showing both production and consumption based data alongside each other. [Debra Roberts, South Africa]	Good suggestion, will attempt for next version of chapter
16720	26	2	26	2	Change “(Gerber et al. 2016)” into “Gerber et al. 2016”. [Jing Wang, China]	accepted see above
5254	26	2	26	4	First, it is unclear what ''taking into account non-linearities..'' actually means, in relation to the computations method. Second, if this is a generic issue, why the effect was only felt in africa and easter europe. Either way, using a single reference to support a statement in a IPCC report requires appropriate qualifications of that statement (high-low agreement, etc.). [Francesco Nicola Tubiello, Italy]	accepted The specific sentence was removed as unhelpful. Specific text was furtehrmore edited for improved clarity
1296	26	2	26	13	This paragraph falls in the subsection regarding livestock but is not in fact fully about livestock. Is it misplaced? [Tonya Rawe, United States of America]	Accepted, text removed
5252	26	7	26	7	found'' is perhaps an inappropriate verb, as it implies observation of the actual world. This is more likely a meta analysis, ''suggesting'', ''highlighting'', etc. [Francesco Nicola Tubiello, Italy]	Accepted changed to ''estimated''
20956	26	9	26	13	This statement grossly mischaracterises the study in my view - it sounds as if the Tier 2 method was the reason for misestimations, whereas the study makes clear that this is related to diet of animals. It also is inappropriate in my view to extrapolate the findings from this study to the global emissions as diets of animals are very different in different world regions. [Andy Reisinger, New Zealand]	accepted specific sentence referring to Tier 2 was eliminated as not needed in the text
25952	26	10	26	10	need to explain IPCC Tier systems [Hans Poertner and WGII TSU, Germany]	accepted specific sentence referring to Tier 2 was eliminated as not needed in the text
5256	26	10	26	11	Quoting a single reference in support of a statement that, in the end, is in any case not very clear. What does it mean that tier 2 methods overestimated methane emissions when compared to experimental studies. First of all, it is expected that this would happen, as the IPCC approach is to built conservativeness into lower tiers methods. In any case, to draw the results from one study to say something that needs to be relevant at the entire country level, and do so in a IPCC report, is poorly defensible. Perhaps consider putting all of this evidence that emissions may be lower in a box. Also, it is suggested to avoid relating a lower estimate in absolute emissions to (uncomputed) lower estimates in percentage shares, because lowering emissions in the numerator of such indicator obviously also lowers the totals in the denominator. [Francesco Nicola Tubiello, Italy]	accepted specific sentence referring to Tier 2 was eliminated as not needed in the text
1486	26	11	26	13	would increase ... From 5.0-5.8 ... to 4.0-6.6': this is a decrease [Pytrik Reidsma, Netherlands]	Accepted Sentence was in fact removed as findings in these tow subsectons 5.3.2 and 5.3.3 are no longer used to inform the overall ag emissions estimated instead in secton 5.3.1

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5258	26	12	26	13	The statement concerning ''revising'' the earlier IPCC AR5 numbers is both ambiguous and incorrect. Ambiguous, because the text seems to suggest that such revision is linked to the ''new'' scientific data discussed in the previous paragraphs. Yet nothing could be further from the truth, because what those paragraphs indicate is, in fact, that emissions should be lower than previously estimated by the AR5--since the latter were based on TIER1 methods implemented in FAOSTAT, EPA and EDGAR, which would tend, conservatively, to overestimate. And yet, the new range indicated is 4.0-6.6 GtCO2! However as noted earlier, this ''new'' range is the sum of the new ''cropland'' and livestock'' estimates provided earlier in 5.3.2 and 5.3.3, and which tend to account into the agricultural emissions a portion of what, under AR5, was instead accounted under FOLU. And yet, becasue it is also stated (inconsistently), that teh AR5 estimates for FOLU remain unchanged, the text implies that the total revised AFOLU range from this report is 8.3-12.1 GtCO2eq yr-1, which frankly verges on the extremely weak in its upper range. I think you have a very poor scientific basis (two sources; based on unclear and very likely IPCC-inconsistent definitions) for changing the AR5 estimates. Kindly integrate the very limited sources used for the current statements with the most updated data from the AR5 data sources. [Francesco Nicola Tubiello, Italy]	Accepted Sections 5.3.1-5.3.3 have been re-written entirely to eliminate inconsistecies in definitions, boundaries and hence double-counting. Findings in sections 5.3.2 and 5.3.3 no longer used to arrive at a new AFOLU total, which is instead given directly in 5.3.1 using a consistent global database. Instead, information in sectons 5.3.2 and 5.3.3 is only provided to enrich details of teh 5.3.1 total.
5262	26	15	26	15	General Comment to Sub-section #5.3.3.1. This is an important section to have potentially. However, first it is unclear why it should only refer to livestock, considering that the issue of IPCC Tiers approaches is of general application to other emissions categories. Second, and most importantly, it is unclear what is the relation of this sub-secton to the overall scope of Section 5.3, which is on emissions from ''food systems'', i.e., in principle not limited to UNFCCC national inventories and IPCC guidelines. It is advised that the authors discuss and refine the rationale for having this sub-section, and edit it to increase clarity of its relation to the previous sections. If this cannot be done, better to eliminate it. [Francesco Nicola Tubiello, Italy]	accepted enitre sub-section was removed considering the large number of negative comments. Rather, freed-up space should be used to increase regoinal emissoin story through subsections 5.3..1-5.3.3
5264	26	15	26	15	Classifications and nomenclature should be as consistent to existing IPCC and other international processes (in this case, UNFCCC) as possible. MRC stands for Monitoring, Reporting and Verification. Here the auhtors use ''monitoring, recording and verification.'' [Francesco Nicola Tubiello, Italy]	accepted changed to ''reporting''
3818	26	15	26	15	It woiudl be good to have uncertainties in GHG inventories for agriculture highlighted earlier in the framing. The TFI co-leads this report [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	accepted uncertainties were introduced earlier in secton 5.3.1-5.3.3 referencing back to AR5 for values used globally for agriculture and lulucf.
15862	26	15	26	30	the following reference would contribute to the narrative of the paragraph: Mohamed H. AssoumaEmail authorDominique SerçaFrédéric GuérinVincent BlanfortPhilippe LecomteIbra TouréAlexandre IckowiczRaphaël J. ManlayMartial BernouxJonathan Vayssières Livestock induces strong spatial heterogeneity of soil CO2, N2O and CH4 emissions within a semi-arid sylvo-pastoral landscape in West AfricaJournal of ARid Land [Jean-Luc Chotte, France]	Accepted, added reference
25560	26	15	26	30	This assumes a lot of specialist knowledge of Tiers 1-3 - maybe present this as a box? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	accepted specific section on MRV was removed. Text mentioning tier 2 effect was also removed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3250	26	15	26	30	In the paper Fetzel T, Havlik P, Herrero M, et al (2017) Quantification of uncertainties in global grazing systems assessment. Global Biogeochem Cycles 31:2016GB005601. doi: 10.1002/2016GB005601 we give a succinct account of the uncertainties realated to livestock data, which are input data for GHG emissions. This assessment shows that, at the global level, mainly three factors contribute massively to the too large uncertainties, which is the NPP per unit ara of grazing land (including data on grazable fractions), the extent of grazing lands (also due to heterogeneities of definitions) and the distribution of livestock. In contrast, the variance of feed-intake per unit of livestock is of smaller importance (which is surprising). These insights are directly relevant for the discussions on uncertainties of GHG from livestock production. [Karlheinz Erb, Austria]	Accepted added text and reference
16852	26	15	26	30	The following reference would contribute to the narrative of the paragraph: Mohamed H. AssoumaEmail authorDominique SerçaFrédéric GuérinVincent BlanfortPhilippe LecomteIbra TouréAlexandre IckowiczRaphaël J. ManlayMartial BernouxJonathan Vayssières Livestock induces strong spatial heterogeneity of soil CO2, N2O and CH4 emissions within a semi-arid sylvo-pastoral landscape in West AfricaJournal of ARid Land [Rattan Lal, United States of America]	Repeat of comment 15862
5266	26	16	26	17	Not having defined the scope of this sub-section, as noted above, generates in turn all sorts of misunderstandings. Comparisons of emissions estimates among countries--the subject of this sentence-- may indeed be difficult if the data source is UNFCCC GHG national inventories, but not unavoidable. For instance, and contrary to what is stated herein, the data summarized in this special report typically come from global models or datasets that tend to treat each country consistently, either at Tier 1 (e.g., FAOSTAT, EDGAR, EPA; IEA) or at Tier 2/3 (e.g., GLEAM). As already noted above, there is a serious need to first clarify the scope of this section in relation to Section 5.3. [Francesco Nicola Tubiello, Italy]	accepted this sub-section has been removed
5268	26	18	26	18	Taking the above consideration on scope of 5.3.3.1 aside, the fact remains that statements made herein on differences between Tier 1 and higher Tiers appear to be the opinion of the LAs, and in fact contradict the 2006 IPCC GLs--as well as the ongoing 2019 IPCC revision material. For National inventories, moving from lower to higher IPCC Tier does not result, as stated incorrectly in the closing sentence of this sub-section, in an improvement in the degree of possible over- or under- estimation (reduction of bias). It rather should result in a reduction of uncertainty (or increase in precision). [Francesco Nicola Tubiello, Italy]	accepted this sub-section has been removed
5270	26	22	26	22	Making reference to a single source is a weak solution to provide material to a IPCC synthesis. What does it mean that a single study found 422 different EFs? Furthermore, by inserting this sentence after a generic one on IPCC Tier use, the suggestion implied here is that using IPCC Tier 1 is wrong, a statement that is clearly counter to the 2006 IPCC GLs and UNFCCC GHG reporting process. [Francesco Nicola Tubiello, Italy]	accepted this sub-section has been removed
5272	26	24	26	24	This section reads at times as a crusade against this or that IPCC Tier estimation method, resulting in an unproductive, biased discussion largely out of scope with both section 5.3 as well as national GHG inventory processes. [Francesco Nicola Tubiello, Italy]	accepted this sub-section has been removed
15636	26	26	26	26	Replace "of" with "on" [Robert Onyeneke, Nigeria]	rejected section has been removed and suggeston no longer applies

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5260	26	28	26	30	There appear to be serious inconsistencies between this statement on the degree of over or under estimation of IPCC Tier 1 Methods and what is actually stated in the IPCC 2006 guidelines. In fact, the 2006 IPCC GLs state the exact opposite of what is written here. [Francesco Nicola Tubiello, Italy]	accepted this sub-section has been removed
3820	26	32	26	32	Is aquaculture covered in the oceans special report? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We do not know but it is relevant for our food systems chapter
10730	26	32	26	43	In aquaculture, emissions from feed prodution are the highest. This shuold be incuded in the analysis. [Anne Mottet, Italy]	accepted inserted a note to this end. Th enumbers now cited from the FAO 2018 report are inclusive of this component
16374	26	32	26	43	On aquaculture emissions, please refer to the just released FAO publication "Impacts of climate change on fisheries and aquaculture" (FAO fisheries and aquaculture technical paper no. 627, http://www.fao.org/3/I9705EN/i9705en.pdf) [Lorenzo Giovanni Bellù, Italy]	accepted Reference inserted in 5.3.1 to support main sources of emissions. Note that orginal text has changed nonetheless.
20958	26	33	26	43	Please use consistent units [Andy Reisinger, New Zealand]	accepted Still needs to be implemented after a review of the numbers cited in this section.
2968	26	38	26	43	Use IPCC guidailnes for units. Gt are recommended. [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, units updated
17462	26	42	26	43	reference at the end of the sentence should be deleted [Noureddine Benkeblia, Jamaica]	noted no longer applies due to changes in the text which removed this reference
17456	26	1			refernce should be between brackets [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
10318	26	2			(Gerber et al. 2016) should be Gerber et al.(2016) [Bolanle Mutiat Titilola, Nigeria]	accepted revised text does not need such minor change.
17808	26	3			Remove first % [Donald Smith, Canada]	accepted removed
17458	26	8			Check the sentence [Noureddine Benkeblia, Jamaica]	Noted
10320	26	22			Charles et al. 2018 should be Charles et al.,(2018) [Bolanle Mutiat Titilola, Nigeria]	Accepted, fixed
20960	26	30			Useful citation here: Wilkes A, Reisinger A, Wollenberg E, van Dijk S. 2017. Measurement, reporting and verification of livestock GHG emissions by developing countries in the UNFCCC: current practices and opportunities for improvement. CCAFS and GRA, Vermont and Wellington. https://cgspace.cgiar.org/bitstream/handle/10568/89335/CCAFS_Report17.pdf [Andy Reisinger, New Zealand]	rejected section has been removed and suggeston --though useful--no longer applies
20852	26	35			This sentence would make the section more complete in terms of concerned GHG and also of technology issues: "carbon dioxide emmissions coming from the processing and transport of feeds for fish aquaculture, and also the emmissions associated to the manufacturing of floating cultivation devices (e.g. rafts or floating fish-farms), connecting or mooring devices, artificial fishing banks or reefs and feeding devices (as well as their energy consumption) must be considered as well. The potential reduction of CO2 emmissions associated to the use of recycled tyres for artificial reefs or banks will have to be considered in this evaluation". [Francisco Javier Hurtado Albir, Germany]	Accepted. Sentence added
17460	26	41			Year of publication [Noureddine Benkeblia, Jamaica]	Accepted. Year of publication added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5274	27	2	27	8	Please restructure this entire paragraph as follows. The first generic sentence is not in need of citation (it is obvious that emissoins from food systems include many other things beyond inventories and no one had to write a paper to say it). Use the Vermeulen et al. reference in teh following sentence, to say these authors estimated these emissions to be ... It is noted however that a full accounting of these issues had been previosuly provided in AR5 WGIII Ch. 10, which is later than Vermuelen et al. 2012. Hence it is suggested to also reference AR5 WGIII Ch. 10. [Francesco Nicola Tubiello, Italy]	accepted still to be done in terms of thoroughly revising actual % figures provided in this paragraph
15786	27	2	27	27	Vermeulen et al. 2012b was cited before Vermeulen et al. 2012a. It should be the other way round [Robert Onyeneke, Nigeria]	noted no longer applies due to changes in the text which removed this reference
5278	27	5	27	6	It is unclear at this point of the report what is the SRCCL stated range of emissions from food systems, and how these relate to AFOLU. If numbers from subsectoins 5.3.2 and 5.3.3 are used herein, then the new SRCCL AFOLU range would be 8.3-12.1 Gt CO2eq yr-1, perhaps not defensible, as noted earlier in this review. Even so, taking this range as the input for doing the math relevant to this paragraph, then 18%-20% of this range would result in 1.5-2.4 Gt CO2eq yr-1--which is close to, but not exactly the same as the range provided on line 6. [Francesco Nicola Tubiello, Italy]	accepted Sections 5.3.1-5.3.3 have been re-written entirely to eliminate inconsistecies in definitions, boundaries and hence double-counting. Findings in sections 5.3.2 and 5.3.3 no longer used to arrive at a new AFOLU total, which is instead given directly in 5.3
5276	27	7	27	8	Emissions intensity needs to be defined, considering that there are as many definitions as there are life cycle analysis or carbon footprinting approaches. Without such a difinition, the statement that emissions intensity for intensive crop systems has a 20% component from fertilizers manufacture, cannot be presented as absolute fact, but needs to be qualified as dependent on a certain accounting approach, i.e., on how many other factors (land use, etc.) where accounted for and how...Perhaps easier to restate the sentence in terms of emissions, and not emission intensity. When doing this however, please use consistent defintions and classificatoins, to avoid double counting. [Francesco Nicola Tubiello, Italy]	accepted First part of this sentence was made general withotu need for a citation. Second part was simplified by eliminating the reference to absolute numbers (confusing, since we do not actually know wht total emissions from food systems are. And by eliminating altogether the reference to teh portion of ''emission intensities'' can be apportiioned to fertilizers manufacturing--a statement that is very problematic to begin with.
16722	27	13	27	13	Change “32%-24%” into “24%-32%”. [Jing Wang, China]	accepted done
25954	27	21	27	21	Which time frame does 'recent globalisation' refer to? [Hans Poertner and WGII TSU, Germany]	Accepted, fixed
8198	27	23	27	23	Please see if the phrase 'agricultural community' can be replaced with 'agricultural commodities'? [Muhammad Mohsin Iqbal, Pakistan]	Accepted, fixed
20962	27	25	27	27	The numbers given here don't add up: the executive summary says that food production makes up about half of total food system emissions, but here they are given as 80-86%. The executive summary number seems correct, whereas this one here seems plain wrong except for specific emissions intensive foods (possibly true for ruminant meat?) [Andy Reisinger, New Zealand]	Accepted, corrected text
20854	27	32	27	33	The sentence should be reworded to include other elements involved in the processing of food. "Cookers, boilers, stoves, furnaces and (industrial) microwave ovens, directly (i.e. when combustion-based) or indirectly (i.e. eletrically powered) originate carbon dioxide emmissions, and wastewater emits methane and nitrous oxide. Food waste deriving from food processing also emits methane" [Francisco Javier Hurtado Albir, Germany]	Accepted, added text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10734	27	40	28	29	Most figures provided come from US diets and US studies. This section should be more balanced to reflect the global diversity of diets, of options, of production systems. For example page 28 line 6: US. Page 28 line 29: US. There is a lack od diet/climate analysis encompassing this divesity as a lot of the available material is based on US/western types of diets and context. The report should recognize this. In addition, the capter gives too much importanc too dits and not enough to income, local specificities to grow food etc. All food consumption results in GHG emisisons. It is not a question of diets. [Anne Mottet, Italy]	Taken into account in rewrite by adding some caveats. However, where dietary footprints have been studied they have been from higher income countries. There is no data for LICs. Second, the focus is on meeting future food security under climate change, and given the trend to move globally to consumption (and waste) more associated with HICs than LICs, the HIC data is relavant to future emissions.
18486	27	40	28	29	Most figures provided come from US diets and US studies. There should more regional balance to reflect the global diversity of diets, of options, of production systems. The overall focus on diet transition is heavily influcned by western perspective and lack the global balance required for such an IPCC report. There is overall a lack of diet/climate analysis encompassing the diversity we see around the world; and too much supportive evidence is taken from either US/Sweden or western high income countries. This certainly paint a distorted overall picture. The authors/reviewers of the report should be very mindful of this. [Aziz Elbehri, Italy]	Taken into account in rewrite by adding some caveats. However, where dietary footprints have been studied they have been from higher income countries. There is no data for LICs. Second, the focus is on meeting future food security under climate change, and given the trend to move globally to consumption (and waste) more associated with HICs than LICs, the HIC data is relavant to future emissions.
2970	27	40	28	29	Section 5.3.6 should be expanded. New literature discusses the CC impacts of different diets and food systems. For instance, Godfray et al 2018, Yau et al 2018, Poore et al 2018, etc. [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account and added in apropriate places
19494	27	40	28	29	Along with the relative differences in GHG emissions (kg CO2eq capita-1yr-1) between current average diets, a comprehensive assessment of "GHG emissions per person nourished by different types of diets" including vegan, lacto-ovo-vegetarian, and non-vegetarian diet can help in determining which type of diet is more sustainable. This assessment must be based on the list of most commonly limiting nutrients and critical nutrients in a balanced diet. Based on this, an increase/reduction in the consumption of certain foods can be advised. [Prasannalakshmi (Lakshmi) Acharya (Dave), New Zealand]	Noted
19496	27	40	28	29	Data on milk production through dairy giants versus small-holder farmers and their respective GHG emissions can help determine which of these two is more sustainable. The feed utilised by dairy farmers that supply milk to dairy giants versus the feed given to cows of small-holder farmers can be significantly different. How does the milk quality differ in these two cases? Also, could small-holder cattles (such as Buffalos in India) be promoted for achieving sufficient milk production in other countries/regions that are lacking? E.g. Buffalo milk has higher calcium content. [Prasannalakshmi (Lakshmi) Acharya (Dave), New Zealand]	Comment noted. Poore and Nemacek's paper (reference added) explores some of these issues
17810	27	5			Remove first % [Donald Smith, Canada]	accepted done
17464	27	10			food chains supply [Noureddine Benkeblia, Jamaica]	Noted
17812	27	13			Remove first % [Donald Smith, Canada]	accepted done
17466	27	23			community or commodity? [Noureddine Benkeblia, Jamaica]	Accepted, fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17814	27	25			Remove first % [Donald Smith, Canada]	accepted done
17468	27	36			Please check the sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
20856	27	39			No reference has been made to emissions associated to food storage. A possible reference: "Food storage pays also a toll in terms of carbon dioxide emmisions, mainly associated to the energy consumption of cooling, refrigerating or freezing". [Francisco Javier Hurtado Albir, Germany]	Accepted, added text
15638	28	3	28	3	Check the spelling of "focusing" [Robert Onyeneke, Nigeria]	editorial
10736	28	5	28	8	Emission intensities vary greatly between regions and production systems. For beef, they range from 100 to 400 kg CO2 equivalentper kg protein. Studiesusually don't account for this variability when considering emisisons from different diets. [Anne Mottet, Italy]	Comment noted. Poore and Nemacek's paper (reference added) explores some of these issues
18488	28	5	28	8	Emission intensities vary greatly between regions and production systems. For beef, they range from 100 to 400 kg CO2 equivalentper kg protein. Studie susually don't account for this variability when considering emisisons from different diets. [Aziz Elbehri, Italy]	Comment noted. Poore and Nemacek's paper (reference added) explores some of these issues
1488	28	9	28	20	Figure 5.9 suggest that a vegan diet would be best from a GHG emission perspective. It should however be noted that a food system with some animal production produces less GHG emisisons, because animals can eat food waste, and they can be held on marginal land. Taking a systems perspective gives different results. See f.e. Kernebeek et al. (2015), Saving land to feed a growing population: consequences for consumption of crop and livestock products, International Journal of Life Cycle Assessment 21(5), pp. 677-687; and several studies by H.H. E. Van Zanten, synthesized in a PhD thesis with peer-reviewed papers: http://edepot.wur.nl/380267. [Pytrik Reidsma, Netherlands]	Noted. However, this section on whether diets have different footprints of emissions. The mitigation potential of the food system discussed in later section. This issue most recently discussed in the Springmann 2018 Nature paper, reference added.
25956	28	10	28	12	Is the whole life-cycle considered here? What are the assumptions and limitations of this study, which makes quite a strong point here? Please be more explicit. [Hans Poertner and WGII TSU, Germany]	Accepted - text added.
15788	28	12	28	12	Where is "Aleksandrowicz et al. 2016a" before "Aleksandrowicz et al. 2016b". [Robert Onyeneke, Nigeria]	editorial
15864	28	18	28	18	change "as a form of food LOSS" by "food WASTE" accordingly the P23 L17 over consumption= food waste [Jean-Luc Chotte, France]	accepted
16854	28	18	28	18	Change "as a form of food LOSS" by "food WASTE" accordingly the P23 L17 over consumption= food waste [Rattan Lal, United States of America]	accepted
3822	28	21	28	22	You could reverse the question - Do healthy diets help mitigate GHGs? Much easier and less policy prescriptive in an IPCC context. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
444	28	21	28	29	The authors may find this new paper by Ritchie et al. useful for this point: Ritchie H, Reay DS, Higgins P (2018) The impact of global dietary guidelines on climate change Global Environmental Change 49, 46-55 [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Reject. This is a lovely paper but shows the inconsistency of dietary guidelines rather than the association of diets with GHGs.
17474	28	25	28	29	Please check the paragraph. Missing word(s). [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
6788	28	30	28	30	Rapid improvements on cultured meat in vitro, which have lower environmental impact than livestock, seem to be quite promising. [Nazimi Acikgoz, Turkey]	Noted. Discussed later under mitigation potential.
6790	28	30	28	30	GHG emissions associated with different diets are unneglectable. Nations have to raise awareness on this subject. So it should also take place in summaries. [Nazimi Acikgoz, Turkey]	Noted
17470	28	5			Please check the sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
17472	28	23			Please check the sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
25958	29	2	29	2	It is confusing to call land use management a 'simple' intervention. Also, afforestation is a kind of land use management [Hans Poertner and WGII TSU, Germany]	noted
20964	29	2	29	6	The AR5 citations seem wrong: the AFOLU chapter is WGII and is Smith et al; also not sure about Kunreuther here? [Andy Reisinger, New Zealand]	Smith et al. is the one used
25960	29	5	29	5	should be WGIII not WGII [Hans Poertner and WGII TSU, Germany]	noted
3824	29	5	29	6	This is to WG III assessing transformation pathways not WG II AFOLU [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	noted
2382	29	22	29	23	How do we quantify the important role of carbon sequestration? A "complementary role" would be more accurate. In addition to sequestration, the question of maintaining carbon in soils is very important but missing from the text. [Anne-Laure Sablé, France]	noted, section on carbon sequestration added
24438	29	37	29	38	The UNCCD monitoring of land degradation can serve as a reference: Three indicators have been proposed to estimate the "proportion of land that is degraded over total land area" (i.e. SDG 15.3.1 indicator) and land degradation neutrality: land cover, land productivity and carbon stocks, particularly soil organic carbon stocks. Please refer to: Sims et al. (2017) https://www.unccd.int/sites/default/files/relevant-links/2017-10/Good%20Practice%20Guidance_SDG%20Indicator%2015.3.1_Version%201.0.pdf Orr et al. (2017) https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf Cowie et al. (2018) https://www.sciencedirect.com/science/article/pii/S1462901117308146?via%3Dihub [Barron Joseph Orr, Germany]	LDN included in Enabling Conditions section. See also Chapter 4

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14582	29	37	29	38	SDG indicator 15.3.1 for LDN is the "proportion of land that is degraded over total land area" -- the subindicators for are land cover change, land productivity dynanmics and soil organic carbon stocks. Please refer to: Sims et al. (2017) https://www.unccd.int/sites/default/files/relevant-links/2017-10/Good%20Practice%20Guidance_SDG%20Indicator%2015.3.1_Version%201.0.pdf Orr et al. (2017) https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf Cowie et al. (2018) https://www.sciencedirect.com/science/article/pii/S1462901117308146?via%3Dihub [Rattan Lal, United States of America]	LDN included in Enabling Conditions section. See also Chapter 4
26820	29	30	32	20	Mitigation potentials from traditional agriculture have been highlighted in the reference below Altieri, M. A., & Nicholls, C. I. (2017). The adaptation and mitigation potential of traditional agriculture in a changing climate. Climatic Change, 140(1), 33-45. doi: 10.1007/s10584-013-0909-y [Alcade Segnon, Benin]	Accepted, added reference
26822	29	30	32	20	The reference below provides a preliminary target for GHG emissions from agriculture reduction to meet the 2degree above pre-industrial levels pledged in Paris Agreement. Wollenberg, E., Richards, M., Smith, P., Havlík, P., Obersteiner, M., Tubiello, F. N., . . . Campbell, B. M. (2016). Reducing emissions from agriculture to meet the 2 °C target. Global Change Biology, 22(12), 3859-3864. doi: 10.1111/gcb.13340 [Alcade Segnon, Benin]	Accepted, added reference
26824	29	30	32	20	The reference below might also be useful Zomer, R. J., Bossio, D. A., Sommer, R., & Verchot, L. V. (2017). Global Sequestration Potential of Increased Organic Carbon in Cropland Soils. Scientific Reports, 7(1), 15554. doi: 10.1038/s41598-017-15794-8 [Alcade Segnon, Benin]	Accepted, added reference
17570	29	30	32	20	The discussion and the importance given to Conservation Agriculture is weak and insufficient. This is not compensated by leaving it at p. 80 of the chapter. [TURI FILECCIA, Italy]	Accepted, noted
10738	29	1	38	4	Supply side mitigation ptions should consider integrated systems such as crop-livestock or crop-livestock-trees, that ccount for the majority of production in most regions. The proposed structure is looking at specialised systems, separating crops and livestock, and at some examples of integrated systems (e.g. agroforestry). Carbon sequestration is competerly absent from the section. This structure doesn't allow to reflect the entire range of options. [Anne Mottet, Italy]	noted, section on carbon sequestration added and more specific discussion on cropo-livestock systems added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18490	29	1	38	4	Supply side mitigation options should consider integrated systems such as crop-livestock or crop-livestock-trees, that count for the majority of production in most regions. The proposed structure is looking at specialised systems, separating crops and livestock, and at some examples of integrated systems (e.g. agroforestry). As pressented this section is quite unbalanced or incomplete. Moreover, carbon sequestration is competerly absent from the section. [Aziz Elbehri, Italy]	noted, section on carbon seuqestration added and more specific discussion on cropo-livestock systems added
26486	29	1			Suggest to add confidence statements to the various sections, regarding their feasibility or the existing evidence [Hans Poertner and WGII TSU, Germany]	Accepted, added confidence statements
20966	29	33			reducing methane emissions from soils - huh? [Andy Reisinger, New Zealand]	Accepted, changed to "paddy rice"
20968	29	35			state at which carbon price this mitigation potential applies (or better give range of potentials and prices) [Andy Reisinger, New Zealand]	Accepted, added carbon price
21112	30	1	30	2	why isn't there any reference to the use of the digest (from methanisation) [Valerie Dermaux, France]	Table removed
16376	30	5	31	1	In Table 5.2, please explain what the $ means and what criteria have been used to assignt them. Also, to what "developed" and what "less developed" refers to? [Lorenzo Giovanni Bellù, Italy]	Table removed
24440	32	1	32	20	Please consider shortening this explanation and/or including most of it in the text below Figure 5.11. [Barron Joseph Orr, Germany]	Accepted, Fig caption shortened and explanation added to text.
298	32	2	32	20	Information given (in page 32) under Figure 5.11 in bold letters are mixed up. It seems that entire information is title of the Figure 5.11. It needs to be rearranged. [Santosh Kumar Mishra, India]	Accepted, Fig caption shortened and explanation added to text.
16724	32	29	32	29	Change “(Herrero et al. 2016)” into “Herrero et al. 2016”. The format of the references in the main text should be unified. [Jing Wang, China]	noted
8200	32	29	32	29	The bracket before 'Herrero' may be shifted to before 2016. [Muhammad Mohsin Iqbal, Pakistan]	noted
10740	32	22	34	36	Authors have demonstred the importance of packages of options rather than individual options to reduce enissions from lievstock. See for example Mottet, Anne, Benjamin Henderson, Carolyn Opio, Alessandra Falcucci, Giuseppe Tempio, Silvia Silvestri, Sabrina Chesterman, and Pierre J. Gerber. "Climate change mitigation and productivity gains in livestock supply chains: insights from regional case studies." Regional environmental change 17, no. 1 (2017): 129-141. Packages have to be tailored to the specificitis of local production systems. In addition, Figue 5.12 is missing options such as improving animal health, feed sourcing, reducing age at first calving etc. [Anne Mottet, Italy]	noted and incorporated

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18492	32	22	34	36	Current thinking has began to emphasize the importance of packages of options rather than individual options to reduce enissions from lievstock. Moreoverm these packages are context specific and need to be tailored to the specificities of local production systems. (See for example: Mottet, Anne, Benjamin Henderson, Carolyn Opio, Alessandra Falcucci, Giuseppe Tempio, Silvia Silvestri, Sabrina Chesterman, and Pierre J. Gerber. "Climate change mitigation and productivity gains in livestock supply chains: insights from regional case studies." Regional environmental change 17, no. 1 (2017): 129-141). In addition, Figure 5.12 is missing options such as improving animal health, feed sourcing, reducing age at first calving etc. [Aziz Elbehri, Italy]	noted and incorporated
3252	32	22	34	36	Alternative strategies to intensification of production / switch to more energy and protein rich feedstuff should be mentioned here, see the food system approach reviewed by Zanten HHEV, Herrero M, Hal OV, et al (2018) Defining a land boundary for sustainable livestock consumption. Global Change Biology 0: doi: 10.1111/gcb.14321, and also Schader C, Muller A, Scialabba NE-H, et al (2015) Impacts of feeding less food-competing feedstuffs to livestock on global food system sustainability. Journal of The Royal Society Interface 12:20150891. doi: 10.1098/rsif.2015.0891 [Karlheinz Erb, Austria]	already included
17572	32	23	34	36	Please see comment n. 20 above. Consider including (where feasible) Pasture Cropping as possible option. Same for follwing paragraph 5.4.4 [TURI FILECCIA, Italy]	rejected, already considered
20970	32	29			Here you give a different mitigation potential by a factor of 2 to the mitigation potential attributed on page 29 of this same chapter to the AR5, without any discussion of the difference. This is not good enough for an assessment. [Andy Reisinger, New Zealand]	Accepted, added Table presenting food system emissions
17476	32	29			Delete barckets of the reference. [Noureddine Benkeblia, Jamaica]	Accepted. Brackets corrected.
8202	33	2	33	2	The last word 'if' seems to be redundant, may be deleted. [Muhammad Mohsin Iqbal, Pakistan]	noted
21114	33	3	33	5	purchassing offset is not a mitigation practice, health is not only for periparturient animals but with the whole group (cf p34 lign 7-8), there is nothing on protecting pastures (avoid conversion of pastures and grasslands, cf p6-25 lign 17), on protecting and (re)introducing mixity between animals and cultures (which gives soil carbon, nutriment cycles) [Valerie Dermaux, France]	noted, incoprporated as mixed-crop livestock systems
1298	33	8	33	30	Given the use in food systems conversations, particulalry in the global north and among food-aware consumers, of terminology re: "grass fed" and "grain fed" livestock, can discussion in this section address the differences/benefits/drawbacks of these approaches? [Tonya Rawe, United States of America]	noted, included in the discussion of system types
11508	33	22	33	30	It would be important to include in this discussion a link to the number of cattle for example grown under the different efficiency systems. As mentioned before, GHG efficiency measured in CO2 per kg produced is only meaningful in absolute terms if the total kg produced is also known. GHG efficiency in isolation is a grossly misleading statistic. [Debra Roberts, South Africa]	noted, included

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17816	33	13			It would probably be better to indicate what "others" refers to. [Donald Smith, Canada]	noted, included
17478	33	15			decreases instead of reduces [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked to ensure correct word is used.
17818	33	16			Replace "rhoughage" with "roughage intake". [Donald Smith, Canada]	noted, included
20972	33	24			If there are significant mitigation opportunities, please give citations! Overall, I find this single para far too brief to credibly assess the mitigation potential from novel technologies, and Gill et al 2010 is quite a dated reference for this. A lot has happened over the past 8 years. [Andy Reisinger, New Zealand]	noted
17820	33	25			There may be some scope for imporovment in more general microbiome manipulations. [Donald Smith, Canada]	noted
11504	33				Figure and related text: - please review new trends in using insect recycling (eg black soldier fly) of food and agricultural waste and using them as poultry/fish/livestock food and adding to animal fodder. This is already practiced in some countries and has multiple mitigation and adaptation co-benefits. - Please keep font uniform and at a readable size. - “Savanna burning” – does this mean what it sounds like? - Soil carbon sequestration: see previous chapters for full list of options. Also mention soil microorganisms (bacteria, fungi) and fauna (insects, earthworms etc), their importance in soil quality, and the need for friendly farming methods that are not detrimental to these organisms. Eg http://dx.doi.org/10.1016/j.soilbio.2017.03.008 [Debra Roberts, South Africa]	noted
1302	34	1	34	23	Discussion is included of challenges and opportunities in developing country livestock systems. What about developed countries? What are the trends there that have negative impacts or demonstrate potential for improvement? [Tonya Rawe, United States of America]	Accepted, addressed
1300	34	1	34	36	Can the discussion of animal numbers and management also (again to reference current terminology and debates) the impact of CAFODs? Reference is made to "intensive systems," though exactly what this means in real terms is not clear (what defines an intensive system?). [Tonya Rawe, United States of America]	Accepted, added CAFOs
20974	34	9	34	14	This para should mention the potential from cross-breeding native and imported breeds - a lot of evidence of this potential from Africa in particular. [Andy Reisinger, New Zealand]	noted, ammended
25584	34	9	34	14	Relevant here is the possibility for increased use of food waste in pig diets. The report by Feedback (2018) Feeding surplus food to pigs safely; a win-win for farmers and the environment, contains peer-reviewed references, including documentation of successful schemes in Japan [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	covered in the circular economy section
21124	34	9	34	14	maybe it's worth adding the fact that on some lands there is nothing else to do than to put gazing animals, both in developping and developped countries, and so even if they are not very efficient they do not compete with humans (as they graze), and the propoal to shift to monogastric animals don't respond to the whole situations. [Valerie Dermaux, France]	noted
2384	34	15	34	23	What about developed countries? [Anne-Laure Sablé, France]	noted, ammended

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20976	34	24	34	36	These options are all only applicable to housed animals - what about grazing animals? (Nitrification inhibitors, stand-off pads, delayed manure spreading collected in milking sheds, etc…). I have no idea what could be meant by "spatially shifting livestock pens". In many grazing systems animals don't overnight in housed facilities. [Andy Reisinger, New Zealand]	noted, ammended
10742	34	24	34	36	Key drivers in production systems are productivity at animal and herd level. FAO has developped tools to support the identification of te best options for each production system and country. See the tool GLEAM-i http://www.fao.org/gleam/resources/en/ [Anne Mottet, Italy]	noted
18494	34	24	34	36	Key drivers in production systems are productivity at animal and herd level. FAO has developped tools to support the identification of the best options for each production system and country. See the tool GLEAM-i http://www.fao.org/gleam/resources/en/ [Aziz Elbehri, Italy]	noted
17576	34	44	34	51	Please check this paragraph. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
26828	34	38	35	20	Zomer, R. J., Neufeldt, H., Xu, J., Ahrends, A., Bossio, D., Trabucco, A., . . . Wang, M. (2016). Global Tree Cover and Biomass Carbon on Agricultural Land: The contribution of agroforestry to global and national carbon budgets. Scientific Reports, 6, 29987. doi: 10.1038/srep29987 [Alcade Segnon, Benin]	Accepted, added reference
8724	34	38	35	20	this section on mitigation in agroforestry needs to be more explicitely linked to food security and revised to avoid repetition of what is already covered regarding C sequestration on land in chapter 2 & 6. [Delphine Deryng, Germany]	Accepted, added link to food security and call outs to Chapters 2 and 6
11510	34	1			The focus on the developing world is inappropriate. Please see http://www.fao.org/docrep/005/y4252e/y4252e05b.htm , http://www.fao.org/docrep/005/y4252e/y4252e07.htm , for illustration https://data.oecd.org/agroutput/meat-consumption.htm , and for fun, http://www.viewsoftheworld.net/wp-content/uploads/2016/08/MeatEatersMap.png . When it comes to mitigation regarding animal products, the focus should be 90% on those regions that consume (and produce) 90% of the products, with pointers on how developing countries can avoid negative, carbon-intense practices in future. [Debra Roberts, South Africa]	Accepted, addressed
17822	34	15			In the developed world about half of the N fertilizer applied is not take up by the crop it is applied to. [Donald Smith, Canada]	noted
27358	34	38			Chatterjee et al. 2018. Changes in soil carbon stocks across the Forest-Agroforest-Agriculture/Pasture continuum in various agroecological regions: a meta-analysis. Agriculture, Ecosystems and Environment 266:55-67. [Doreen Stabinsky, United States of America]	Accepted, added reference
27354	34	45			I don't understand the use of the word "traditional" here. These are practices used by farmers aroudn the world. The government of California is providing support under its Healthy Soils Program to farmers who adopt these practices. [Doreen Stabinsky, United States of America]	Accepted, changed to 'smallholder' and added 'developing and developed countries'

Comment No	From Page	From Line	To Page	To Line	Comment	Response
700	35	4	35	4	the meaning of: (ns) [Roberto Abeldaño, Mexico]	Accepted, removed
20980	35	10	35	14	Please give a reflection of the economics of this, overall scale, etc. What's the difference between biogas and biomethane? [Andy Reisinger, New Zealand]	Economics, beyond scope of Chapter. Changed biogas and biomethane to methane
17480	35	12	35	16	Please check this paragraph. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
446	35	12	35	20	various typos and grammatical errors [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Fixed
27004	35	17	35	20	Check language use in this sentence. It would also be useful if the sentence could 1) provide a quantiative value of GHG emissions reductions; and 2) note which semi-arid systems were analysed for the reference cited - Brandt et al 2018. [Beau Damen, Thailand]	Accepted, no quantitative value given in reference. Added precipitation range for semi-arid system
8204	35	27	35	28	The bracket before 'van Zanten' may be shifted to before 2018. [Muhammad Mohsin Iqbal, Pakistan]	noted
20978	35	24	36	7	Please critically assess the realism, economic and market potential of these approaches - as written this seems like an uncritical, qualitative repetition of claims made in some studies but not as an assessment. [Andy Reisinger, New Zealand]	Accepted, added feasibility statement
27070	35	39	45	44	It is unclear whether the reference cited on lines 39-44 (Birney et al 2017) directly addresses the question stated on line 35 as the study seems to involved a combined scenario including both dietary change and national targets related to food loss and waste. It may also be worth clarifying whether the studies referred for China and India also involve a combined scenario or whether they assessed dietary shift in isolation. If it is the latter these may be more immediately relevant to answering the question stated on line 35. It may also be worth referencing Springmann et al 2016, which found that transitioning toward more plant-based diets that are in line with standard dietary guidelines could reduce food-related greenhouse gas emissions by 29–70% compared with a reference scenario in 2050. This result would seem to more directly address the question posed on line 35. Full reference as follows: Springmann, M., Godfray, H. C. J., Rayner, M., & Scarborough, P. (2016). Analysis and valuation of the health and climate change cobenefits of dietary change. Proceedings of the National Academy of Sciences, 113(15), 4146–4151. doi:10.1073/pnas.1523119113 [Beau Damen, Thailand]	noted, Springmann et al. cited 2016 and 2018
27356	35	6			again, I find the use of the word "traditional" odd and inappropriate here. [Doreen Stabinsky, United States of America]	Accepted, changed to 'smallholder'
17824	35	8			Remove first % [Donald Smith, Canada]	Fixed
17826	35	12			Move opening to just before the year. [Donald Smith, Canada]	Fixed
17482	35	16			cocoa not cacao [Noureddine Benkeblia, Jamaica]	Accepted. Spelling corrected.
17828	35	17			Move opening bracket to just before the year. [Donald Smith, Canada]	Fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17484	35	24			devised…????? [Noureddine Benkeblia, Jamaica]	Noted
17830	35	28			Move the opening bracket to just before the year. [Donald Smith, Canada]	noted
18564	36	6	36	6	Sentence ending with "…on land with low opportunity costs". Not sure whether there is any concrete examples of this happening or just a wishful thinking! [Aziz Elbehri, Italy]	noted, land with low opportunity costs is in this case land where crops cannot be grown due to poor agroecological conditions. This is land suitable for livestock.
26732	36	10	36	14	Please elaborate. They do not only not compete, but are complimentary rather than competive. 1 generation energy crops compete with food crops on land, while second generation enery biomassses from residues constitute a complimentary source for the farmers increasing incentive to produce. It can also improves nutrients reuse. [Knud Christensen, Denmark]	Accepted, addressed
17832	36	5			Remove first % [Donald Smith, Canada]	noted
20858	36	11			After the reference: "The use of CHP (combined heat and power) or gas turbines for biofeed, and specific fuel obtention technologies like obtention of bio-diesel, bio-pyrolysis, torrefaction of biomass, production of cellulosic bio-ethanol and of bio-alcohols produced by other means than fermentation, and the production of methane by anaerobic fermentation, must be considered. " [Francisco Javier Hurtado Albir, Germany]	Added
20982	36	20			Shouldn't this section be linked with section 5.4.2? Also I find it puzzling why there is no mention of the work on 3NOP (Hristov et al 2015 and quite a few others), which is by far the most promising and nearly market ready inhibitor with no known animal welfare or performance issues. Nobody is seriously thinking of using chloroform as practical inhibitor. [Andy Reisinger, New Zealand]	3NOP discussion now added
17834	36	23			Remove first % [Donald Smith, Canada]	Accepted, changed
27006	37	1	37	21	This section should have its own sub-heading using the first sentene of its first paragraph: Economic mitigation potentials of crop and livestock sectors. [Beau Damen, Thailand]	Accepted, changed
20984	37	8	37	14	It seems odd to discuss a study that included structural measures here in comparison with narrower supply-side studies. Also it would help to actually state the AR5 mitigation potential here and express carbon prices consistently in $/tCO2e, not $/tC. [Andy Reisinger, New Zealand]	we discuss strcutural measures because the AR5 did not include them specifically in relation to the lviestock sector. Hence this is essential for the special report
10522	37	10	37	10	to switch from ruminants to monogastrics in may regions has socio-cultural implications, also gender issues should be considered as often large livestock belongs to men and small livestock to women [Zitouni Ould-Dada, Italy]	Accepted, added text
16726	37	24	37	24	add a “)” after “2018)”. [Jing Wang, China]	noted
20986	37	16			"reductions in consumption" presumably should mean "shifts in consumption" - not eating less in total, but eating different products? [Andy Reisinger, New Zealand]	Accepted, changed text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11512	37	20			“Regions with the highest mitigation potentials were Latin America, China and Sub-Saharan Africa.” Does this mean these regions stand to gain most, economically, by implementing mitigation options? This section is not very clear. “food price increases” (line 17) are listed as a mitigation option, if I understand right. How does this benefit Sub-Saharan Africa? [Debra Roberts, South Africa]	Yes, they will gain the most and the text has been rephrased
17486	37	21			Please check the sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
16378	38	1	38	4	In Figure 5.15, what does the baseline assume and how has it been calculated? What prices are you using? [Lorenzo Giovanni Bellù, Italy]	noted, the baseline is the baseline from Frank et al. 2018 which is the a baseline similar to the AR5
16728	38	4	38	4	add a “.” after “2030”. [Jing Wang, China]	noted
10524	38	6	38	6	articulation of productive and social policies, linking local production to institutional markets, like school feeding can promote local purchase/markets, as well as bio diversity through promotion of local varieties and foods in schools [Zitouni Ould-Dada, Italy]	Rejected because linking local production to institutional markets is out of scope of this section. Additionall, the review did not provide the relevant literature for this.
20988	38	8	38	16	This section is incredibly superficial, in that it seems to equate locally produced food with lower emissions. A number of studies have shown that total emissions depend strongly on emissions intensity at the production side especially for emissions intensive products such as ruminant meat. E.g. lamb produced in New Zealand and shipped to the UK has a lower carbon footprint than lamb produced and consumed in the UK. Plus generally out-of-season local production of vegetables and fruits (such as strawberries) can be very emissions intensive. [Andy Reisinger, New Zealand]	Accepted
1304	38	8	38	16	The section on locally produced food should also flag that the benefit of this is contingent on locally produced food being suitable for the climate. i.e. it is not necessarily beneficial to increase consumption of locally produced foods if that drives production to include crops that are not suited to a cliamte and therefore require unsustainable practices to produce them. Increasing consumption of locally produced food also then needs to imply potential dietary shifts toward food that are approriately produced locally. [Tonya Rawe, United States of America]	Accepted
448	38	9	38	16	This is highly contingent on the commodity and how it is produced. For instance, heated greenhouse tomatoes grown and consumed in norther Europe may have a higher (not lower) C footprint than non-European imports. Suugest this para is re-worded to give thus nuance as the exmaple of one specific emissions savings per kilo of unspecified commodity (as it currently given) could be misleading [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
27008	38	14	38	16	It would be useful to note here whether the study referenced also considered any trade-offs associated with reducing imports from the global south i.e. reduced economic activity in exporting countries. [Beau Damen, Thailand]	Rejected because this is out of scope of the section. Further, we are not aware about literature that can present such interesting trade-offs.
40	38	14	38	16	importing from Europe will reduce developing countries' GDP even more. Between CO2 and economic growth, the choice will be rapid. This proposal is deleterous for the Global South, as our imports are their exports. GDP= C+I+G+(X-M) [Nathalie Jeanne Marie Hilmi, France]	Rejected, because the comment is unrelvant to this section.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1306	38	19	38	19	Please clarify in the first sentence that the causes of growing global food demand are more than population growth. It's stated in the same para that changiung dietary preferences can make a significatn contribution. However, the first sentence should be clear taht global food demand is also driven by changing/growing incomes and resulting changes in dietary demand for animal-source foods. [Tonya Rawe, United States of America]	Accepted, added text
3826	38	19	38	23	Environment as a co-benefit of pursuing healthy diets? Reverse the argument? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, changed text
26808	38	24	38	25	A strong body of evidence, from the behavioral sciences and elsewhere, indicates that "marketing" is often a dominant influece on contemporary consumar choice/dietary preference. The implications of this are substantially different from emphasizing more diffuse causes, e.g. social, cultural, traditional factors. [Daniel Zarin, United States of America]	Accepted, added text
20990	38	18	39	23	This section is very heavily developed country centric in its citations and examples. Either improve the balance of sources and examples, or state up front that the evidencde base is heavily centred on a few developed countries. [Andy Reisinger, New Zealand]	Accepted, added statement on evidence base
19498	38	18	39	23	Prevention of aggressive advertising of ultra-processed foods and promotion of local food systems will help in positively influencing the dietary choice and preference of people. A shift towards local indigenous food systems will further the cause of reducing GHG emissions per person nourished while also enhancing agro-biodiversity. [Prasannalakshmi (Lakshmi) Acharya (Dave), New Zealand]	Accepted, added text
10744	38	6	43	6	The section on demand-side is again focused on US context and litterature. The section doesn't include considerations about global food security and nutrition issues, nor does it look into trade. [Anne Mottet, Italy]	Accepted, extended focus to developing countries and added food security and nutrition. For trade see 5.6.2
18496	38	6	43	6	The section on demand-side is again focused on US context and litterature. The section doesn't include considerations about global food security and nutrition issues, nor does it look into trade. [Aziz Elbehri, Italy]	Repeat of 2570
3522	38	6	43	6	While section 5.3 is devoted to mitigation options on the demand side, almost the whole section is restricted to changes in diet. Should not reducing the wolrd population be discussed and evaluated ? For example, it is stated in the last paragraph of page 42 that an adequate shift in consumption might decrease GHG emissions from food production by 11%. It is likely that a 11% decrease of the world population would produce a similar result (while a 11% increase, which is closer to the present trend, would conversely cancel the beneficial effect of an improved diet....) [Philippe Waldteufel, France]	Rejected, beyond scope of chapter

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17342	38	6	43	6	The role of emotions and behaviour needs to be integrated better in section 5.5 as a whole. Various studies have articulated the influence of emotions and behaviour and people choices for food; see Swetlana Gutjar, Cees de Graaf, Valesca Kooijman, René A. de Wijk, Alexia Nys, Gert J. ter Horst, Gerry Jager,The role of emotions in food choice and liking, Food Research International, Volume 76, Part 2, 2015, Pages 216-223; see also Swetlana Gutjar, Jelle R. Dalenberg, Cees de Graaf, René A. de Wijk, Aikaterini Palascha, Remco J. Renken, Gerry Jager, What reported food-evoked emotions may add: A model to predict consumer food choice, Food Quality and Preference, Volume 45, 2015, Pages 140-148. And also; Egon P. Köster, Jozina Mojet, From mood to food and from food to mood: A psychological perspective on the measurement of food-related emotions in consumer research, Food Research International, Volume 76, Part 2, 2015, Pages 180-191, ISSN 0963-9969, [Robert Ddamulira, United States of America]	Accepted, added text
26488	38	6			Please use IPCC confidence language to strengthen the assessment style in this section [Hans Poertner and WGII TSU, Germany]	Accepted, added confidence language
3256	39	26	29	37	In Erb K-H, Lauk C, Kastner T, et al (2016) Exploring the biophysical option space for feeding the world without deforestation. Nat Commun 7:11382. doi: 10.1038/ncomms11382 we show that demand side options enhance the option space to avoid deforestation, which could be a nice addition to the introduction of this passage. There is robust evidence and high agreement that dietary changes could even allow to avoid land-use expansion altogether, see eg. also Billen G, Lassaletta L, Garnier J (2015) A vast range of opportunities for feeding the world in 2050: trade-off between diet, N contamination and international trade. Environ Res Lett 10:025001. doi: 10.1088/1748-9326/10/2/025001 [Karlheinz Erb, Austria]	Accepted added text and references
10746	39	1	39	2	Ruminant meat doesn't have a higher enviroemental foorpting than white meat. This is wrong. It all depends on the type of environemental impact (land-use, GHG emissions, water use etc.), the metric (per kg of meat or per ha or per person…) and the produciton system. In addition, pork is a red meat. so it's not included in te paragraph with this wording. [Anne Mottet, Italy]	Accepted, fixed text
18500	39	1	39	2	It is not correct to state that ruminant meat doesn't have a higher envirnomental footprint than white meat. It all depends on the type of environmental impact (land-use, GHG emissions, water use etc.), the metric considered (per kg of meat or per ha or per person…) and the produciton system. In addition, pork is a red meat but seems to be missing in the paragraph as presented. [Aziz Elbehri, Italy]	Repeat, see above
3254	39	1	39	8	The paper by Muller A, Schader C, Scialabba NE-H, et al (2017) Strategies for feeding the world more sustainably with organic agriculture. Nature Communications 8:1290. doi: 10.1038/s41467-017-01410-w elaborates on the interrelation between reducing demand for animal products to a point where no feed from cropland is required and the options it opens for more sustainable forms of farming (organic farming) to counteract the increased area demand. [Karlheinz Erb, Austria]	Accepted, added reference
17488	39	4	39	6	Please check the sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1308	39	6	39	8	Can the amount by which beef consumption was reduced be included? [Tonya Rawe, United States of America]	Noted, number not available at this time
1310	39	12	39	15	Solely addressing women because of their current roles in family care responsibility can reinforce unequal and discriminatory social norms. Men and women should both be targted for information on changing diets. The role women play in their families' care and food security can be an indicator of unequal labor burdens (and inequality writ large, given the unpaid nature of so much of women's current roles/"women's work"). [Tonya Rawe, United States of America]	Accepted, added text
27010	39	14	39	15	It is noted here that "specific measures addressed to women and changing diets can be promising." It would be useful if some examples could also be identified and referenced if possible. [Beau Damen, Thailand]	Noted, will add in next version
10748	39	16	39	23	Again only focus on US and overweight issues and no mention of undernutrition and malnutrition, or hunger. [Anne Mottet, Italy]	Accepted, added
18498	39	16	39	23	Again only focus on US and overweight issues and no mention of undernutrition and malnutrition, or hunger. [Aziz Elbehri, Italy]	Repeat, see above
1312	39	20	39	23	This concrete example of action and result is very helpful. [Tonya Rawe, United States of America]	Noted, thank you
15640	39	26	39	26	Check error [Robert Onyeneke, Nigeria]	Fixed
702	39	26	39	26	Error! Reference source not found. [Roberto Abeldaño, Mexico]	Fixed
2560	39	26	39	26	Reference source not found. [William Lahoz, Norway]	Fixed
450	39	26	39	37	The authors may find this new paper by Ritchie et al. useful for this point: Ritchie H, Reay DS, Higgins P (2018) Potential of Meat Substitutes for Climate Change Mitigation and Improved Human Health in High-Income Markets Front. Sustain. Food Syst. | https://doi.org/10.3389/fsufs.2018.00016 [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, text and reference
1314	39	29	39	29	Does the study referenced consider "adequte food production in 2050" to address nutritional needs or calories alone? [Tonya Rawe, United States of America]	Noted, will address in next version
20996	39	25	42	2	This section lacks a discussion of the effect of diet changes on micronutrient intake - noting that the impact of a policy-driven diet change could be very different to that of a voluntary dietary choice. Several papers claim that reducing e.g. ruminant milk consumption could have significant micronutrient effects - I would like to read an assessment whether that's true or not as this is a key argument brought forward against policy-driven diet change. [Andy Reisinger, New Zealand]	Noted, will address in next version
226	39	25	42	2	In this whole paragraph, I find surprisingly little about the impact of the food-demand side on water resources. (semi-)vegitarian food patterns need much less water. This certainly interacts with the climate impact. [Eline Vanuytrecht, Belgium]	Accepted, added water resources
17836	39	21			Remove "%" following "46" [Donald Smith, Canada]	Fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11514	39	24			Consumers' choice is also very much guided by business, capitalism, advertising, etc. This is important as in this area governments do have some influence. [Debra Roberts, South Africa]	Accepted, added
17340	39	26			Figure reference error [Robert Ddamulira, United States of America]	Fixed
3828	40	2	40	4	this figure covers the same ground as Figure 5.9 [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, Figure 5.9 removed
25562	40	2	40	4	The red bar is nearer 2.6 than 2.4 [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, red bar removed
17490	40	6	40	7	The study of who? [Noureddine Benkeblia, Jamaica]	Noted, more clarity added
20994	40	6	40	13	This discussion of land-sparing is theoretical - what is needed is an understanding of what ACTUAL land-sparing would occur for a given policy intervention that seeks to change dietary demand. E.g pricing could have a very different effect from regulatory or education interventions because they will affect producer returns for alternative land uses. [Andy Reisinger, New Zealand]	Accepted, added call out to cross-chapter box on land sparing.
2562	40	13	40	13	The text describes the land sparing effect. Previous chapters discuss this effect – the authors should make sure there is a description of the effect when first introduced. [William Lahoz, Norway]	Accepted, added call out to cross-chapter box on land sparing.
20992	40	4			At what carbon price does the supply-side potential apply? [Andy Reisinger, New Zealand]	Noted, supply-side bar removed
17492	40	16			follows… [Noureddine Benkeblia, Jamaica]	Noted, text restructured
3830	41	5	41	7	Same study referred to in Figure 5.9 [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, Figure 5.9 removed
2564	41	7	41	7	What is reference 37 for the Vegetarian diet? [William Lahoz, Norway]	Accepted, removed text
2566	41	9	41	9	What recommendations were done and from whom for the Mediterranean diet? [William Lahoz, Norway]	Accepted, removed text
2568	41	15	41	15	Reference source not found. [William Lahoz, Norway]	Fixed
15642	41	15	41	16	check "Error Reference source not found" [Robert Onyeneke, Nigeria]	Fixed
704	41	15	41	16	Error! Reference source not found. [Roberto Abeldaño, Mexico]	Fixed
17494	41	22	41	25	Please check the units. [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
8144	41	26	41	29	I feel like this is a repeat. See page 27 lines 41-42. [Peter Neofotis, United States of America]	Accepted, fixed
17838	41	17			Move opening bracket to just before year. [Donald Smith, Canada]	Fixed
42	42	4	42	4	cultural aspects should also be considered here and included in dietary shifts [Nathalie Jeanne Marie Hilmi, France]	Accepted - text added.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
454	42	5	42	45	The authors may find this new paper by Ritchie et al. useful for this point: Ritchie H, Reay DS, Higgins P (2018) Sustainable food security in India—Domestic production and macronutrient availability PLoS One [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - Nice paper but doesn't fit the scope of the discussion in this section.
452	42	6	42	6	The authors may find this new paper by Ritchie et al. useful for this point: Ritchie H, Reay DS, Higgins P (2018) The impact of global dietary guidelines on climate change Global Environmental Change 49, 46-55 [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - Nice paper but doesn't fit the scope of the discussion in this section.
3832	42	8	42	8	Reverse the question? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted - but the discussion point is whether adopting public health advice to tackle nutrition will create GHG increases or decreases.
10526	42	8	42	11	plant-based foods are more healthy, but this also depends on how these foods are produced (pesticide use, toxins, etc.) [Zitouni Ould-Dada, Italy]	Noted - but this section about the co-relation of "healthy" and GHG - so farming system (or other aspect of supply chain) not directly in scope
16730	42	20	42	20	delete “.” after “risks”. [Jing Wang, China]	editorial
17496	42	23	42	31	Please check units and references citation style. [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
17498	42	35	42	38	Please check units and references citation style. [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
15790	42	37	42	37	Replace "Pradhan et al. 2013b" with "Pradhan et al. 2013a". Be sure there is "Pradhan et al. 2013b" in the study. If none exists, then replace with "Pradhan et al. 2013" [Robert Onyeneke, Nigeria]	editorial
10750	42	39	42	45	Focus again on US only [Anne Mottet, Italy]	accepted so text modified to explain
17500	42	39	42	45	Please check this paragraph. [Noureddine Benkeblia, Jamaica]	Accepted. To be addressed during copy-editing.
20998	42	4	43	6	Again this section is heavily biased towards developed country examples. More nuance is needed, and evidence, about the extent to which this can be generalised to other countries, and across people within countries. Page 43 lines 1-6 seems out of place here and repeat material stated in other sections. [Andy Reisinger, New Zealand]	Accepted, and some text inserted to highlight about HIC diets being analogues for the end point of the nutritional transition in lower income countries+L842
7166	42	35	43	6	This section does not answer the question it sets. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - question modified; estimate of global costs from healthier diets added to Section 5.1.2
17840	42	18			Remove first % [Donald Smith, Canada]	editorial
17842	42	22			Remove first % [Donald Smith, Canada]	editorial
17844	42	26			Remove first % [Donald Smith, Canada]	editorial

Comment No	From Page	From Line	To Page	To Line	Comment	Response
220	43	11	43	12	Also solar radiation is a very important weather variable for food production. This is expected to change due to chaning conditions for cloud formation. [Eline Vanuytrecht, Belgium]	Accepted, added 'solar radiation
1490	43	18	43	29	Integrated metrics related to pests and diseases are also of high importance. See for examples, including 'warm and wet' causing Erwinia infection in potatoes and fungi development in onion, in Schaap, B., P. Reidsma, J. Verhagen, J. Wolf , M.K. van Ittersum. 2013. Participatory design of Schaap, B., P. Reidsma, J. Verhagen, J. Wolf , M.K. van Ittersum. 2013. Participatory design of farm level adaptation to climate risks in an arable region in the Netherlands. European Journal of Agronomy 48: 30-42. Available on-line: http://dx.doi.org/10.1016/j.eja.2013.02.004. [Pytrik Reidsma, Netherlands]	Accepted, added text
16732	43	22	43	22	change “-5C” into “-5 oC”. [Jing Wang, China]	Accepted, fixed
17394	43	28	43	29	Remote sensing could be considered for characterization of many other weather components such as reference evapotranspiration. Some studies using ECMWF and LSA SAF technologies could be added (Cruz-Blanco et al. 2015 International Journal of Climatology 35(11):3371-3384; Sepulcre-Cantó et al 2014 International Journal of Applied Earth Observations 30:190-202) [Ignacio Lorite, Spain]	Accepted, changed text
17396	43	28	43	29	This paragraph could be separed of the rest grouping the role of remote sensing in the characterization of weather [Ignacio Lorite, Spain]	Rejected, section is about climate variables not technologies
222	43	29	43	30	What are these direct effects of black carbon, and especially ozone. This has been studied extensively, so I would expect here some explanation of the effects, and not just a quantification of yield being affected. [Eline Vanuytrecht, Belgium]	Accepted, added more text and references
17502	43	36	43	37	Give losses unit? Per year? [Noureddine Benkeblia, Jamaica]	Noted, units fixed
224	43	41	43	43	This should be moved higher up, closer to the paragraph online 11-17. [Eline Vanuytrecht, Belgium]	Rejected, this is about the feedbacks of agriculture to climate
16072	43	41	46	35	It is important to strength outreach and communications. The summaries for policy makers and the technical summaries are difficult to access and understand by non experts. [Youssouph Sane, Senegal]	Rejected, out of place
6792	43	8	47	4	5.6.1 Climate variables, including extremes, important to food systems. Here, we have to emphasize the contribution of bad governance to rising effect of climate change to food security. In Syria case mismanagement of water sources was a cause of the droughts. Not following aquifer and not controlling the changes of plant patterns (from regular plants to more water needing cotton) may be other most important causes. A number of other administrations, like Saudi Arabia, took measures to improve water management to plan for the dangers of water shortage. In 2013 the Saudi Arabia government announced that starting from 2016; wheat production wouldn’t be allowed in the country. (https://nacikgoz.blogactiv.eu/2015/03/28/role-of-climate-change-in-current-syrian-conflict/ [Nazimi Acikgoz, Turkey]	Rejected, reference is not peer-reviewed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27554	43	1	55	46	The work done here is substantive with clear examples and case studies from Africa and elsewhere. [Daniel Mailumo, Nigeria]	Noted
17846	43	35			Make soybeans singular [Donald Smith, Canada]	Accepted, fixed
11516	43				It is not advised to introduce acronyms for all the metrics mentioned here. For the sake of the reader, simply use the full terms. [Debra Roberts, South Africa]	Accepted, deleted acronyms
25962	44	1	44	1	Figure 5.18: need to explain individual figures a-d [Hans Poertner and WGII TSU, Germany]	Accepted, added full caption
27012	44	7	44	26	It would be useful in this section to return to some of the key issues with attribution for food systems noted in AR5 (Porter et al p. 491) - particularly regarding difficulties in establishing baseline scenarios, the prevelance of non-climate drivers and problems regarding assumptions of farmer behaviour. It is unclear from the section as currently written whether these issues have been addressed by the new studies cited. While the case cited from Syria is useful, it is also questionable to what extent one case can meaningfully be said to be indicative of progress in detection in climate change impacts on food systems and to what extent climate change trends can be attributed to observed changes in global food systems. If the methods employed in these studies represent a significant advance in terms of detection and attribution then an assessment of how the methods employed address the issues identified in AR5 should be included here. [Beau Damen, Thailand]	Accepted, addressed these points
17430	44	13	44	21	A very interesting study related with the impact of drought on the civilizations has been recently published (Evans et al 2018 Science 361(6401):498-501; http://science.sciencemag.org/content/361/6401/498) [Ignacio Lorite, Spain]	rejected, outside the scope of the chapter
15866	44	22	44	22	Challinor et al. 2018 is not in the references section [Jean-Luc Chotte, France]	Added
16856	44	22	44	22	Challinor et al. 2018 is not in the references section [Rattan Lal, United States of America]	Added
8086	44	28	44	28	This section only speaks about observed impacts on crops in mountain regions and Africa. Aren't there any other studies for other parts of the World? [Katharina Waha, Australia]	We have expanded our discussion to go beyond mountain regions and Africa.
21000	44	6	47	4	The sections on observed impacts are dangerously simplistic and don't follow the IPCC guidance on D+A - there is very little evidence that authors have critically assessed the cited studies for whether climate trends are significant or mere climate variability, and whether examples present correlations or causation (i.e. can the observed impact be explained only by climate change or are there other potential explanations). Trends that only extend over the past 10 years are almost certainly not demonstrable climate change impacts. This section needs to be done with much more rigour to avoid misleading and potentially wrong conclusions. [Andy Reisinger, New Zealand]	The authors have included a table that critically assesses the studies cited in this section

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21002	44	6	47	4	References to "perceived" impacts, and regions "appearing to experience" climatic changes are inappropriate; the authors should assess actual climate changes consistent with IPCC guidance, and actual, demonstrable impacts. Discussions of perceptions are useful but don't belong in this section. Also, don't mix projections and observed impacts here. [Andy Reisinger, New Zealand]	The authors disagree that percieved impacts should not be included, as in some areas (remote) within the developing world such studies provide important documentation. We also agree with other reviewers (e.g. Robert Onyeneke) who have specifically requested (and recommended) more of these studies. However, the authors agree such studies should be distinguished from those that assess actual climate change impacts consistent with IPCC guidance and have made attempts to clarify this in the chapter, along with including a table that makes this more clear. In our table, we make clear which studies were able to make formal attibution statements.
1316	44	6	47	4	Might the section on observed impacts include those on pastoral systems? Crops are the main focus. And geographic diversity of information on observed impacts would also be helpful (Horn of Africa? Central America?) [Tonya Rawe, United States of America]	We have expanded our discussion and now cite studies from all continents and the impacts stated by production system, including pastoral.
18890	44	7	47	4	if there are different for the Detection and attribution and Observed impacts on crops, the section should be Detection and attribution of observed impacts [Jianguo Wu, China]	Rejected, these terms are accepted in the field
16736	44	28	47	4	There is a lack of overall descriptions on the observed impacts on crops at the global view. [Jing Wang, China]	We have expanded this discussion with more studies. We have also added language that "As more studies emerge, it appears that though warming may poise a growing threat to agricultural yields and food security in regions at low and mid latitudes (<45o). At high latitudes, warming my increase the yields of some crop because temperatures are not currently above the optimal level for maximum rates of photosynthesis for many crops. "
27014	44	31	47	4	There are a number of features of this section that lack clarity and could be improved. It would be useful if the authors could define "studies documenting perceived changes in crop yields associated with changes in climate" and describe what has motivated their choice to focus on this type of study in this section. Further, it is unclear whether and to what extent the studies that are cited in the section can all be categorized as 'perception-based' studies. In general, the studies cited in this section employ a range of methods. While the perception-based focus of the authors is noted, it could be useful if the authors could attempt to update AR5 figure 7-2 (Porter et al (2014) p.492) to provide a sense of continuity with the quantitative approach adopted in that report. Use of sub-headings and clear differentiation between the types of studies assessed in this section may help to clarify for the reader. Finally, while the case studies cited are of interest, it would be useful if the authors could outline in a more systematic way why the geographical regions assessed in the case studies in this section were chosen over other potentially relevant regions. [Beau Damen, Thailand]	The use of "percieved" early in the section has been removed, and we believe we have clarified when studies are perception based vs. based on the instrumental record by making this more clear in the writing as well as with our table. While we did not update Figure 7-2, our table makes it clear to the reader the differences in the methods used in the studies we highlight. We have also expanded the geographic range of our studies we looked at to include all 7 contenents.
10322	44	25			Rewriting " ,,,and integrated assessment models; and methods to understand..." as "... and integrated assessment models and methods to understand... " [Bolanle Mutiat Titilola, Nigeria]	Accepted, fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25964	45	1	45	1	In the following, however, you also describe observed, not only percieved, changes... [Hans Poertner and WGII TSU, Germany]	True. We have removed percieved from early in the section.
2570	45	2	45	2	I suggest authors identify the observation platforms (remote sensing, in situ) used in these studies. [William Lahoz, Norway]	Our table includes the data sources for the studies we highlight.
706	45	4	45	4	place of the comma in the phrase: 'global grain production area,' [Roberto Abeldaño, Mexico]	Unclear. There is a comma
8146	45	10	45	10	areas. (period missing) [Peter Neofotis, United States of America]	There should be no period. A comma seems to be the right punctuation.
228	45	14	45	14	such crop-damaging temperatures'? In the previous paragraph, it is all about droughts. These may coincide with high temperatures, but not necessarily. Characteristic is mainly the absence of rainfall/water. So, I recommend reformulation here. [Eline Vanuytrecht, Belgium]	Section has been revised and reformulated.
17398	45	14	45	15	This sentence is not related with agriculture. I recommend to remove it [Ignacio Lorite, Spain]	We disagree. The study is related to agriculture. Table has been added to make this more clear and section has been revised.
230	45	14	45	16	Is it the direct feeling of warmth that causes suicides, or the indirect effect through the impact of warming on other things, such as crop yield. If the latter, I would not start the paragraph with the statement on suicide, but first with the statement on yield impact. And at least specify that the suicides are probably consequence of the indirect effects of warming. [Eline Vanuytrecht, Belgium]	The authors do not portray the study in this way. They link suicides to climate variables, and then assesses how climate variables affect agricultural yields. The authors find that the yields mirror suicides in thier response temperature. This has been clarified in the section.
3834	45	14	45	16	Need to explain the first step - why does crop damage lead to suicide? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Section has been expanded to give a better explanation. We have also included information in the table.
8074	45	14	45	16	Irrelevant here, move to 5.6.5 Socio-economic aspects [Katharina Waha, Australia]	Disagree. We have revised the section to make it more clear why this is important.
21228	45	14	45	16	To state that the farmers suicides in India are due to temperature related crop failure is too unrealistic and too simplistic statement. The crop failure is related mostly due to monsoon aberrations, rainfall coinciding sensitive stages of crops. In addition to these several socio-economic factors play a role in such unfortunate events...I appeal the authors to consider either edelting this or to add an additional statement mentioning the above mentioned facts... [Soora Naresh Kumar, India]	We have reviewed the study and find that it is convincing. We have revised the section to explain the study in more detail, and also added a statement about the importance of rainfall in India's agriculture: "The crop failure is related mostly due to monsoon aberrations, rainfall coinciding sensitive stages of crops."

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27072	45	14	45	23	There are additional recent studies that may be relevant to the assessment included in this parapgraph. For example. Moore & Lobell (2015) found that long-term temperature and precipitation trends since 1989 have reduced continent-wide wheat and barley yields in Europe by 2.5% and 3.8%, respectively. Meng et al (2014) found that maize yields in the Heilongjiang region of China would have stagnated in most areas and decreased in the southern part of the region if varieties were assumed fixed since 1980. In the same region of China Meng et al (2016) further found that modern, longer-maturing varieties of maize have extended the growing period by an average of 8 days and have significantly offset the negative impacts of climate change on yield - although the sensitivity of maize production in the region to available irrigation water has increased. Moore, F. C., & Lobell, D. B. (2015). The fingerprint of climate trends on European crop yields. Proceedings of the National Academy of Sciences, 112(9), 2670–2675. doi:10.1073/pnas.1409606112 Meng, Q., Hou, P., Lobell, D. B., Wang, H., Cui, Z., Zhang, F., & Chen, X. (2014). The benefits of recent warming for maize production in high latitude China. Climatic Change, 122(1–2), 341–349. doi:10.1007/s10584-013-1009-8 Meng, Q., Chen, X., Lobell, D. B., Cui, Z., Zhang, Y., Yang, H., & Zhang, F. (2016). Growing sensitivity of maize to water scarcity under climate change. Scientific Reports, 6(1), 19605. doi:10.1038/srep19605 [Beau Damen, Thailand]	Thank you for these helpful suggestions. We have cited these studies our section now.
8206	45	21	45	21	The phrase 'North of India' seems to be redundant, may be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Noted, we believe that it is helpful transition.
17504	45	21	45	23	How can NorthIndia affect pakistan? Why not not giving the location in Pakistan? [Noureddine Benkeblia, Jamaica]	Noted, we believe that it is helpful transition.
8208	45	24	45	25	The phrase 'One large geographic area that appears vulnerable is the Hindu Kush Himalaya region, which encompasses four riversub-basins stretching across Pakistan,India, Nepal and China' is suggested to be rewritten as 'A geographic area encompassing Pakistan, ---and China appears to be vulnerable - -'. [Muhammad Mohsin Iqbal, Pakistan]	Change has been made.
2830	45	24	45	39	It is good to see the food insecurity of marginal geographies like the Hindu Kush Himalayas highlighted. I would like to bring to the notice of the Lead Authors that ICIMOD recently led a comprehensive assessment food and nutrition security in the HKH. This assessment, where more than 300 scientists were involved, has been submitted to Springer Nature and it will be published in November 2018. A draft version can be made available, perhaps through the WGII TSU. [Aditi Mukherji, Nepal]	Thank you. We have cited this report.
8076	45	25	45	29	Irrelevant here, move to 5.6.5 Socio-economic aspects [Katharina Waha, Australia]	Disagree. Other reviewers (i.e. Aditi Mukherji) seem to like that this is in the section.
16734	45	30	45	30	What is the difference between rises in temperature and increases in temperature? [Jing Wang, China]	"rises in temperature" has beem deleted.
15172	45	30	45	30	"rises in temperature, increases in temperature". It is duplicated. [Toshichika Iizumi, Japan]	Thank you. We have deleted "rises in temperature."

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8210	45	44	45	44	Please see if 'changes' is the better word in place of 'alterations'. The same is suggested for page 46, line 6. [Muhammad Mohsin Iqbal, Pakistan]	We have revised the sentence to read, "also attributing these changes to shifts in climate. " To say "changes to changes" is confusing.
15644	45	45	45	45	Replace "particularity" with "particularly" [Robert Onyeneke, Nigeria]	We have made this change. Thank you.
8078	45	40	46	3	Irrelevant here. This is the section about observed impacts on crops not about observed impacts on food security and nutrition or adaptation. Move to appropriate section. [Katharina Waha, Australia]	Reject. The section specifically talks about declines in agricultural productivity.
15672	45	1	47	48	Can we have examples of studies on impact of climate change on crop production in central Europe, Northern Africa, Northern Europe, North America. High drought was observed in these regions as stated, but you the authors failed to provide examples of studies on the impact of this climate risk and other events on crop production in the regions. [Robert Onyeneke, Nigeria]	We have included studies from all continents now.
15652	45		47		Can we have examples of studies on impact of climate change on crop production in central Europe, Northern Africa, Northern Europe, North America. High drought was observed in these regions as stated, but you the authors failed to provide examples of studies on the impact of this climate risk and other events on crop production in the regions. [Robert Onyeneke, Nigeria]	We have expanded our discussion and now cite studies from all continents.
10528	45	14			the suicides are also related to the fact that farmers have no crop insurance and could not pay back the loans the took for producing high yielding, high input demanding crops [Zitouni Ould-Dada, Italy]	Thank you. Section has been revised to include the sentence, "The suicides may also be related to the fact that farmers may have no crop insurance and cannot pay back the loans they took for producing high yielding, high input demanding crops."
19578	45	24		39	Even in West Africa, watch floods have become recurrent since the 2000s with serious consequences on production, harvests and the system of transport and distribution of food products. [Ibouraïma Yabi, Benin]	Please provide citation.
17506	45	30			reprtition [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
8080	46	4	46	13	Irrelevant. This is about farmer's perception about climate change impacts and adaptation, move to appropriate sections. [Katharina Waha, Australia]	Disagree. We discuss reasons for using such studies, particularly for remote regions and in the developing world.
15646	46	6	46	10	What are the plausible explanations for the continued agricultural productivity decline in the region after adopting several strategies to manage climate risks in the area? Are these strategies not adequate to check the risks? [Robert Onyeneke, Nigeria]	Rejected, beyond the scope of the chapter.
8212	46	11	46	11	The word 'including' is suggested to be changed to 'include'. [Muhammad Mohsin Iqbal, Pakistan]	Thank you. Change made.
15648	46	11	46	11	Replace "including" with "include" [Robert Onyeneke, Nigeria]	Thank you. Change made.
8082	46	14	46	16	Irrelevant. This is about farmer's perception. [Katharina Waha, Australia]	Disagree. We discuss reasons for using such studies, particularly for remote regions and in the developing world.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8214	46	22	46	22	Please see if the word 'concluded' can be replaced with 'suggested'? [Muhammad Mohsin Iqbal, Pakistan]	Change made.
8084	46	25	46	29	Irrelevant. This paragragh does not provide any evidence for observed impacts on crops. [Katharina Waha, Australia]	Disagree. We discuss reasons for using such studies, particularly for remote regions and in the developing world.
8216	46	35	46	35	Please see if the phrase '- - - if the climate was changing in relation to declines in crop yields - -' can be changed to '- - - if the crop yields were declining in relation to climate - -'? [Muhammad Mohsin Iqbal, Pakistan]	Change made.
16738	46	36	46	36	change “temperature” into “temperatures”. [Jing Wang, China]	Change made.
8218	46	40	46	40	The word 'trypanosomes' may be changed to 'trypanosomiasis'. [Muhammad Mohsin Iqbal, Pakistan]	Change made.
8220	46	42	46	42	'less years' is suggested to be changed to 'lesser years. [Muhammad Mohsin Iqbal, Pakistan]	Change made.
8222	46	43	46	43	Mango, no doubt, is a fruit crop, how can it minimize the risk of food insecurity? [Muhammad Mohsin Iqbal, Pakistan]	Agreed. See response above.
10530	46	43			maize is tradidionally the main staple food in many regions of the world and cannot be easily replaced by mangoes and cassava - instead varieties should be adapted to become more adapted/resilient to climate conditions, and traditional varieties should be promoted. eventually sorghum could substitute maize in some regions [Zitouni Ould-Dada, Italy]	We have revised the section to read, "The authors recommend that farmers cultivate other crops such as mangoes and cassava that are likely to minimise future food and nutrition security risks due to their greater climate resilience (Ketiem et al. 2017). However, it is recognized that maize is a staple food that cannot be easily replaced by mangoes and cassava. Besides the authors’ suggestions, maize varieties could be adapted to become more adapted/resilient to climate conditions, traditional varieties could be promoted, or, in some regions, sorghum could used as a substitute maize. "
8224	47	1	47	2	The phrase 'hotness of weather' is suggested to be replaced with 'severity of temperature'. [Muhammad Mohsin Iqbal, Pakistan]	Agreed. Change made.
26552	47	1	47	4	If you want a similar reference for cocoyam (colocasia and xanthosoma), there is https://link.springer.com/chapter/10.1007/978-3-319-25814-0_18 [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	We have cited this reference now.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15650	47	1	47	4	Please, use studies published in top-tier journals (perhaps with doi numbers). Also, there are many scholarly articles recently published in top-tier journals that quantitatively analysed the impacts of climate change on crop production in Nigeria. You may find these useful, "4. Onyeneke R.U.; Igberi C.O.; Uwadoka, C.O. and Aligbe J.O. (2018). Status of Climate-smart Agriculture in Southeast Nigeria. GeoJournal, 83 (2): 333 – 346. http://doi.org/10.1007/s10708-017-9773-z. Onyeneke R.U.; Mmagu C.J. and Aligbe J.O. (2017). Crop Farmers' Understanding of Climate Change and Adaptation Practices in southeast Nigeria. World Review of Science, Technology and Sustainable Development. Vol. 13, No. 4, 299 – 318. Onyeneke, R.U. (2018). Challenges of Adaptation to Climate Change by Farmers Anambra State, Nigeria. International Journal of BioSciences, Agriculture and Technology, Vol. 9, No. 1, Pp. 1-7 [Robert Onyeneke, Nigeria]	We have looked at these studies and cite them now.
25966	47	2	47	4	This part is suddently about adaptation, without context. Suggest to move this to the according adaptation section. [Hans Poertner and WGII TSU, Germany]	This is fine. Or the whole sentence could be deleted.
8226	47	3	47	3	The phrase 'found that in Nigeria the principal constrains - -' is suggested to be changed to 'shown that in Nigeria the major constraints - -'. [Muhammad Mohsin Iqbal, Pakistan]	Change made - though "showed" is the corred verb form.
27016	47	5	47	5	It would be useful if the authors could also provide an update or restate observed impact studies focusing on other elements of the food production system including fisheries and livestock. Potentially relevant references could include: FAO (2018) Impacts of climate change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options. Rome. Descheemaeker, K., Zijlstra, M., Masikati, P., Crespo, O., & Homann-Kee Tui, S. (2018). Effects of climate change and adaptation on the livestock component of mixed farming systems: A modelling study from semi-arid Zimbabwe. Agricultural Systems, 159(October 2016), 282–295. doi:10.1016/j.agsy.2017.05.004 [Beau Damen, Thailand]	Accepted, added fisheries and added new references to livestock section
270	47	5	47	5	Fiwa et al (Fiwa L, Vanuytrecht E, Wiyo KA, Raes D (2014) Effect of rainfall variability on the length of the crop growing period over the past three decades in central Malawi. Clim Res 62:45–58) studied the impact of changing rainfall patterns on the length of the growing season in Malawi. [Eline Vanuytrecht, Belgium]	Accepted, we have responded to this comment in the Observed Impacts section
17400	47	6	47	6	In this topic three relevant impact could be added: a) Divergences in the male-female synchrony (for example in maize), b) Lack of chilling hours in olive/almond generating deficiences in the flowering (and then in yield), and c) Heat/water stress during flowering. [Ignacio Lorite, Spain]	Accepted, added phenology references
8228	47	8	47	8	The last but one word 'its' is suggested to be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Accepted, removed 'its'

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15174	47	9	47	11	Recent modeling study estimates that climate change has decreased the global mean yields of maize, wheat and soybeans in 1981-2010 by 4.1%, 1.8% and 4.5%, respectively, relative to the counterfactual simulation (that is, preindustrial climate), even when CO2 fertilization and agronomic adjustments are considered; and the associated average annual production losses throughout the world account for 22.3 billion USD (B$) for maize, 6.5 B$ for soybeans, 0.8 B$ for rice and 13.6 B$ for wheat (Iizumi et al., 2018). Although this is a detection and attribution study, the above text would fit to the begining of section 5.6.3.1 (for instance, just after page 47 line11) because this study corroborates the findings of Lobell et al. (2011) using process-based modeling. Iizumi T, Shiogama H, Imada Y, Hanasaki N, Takikawa H, Nishimori M. Crop production losses associated with anthropogenic climate change for 1981–2010 compared with preindustrial levels. Int J Climatol. 2018;1–13. https://doi.org/10.1002/joc.5818 [Toshichika Iizumi, Japan]	Accepted, added reference
232	47	11	47	14	This is not immediately clear. It should be added that growth acceleration (due to higher average temperatures) means less radiation interception, thus less biomass production. This is distinct from temperature above optimal temperatures, which directly harm crop physiological processes. [Eline Vanuytrecht, Belgium]	Accepted, added text and reference
8028	47	13	47	14	Change "reduce maize yield by 1.7% under drought conditions (Thornton and Cramer 2012)" to "reduce maize yield in sub-Saharan Africa by 1.7% under drought conditions (Lobell et al. 2011) and global wheat production by 6% (Asseng et al. 2015)", Thornton and Cramer reference not correct. Ref: Lobell DB, Bänziger M, Magorokosho C, Vivek B (2011) Nonlinear heat effects on African maize as evidenced by historical yield trials. Nat Clim Chang 1(1):42–45. and 1. Asseng S, et al. (2015) Rising temperatures reduce global wheat production. Nat Clim Chang 5:143–147. [Katharina Waha, Australia]	Accepted, updated references
8030	47	15	47	15	Change "they will lead" to "they can potentially lead to". There is no reference provided so 'will lead' is not justified. [Katharina Waha, Australia]	Accepted, added 'potentially'
8034	47	16	47	18	Move sentence "Higher temperatures are also associated…" to L22 and insert after "…allocated to a crop's storage organ". [Katharina Waha, Australia]	Accepted, moved sentence
8032	47	17	47	17	Change "which are harmful to crops" to "which can be harmful to crops" [Katharina Waha, Australia]	Accepted, text changed
8036	47	22	47	23	Remove sentence, repetive: 'These have been studied with a variety…" [Katharina Waha, Australia]	Rejected, different methodological approaches are important for assessment
234	47	23	47	23	These methodological approaches, also mentioned in fig 5.19, should be explained at least basically. [Eline Vanuytrecht, Belgium]	Accepted, added brief description of approaches

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27018	47	6	50	48	This section would benefit from a brief overview and update of methodological issues and resulting uncertainty associated with modelling studies similar to that provided in AR5 (Porter et al 2014 p.494-497). [Beau Damen, Thailand]	Accepted, added
248	47	6	50	48	I don't read anything about the impact of temperature and rainfall changes on length of the growing period. Both have probably an opposite impact. Higher temperatures will expand the length of the growing season, while less rainfall will shorten the length of the growing season. (Continuation of the already observed trends) [Eline Vanuytrecht, Belgium]	Accepted, added references
26830	47	7	50	48	Schleussner, C.-F., Deryng, D., Müller, C., Elliott, J., Saeed, F., Folberth, C., . . . Rogelj, J. (2018). Crop productivity changes in 1.5 °C and 2 °C worlds under climate sensitivity uncertainty. Environmental Research Letters, 13(6), 064007. Parkes et al 2018 Projected changes in crop yield mean and variability over West Africa in a world 1.5 K warmer than the pre-industrial era. Earth Syst. Dynam. 9 (1):119-134 Faye, B., Webber, H., Naab, J. B., MacCarthy, D. S., Adam, M., Ewert, F., . . . Gaiser, T. (2018). Impacts of 1.5 versus 2.0 °C on cereal yields in the West African Sudan Savanna. Environmental Research Letters, 13(3), 034014. Sultan, B., & Gaetani, M. (2016). Agriculture in West Africa in the Twenty-First Century: Climate Change and Impacts Scenarios, and Potential for Adaptation. Frontiers in Plant Science, 7(1262). doi: 10.3389/fpls.2016.01262 Deryng, D., Conway, D., Ramankutty, N., Price, J., Warren, R., & Jeff, P. (2014). Global crop yield response to extreme heat stress under multiple climate change futures. Environmental Research Letters, 9(3), 034011. Faye, B., Webber, H., Diop, M., Mbaye, M. L., Owusu-Sekyere, J. D., Naab, J. B., & Gaiser, T. (2018). Potential impact of climate change on peanut yield in Senegal, West Africa. Field Crops Research, 219, 148-159. doi: https://doi.org/10.1016/j.fcr.2018.01.034 Tesfaye, K., Zaidi, P. H., Gbegbelegbe, S., Boeber, C., Rahut, D. B., Getaneh, F., . . . Stirling, C. (2017). Climate change impacts and potential benefits of heat-tolerant maize in South Asia. Theoretical and Applied Climatology, 130(3), 959-970. doi: 10.1007/s00704-016-1931-6 Tebaldi, C., & Lobell, D. (2018). Estimated impacts of emission reductions on wheat and maize crops. Climatic Change, 146(3), 533-545. doi: 10.1007/s10584-015-1537-5 Tebaldi, C., & Lobell, D. (2018). Differences, or lack thereof, in wheat and maize yields under three low-warming scenarios. Environmental Research Letters, 13(6), 065001. [Alcade Segnon, Benin]	Accepted, added references
15868	47	8	50	48	somewhere in the paragraph the authors might use pertinent results from Sultan et Gaetani 2016 Agriculture in West Africain theTwenty-First Century:Climate Change and Impacts Scenarios,and Potential for Adaptation; Frontiers in plant science [Jean-Luc Chotte, France]	Accepted, addded reference
16858	47	8	50	48	Somewhere in the paragraph the authors might use pertinent results from Sultan et Gaetani 2016 Agriculture in West Africain theTwenty-First Century:Climate Change and Impacts Scenarios,and Potential for Adaptation; Frontiers in plant science [Rattan Lal, United States of America]	Repeat of comment 10326

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15674	47	1	51	14	What about other climatic stimuli, especially rainfall/precipitation, extreme events etc? No projected impacts of these stimuli on crops. Why? [Robert Onyeneke, Nigeria]	Accepted. Observed impacts section expanded. Now includes other climatic stimuli
10752	47	6	51	18	The section on climate change impact is only considering climate scenarios but makes no mention of observed impact such a droughts. See for example FAO, 2016. Climate change and food security: risks and responses. [Anne Mottet, Italy]	Rejected, this section is on projected impacts. Observed impacts are in previous section
18502	47	6	51	18	The section on climate change impact is only considering climate scenarios but makes no mention of observed impact such a droughts. See for example FAO, 2016. Climate change and food security: risks and responses. [Aziz Elbehri, Italy]	Noted, Repeat of comment 10752
15656	47		51		What about other climatic stimuli, especially rainfall/precipitation, extreme events etc? No projected impacts of these stimuli on crops. Why? [Robert Onyeneke, Nigeria]	Rejected, see section on Climate Variables
1492	47	8	54	3	I miss a section 6.6.3.4 on projected impacts on farms and farming systems. In the scoping meeting it was agreed to also consider the farming systems perspective specifically. A large range of literature is available considering the farm and farming systems perspective. Yield declines do not necessarily lead to income declines, as prices may go up when yields go down, and other crops may be cultivated. [Pytrik Reidsma, Netherlands]	Accepted, added section on farms and farming systems
26490	47	6			Need to use IPCC uncertainty/confidence/likelihood language. This is very important in the projections section. [Hans Poertner and WGII TSU, Germany]	Accepted, added uncertainty language
27360	47	7			Pugh, T. A. M., Müller, C., Elliott, J., Deryng, D., Folberth, C., Olin, S., ... & Arneth, A. (2016). Climate analogues suggest limited potential for intensification of production on current croplands under climate change. Nature communications, 7, 12608. [Doreen Stabinsky, United States of America]	Accepted, added reference
27362	47	7			Tigchelaar, M., Battisti, D. S., Naylor, R. L., & Ray, D. K. (2018). Future warming increases probability of globally synchronized maize production shocks. Proceedings of the National Academy of Sciences, 201718031. [Doreen Stabinsky, United States of America]	Accepted, added reference
17848	47	17			Make soybeans singular [Donald Smith, Canada]	Accepted, made singular
17850	47	18			Make oats, green beans and peppers singular. [Donald Smith, Canada]	Accepted, text changed
8048	48	2	48	2	Provide full caption from image. [Katharina Waha, Australia]	Accepted, added full citation
25968	48	3	48	3	more negative' is a confusing expression. Also, in Figure 5.20 it seems that the blue areas show positive change...? [Hans Poertner and WGII TSU, Germany]	Noted, text and figure deleted
21004	48	3	48	4	What about the AR5? [Andy Reisinger, New Zealand]	Noted, text and figure deleted. Already cited in AR5

Comment No	From Page	From Line	To Page	To Line	Comment	Response
236	48	4	48	14	Do these studies consider the atmospheric CO2 concentration causing these temperature increases? Or is it merely a simulation exercise for temperature imact. That should at least be mentioned. [Eline Vanuytrecht, Belgium]	Noted, text and deleted
8050	48	8	48	14	Remove from: "Global wheat production from crop model ensembles…". Impacts presented here are inconsistent with what has been said before and studies are included in review by Zhao et al. 2017a. [Katharina Waha, Australia]	Noted, text deleted
21006	49	2	49	10	It is somewhat misleading to only give an RCP8.5 figure, as this is an extreme scenario. If the same figures are not available for RCP6.0, at least describe in text what the range of responses under a range of climate change scenarios would be. [Andy Reisinger, New Zealand]	Noted, text and figure deleted
4272	49	5	49	17	lack of sufficent examples and references in this section is obvious. Mention more examples.for example.1. Ghahreman, N.,and Tabatabaei, M., (2015) Feasibility of sugarcane cultivation during the next five decades under RCP climate change scenarios. (Case study: Khuzestan province, Iran), ICID 2015, Montpellier, France. 2.11. Ghahreman, N., Babaeian, I.(2016) Possible effects of climate change on sugarcane development and water use in southwest of Iran.2nd World Irrigation Forum. Chiang Mai, Thailand, 6-8 Novemeber,2016. [Nozar Ghahreman, Iran]	Rejected, not peer-reviewed literature
708	49	6	49	7	Error! Reference source not found. [Roberto Abeldaño, Mexico]	Accepted, fixed
25564	49	12	49	19	Worth making the point more explicitly that lost income for smallholders from declines in e.g. coffee production decrease their food security [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, added this point in new farming systems section
8230	49	13	49	13	The word 'be' should be added between 'can' and 'substantial'. [Muhammad Mohsin Iqbal, Pakistan]	Accepted, added
8232	49	16	49	16	The bracket before 'Rippke' should be shifted to before 2016. [Muhammad Mohsin Iqbal, Pakistan]	Accepted, fixed
8234	49	17	49	18	The phrase '- - will experience 10 or more years with crop suitability - -' is not clear. [Muhammad Mohsin Iqbal, Pakistan]	Accepted, clarified text
8052	49	19	49	19	Insert: "Of the 174 studies considered in a recent review only 14 described results of field or greenhouse experiments studying impacts of increased temperatures on yields of different root and leafy vegetables, tomatoes and legumes. Mean yield decline with a temperature increase of 4°C by 31.5% (CI 41.4- 21.5%) with baseline temperature higher than 20°C but only by 4.9% (CI -47.6% to +37.8%) with baseline temperature equal or below 20°C (Scheelbeek et al. 2018)." Scheelbeek PFD, et al. (2018) Effect of environmental changes on vegetable and legume yields and nutritional quality. Proc Natl Acad Sci 115(26):6804–6809. [Katharina Waha, Australia]	Accepted, added text and reference
15654	49	19	49	19	"Studies for vegetables are very limited (Bisbis et al. 2018)". What did Bisbis et al. 2018 find on projected impacts of climate change on vegetable production? [Robert Onyeneke, Nigeria]	Accepted, added results

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1318	49	19	49	19	The lack of studies for vegetables (studies on non-staples generally) cannot be emphasized enough, if we are also to address dietary diversity. Can this be emphasized with some reference to the importance for understanding the full range of climate impacts on food and nutrition security? [Tonya Rawe, United States of America]	Accepted, emphasized important of fruits and vegetables
238	49	20	49	20	Lower stomatal conductance (instead of higher!) and higher water use efficiency [Eline Vanuytrecht, Belgium]	Accepted, text deleted
16740	49	20	49	20	As I know, elevated CO2 concentration would decrease stomatal conductance! [Jing Wang, China]	Accepted, text deleted
8054	49	24	49	25	Insert: "..with elevated atmospheric CO2 concentration of 546-586 ppm…" after "(FACE) experiments…" and before "…(Myers et al. 2014)…" [Katharina Waha, Australia]	Accepted, text added
19500	49	20	50	4	This section should include data from the work of Irakli Loladze that details the potential effects of rising CO2 levels on protein, micronutrient and vitamin content of crops [Prasannalakshmi (Lakshmi) Acharya (Dave), New Zealand]	Added, see section 5.2.4.3
242	49	27	50	1	Also C4 crops are prone to decrease N concentrations, see reference above [Eline Vanuytrecht, Belgium]	Rejected, unclear, couldn't find reference
20752	49	2			CGCMs without NSTRESS ' results is different from the experimental results. High temperature shorten growth duration, especially grain fliilg duration to reduce yield. Enough N could not fully compensate the shorten gowth duration. [Junhwan Kim, Republic of Korea]	Noted, text and figure deleted
17508	49	13			can be substantial. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
10324	49	16			Write as "Rippke et al. (2016) found that 30-60% of the common bean growing area …" instead of " (Rippke et al. 2016) found that 30-60% of the common bean growing area…" [Bolanle Mutiat Titilola, Nigeria]	Accepted, fixed
17852	49	16			Move opening bracket to just before the year. [Donald Smith, Canada]	Accepted, fixed
17854	49	17			Delete first %. [Donald Smith, Canada]	Accepted, fixed
17856	49	20			Change "higher" to "lower". For the plant this limits water loss. [Donald Smith, Canada]	Accepted, text deleted
17858	49	27			Singular for pea and soybean [Donald Smith, Canada]	Accepted, changed to singular
11518	49				Figure: the hatching is not really visible. Perhaps consider crudely outlining the areas where most of the hatching occurs. [Debra Roberts, South Africa]	Noted, Figure removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
240	50	3	50	3	It is very likely that it is not merely a dilution effect. See for example Feng Z, Rütting T, Pleijel H, Wallin G, Reich PB, Kammann CI, Newton PCD, Kobayashi K, Luo Y, Uddling J (2015) Constraints to nitrogen acquisition of terrestrial plants under elevated CO2. Glob Change Biol 21:3152–3168; Bloom AJ, Burger M, A. Kimball B, J. Pinter JP (2014) Nitrate assimilation is inhibited by elevated CO2 in field-grown wheat. Nature Clim Change 4:477–480; Taub DR, Wang X (2008) Why are nitrogen concentrations in plant tissues lower under elevated CO2? A critical examination of the hypotheses. Journal of Integrative Plant Biology 50:1365–1374. [Eline Vanuytrecht, Belgium]	Accepted, added reference
8056	50	4	50	4	Insert: "Legume and vegetable yields increased with elevated CO2 concentration of 250 ppm by 22% (CI 11.6-32.5%), with a stronger effect on leafy vegetables than on legumes and no impact was found for changes in iron, vitamin C or flavonoid concentration (Scheelbeek et al. 2018)." [Katharina Waha, Australia]	Accepted, added text and reference
8038	50	5	50	5	Change "Wheat, rice, maize and soybean provide two-thirds of human caloric intake" to "Wheat, rice and maize provide about two-fifth of the calories and protein globally produced for human consumption (Shiferaw et al. 2013)." Shiferaw B, et al. (2013) Crops that feed the world 10. Past successes and future challenges to the role played by wheat in global food security. Food Secur 5(3):291–317. [Katharina Waha, Australia]	Accepted, added text and reference
1320	50	5	50	7	While the high current reliance on these four crops for calories makes it important to understand climate impacts on their production, this statement should be tempered a bit and put in the context of 2B malnourished people and the need to consider far more than caloric intake for food security. [Tonya Rawe, United States of America]	Accepted, added to introduction of section
244	50	5	50	17	Can this paragraph be moved up, where the study was mentioned first or closer to the figure itself. [Eline Vanuytrecht, Belgium]	Accepted, moved earlier an d closer to figure
246	50	5	50	17	Are these temperature impacts including elevated atmospheric CO2 concentration impacts? IT would be good to explicitly mention this. [Eline Vanuytrecht, Belgium]	Accepted, added "results do not take CO2 effects, adaptation, and genetic improvement into account"
8046	50	5	50	17	Move paragraph plus inserted sentence to Page 47, Line 24. [Katharina Waha, Australia]	Accepted, moved earlier an d closer to figure
15176	50	5	50	17	One limitation of Zhao et al. (2017a) is based on the assumption that the yield response to temperature increase is linear to derive the yield impact per degree celsius increase. However, the yield response for each degree celsius warming differs by growing season temperaure level. The projected global mean yields of maize and soybean in the end of this century monotonically decrease with warming, wheres those of rice and wheat increase with warming and turn to stagnate at a warming of about 3 degC (2091-2100 relative to 1850-1900) (Iizumi et al., 2017). Iizumi, T., Furuya, J., Shen, Z., Kim, W., Okada, M., Fujimori, S., Hasegawa, T. and Nishimori, M. (2017) Responses of crop yield growth to global temperature and socioeconomic changes. Scientific Reports, 7, 7800, doi:10.1038/s41598-017-08214-4. [Toshichika Iizumi, Japan]	Accepted, added text and reference

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8040	50	9	50	17	celsius to Celsius [Katharina Waha, Australia]	Accepted, fixed
8042	50	11	50	12	Unclear: Mostly the different methods generated similar results at the country scale, but estimates varied between countries. Is that "similar results at the global scale, but estimates varied.." ? [Katharina Waha, Australia]	Accepted, text changed
8044	50	17	50	17	Insert: "A temperature increase of one degree Celsius will reduce average wheat, rice and soybean yield globally by 6.0 ± 2.9%, 3.2 ± 3.7% and 3.1%, respectively but with large uncertainties for soybean yield (Zhao et al. 2017a)." [Katharina Waha, Australia]	Accepted, added text
18566	50	17	50	26	This whole program is a promotion of a research network. I am not sure it is appropriate as written in an IPCC report. A more sensible approach is to present a table describing the major modeling platforms and do an objective comparation of its features, assumptions, strengths and weaknesses. THis way a distance is created between the authors and the platforms they seem to push for greater recognition and self-promotion! [Aziz Elbehri, Italy]	Accepted, agree, text changed
8058	50	18	50	27	Remove from: "The Agricultural Model Intercomparison and Improvement Project…" This is a description of a single project without stating any scientific findings and irrelevant here. [Katharina Waha, Australia]	Accepted, text removed
16380	50	33	50	35	Please give the references of the statement you are making. [Lorenzo Giovanni Bellù, Italy]	Accepted, reference given
8060	50	38	50	48	Remove, off-topic. This is about mitigation, crop prices etc. Should be moved to Section 5.8 Mitigation, Adaptation, Food and Nutriton Security…. [Katharina Waha, Australia]	Accepted, moved to synergies section
27364	50	40	50	41	The implication of the text here is that bioenergy crops and afforestation / reforestation is REQUIRED. There are quite a number of new scenarios considered in the context of the 1.5 report that do not REQUIRE large areas of land for CDR. Update with a more circumspect assessment based on the entire range of IAMs and other scenarios out there, not just the ones that have BECCS and A/R as their outputs. [Doreen Stabinsky, United States of America]	See revised Synergies section
17860	50	3			Electrons that would have flowed to oxygen go to nitrate instead, so I guess this is alright, but it seems an odd way to state it. [Donald Smith, Canada]	Rejected, unclear
17862	50	21			Remove first oC [Donald Smith, Canada]	Accepted, fixed
17864	50	22			Remove first oC [Donald Smith, Canada]	Accepted, fixed
17866	50	34			Remove first oC [Donald Smith, Canada]	Accepted, fixed
20758	50	38			(Ruane et al, 2018) couldn’t find in Glob. Environ. Chang. [Junhwan Kim, Republic of Korea]	Accepted, updated reference
17868	50	40			With advanced biofuels we can avoid this. Once more, if it is useful I could provide a few concise sentences on this. [Donald Smith, Canada]	Accepted, text revised and moved to synergies section
20760	50	48			(Ruane et al, 2018) couldn’t find in Glob. Environ. Chang. [Junhwan Kim, Republic of Korea]	Repeat of comment 15662
17510	51	2	51	8	Please check this paragraph. Many errors. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3258	51	3	51	18	The large uncertainties related to grassland/grazing land NPP should (and beyond this crucial factor) be addressed here: Fetzel T, Havlik P, Herrero M, et al (2017) Quantification of uncertainties in global grazing systems assessment. Global Biogeochem Cycles 31:2016GB005601. doi: 10.1002/2016GB005601, Chen Y, Tao Y, Cheng Y, et al (2018) Great uncertainties in modeling grazing impact on carbon sequestration: a multi-model inter-comparison in temperate Eurasian Steppe. Environ Res Lett 13:075005. doi: 10.1088/1748-9326/aacc75 [Karlheinz Erb, Austria]	Accepted, added statement on uncertainties with new reference (Fetzel et al). Chen et al included in Mitigation section
2572	51	5	51	6	Reference source not found (two occurrences). [William Lahoz, Norway]	Accepted, fixed
718	51	6	51	7	Error! Reference source not found. [Roberto Abeldaño, Mexico]	Accepted, fixed
21008	51	13	51	18	This mixes a lot of different time scales - need to understand how population and rural economies would change before one can give a dollar value for a shift that is projected to occur in 2050! [Andy Reisinger, New Zealand]	Accepted, removed dollar value
17870	51	15			Remove first % [Donald Smith, Canada]	Accepted, fixed
17872	51	15			Remove second USD [Donald Smith, Canada]	Noted, text deleted
25566	52	3	52	15	The issue of woody encroachment both by invasive species sensu stricto and others is well-covered in Chapter 3 [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, added call-out to Chapter 3
1322	53	1	53	12	It appears there is a missing figure?? Fig 5.22 is in regard to rangeland productivity; lines 3-12 discuss fisheries and agriculture and reference data than that captured in the figure. [Tonya Rawe, United States of America]	Accepted, deleted text
25970	53	3	53	3	Unclear use of vulnerability concept. Suggest to rephrase. [Hans Poertner and WGII TSU, Germany]	Accepted, deleted text
25568	53	3	53	12	This paaragraph appears to be notes for a figure that has not been included! [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, deleted text
8088	53	3	53	12	This seems to be part of a figure caption belonging somewhere else. Remove here. [Katharina Waha, Australia]	Accepted, deleted text
17512	53	6	53	7	Please check the sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
10754	53	14	54	2	The impact on livestock is missing entirely the link with rangelands and how climate change impacts livestock productivity through pastures. This is key considering the very large areas concerned and the number of vulnerable people affected. [Anne Mottet, Italy]	Accepted, added linkage
18504	53	14	54	2	The impact on livestock is missing entirely the link with rangelands and how climate change impacts livestock productivity through pastures. This is key considering the very large areas concerned and the number of vulnerable people affected. [Aziz Elbehri, Italy]	Repeat of coment 18444

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11520	53	3			What figure does this text refer to? [Debra Roberts, South Africa]	Accepted, deleted text
10326	53	6		7	The sentence "Fisheries and agriculture dependency estimates are calculated from employment, economy and food and nutrition security." is not a complere sentence [Bolanle Mutiat Titilola, Nigeria]	Accepted, deleted text
17874	53	28			Remove first % [Donald Smith, Canada]	Accepted, fixed
15658	54	27	54	27	Replace "that" with "than" [Robert Onyeneke, Nigeria]	Noted. Editorial
15660	54	27	54	28	Check the sentence and be sure nothing is missing [Robert Onyeneke, Nigeria]	Noted. Sentence is complete
25570	54	40	54	44	This is a bit misleading and flies in the face of well-reported conclusions that casava is a very valuable drought resistant crop. Some cultivated varieties of cassava are much more cynogenic than others, and there are various traditional techniques for removing cyanide. The risk is not that farmers are more likely to eat cassava per se, but that they may either eat mor e cyanogenic varieties, or fail to process properly, or both [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text modified
25572	54	45	54	47	This understates the severity of the threat, and the increasing literature on it [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text modified
8090	54	45	54	47	Irrelevant here, the section is about food safety, not human health. Remove. [Katharina Waha, Australia]	Rejected - text modified to justify
15242	54	45	54	47	Climate change can affect human health, worktime and labor productivity (Takakura et al., 2017), which have implications for work environment in agricultural sector. Takakura, J., Fujimori, S., Takahashi, K., Hijioka, Y., Hasegawa, T., Honda, Y. and Masui, T. (2017) Cost of preventing workplace heat-related illness through worker breaks and the benefit of climate-change mitigation. Environmental Research Letters, 12, 064010, https://doi.org/10.1088/1748-9326/aa72cc. [Toshichika Iizumi, Japan]	Accepted - ref added
10532	54	45			because of increasing temperatures, human health is already affected by diseases like malaria, dengue, chikungunya, etc. transmitted by mosquitoes (aedis aegipty) which some years ago were not present in higher altitudes impacting peoples workforce [Zitouni Ould-Dada, Italy]	Rejected - not related to food, so out of scope
1324	55	12	55	16	While many of us will be devastated by a drop in the quality of wine, given that the report is about food security, wine (especially as a more "luxury commodity") may not be the most illustrative crop to lead with in the discussion of the reduction in food quality due to climate change. A more illustrative example would be a discussion of a product/crop that people rely on -- a grain, perhaps? [Tonya Rawe, United States of America]	Accepted - text modified

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15244	55	12	55	16	The observed decreases in acid concentration and increases in soluble-solids concentration in apples in Japan (these affect the taste and textural attributes of fruites) are attributed to recent warming (Sugiura et al., 2013). Sugiura, T., Ogawa, H., Fukuda, N., Moriguchi, T., (2013) Changes in the taste and textural attributes of apples in response to climate change. Scientific Reports, 2418, 3, doi:10.1038/srep02418. [Toshichika Iizumi, Japan]	Accepted - ref added and discussion
252	55	18	55	19	This explanation should come much earlier in the report, when explaining why CO2 can have a positive fertilization effect on crops. [Eline Vanuytrecht, Belgium]	Accepted - sections re-ordered
24442	55	24	55	24	What is the difference between robust and strong evidence, please? [Barron Joseph Orr, Germany]	Accepted - reworded
250	55	25	55	25	Add: because plant nitrogen concentrations decrease (as described in section 5.6.3.1) [Eline Vanuytrecht, Belgium]	Accepted - text inserted in appropriate place
1326	55	26	55	28	reference is made to iron and zinc being "less available in food" -- what kind of food? [Tonya Rawe, United States of America]	Noted - plant-based food from agriculture, but section rewritten and sentence no longer there
11524	55	40	55	42	Please specify how heat stress changes the items mentioned – increase or decrease or what? [Debra Roberts, South Africa]	Accepted - reduces inserted
11522	55	14			It seems a bit strange to have wine as first example. [Debra Roberts, South Africa]	Accepted - text modified
26990	56	27	43	56	Pollinators are critical for the sustainable future of food and agricultural systems. This report could benefit from a mention of possibly a North American phenomenon of the mysterious disappearance of workers bees, which has been termed as 'Colony Colapse Disorder". [Laxmi Pant, Canada]	Rejected - out of scope CCD likely not climate-related
254	56	1	56	1	Also C4 crops are prone to decrease N concentrations, see references above [Eline Vanuytrecht, Belgium]	Accepted - text modified
8676	56	4	56	25	reference outdated; add Zhu et al. 2018" Carbon dioxide (CO2) levels this century will alter the protein, micronutrients, and vitamin content of rice grains with potential health consequences for the poorest rice-dependent countries", Science Advance [Delphine Deryng, Germany]	accepted - ref added
8092	56	4	56	25	Direct CO2 effects on nutritional quality are discussed as well in 5.6.3.1, incorporate these two paragraphs into 5.6.3.1. [Katharina Waha, Australia]	accepted sections amalgamated
15246	56	5	56	6	Climate change threatens to undermine the past 50 years of gains in public health where food security and undernutrition are a part of determinants of good health (Watts et al., 2018). Watts, N. et al. (2018) The Lancet Countdown on health and climate change: from 25 years of inaction to a global transformation for public health. Lancet, 391, 581-630, doi:https://doi.org/10.1016/S0140-6736(17)32464-9. [Toshichika Iizumi, Japan]	Accepted - intro text added including this ref

Comment No	From Page	From Line	To Page	To Line	Comment	Response
456	56	14	56	25	The authors may find this new paper by Ritchie et al. useful for this point: Ritchie H, Reay DS, Higgins P (2018) Quantifying, Projecting and Addressing India's Hidden Hunger Front. Sustain. Food Syst. | doi: 10.3389/fsufs.2018.00011 [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - Nice paper but doesn't fit the scope of the discussion in this section.
15792	56	15	56	16	Please, provide the source of this statistics/claim, "An estimated two billion people suffer these deficiencies, causing a loss of 63 million life years annually". [Robert Onyeneke, Nigeria]	Accepted -the reference is the Myers one within that discussion. New refernce to the op. cit. added.
15794	56	20	56	22	Provide sources of the statistics quoted [Robert Onyeneke, Nigeria]	Accepted - tightened
17876	56	24			It now seems that aspects of this could be approached by maniputlations of the phytomicrobiome. I could provide a few concise sentences if that is useful. [Donald Smith, Canada]	Noted. Other routes to mitigating (e.g. eating a different diet).
11526	56	30			The text should read "most fruit and vegetables", not "many" [Debra Roberts, South Africa]	Accepted.
17878	56	30			Remove first % [Donald Smith, Canada]	Editorial
11528	56	34			It is a bit surprising not to see the effect of insecticides mentioned here. Another point to raise would be the huge co-benefit of conservation agriculture and other nature based mitigation options such as indigenous vegetation, reforestation with local species etc on biodiversity and therefore on pollination services. Important pollinators include various flies and beetles, whose larvae may live in mud, compost, feed on indigenous vegetation, and thus deserve consideration. Also very importantly wasps, which are both pollinators as well as important natural pest control. Yes, these systems are understudied, but there is a lot of information out there that deserves mention here. The benefits of insects vastly exceed their negative impacts. [Debra Roberts, South Africa]	Noted - the value of insects for providing ecosystem services, and the harm caused by pesticide regimes, is hugely important; but this section about the impact of climate change on distributions of insects. We have added some new text on pollinators, including how indigenous knowledge is important for their maintenance, citing IPBES 2016 report on ollinators
44	57	1	57	1	If you want to convince policy-makers, healthcare aspects and their costs should be considered here. [Nathalie Jeanne Marie Hilmi, France]	Reject - this section is about food security and pests/diseases affecting food production. Pests and diseases of humans out of scope.
10756	57	1	57	31	The impact on pests and diseases is missing important examples for livestock (eg.g ticks, bluetongue etc.) [Anne Mottet, Italy]	Reject - section talked about pests and disease generically, but references included for example bluetongue!
18506	57	1	57	31	The impact on pests and diseases for livestoc is missiong (eg.g ticks, bluetongue etc.) [Aziz Elbehri, Italy]	Reject - section talked about pests and disease generically, but references included for example bluetongue!
15178	57	1	57	31	A short description on food strage insect pest would be worth to be included in this section. For instance, there are concerns that storage insect pest problems are likely to be exacerbated by global warming as most of these pests multiply faster under higher temperatures (Mlambo et al., 2017). Mlambo, S., Mvumi, B.M., Stathers, T., Mubayiwa, M. and Nyabako, T. (2017) Field efficacy of hermetic and other maize grain storage options under smallholder farmer management. Crop Protection, 98, 198-210, https://doi.org/10.1016/j.cropro.2017.04.001. [Toshichika Iizumi, Japan]	accepted but this reference didn't seem relevant to climate, so another added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1494	57	21	57	22	References on increased incidences of pests and diseases include Schaap, B.F., Blom-Zandstra, M., Hermans, C.M.L., Meerburg, B.G., Verhagen, J., 2011. Impact changes of climatic extremes on arable farming in the north of The Netherlands. Regional Environmental Change 11 (3), 731–741; and: Schaap, B., P. Reidsma, J. Verhagen, J. Wolf , M.K. van Ittersum. 2013 Participatory design of farm level adaptation to climate risks in an arable region in the Netherlands. European Journal of Agronomy 48: 30-42. Available on-line: http://dx.doi.org/10.1016/j.eja.2013.02.004. This also reltes to line 26-27 on this page (risks may decrease; f.e. Phytophtera in the Netherlands with dryer summers) [Pytrik Reidsma, Netherlands]	Rejected - neither seem relevant directly to lines 21-22
2388	57	35	57	36	It is not always the private sector that determines to movement of production: public policies (such as the CAP) have a proeminent role that needs to be mentioned in this paragraph. [Anne-Laure Sablé, France]	Rejected - "the movement of produce to market" is the sense of the sentence, and this is usually determined by private actors rather than policies. Text changed to sharpen.
16382	57	34	58	29	Important references you missed to review and to cite in this section are: 1) FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf; 2) FAO. 2016. The State of Food and Agriculture - Climate change, agriculture and food security. Available at http://www.fao.org/publications/sofa/2016/en/; 3) all the work of the AgMIP Global Economics Group; 4) FAO (forthcoming) The future of food and agriculture - Alternative pathways to 2050. For info re this forthcoming report, please, contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies: lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Noted - but this section about food price spikes rather than climate and scenarios for the future of food systems. Text and title changed to indicate.
16384	57	34	58	29	Semantics matter: 1) climate change is not synomymous to weather variation. You talk in this section about shortfalls in production caused by extreme weather events. You have to justify that these events are connected to climate change. 2) the short term reactions are not the same as the long term ones because agends have different decision making mechanisms. In Section 5.6.5.1 you focus disproportionally on extreme weather events and short term reactions. Please revise and discuss also about the long term implications of climate change. [Lorenzo Giovanni Bellù, Italy]	Noted - but this section about food price spikes rather than climate and scenarios for the future of food systems. Text and title changed to indicate.
17880	57	14			Change "fungus" to "pathogens", as this would also apply to bacterial pathogens. [Donald Smith, Canada]	Accepted.
27366	57	35			There is not just one global food market. [Doreen Stabinsky, United States of America]	Accepted
17514	58	7	58	9	Check interogative form of the sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
15662	58	7	58	9	Check grammar [Robert Onyeneke, Nigeria]	Noted. Editorial

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24444	58	26	58	26	For ease of reference, Figure 5.23 would benefit of a clearer graphic representation of the sequence of each element for ease of reference/ understanding of the relations among such elements -- attributing numbers to each element (box) could be one means, if possible. [Barron Joseph Orr, Germany]	accepted - figure modified
14584	58	26	58	26	Sequence and interrelationships of elements of Figure 5.23 not clear. [Rattan Lal, United States of America]	accepted - figure modified
24446	59	1	59	1	Please consider adding reference to the UNCCD Gender Action Plan (based on decision 30/COP.13, UNCCD 2017: 3-9): https://www.unccd.int/sites/default/files/documents/2018-01/GAP%20ENG%20%20low%20res_0.pdf [Barron Joseph Orr, Germany]	Rejected. The reference provided is a 2 pages action plan. It can be useful in the gender cross-chapter box. From the reference provided we have extracted the following one useful for our chapter: Nelson, V., L. Forsythe and J. Morton, Achieving Dryland Women's Empowerment: Environmental resilience and social transformation imperatives (2015).
14586	59	1	59	1	See Towards a gender-responsive implementation of the United Nations Convention to Combat Desertification (Mor, 2017) and UNCCD Gender Action Plan (based on decision 30/COP.13, UNCCD 2017: 3-9): https://www.unccd.int/sites/default/files/documents/2018-01/GAP%20ENG%20%20low%20res_0.pdf [Rattan Lal, United States of America]	same response than comment 16954
1328	59	5	59	7	Statement would be stronger with reference to WHY women and poor people are more vulnerable -- unless the "and" after "vulnerability is higher" should be be there, in order for the sentence to read "vulnerability is higher because of gender-differentiated relativer powers, roles, and responsibilities...." A discussion of why they are more vulnerable (and recognition that vulnerability is shaped by access to resources, including economic, natural, social, decision-making, and political) will reinforce the statement made earlier in the report regarding the importance of addressing inequality in food systems. [Tonya Rawe, United States of America]	Accepted, fixed
1330	59	21	59	22	Inclusion of a phrase to indicate why women and poor people are more likely to be disproportionately impacted by price spikes would be helpful. Inclusion of why helps indicate underlying problems that must be addressed and solutuions to these problems. [Tonya Rawe, United States of America]	Accepted, added text
1332	59	43	59	44	It also impacts women's ability to care for themselves -- while women's roles current involve primary responsibility for care of infants and children, as a reflection of an unequal labor burden, this cannot always remain solely women's responsibility. And we must start first and foremost with impacts on women as women -- not solely as tools for the care of others. [Tonya Rawe, United States of America]	Noted
25574	59	1	60	30	Considering gender is crucial, but this section is repetatitve and unwieldy, and doesn't say enugh about other dimensions of inequality. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Other dimensions of inequality added
6794	59	1	60	30	5.6.5.2 Gender and equity as a sub paragraph is relevant but this is a long paragraph which you might want to cut down. [Nazimi Acikgoz, Turkey]	Rejected. Text reduced only to avoid repetition

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1336	59	1	60	30	Comments on the framing of the gender section: (1) discussion should be included of the implications of gendered differences in perspectives, roles & related info/resource needs, access to decision-making… women are often not included in decisions that shape interventions, priorities, and use of resources; (2) this exclusion of women is perpetuated when women are framed solely as victims of climate change impacts and at a disadvantage, rather than as active agents of change and individuals with roles that reflect different information, resource, and decision needs; (3) at the same time, it's necessary to acknowledge that women's current roles often reflect an unequal labor burden and simply targeting certain interventions at women because of their current roles (and not also targeting men) can reinforce an unequal labor burden and miss the opportunity to foster dialogue about gender roles that encourages a redistribution of labor between men and women in a way that addresses a driver of (and thereby reduces) a woman's disproportionate vulnerability to climate change. [Tonya Rawe, United States of America]	Accepted. All these issues have been added in the text and a new section on synergies has been created on gender empowerment where some of these issues are also raised.
10536	59	26			the promotion of rain water harvesting at household level, the production of vegetables in backyards and food and nutrition education of women/families, contributes to food security at houshold level [Zitouni Ould-Dada, Italy]	Accepted, these have been included in adaptation. This section is about observed impacts
10534	59	27			women are often also responsible for storing/keeping seeds. As a consequence of recurrent droughts, farmers are loosing seeds. Promoting women to establish community seed banks helps communities to keep seeds for replanting [Zitouni Ould-Dada, Italy]	Accepted. This is mentioned now in adaptation
17882	59	34			Remove first % [Donald Smith, Canada]	Fixed
25972	60	7	60	10	Need to be more explicit about specific problems for urban populations. [Hans Poertner and WGII TSU, Germany]	Accepted, added more specific text on urban populations
1334	60	19	60	20	From the perspective of climate resilience, what does it mean for many of women's activites to not be defined as "economically active employment"? i.e. when women are not considered key informants in household livelihood strategies or contributors to a household's economy, their are not included in wider discussions of priorities or needed interventions; their unique perspectives are not included; their unique needs (as producers of food for household consumption, not markets) are not met; interventions, iunformation (including actionable weather and climate forecasts), technologies, and tools are potentially not relevant. [Tonya Rawe, United States of America]	Accepted, added text to gender section
6796	60	32	60	32	5.6.5.3 Migration. This subtitle could be renamed as "Migration and Conflicts”. Case in point, the Arab spring and Syrian conflict. [Nazimi Acikgoz, Turkey]	Noted - we have briefly addressed the relationship between conflict and food security in the section
46	60	45	60	46	a report of the World Bank has been released on the 19th of March 2018 about migration [Nathalie Jeanne Marie Hilmi, France]	Relevant information from this report has been included in the revised text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15870	60		60		A box dealing with "Impact of land degradation on migration and radicalization Looking for science-based evidence" would have been interesting see the link to download the document https://www.dropbox.com/s/8ujdhmu31x3hdbn/0-IRD-Migration%26DDTS_UNCCD-Final.pdf?dl=0 [Jean-Luc Chotte, France]	Not relevant to this chapter. Land degradation is covered in Chapter 4.
16860	60		60		A box dealing with "Impact of land degradation on migration and radicalization Looking for science-based evidence" would have been interesting see the link to download the document https://www.dropbox.com/s/8ujdhmu31x3hdbn/0-IRD-Migration%26DDTS_UNCCD-Final.pdf?dl=0 [Rattan Lal, United States of America]	Not relevant to this chapter. Land degradation is covered in Chapter 4.
1338	60	32	61	47	See Warner, Koko, et al Where the Rain Falls (https://www.carefrance.org/ressources/themas/1/2755,WTRF_report_lowres.pdf) and related country-specific studies for discussion of relationship between changing rainfall patterns, food security, and human mobility, largely within national borders. [Tonya Rawe, United States of America]	This has been taken care of and the text is revised incorporating new information
1340	60	32	61	47	This section could benefit from discussion of rural to urban migration driven by climate impacts on agricultural livelihoods…and the implications for urban stability, urban growth, and land use. [Tonya Rawe, United States of America]	Additional information has been included in the revised text
17884	60	27			Remove "(" [Donald Smith, Canada]	Fixed
25974	60	32			This section is to generic on migration, conflict, etc. Suggest to cut the first general paragraph and some further sentences in this section on environmental change-induced migration and focus only on explicit food security implications. [Hans Poertner and WGII TSU, Germany]	Accepted, deleted paragraph
15664	61	8	61	8	Expunge "of" [Robert Onyeneke, Nigeria]	Text changed
48	61	18	61	20	neo--malthusianism is a very criticised concept in economics. [Nathalie Jeanne Marie Hilmi, France]	Noted and text corrected
50	61	20	61	20	any more recent reference? [Nathalie Jeanne Marie Hilmi, France]	New work on Africa cited in in observed and future impacts sections
9430	61	21	61	30	The report points to Mexico as a country that has experienced rural outmigration—and attributes this to “well-known socio-demographic factors coupled with climate change impacts” (page 5-61). I was not exactly sure what these factors entailed, but many food studies scholars call out NAFTA (the Norther America Free Trade Agreement) as a core factor that triggered peasant’s exodus out of agriculture in that country (the work of Otero 2011 comes to mind). [Helena Shilomboleni, Canada]	Noted. Text improved. Our prime focus in this section is migration in relation to climate change impacts.
8236	61	31	61	31	Is the long-term migration in Pakistan confined only to men and not the families? [Muhammad Mohsin Iqbal, Pakistan]	Noted. Both women and men respond to heat stress by moving, but study says men move long-distances in response to extreme temperatures.
8238	61	38	61	38	What is meant by 'at the point of origin'? [Muhammad Mohsin Iqbal, Pakistan]	Noted and corrected in the text as place of origin.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24448	61	40	61	40	If considered to add to the references, see https://knowledge.unccd.int/publications/climate-change-vulnerability-and-migration as well as key messages derived from AR5 (IPCC 2014) which refer to: The movement of people is and will continue to be affected by natural disasters and environmental degradation. Climate change is expected to have major impacts on human mobility. Environmental migration may take many complex forms; forced and voluntary, temporary and permanent, internal and international. The concept of "vulnerability" needs to be put at the centre of current and future responses to environmental migration. The most vulnerable may be those who are unable to or do not move (trapped populations). Environmental migration should not be understood as a wholly negative or positive outcome – migration can amplify existing vulnerabilities but can also allow people to build resilience. [Barron Joseph Orr, Germany]	Noted, but outside the scope of this section. Our focus was impact of CC, migration and food security
3836	61	7	67	20	Not all of this is food related. Keep the focus [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and text improved
21010	61	7			This is a rather absolute statement - all policymakers? At all times? Only as that? [Andy Reisinger, New Zealand]	Accepted and text improved
3838	62	1	62	1	Not much food focus [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Text revised to give more focus on food security in relation to migration
19390	62	1	62	1	In Box 5.1 there is very little mention of food and nutrition security. Most of the Box explain migration. Within country migration and outside country migration contribute differently in food security. Land tenure and access to land is significant for food security. Relocation of communities (within country) due to sea level rise is common in the Pacific. Migration should not only mean large scale but should include relocation of communities in a small scale manner. [VILIAMU IESE, Fiji]	Noted and text revised.
25976	62	1			This Box is hardly about food security, but very generic about migration on small islands... suggest to either focus on food security concerns, supported by according evidence, or remove this box. Migration issues on small islands are also discussed in the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC). [Hans Poertner and WGII TSU, Germany]	Noted and text revised.
16954	63	11	63	11	To "contexts" I would add "environmental and cultural", so it becomes "environmental and cultural contexts". [Vincenza Ferrara, Italy]	Text removed
17516	63	12	63	21	The term "agro-clomatic" is considered as ambiguous, and should well defined when used. [Noureddine Benkeblia, Jamaica]	Noted, definitions added
19658	63	18	63	18	… and trading as well as consumption, health, livelihoods, cultural contexts and NCPs … [Birgit Kuna, Germany]	Accepted.
17402	63	20	63	26	In this parragraph could be interering to add the relevance of the promotion of advisory services/extension services to promote best agronomical practices to farmers [Ignacio Lorite, Spain]	Noted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1342	63	20	63	26	A key pathway to adaptation is also addressing underlying drivers of vulnerability, particularly those related to unequal access to resources (information, options, education, decision-making) needed to adapt. [Tonya Rawe, United States of America]	Noted.
14588	63	28	63	28	Section 5.7.1 in page 63: A good number of climate resilient technologies on heat stress, submergence tolerence and salt resistance are available in the region to adapt climate change extremes. This could be highlighted. https://www.unccd.int/sites/default/files/documents/2018-01/GAP%20ENG%20%20low%20res_0.pdf [Rattan Lal, United States of America]	Accepted. Added some context to highlight stress-resistant technologies.
15180	63	28	63	37	Replacing rainfed cropping systems with irrigated systems is deemed an effective adaptation measure to climate change. However, competitive water use among crops and the geographical patterns of future precipitation change influence the benefits of expanding irrigated area as the adaptation measure (Okada et al., 2018). Okada, M., Iizumi, T., Sakamoto, T., Kotoku, M., Sakurai, G., Hijioka, Y., and Nishimori, M. (2018). Varying benefits of irrigation expansion for crop production under a changing climate and competitive water use among crops. Earth's Future, 6. https://doi.org/10.1029/2017EF000763. [Toshichika Iizumi, Japan]	Noted.
15186	63	28	63	37	Crop yield variability is projected to increase (Tigchelaar et al., 2018). Crop yield forecasting based on seasonal climate forecasts provides a means of limiting the negative effects of climate variability and extremes, and at the same time, it represents an adaptation technology to climate change (Iizumi et al., 2018) because reducing the vulnerability and exposure to present climate variability is a first step towards adaptation (IPCC WG2 AR5 SPM 2014). Iizumi, T., Shin, Y., Kim, W.., Kim, M. and Choi, J. (2018) Global crop yield forecasting using seasonal climate information from a multi-model ensemble. Climate Services, https://doi.org/10.1016/j.cliser.2018.06.003. Tigchelaar, M., Battisti, D.S., Naylor, R.L., Ray, D.K. (2018) Future warming increases probability of globally synchronized maize production shocks. Proceedings of the National Academy of Sciences, 115, 6644-6649, doi:10.1073/pnas.1718031115. [Toshichika Iizumi, Japan]	Accepted. Added references.
256	63	37	63	37	At the same time, efforts to improve the crop water use efficiency have to be increased, for example by decreasing evaporation losses (by mulching), aligning crops and cultivars to climatic characteristics of the region, choosing right sowing dates in response to a changing climate, and proper field management. [Eline Vanuytrecht, Belgium]	Accepted. Added relevant context.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9434	63	28	64	10	The third concern I see with this report pertains to the various adaptation and risk management options proposed. When thinking about the broader vision of transformation change in the food system, I am not entirely convinced of the transformational nature of some of the solutions proposed, and that some might give impetus to mainstream actors in the food system to continue with business as usual if/when we label such solutions as sustainable. Among these are sustainable intensification and climate-smart agriculture and associated practices of drone applications, and bioengineered inputs. Various food studies scholars would take issue with technocratic and incremental solutions, for they can undermine the small-scale producers by exposing them to debt relations in purchasing these inputs, as well as further reinforcing monoculture crop systems (see Holt Gimenez and Shattuck 2011). [Helena Shilomboleni, Canada]	Noted.
8726	63	29	64	10	need to mention the potential of divertification as an adaptation strategy to enhance resilience at the farm level [Delphine Deryng, Germany]	Accepted. Added the relevant context.
8728	63	29	64	10	Section 5.7 on Adaptation is very brief in comparison to the sections on impacts and mitgiation;add more examples and discuss the role of transformative adaptation versus autonomous adaptation measures for the agriculture sector, as well as limit to adaptation and its consequences (rural migration; loss of traditional/prefered food) [Delphine Deryng, Germany]	Accepted. More context on adaptation added.
1496	63	29	64	10	I think it is important to note that a farm level approach should be taken to identify adaptation options, and not a model approach. Models are often limited to the type of adaptation options that can be addressed. Schaap et al. (2011, 2013; see above), use a method to develop adaptation strategies at farm level: 1) Identify climate risks and impacts at crop and field level, 2) Create adaptation measure portfolio for major risks nd impacts at crop and field level, 3) Design an adaptation strategy for major risks and impacts considering the farm context in 2050. Costs and benefits of adaptation measures can also vary spatially. See spatially assessment for the Netherlands: Diogo, V., P. Reidsma, B. Schaap, B.P.J. Andree, E. Koomen. 2017. Assessing local and regional economic impacts of climatic extremes and feasibility of adaptation measures in Dutch arable farming systems. Agricultural Systems 157, 216–229. Available at: https://doi.org/10.1016/j.agsy.2017.06.013. [Pytrik Reidsma, Netherlands]	Noted. Thanks.
10758	63	28	65	4	The section on adapting to means and extremes doesn't include any livestock elements while the most severe draughts usually affect livestock based communities such as pastoralists. [Anne Mottet, Italy]	Accepted. Some context concerning livestock adaptation added.
18508	63	28	65	4	The section on adapting to means and extremes doesn't include any livestock elements while the most severe draughts usually affect livestock based communities such as pastoralists. [Aziz Elbehri, Italy]	Accepted. Some context concerning livestock adaptation added.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25576	63	2	69	23	This section places too much emphasis on planned or facilitated adaptation, and not enough on autonomous adaptation, especially among smallholder farmers, though I suspect some examples of the latter have been used in passages on the former. AR5 WG2 Ch.9, Section 9.4 is a good baseline, and there are large numbers of field-based studies since, some of which talk about constraints and determinants of adaptation. I mention Belay et al. Agric & Food Secur (2017) 6:24 DOI 10.1186/s40066-017-0100-1 of which I'm a co-author, only by way of illustration. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We added a special paragraph for autonomous adaptation for small farmers.
1352	63	2	69	23	What about adaptation options at other points in the supply chain? Much of the discussion is on production-focused techniques or technologies. Are there approaches re: infrastructure, post-harvest storage, or processing that can help reduce losses and indirectly support food security? [Tonya Rawe, United States of America]	Noted.More context added.
27556	63	2	69	45	The work done here is substantive with clear examples and case studies from Africa and elsewhere. [Daniel Mailumo, Nigeria]	Noted. We added and categorized more adaptation measures to enrich the context.
27370	63	8			Limits to adaptation are likely being reached now. No need to wait for cc to continue unabated. [Doreen Stabinsky, United States of America]	Noted. Some discussions on limits to adaptation added.
17440	64	3	64	11	The consideration of deficit irrigation strategies is an excellent example of adaptation measure related with efficient irrigation management, specially for orchards (Fereres and Soriano 2007; Journal of Experimental Botany 58:147:159) [Ignacio Lorite, Spain]	Noted. Thanks.
8678	64	4	64	7	add reference on the effect of changing sowing date and crop type or variety: Deryng et al. 2011 "Simulating the effects of climate and agricultural management practices on global crop yield", GBC VOL. 25, GB2006, doi:10.1029/2009GB003765, 2011 [Delphine Deryng, Germany]	Noted. Reference added.
1344	64	7	64	7	What may be sacrificed when breeding for more drought, flood, and heat-resistance crop varieties? Reference was made earlier to concerns re: biodiversity and equitable access/IP rights (in the case of genetic engineering) [Tonya Rawe, United States of America]	Accepted. Added the relevant context.
8094	64	8	64	10	Remove "Further options for adapting to change in both mean climate and extreme events are livelihood diversification (Michael 2017; Berrang-ford et al. 2015), and production diversity (Sibhatu et al. 2015). Sibhatu et al. do not even mention the word "climate" not to speak of the adaptation to climate change trough diversification. The Berrang-Ford study (which should be Ford et al. really) does not speak about this either and the Michael 2017 reference is not in the reference list. [Katharina Waha, Australia]	Accepted. Added the relevant context in risk mangement part.
720	64	11	64	11	Error! Reference source not found. In box [Roberto Abeldaño, Mexico]	Fixed
2574	64	11	64	11	Box 5.2: Error: reference not found (Fig. 5.24). [William Lahoz, Norway]	Fixed
16742	64	11	65	1	Change “it is plays” into “it plays”. [Jing Wang, China]	Fixed
16744	64	11	65	1	Change “According” into “According to”. [Jing Wang, China]	Fixed
16746	64	11	65	1	What did NCPs mean? [Jing Wang, China]	Changed to ecosystem services

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17886	64	7			Signal compounds produced by bacteria within the phytomicrobiome can exert powerful effects on stress resistance. I could supply some material if this were felt to be constructive. [Donald Smith, Canada]	Noted. Thanks.
17888	64	11			Line 10 within the text box: Also some management changes, nursery greenhouses. [Donald Smith, Canada]	Added managemet changes
20754	64				Li et al (2017) is supposed to be Li et al(2014) [Junhwan Kim, Republic of Korea]	Rejected, Li et al 2017 is correct
15796	65	1	65	1	In Box 5.2, there is the use of 'NCPs'. Full form of it is probably required here as it is a first time usage [Arjuna Srinidhi, India]	Changed to ecosystem services
10760	65	7	65	25	The section on ecosystem based solutions doesn't include any livestock elements while 60% of farms hav livestock [Anne Mottet, Italy]	Noted.
18510	65	7	65	25	Ecosystem based solutions need to recognize the importance of livestock as 60% of farms have livestock [Aziz Elbehri, Italy]	Noted.
18568	65	33	65	37	Much of this discussion is just a listing of options without any contextualizing or assessment of how, where and by whom they can implemented. This doesn't make for a basis for policy guidance [Aziz Elbehri, Italy]	Noted.
15666	65		66		You can improve the report on ecosystem-based adaptation by x-raying examples from different regions of the world. [Robert Onyeneke, Nigeria]	Noted.
20756	65	4			Description of legend on figure is required. What is UR, LSR, MSR and HSR? [Junhwan Kim, Republic of Korea]	Noted. The figure is deleted.
17890	65	11			Line three of first full paragraphs within text box: Remove first % [Donald Smith, Canada]	Accepted. Thanks
11530	65				Figure: one legend suffices, but acronyms need to be spelled out. [Debra Roberts, South Africa]	Noted.
2390	66	1	66	7	Trade-offs of conservation agriculture must be mentioned. The use of herbicides is often mentioned in the literature on conservation agriculture. And effects of pesticides on biodiversity is an element to take into account in this report. [Anne-Laure Sablé, France]	Noted.
2392	66	1	66	7	Pesticides and biodiverdity: Pelosi C. et al. 2014. Pesticides and earthwormes. A review. Agron. Sustain. Dev. DOI: 10.1007/s13593-013-0151-z [Anne-Laure Sablé, France]	Noted.
15676	66	1	66	25	You can improve the report on ecosystem-based adaptation by x-raying examples from different regions of the world. [Robert Onyeneke, Nigeria]	Noted.
16748	66	11	66	11	change "water soil management" into ", water and soil management". [Jing Wang, China]	Noted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7288	66	27	66	27	Clarification required: Community-based adaptation to what? [Mariam Akhtar-Schuster, Germany]	Noted. Defined in first sentence
1346	66	28	66	40	The section on community-based adaptation would greatly benefit from a discussion of tools (much like the techniques discussed in the EBA section) to deliver CBA. Tools might include participatory vulnerability assessments (such as the Gender-sensitive CVCA - see https://careclimatechange.org/wp-content/uploads/2016/02/GCVCA_Practitioners-Guide-FINAL-July-2014.pdf; the visioning approach - see https://careclimatechange.org/wp-content/uploads/2014/09/Visioning_tool.pdf; the Gender and Inclusion Toolbox - see https://careclimatechange.org/tool-kits/gender-inclusion-toolbox/; participatory scenario planning - see https://careclimatechange.org/wp-content/uploads/2018/06/Practical-guide-to-PSP-web.pdf; and participatory approaches to M&E - see https://careclimatechange.org/wp-content/uploads/2014/12/2014_PMERL.pdf.Overall, community-based adaptation calls for a more thorough discussion of HOW strategies and practices were identified -- not just what technologies or biophysical approached were identified (as in the text box). [Tonya Rawe, United States of America]	Noted. Taken as references.
15798	66	31	66	31	in place of "community-based adaptation generates adaptation strategies", perhaps we could just say "community-based adaptation generates strategies" and delete the 2nd usage of the word "adaptation" [Arjuna Srinidhi, India]	Accepted. Thanks.
24450	66	27	67	1	For evidences on the scope for local adaptation strategies concerning extreme weather events and shocks, see Rodriguez-Osuna et al. (2014) [Rodríguez Osuna, V., J. Börner and M. Cunha (2014): Scoping adaption needs for smallholders in the Brazilian Amazon: a municipal level case study. Change and Adaptation in Socio-Ecological Systems (CASES), 1: 12-25.] could be added as directly related evidences to complement the references to the global studies already referred. (see complete reference in cell I 34) [Barron Joseph Orr, Germany]	Noted. Taken as references.
19660	66	27	67	1	remark: The concept of CBA has developed continuously during the past decade. Since it relies on a bottom up approach (community-based initiatives) and the development is not reflected in classical scientific publications, the paragraph does not seem to be able to highlight the importance of CBA and it's development. Many CBA conferences have made it possible for communities - especially from and between low-income countries and between low-, middle and high-income countries - to connect, share experiences and develop projects together. This development over the past decade is maybe best decribed in the book: Enhancing adaptation to climate change in developing countries through community-based adaptation. Atela et al. 2017. The African Centre for Technology Studies (ACTS). You may consider to mention it here. [Birgit Kuna, Germany]	Noted. Taken as references.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
258	66	27	67	1	The paper of Challinor et al 2018 (Challinor AJ, Müller C, Asseng S, Deva C, Nicklin KJ, Wallach D, Vanuytrecht E, Whitfield S, Ramirez-Villegas J, Koehler A-K (2018) Improving the use of crop models for risk assessment and climate change adaptation. Agricultural Systems 159:296–306) could be a valuable addition to this paragraph. [Eline Vanuytrecht, Belgium]	Noted. Taken as references.
14590	66	27	67	1	For evidences on the scope for local adaptation strategies concerning extreme weather events and shocks, see Rodriguez-Osuna et al. (2014) could be added as directly related evidences to complement the references to the global studies already referred. (see complete reference in cell I 34) [Rattan Lal, United States of America]	Noted. Taken as references.
11532	66	8			“such as microorganisms” add references to soil fauna. [Debra Roberts, South Africa]	Accepted.
25978	66	27			Apart from the box, this section does not provide an assessment of the knowledge on CbA for food security. This section needs to be revised/extended. [Hans Poertner and WGII TSU, Germany]	Noted.
10538	66	27			include watershed management approach, participatory watershed management plans [Zitouni Ould-Dada, Italy]	Noted.
10540	66	38			in Honduras and other Central American countrie the "Cajas Rurales" - community saving/credit groups have contributed to resilience and community development [Zitouni Ould-Dada, Italy]	Noted
15800	67	1	67	1	Last sentence in box 5.3 ca be re-worded as "Growing their own food and selling their surplus, creates a greater confidence about their future" as the 'nutrition' and 'reliable/resilient' food bit has already been mentioned in previous sentence [Arjuna Srinidhi, India]	Accepted and corrected
1348	67	2	67	20	Section should be expanded to reflect discussion of cultural beliefs and NORMS. A framing around "cultural beliefs" can mask the harmful nature of some norms and imply that they should not be changed to respect culture. However, social norms can be addressed and changed, and this is a core part of community-based adpatation approaches to addressing underlying drivers of vulnerability. Expanding to discuss these as norms would also enable better discussion of societal inequality that is not due to a "cultural belief" but is a driver of vulnerability. For some background/addl info on how to address norms, see IFAD's ASAP Gender Assessment and Learning Review: https://cgspace.cgiar.org/handle/10568/91013 and the associated How To Do Note regarding gender here: https://www.ifad.org/web/knowledge/publication/asset/40215442 [Tonya Rawe, United States of America]	Noted, will address in next version
25578	67	3	67	20	This section is very negative in tone, it could be expanded to discuss indigenous knowledge and general adaptedness to climate variability. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. A new section on ILK has been added
9550	67	13	67	15	The statement with reference to the REDD+ program in Central African Republic would require a reference. [Dirk Nemitz, Germany]	Accepted- Text deleted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18570	67	15	67	21	The first sentence starting with "There a number of adaptation options in form of policy planning, and governance..". This sentence is awkwardly constructed. All adaptation options require policy, planning and governance, even adaptation that are implemented by individuals at micro-scale level require some form of planning and governance, Not just some adaptation options! [Aziz Elbehri, Italy]	Accepted. Text changed
15802	67	17	67	18	suggest re-wroding sentence as "...there is little recognition of geographically determined and gender-sensitive preferences in the adoption of ecosystem-based management practices." [Arjuna Srinidhi, India]	Accepted. Text added
25580	67	18	67	18	South Africa not South Asia [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text changed
15668	67	18	67	18	The study of Elum et al. (2017) was in South Africa not South Asia [Robert Onyeneke, Nigeria]	Accepted. Text changed
25980	67	2			Apart from the cultural barriers, this section should address the role of culture for the way people deal with nature, including the loss of subsistence practices in 'modern' cultures and accordingly the lack of adaptive capacities of populations in developed countries. Also the influence of cultural change on traditional populations has according implications. Keeping the example of small islands: many island communities turned to western-style consumptionism and food imports rather than local production. This has a great implication for the food system's vulnerability to environmental/climate change. Also, what about cultures of cooperation vs. cultures of competition, etc.? This has a great effect on adaptive capacity on the local level. [Hans Poertner and WGII TSU, Germany]	Accepted. Text added
10542	67	2			there is a need to consider indigenous knowledge and the role of indigenous peoples in conserving natural resources [Zitouni Ould-Dada, Italy]	Accepted. A section on ILK has been added
11534	67	14			Please give specifics re the REDD program? This paragraph has potentially interesting information but it is too vague. [Debra Roberts, South Africa]	Accepted- Text deleted
10544	68	2	68	9	information is crucial to guide planning, but there is also a need to articulate social and productive policies, as well as to involve stakeholders in developing territorial plans for better governance [Zitouni Ould-Dada, Italy]	Accepted. Territorial scale added
16386	68	2	68	32	The current content of section 5.7.5 should move into the previous sections discussing adaptation. Here instead you should focus on financing adaptation. Please discuss investment needs to adapt to climate change, considder different options given that there are several climate change scenarios analysed in AR5 IPCC report and analyse what institutions are needed to support adaptation. The role of research and development should be also highlighted. [Lorenzo Giovanni Bellù, Italy]	Rejected. Financing and institutions are developed in chapter 7. The role of research has been expanded

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6800	68	2	68	32	Also, if not combined paragraph 5.7.5 needs to be expanded on and can be enriched with the following points -Facilitating subsidies that promote tools and practices (micro irrigation, minimum tillage, laser land leveling, mechanical drilling/banding of fertilizers, sensors and decision support tools for automation of nutrient and water application and discourage the overuse of water and nitrogen). A policy decision to ban flood irrigation and broadcast application of fertilizers in a phased manner should receive immediate attention of the government etc; - It should also be mentioned World Bank's subsidies for Climate Changes; - Content FAO's "Climate-smart agriculture" action plan should be summarized. [Nazimi Acikgoz, Turkey]	Rejected. Available adaptation options are many and also context-dependent. Adaptation section has organised adapation options in categories and given some examples for each of the categories
4092	68	2	68	32	Financial out lay in the Budget and actual expenditure :- While above is the distressed picture, such schemes and measures should be taken through policy, plan augmenting new schemes and reviving the closed schemes that the distress situation can be improved. Budgetary fund should be allotted and released for real expenditure. No system of cost norm on per hectare of treatable area basis should be fixed, as this system hardly serve the desire of watershed saturation. Open requirement as per estimates should be the allocation. [Prafulla Kumar Mabdal, India]	Rejected. No references offered to address the topic which is out of the scope of the chapter
1350	68	2	68	32	This section -- as one that includes governance -- would benefit from inclusion of participatory approaches to policy making and budget setting. Resulting policies are important, yes, but the quality of them and their ability to address needs among the most vulnerable/food insecure is as much about the content of hte policy as the process for creating it, as it is in a participatory approach to policy creation that marginalized populations' needs can be met. [Tonya Rawe, United States of America]	Accepted. Participatory processes added
24452	68	2	68	33	Chapter 5.7.5 could benefit from elaborating on how land-based mitigation and adaptation policies/ governance relate to integrated land-use planning in the realm of Land Degradation Neutrality -- see Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality https://www.sciencedirect.com/science/article/pii/S1462901117308146?via%3Dihub; and Sanz et al 2017. Sustainable Land Management contribution to successful land-based climate change adaptation and mitigation. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. https://www.unccd.int/sites/default/files/documents/2017-09/UNCCD_Report_SLM_web_v2.pdf [Barron Joseph Orr, Germany]	LDN included in Enabling Conditions. See also Chapter 3 and 4 for more discussion

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14592	68	2	68	33	Chapter 5.7.5 could benefit from elaborating on how land-based mitigation and adaptation policies/ governance relate to integrated land-use planning in the realm of Land Degradation Neutrality -- see Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality https://www.sciencedirect.com/science/article/pii/S1462901117308146?via%3Dihub; and Sanz et al 2017. Sustainable Land Management contribution to successful land-based climate change adaptation and mitigation. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. https://www.unccd.int/sites/default/files/documents/2017-09/UNCCD_Report_SLM_web_v2.pdf [Rattan Lal, United States of America]	LDN included in Enabling Conditions. See also Chapter 3 and 4 for more discussion
52	68	16	68	18	and weather derivatives [Nathalie Jeanne Marie Hilmi, France]	Rejected. Text has been removed
15804	68	17	68	17	should be "crop insurance schemess" and not "weather insurance scheme" [Arjuna Srinidhi, India]	Rejected. Text has been removed
15806	68	23	68	23	The word "disaster" appears multiple times in sentence. We could just say "To build resilient societies against water-related disasters…" [Arjuna Srinidhi, India]	Accepted. Text changed
15808	68	24	68	24	delete worrd "an" [Arjuna Srinidhi, India]	Accepted
15810	68	35	68	37	"Development" of what / who is not clear. Suggest rewording as "Developments in the use of climate stress-tolerant crop varieties, heat-tolerant animals, and salt-resistant crops are the leading adaptation measures to extreme weather events and climate volatility" [Arjuna Srinidhi, India]	rejected. It refers to the development of the varieties. Anyhow the sentence has been reworded
8134	68	35	68	39	Reading through this chapter on food security, I feel like there could be a little more on the role of advances in crop science/plant biology may have on increasing food production. There is much work in the pipeline on identifying genes that help crops deal with heat stress, for instance. There are also precise assessment tools to identify strains that are more suited to a warmer world. The use of gene editing technologies (CRISPR) I think also needs to be mentioned. This is so important, I feel more than one paragraph is needed to discuss it. page 15 (lines 7-9) also has some of this discussion but it is very brief. [Peter Neofotis, United States of America]	Noted. All adaptation section has been rewritten and some adaptation options listed in different categories
17404	68	40	68	45	Remote sensing for efficient irrigation management is essential. Many studies carried out using energy balance approaches based on remote sensing have contributed to improve irrigation efficiency around the world. I would highlight this methodology specially for irrigation management [Ignacio Lorite, Spain]	Accepted, added text
15812	68	42	68	42	Delete word "drone" from "drone applications" [Arjuna Srinidhi, India]	Changed text
2576	68	45	68	45	Satellite observations of which variables? [William Lahoz, Norway]	Accepted, added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6798	68	2	69	23	5.7.5 Policy, planning, and governance and 5.7.6 Knowledge, science and technology subtopics contain mostly the same content. You might want to combine the two under the name: "Opportunities for innovation to mitigate the impact of climate change on food security". If not, I would move the point around drought-tolerant hybrid corn release in paragraph 5.7.6 not in 5.7.5. [Nazimi Acikgoz, Turkey]	Accepted. The sections has been changed and reworded substantially
260	68	34	69	23	The paper of Challinor et al 2018 (Challinor AJ, Müller C, Asseng S, Deva C, Nicklin KJ, Wallach D, Vanuytrecht E, Whitfield S, Ramirez-Villegas J, Koehler A-K (2018) Improving the use of crop models for risk assessment and climate change adaptation. Agricultural Systems 159:296–306) could be a valuable addition to this paragraph. [Eline Vanuytrecht, Belgium]	Rejected. This paper has been used in scenarios sections
6802	68	34	69	23	You need to expand on the text "development and use of climate stress-tolerant crop varieties, heat-tolerant animals, and salt-resistant crops are leading adaptation measures to climate extreme events and volatility". I would recommend providing further information along the following: Those results are plant breeding products. But conventional breeding is losing the battle against climate change. Lately numbers of innovation have been improved in this area and unfortunately they are not accepted as an indispensable tool for genetic advancement by many countries. Those are genetic engineering and genome editing. They need number of regulations and governances. If SRCCL won't emphasize their necessities for breeding new genotype to mitigate impact of climate change to food security, who will? Being late would cost to mitigate the impact of climate change to food security. Genetic engineering has steadily advanced, resulting in new scientific opportunities. 'Traditional' methods, using heavily criticized antibiotic or herbicide resistance markers have been replaced by new methods which result in marker-free GMOs. Studies have demonstrated that genetically modified plants are as safe as plants grown by conventional methods (EASAC, 2013). It has been suggested that transgenic plants (carrying genes from other species) should be distinguished from cisgenic ones (which do not carry an alien gene) in regulatory terms. Currently, the only genetically modified animal commercially produced for food (in the USA) is genetically modified salmon. But they are numbers of transgenic crop species grown %15 of worlds cultivated land. Genome editing, also called new breeding techniques are new methods of genetic engineering that give scientists the ability to more precisely, lower costs and more flexibility in their use, genetically modify crops and animals. With this method, researchers can enhance or silence or insert or remove desired traits. So breeding a new variety/genotype takes quite short time compering the conventional breeding Genome editing has the potential to replace mutagenesis by irradiation or chemical treatment, which has been frequently used in breeding for 70 years. Genome-based selection has been of the greatest importance in cattle breeding worldwide and can be expected to revolutionize the breeding of other farm animals. SPCCL should advise to governments to develop new strategies and policies for food security. For example EU has already started to support "Modelling Adaptation to climate change in agricultural systems. The scope of this theme includes determining adaptation options to	Noted. The adaptation section has been expanded but given the large number of existing options for adaptation and mitigation, many of them context-specific, options have been categorised and only a few examples give per category

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16956	68	34	69	23	I think in this paragraph there are missing two important knowledge components that need instead to be taken into account: 1) Traditional Ecological Knowledge 2) knowledge of adaptation dynamics over the long term (as, in the example of terraces in line 5 - p. 5- 69, long term adaptation dynamics could be a very old way of land management but nonetheless still valid or, however, to be considered for learning purposes about the development of new adaptation and management strategies). [Vincenza Ferrara, Italy]	Accepted. ILK added as a subsection. Temporal dimension added
24454	68	34	69	24	Chapter 5.7.6 could benefit from elaborating on the role of local knowledge/ LIK can be useful for climate change mitigation and adaption. -- see UNCCD (2017): Global Land Outlook, first edition. Bonn, Germany https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf (specifically on LIK/local knowdge related to land, see https://knowledge.unccd.int/GLO/part-one-big-picture/chapter-1-meaning-land) [Barron Joseph Orr, Germany]	Accepted. ILK section has been added. The proposed reference has not been added since it does not deal with knowledge related to food systems and adaptation/mitigation to climate change
16388	68	34	69	69	The current content of section 5.7.6 should move into the previous sections discussing adaptation. [Lorenzo Giovanni Bellù, Italy]	Noted. All adaptation section has been rewritten
25982	68	34			The section should address the role of ILK more. [Hans Poertner and WGII TSU, Germany]	Accepted. ILK added as a subsection
17892	68	36			Once again, signal compounds produced by elements of the phytomicrobiome can also excert dramatic effects on crop stress tolerance. [Donald Smith, Canada]	Rejected. It is not clear what is expected from this comment
17894	68	37			"Phenomics" instead for "fenomics"? [Donald Smith, Canada]	Accepted. Changed
4094	69	1	69	23	Well equipped, strengthy, expert official functionary need. Strong official organization should be established with the specialized enough number of technical personnel who will transform education, undertake research and transmit the established practices to the land owners and users and will plan, design, formulate and implement the schemes. Once resources will be built up then industry, agriculture, non-agriculture etc. can be accommodated thereon. Governments should establish such functionary at National, State/Provincial, District, Sub-Division/ Taluka , Block and Ground level maintaining a line of hierarchy on the principle of responsibility and authority should be co-terminus. If well equipped strong set up of functionary is built up then only the success will be possible. [Prafulla Kumar Mabdal, India]	Rejected. Not clear orientation of what is expected from this comment

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26554	69	3	69	9	This could be expanded to deal more generally with rural advisory services and with national level agricultural research. Reference could be made to Morton, J. (2017). Climate change and African agriculture: unlocking the potential of research and advisory services. In Nunan F. (ed.) Making Climate Compatible Development Happen (pp. 109-135). Routledge. Findings included general resource constraints of rural advisory services, disconnects between advisory policy and climate policy, the importance of adviiory services adopting commodity/value chain approaches and remaining open to engagement in input supply, new opportunities presented by ICTs, and the importance of mutual learning between multiple stakeholders. A less polished and longer (but more accessible) version is at http://gala.gre.ac.uk/14374/1/14374_Morton_Climate%2C_agriculture_and_knowledge_in_Africa_%28pub_PDF%29_2014.pdf [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text added
15814	69	8	69	8	change 'and' with 'for' [Arjuna Srinidhi, India]	Accepted. Text has been reworded
10762	69	10	69	10	Early warning systems are mentionned but they should have a dedicated sub-section [Anne Mottet, Italy]	Accepted, added sub-section
2578	69	12	69	12	The authors could mention what appears to be a move to increasing use of citizen science (e.g., smartphones) to monitor the environment. [William Lahoz, Norway]	Accepted. Citizen science added
17438	69	16	69	19	Weather forecast at short and medium range have been considered in the improving of irrigation water management in recent publications (Lorite et al. 2015; Irrigation Science 33:411-427) [Ignacio Lorite, Spain]	Accepted, added reference
3840	69	27	69	42	Need to be careful about how to introduce unproven BECCS - is theis the righ tpalce or does it need to be introduced elsewhere [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	BECCS now introduced in BECCS section
14596	69	34	69	34	Chapter 5.7.6 could benefit from elaborating on the role of local knowledge. LIK can be useful for climate change mitigation and adaption. -- see UNCCD (2017): Global Land Outlook, first edition. Bonn, Germany https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf (specifically on LIK/local knowdge related to land, see https://knowledge.unccd.int/GLO/part-one-big-picture/chapter-1-meaning-land) [Rattan Lal, United States of America]	Noted. ILK section added in Section 5.7
3842	69	43	70	11	SSPs are introduced quite cursorily - in subsequent text it is assumed that readers know what the different SSPs are. Does this need a box or a reference to an enhanced Chapter 1? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	References to chapters 1 and 2, and cross-chapter box included
18588	69	25	81	5	This document (FAO,2009,Food Security and Agricultural Mitigation in Developing Countries: Options for Capturing Synergies): http://www.fao.org/docrep/012/i1318e/i1318e00.pdf, may add value to this section. [Asia Adlan, Sudan]	Thank you for suggestion. Many more new literature are available since then.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19626	69	25	81	5	This document (FAO,2009,Food Security and Agricultural Mitigation in Developing Countries: Options for Capturing Synergies): http://www.fao.org/docrep/012/i1318e/i1318e00.pdf, may add value to this section. [Asia Adlan, Sudan]	Thank you for suggestion. Many more new literature are available since then.
8730	69	25	81	31	This section on synergies, trade-offs and co-benefits repeats the topic covered in Chapter 6. [Delphine Deryng, Germany]	this is the outline given by the IPCC and we need to cover that in particular for food systems
21012	69	25			This section attempts to integrate perspectives but I feel still repeats too much previous material, rather than moving to integrated and policy relevant perspectives. In particular it fails to really address the question of how much intensification is consistent with food security and mitigation goals, and what criteria can help individual countries and actors decide their role in this. This section should also more explicitly reflect the potential pressure on land arising from the need for afforestation and BEECS to meet overall mitigation goals, and what this means for the necessary or potential balance between supply and demand-side mitigation and intensification vs extensification such as agroforestry (which by definition cannot be as intensive as pure intensive systems). [Andy Reisinger, New Zealand]	Accepted, added section on NETs and cross-chapter box on Ag Intensification. Deleted repeats
11536	69				What is MAF? LAM? There are too many acronyms, some undefined, in this section which makes it difficult to read. Please as far as possible just write out the terms. [Debra Roberts, South Africa]	Accepted, added definitions
14594	69				Section 5.8 : Bangladesh is the worst victim of climate change vulnerabilities. Food and nutrition security is the high priority of the Government of Bangladesh. Climate change extremes often offset food productions and causing huge food deficiency of large number of population. As a result chronic malnutrition remain major challenge. A case study on Bangladesh food and nutrition security would strengthen this section. [Rattan Lal, United States of America]	We have included one case study from mountain ecosystem.
4096	70	1	70	29	Concerted effort worldwide :- The gravity, depth and spread is extensive, not merely territorial but international, question of subsistence and existence of Civilization. Hence, the world community has to adopt scientific , need based , practical measures to resist adverse going climate and to combat the adverse climate. Honour, recognition, acknowledgement to the peasantry.- It can not be denied that who produce food for the living of all, are hardly given due honour, recognition, and acknowledged their contribution. Worldwide, they should be given top place in the human society. [Prafulla Kumar Mabdal, India]	Agreed. Farmers' role in food systems is of primary importance
2972	70	9	70	22	Authors is Ch5 need to coordinate with Ch2 and 6 content of scenarios. [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Added call-out to Ch 1, 2 and 6

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1354	70	9	70	29	The limitations of the SSP scenarios cannot be underestimated -- and their utility in a report that should address food security is questionable, as they do not address interactions btwn healthy diets/food and nutrition security. The knowledge gap re: social dynamics is a rather significant gap in a report that must look at food security, given how much social dynamics play into food security among certain populations and individuals and shape climate vulnerability. [Tonya Rawe, United States of America]	Noted
16390	70	11	70	11	Chapters 1 and 2 do not describe the SSPs (at least not in an easy to find and understandable way). Please describe the SSPs here. [Lorenzo Giovanni Bellù, Italy]	Noted. Cross-chapter box on Scenarios has been added to Chapter 1
21014	70	12	70	16	Please ensure you quote the Paris Agreement wording correctly - no point paraphrasing here (e.g. "Well below 2 degrees" and "pursuing efforts to…"). NDCs are a means to an end but not linked to the 1.5 goal any more than the 2 degree limit. [Andy Reisinger, New Zealand]	Noted. Section on Paris Agreement now in Framing section
8732	70	12	70	16	This is an inacurate formulation of the Paris Agreement's temperature goal. The goal is to limit warming to "well below 2ºC" and to pursue efforts to limit warming to below 1.5ºC. As written this suggests that the goal is below 2 - not WELL below 2 - and that this is separate from the 1.5ºC limit, when in fact the 1.5 and well below 2 limits both form the long-term temperature goal. The statement that the NDCs aim at stabilisation at 1.5ºC is also inacurate - there is no language on temperature stabilisation in the Paris Agreement. [Delphine Deryng, Germany]	Noted. Section on Paris Agreement now in Framing section
16392	70	23	70	29	It seems that the authors ignore a vast body of literature on economic modelling exercises. All modelling teams participating in the AgMIP Global Economics group have a wide spectrum of studies to show, which are too much to be listed in a comment. [Lorenzo Giovanni Bellù, Italy]	Noted. Will add in next version
16394	70	23	70	29	As mentioned in an earlier comment on this chapter, please note that sustainability is a development process involving the entire economy. The SDGs identify where emphasis should be given within this development process and the SDG indicators help measuring this process. This means that development favoring one part of the economy, one aspect of life, is not the sustainable development the SDGs are indicating. This development path is not any of the SSPs. On the quantification of the SDG indicators, please note that as we speak methodology on quantifying them is being developed. It is meaningless to say that modelling exercises fall short quantifying them, the time countries have not agreed with the responsible agencies on the methodology. Finally you should know that some indicators are monitored through surveys, like SDG indicator 2.1.2 - Severity of food insecurity. Survey based indicators are not meant to be modelled! Please revise your statements. [Lorenzo Giovanni Bellù, Italy]	Accepted, text deleted
710	70	31	70	31	Production, prices, and trade must be changed to Production, prices and trade [Roberto Abeldaño, Mexico]	Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9432	70	31	70	41	A second concern I have is with the argument around the need to increase overall food production to feed a world population that is expected to reach 9.1 billion people in 2050, including changing diets that will entail more meat consumption. This powerful (doubling) narrative has been embraced by leading actors in global governance arenas and by some in the academic community. However, it is a narrative that is contested—and the authors need to thread carefully around fervent claims of needing to feed 9 billion. There are troubling assumptions associated with positioning massive growth in food production as a solution to future food security that several scholars call into question (see Weis 2015; Tomlinson 2011). First, the world already produces enough food to adequately feed everyone (the report mentions this fact), thus, it is questionable whether advocating for more production (even for future population growth) will necessarily resolve hunger for the people who are unable to access that food. The doubling narrative can, more dangerously, obscures many deep-rooted problems in the global food system. These include the industrial production of livestock that is supported by political and economic incentives (to respond to economies of scale) that necessitates an series of resource-intensive inputs. The great volume of feed that goes to animals in feedlots comes from monocultured crops (corn, soy, etc.), which generate an array of ecological costs (Weis 2015). Other problems that the doubling narrative obscures are the marginalization of family farms across the world; the possibilities to support more local, and bio-diverse food systems. My suggestion is that the authors at least raise some of these concerns because change towards transformation in the food system would require confronting these deep-rooted narratives that can reinforce unsustainable practices. [Helena Shilomboleni, Canada]	Accepted, added text and references
8734	70	32	70	37	Do these production growth projections incorporate reductions in food waste or do they assume that food waste remains a constant share? [Delphine Deryng, Germany]	Does not include reducing food waste. This is explained in text
54	70	38	70	41	what would be the role of GMOs? [Nathalie Jeanne Marie Hilmi, France]	See plant breeding discussion in Section 5.7
8736	70	42	71	10	Are these BAU projections? What assumptions underly them? [Delphine Deryng, Germany]	See first paragraph of this section
712	70	43	71	1	space after parenthesis ([Roberto Abeldaño, Mexico]	Text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3260	70	32	72	21	The analyses by Erb K-H, Lauk C, Kastner T, et al (2016) Exploring the biophysical option space for feeding the world without deforestation. Nat Commun 7:11382. doi: 10.1038/ncomms11382, Billen G, Lassaletta L, Garnier J (2015) A vast range of opportunities for feeding the world in 2050: trade-off between diet, N contamination and international trade. Environ Res Lett 10:025001. doi: 10.1088/1748-9326/10/2/025001 should be added to this assessment. These papers elaborate on alternative development pathways (not evaluated according to their probality, but rather towards their biophysical feasibility) and reveal interesting insights into pathways that do not necessarly rely on these vast increases of production and area expansions. Furhtermore, their insights towards trade effects should be assessed in this passage, in particular their insights into the interlinkages between diets-intensification/production-trade. [Karlheinz Erb, Austria]	Accepted, added reference
17896	70	32			Remove "s" from "currents" [Donald Smith, Canada]	Fixed
10546	70	33			the increase of 60% is not considering the waste and loss of food [Zitouni Ould-Dada, Italy]	Does not include reducing food waste. This is explained in text
17898	70	35			Should this be the metric tonnes? [Donald Smith, Canada]	Text removed
17900	70	40			Rremove first % [Donald Smith, Canada]	Fixed
17902	70	43			Remove the page break after the (. [Donald Smith, Canada]	Text removed
16396	71	6	71	9	For an update of the Alexandratos and Bruinsma 2012 projections, please refer to FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf and to FAO (forthcoming) The future of food and agriculture -Alternative pathways to 2050. For info re this forthcoming report, please, contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies: lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Table removed. Will update with SOFI in next version
2974	71	11	71	11	Refrain from using "business as usal". Consider using "baseline" or "reference". [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, text removed
16398	71	11	71	12	What do you mean when saying that "business as usual" projections allow the decomposition of growth into an annual rate of increase? Projections of other counterfactual scenarios do not? This has to do with the modelling exercise being comparative static or (recursive) dynamic, it has nothing to do with the specification of the simulation scenario! Please revise your statement. [Lorenzo Giovanni Bellù, Italy]	Accepted, text removed
17518	71	15	71	17	Please check this paragraph. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
21016	71	22	71	25	Explain and expand on what is meant by "sustainability in the broad sense" - this is important to understand that limited utility of the concept of sustainability in agricultural systems, and should be at the heart of this section. [Andy Reisinger, New Zealand]	Removed 'in the broad sense' and added call-out to cross-chapter box on Intensification
17520	71	26	71	28	In this sentence, indicates who found what. Authors are not cited according to what is reported. [Noureddine Benkeblia, Jamaica]	Removed text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2976	71	28	71	28	Refrain from using "business as usal". Consider using "baseline" or "reference". [Joana Portugal-Pereira, United Kingdom (of Great Britain and Northern Ireland)]	Added 'reference'
16400	71	26	72	5	Please specify the assumptions of the source you are citing on economic and population growth and on technology improvement. In other words, please give some information on the scenario these guys call "business as usual". 2009 is the baseline or the base year? [Lorenzo Giovanni Bellù, Italy]	Removed text, see paragraoh describing SSP assumptions
17904	71	11			Remove the "s" from "forwards" [Donald Smith, Canada]	Fixed
17906	71	13			Remove first % [Donald Smith, Canada]	Fixed
17908	71	16			Remove all but last % [Donald Smith, Canada]	Fixed
9426	72	6	72	12	Further, the discussion on the equilibrating role of trade for food security needs a more complex analysis and the ideas presented on this topic could be presented more clearly. The report rightly argues that “trade is a critical mechanism to stabilise demand and supply under climate change and under a diverse set of economic futures... and its relation to prices is also significant and a key aspect of how to balance food and nutrition security between different regions” page (5-72). However, there are strong opposing narratives surrounding trade that needs further attention: between those that sees trade as an opportunity to enhance food security versus those that sees trade as a threat to food security (see Clapp 2016). [Helena Shilomboleni, Canada]	Accepted, added text and references
9428	72	6	72	12	Clapp 2016 explain that trade (supported by high levels of subsidy support to agriculture in some countries) can put downward pressure on world prices and reduce incomes for other agricultural exporters. Lower food prices that result from subsidy support may benefit urban consumers in importing countries but at the same time they may hurt farmers’ incomes in those same countries. The outmigration of peasants from the agriculture sector across the global south, as some scholars argue, is significantly attributed to these trade patterns of cheap food imports (see Wittman et al. 2010; McMichael 2014; Akram-Lodhi 2013). [Helena Shilomboleni, Canada]	Accepted, added text and references
16	72	6	72	21	this passage fails to consider the impact of food production and trade cartels, as well as financial speculation on food futures markets, on low income market dependent populations. See Reuter, Thomas A. 2015. ‘The Struggle for Food Sovereignty: A Global Perspective.’ In Thomas A. Reuter (ed.) 2015. Averting a Global Environmental Collapse: The Role of Anthropology and Local Knowledge. London: Cambridge Scholars, pp. 127-147. [Thomas Reuter, Australia]	Accepted, added text and references
3844	72	13	72	15	Casual reference. Who will know what a scenario that promotes regionalisation looks like? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
16750	72	14	72	14	I do not remember there is RCP5.6 scenario. Please check it. [Jing Wang, China]	Noted, text removed
7120	72	14	72	15	How is "unsustainable population growth" defined? [Mariam Akhtar-Schuster, Germany]	Noted, text removed
8738	72	18	72	21	This section on trade says nothing about small islands and food imports. [Delphine Deryng, Germany]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8740	72	23	73	29	This section seems to overlap with other sections on demand / supply side mitigation options. Also coverage of food waste is missing. [Delphine Deryng, Germany]	Noted, text removed
16402	72	23	74	6	The sources in this section are missing, please include them. In addition, please refer to the work of the AgMIP global economic group and to FAO (forthcoming) The future of food and agriculture -Alternative pathways to 2050. For info re this forthcoming report, please, contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies: lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
6804	72	23	74	6	5.8.2 Supply and demand: İ would consider including the following info: Annual consumption averages (kg) of some products for the years 2005, 2006 and 2007 were calculated, by using FAO, IFAD, WFP, WRI, CGIAR data. Differences of this values and estimated consumption for the year 2050 were as follow: Cereal %1, sugar 14%, leguminous 15%, vegetable oil 33%, meat 26%. This means, that we have to revise our future agricultural production plans and we have to inform the climate change research community and food strategists and politicians (https://nazimiacikgoz.wordpress.com/2014/01/) 16 5.8.2 Supply and demand: İ would consider including the following info: Annual consumption averages (kg) of some products for the years 2005, 2006 and 2007 were calculated, by using FAO, IFAD, WFP, WRI, CGIAR data. Differences of this values and estimated consumption for the year 2050 were as follow: Cereal %1, sugar 14%, leguminous 15%, vegetable oil 33%, meat 26%. This means, that we have to revise our future agricultural production plans and we have to inform the climate change research community and food strategists and politicians (https://nazimiacikgoz.wordpress.com/2014/01/) [Nazimi Acikgoz, Turkey]	Noted, text removed
17910	72	17			Insert "production" after "crop" [Donald Smith, Canada]	Noted, text removed
15872	73	2	73	2	figure 5.25 change Baseline to RCP 8.5, 45 by RCP 4.5 (add a dot), 26 by RCP 2.6 add a dot [Jean-Luc Chotte, France]	Noted, text removed
16862	73	2	73	2	Figure 5.25 change Baseline to RCP 8.5, 45 by RCP 4.5 (add a dot), 26 by RCP 2.6 add a dot [Rattan Lal, United States of America]	Noted, text removed
2580	73	4	73	4	I suggest authors include in the caption explanations of the “baseline”, as well as of “45” and “26” scenarios. In next figures that are similar, the captions mention these scenarios. [William Lahoz, Norway]	Noted, text removed
21018	73	6	73	29	This discussion needs to make clearer whether price is used simply as a measure of cost-effectiveness of actions, or seen as a driver for those actions. Also, it's not clear to me why the effectiveness of demand-side measures depends so much on supply-side measures - why are they not additive? This is important to get clear. Overall, this section also is too much a parroting of Frank et al, and not a critical assessment. [Andy Reisinger, New Zealand]	Noted, text removed
17522	73	8	73	10	Please check this sentence. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
10764	73	8	73	31	A carbon price of 100USD is very high. Current price is closer to 10USD [Anne Mottet, Italy]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8240	73	17	73	17	The phrase 'economic and socio-economic, i.e. food security, benefits' is suggested to be written as 'economic and socio-economic benefits, i.e. food security'. [Muhammad Mohsin Iqbal, Pakistan]	Noted, text removed
16404	73	20	73	20	Inelastic demand to what? To income? To prices? To both? [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
3846	73	20	73	22	Part of my worry about casual use of scenarios. A C tax of $2500/tonne is phantasy. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
17912	73	15			After "achievement" insert "of" [Donald Smith, Canada]	Noted, text removed
25984	74	8	74	8	Suggest to change the section title, which is very generic at the moment. The section mainly deals with food prices. [Hans Poertner and WGII TSU, Germany]	Accepted, changed title
3848	74	16	74	22	"An ensemble of 4 RCPs and 3 SSPs" - incomprehensible to an educated lay reader. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, made more user friendly
21020	74	16	74	28	This is almost the only place in this chapter whether the impact of an actual GHG_price based policy measure is discussed. However, the discussion is far too short and uncritical - there is another publication by the same authors (in ERL) that clarifies what complementary policies could avoid negative impacts. A range of other ppapers have also explicitly looked at GHG pricing as policy measure and discussed its pros and cons. As it stands, all we can take from the Hasegawa study is that single-minded mitigation focused GHG pricing could have a detrimental effect on food security - but this needs to be made clear and placed into a more considered context of actual policy options. [Andy Reisinger, New Zealand]	Accepted, added context and added Fujimori et al 2018
8742	74	16	74	28	This paragraph does not detail the assumptions used in the studies mentioned - e.g. what mitigation measures are considered (and are there other mitigation pathways that are not considered)? Why do different models have such different climate change impacts, and what are the uncertainties of impacts? [Delphine Deryng, Germany]	Accepted, added information about assumptions and mitigation methods
16406	74	8	75	5	Section 5.8.3 on food and nutrition security does not talk about nutrition and says nothing about inequality and poverty that very much define food security. Please make reference to FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf and to FAO (forthcoming) The future of food and agriculture -Alternative pathways to 2050. For info re this forthcoming report, please, contact Lorenzo Giovanni Bellù, FAO Global Perspectives Studies: lorenzogiovanni.bellu@fao.org [Lorenzo Giovanni Bellù, Italy]	Accepted, changed focus on section to role of mitigation and prices on food security
17914	74	16			Change "it" to "their" [Donald Smith, Canada]	Fixed
17916	74	16			Remove space between figure number and ")" [Donald Smith, Canada]	Fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11538	74				Figure: in the legend please explain in plain English what this figure shows. The legend is too technical and does not give enough background. Something like “the greatest reductions in emissions are predicted to be possible if …” . Really talk the reader through it. Is the black line in (a) business as usual? In (b) is CP500_D the difference between CP500 and CP500_D in (a)? Is the area plot stacked? i.e. is the value of base_D at 2070 1 or 0.8? Area graphs are very pretty, but they imply some kind of additive totals. Line graphs would be unambiguous. The same applies to (a). Area graphs imply that the relevant value is represented by the area, not by the distance from the axis. So if in (a) the value of CP2500_D at 2070 is 3.5 down from 5.5, then this should be a line graph. [Debra Roberts, South Africa]	Figure removed
3850	75	10	75	10	"SSP x RCP framework" WHAAAT! [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted, text removed
16408	75	7	77	21	Section 5.8.4 discusses the findings of the so-called marker scenarios of the IAM community. Beware however when putting the findings of different models and scenarios inside the same sentence. These findings are subject to different assumptions. [Lorenzo Giovanni Bellù, Italy]	Noted, text removed
27558	75	1	95	44	The work done here is substantive with clear examples and case studies from Africa and elsewhere. [Daniel Mailumo, Nigeria]	Noted. Thank you
17918	75	10			Change "described" to "indicated" [Donald Smith, Canada]	Noted, text removed
11540	75				Figure legend: should stand alone without text, so need to explain RCP 26 and RCP60, why RCP60 has no mitigation bars, what OECD is. [Debra Roberts, South Africa]	Noted, text removed
15874	76	18	76	18	figure 5.28 change Baseline to RCP 8.5, 45 by RCP 4.5 (add a dot), 26 by RCP 2.6 add a dot [Jean-Luc Chotte, France]	Noted, text removed
16864	76	18	76	18	Figure 5.28 change Baseline to RCP 8.5, 45 by RCP 4.5 (add a dot), 26 by RCP 2.6 add a dot [Rattan Lal, United States of America]	Noted, text removed
11542	76				This section talks about the implications on land of various SSP scenarios, but without an explanation of how these scenarios differ, the real-world implications do not come through. Somehow it will be necessary to spell this out clearly for the non-specialist reader, for example listing the relevant assumptions in the SSP scenarios, so that the predictions can be traced back to the assumptions, perhaps as a flow chart or table. Going forward, this information is critical for policy makers, so it is important that they understand what they are looking at. If someone were to ask: “How do I reduce the demand for land, while meeting the food needs of my people, while also mitigating against climate change, and what will it take and how sure can I be that it will work?” can they get this information easily from this section? [Debra Roberts, South Africa]	Noted, text removed
15876	77	0	77	0	figure 5.29 change Baseline to RCP 8.5, 45 by RCP 4.5 (add a dot), 26 by RCP 2.6 add a dot [Jean-Luc Chotte, France]	Noted, text removed
16866	77	0	77	0	Figure 5.29 change Baseline to RCP 8.5, 45 by RCP 4.5 (add a dot), 26 by RCP 2.6 add a dot [Rattan Lal, United States of America]	Noted, text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21022	77	7	77	11	The statement here that a carbon tax on food can help meet multiple SDGs is in direct contradiction to the findings from Hasegawa, Fujimore and others presented on page 74. Please condense and do a critical assessment of the different studies to reconcile (or at least clarify) the differences. [Andy Reisinger, New Zealand]	Noted, text removed
10548	77	7	77	11	the private sector/food industry has also an important role to play in changing food habits. In some countries taxes on soft drinks, limiting size of bottles had an impact on consumption habits of soft drinks. [Zitouni Ould-Dada, Italy]	Noted, text removed
21024	77	12	77	21	The claim that demand-side measures can significantly reduce emissions seems to be in direct contradiction to the discussion of Frank et al 2018 on page 73. Please condense and do a critical assessment of the different studies to reconcile (or at least clarify) the differences. [Andy Reisinger, New Zealand]	Noted, text removed
3262	77	12	77	21	The following papers add to these arguments: Muller A, Schader C, Scialabba NE-H, et al (2017) Strategies for feeding the world more sustainably with organic agriculture. Nature Communications 8:1290. doi: 10.1038/s41467-017-01410-w, Zanten HHEV, Herrero M, Hal OV, et al (2018) Defining a land boundary for sustainable livestock consumption. Global Change Biology 0: doi: 10.1111/gcb.14321, Erb K-H, Lauk C, Kastner T, et al (2016) Exploring the biophysical option space for feeding the world without deforestation. Nat Commun 7:11382. doi: 10.1038/ncomms11382, Clark M, Tilman D (2017) Comparative analysis of environmental impacts of agricultural production systems, agricultural input efficiency, and food choice. Environ Res Lett 12:064016. doi: 10.1088/1748-9326/aa6cd5, Tilman D, Clark M (2014) Global diets link environmental sustainability and human health. Nature 515:518–522. doi: 10.1038/nature13959. A critical perspective to the "classical" scenario approachs (such as those presented in the passages before this one) can be found here: Tomlinson I (2013) Doubling food production to feed the 9 billion: A critical perspective on a key discourse of food security in the UK. Journal of Rural Studies 29:81–90. doi: 10.1016/j.jrurstud.2011.09.001, raising important points in the context of food security(souvereignity). [Karlheinz Erb, Austria]	Noted, text removed
3264	77	16	77	16	not only poultry, all monogastrics [Karlheinz Erb, Austria]	Noted, text removed
21026	77	19	77	21	I find this conclusion far too glib and, frankly, lazy. Can diets based on beef+dairy+plant really be equivalent to chicken+plant? What does this depend on? Give examples, and explain - simply saying this is dependent on time and place tells me nothing of value. [Andy Reisinger, New Zealand]	Noted, text removed
8242	77	26	77	26	'effecting' may be changed to 'affecting'. [Muhammad Mohsin Iqbal, Pakistan]	Accepted
21028	77	23	78	16	This section would benefit from more critical analysis of who does the wasting (producer or consumer end), to what extent does this vary between countries or commodities, and whether reductions in waste would affect producer returns, or consumer prices, or price stability, etc. Otherwise it's very hard to see better entry points for policy. [Andy Reisinger, New Zealand]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1360	77	23	78	16	The discussion and evidence cited is skewed toward food waste. Is there the same amount of literature on food loss (i.e. post harvest loss in developing countries) as on food waste? If not, might this gap be pointed out? Cobenefits of reducting food loss/waste can also be found in nutrition -- additional resources that may be useful (or lead to other resources) include http://www.fao.org/food-loss-reduction/news/detail/en/c/345300/ [Tonya Rawe, United States of America]	Noted: We also include discussion on food loss, including post harvest loss.
16410	77	28	78	2	The main point you are making in this section is to reduce overconsumption. Do you know where food is being lost? How? What data have you used? Are sure that food is being wasted at household level? How about processing and services? [Lorenzo Giovanni Bellù, Italy]	Noted: We refer to the relevant literature addressing these questions.
11546	77	20			Actually, the idea of a “climate smart diet” (add health-smart) holds incredible potential, because it can be packaged quite easily. For common people being told the dietary daily requirements are x, and that x gram of such and such types of protein would represent a sustainable diet in terms of climate change, this is where ‘diet shift’ could start. So if this IPCC report could review the literature in this area, this would be a tremendous contribution to policy makers wanting to give the ‘diet shift’ a try. Simply concluding here that “there is no simple evidence based…” is not helpful. You can already find such information on the Internet (whether it is correct or not is open to question) so what is needed is an authorative scientific basis for this. [Debra Roberts, South Africa]	Noted, text removed
11548	77	23			In this section it would be good to discuss technological developments in food preservation that maintains nutritional value, for instance advances in hurdle technology. There has been much development in this field, and this has large potential implications on food wastage, health and nutrition, and sustainability. [Debra Roberts, South Africa]	Rejected: due to page limitation we did not discuss technological developments in food preservation.
11544	77				Re taxing food: if global food taxes will harm people in developing countries, is anybody talking about a sliding tax scale based on consumption? Global solutions that do not attend to regional differences are by definition unjust, because they treat the world as a unified entity when it is not. [Debra Roberts, South Africa]	Noted, text removed
18512	78	3	78	4	Reducing undernourishment is primarily a matter of reducing inequality. Effects of reducing food losses and waste as seen in FAO and LEI, 2015 are limited. (please consult corresponding chapter in: FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf, on poverty and inequality and the connection to food security. [Aziz Elbehri, Italy]	Accepted: the section does not say that reducing food waste will automatically reduce undernourishment.
16412	78	3	78	4	Please note that reducing undernourishment is primarily a matter of increasing equality. Effects of reducing food losses and waste as seen in FAO and LEI, 2015 are limited. Please refer to the dedicated chapter of FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf, on poverty and inequality and the connection to food security. [Lorenzo Giovanni Bellù, Italy]	Accepted: the section does not say that reducing food waste will automatically reduce undernourishment.
1356	78	3	78	4	What about this is debatable? Addition of a phrase or two would help make sentence more insightful. [Tonya Rawe, United States of America]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1358	78	8	78	10	Where is the 14% reduction in the need for cropland area? And what of those farmers? Are there likely other factors that will continue to incentive production on that land (like subsidies)? [Tonya Rawe, United States of America]	Accepted by restructuring the stentence. The statment is related to global level and limiting the need for agricultural expansion by 2050.
21030	78	19	78	36	This section ought to be critical and deserves more space and to act as a central focus point I believe: given pressures on land from other climate change drivers, what is the best way to manage this from a mitigation and adaptation perspective so as not to jeopardise food security? It seems odd to mention agroforestry here since this would normally reduce total prouction below what could be achieved by pure intensive systems - and if maximising production on a shrinking land resource is the goal, how do we best do this? [Andy Reisinger, New Zealand]	Noted, section removed. See Cross-Chapter Box on Land Intensification
8744	78	20	78	34	This section on food vs. energy could go into more detail on options for reducing competition, e.g. use of abandoned / unproductive agricultural land, integrated energy-food systems (rotation cropping), use of residues - e.g. see Diaoglou et al. (2016) https://doi.org/10.1111/gcbb.12285. [Delphine Deryng, Germany]	Noted, section removed.
3852	78	24	78	24	Late introduction of BECCS - describing it in the present tense is inappropriate because it basically hasn't been done. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, added description of NETs earlier in section.
1362	78	24	78	32	Can estimates of land area needed for BECCS to deliver different quantities of emissions reduction be included? This will help concretize the discussion of trade offs and competition. See Smith, Pete, et al, Biophysical and Economic Limits to Negative CO2 Emissions, https://www.nature.com/articles/nclimate2870 [Tonya Rawe, United States of America]	Estimates added
262	78	37	78	37	Agrivoltaics may offer opportunities to combine food and energy production on the same land surface by installing solar panels above agricultural crops or grassland, without compromising crop production if the canopy is only partly covered. This system is currently being evaluated (eg. Dupraz C, Marrou H, Talbot G, Dufour L, Nogier A, Ferard Y (2011) Combining solar photovoltaic panels and food crops for optimising land use: Towards new agrivoltaic schemes. Renewable Energy 36:2725–2732; Marrou H, Guilioni L, Dufour L, Dupraz C, Wery J (2013) Microclimate under agrivoltaic systems: Is crop growth rate affected in the partial shade of solar panels? Agricultural and Forest Meteorology 177:117–132). [Eline Vanuytrecht, Belgium]	Noted, text deleted
24456	78	18	79	6	On the competition for land and trade-offs related to chapter 5.8.6, see Verburg et al. (2015) [Verburg et al. (2015): Land system science and sustainable development of the earth system: A global land project perspective; and/or Niewoehner et al. Eds (2016) Land Use Competition: Ecological, Economic and Social Perspectives.] [Barron Joseph Orr, Germany]	Noted, text removed
14598	78	18	79	6	On the competition for land and trade-offs related to chapter 5.8.6, see Verburg et al. (2015). [Rattan Lal, United States of America]	Repeat of comment 18514

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6806	78	18	80	1	(5.8.6.1 Food vs. energy – Competition for land and 5.8.6.2 Sustainable intensification) Closing yield gaps is one of the main targets. More efficient use of land per unit production for food security quite important. In this respect we can't skip the following:In traditional soybean cultivation, farmers plow the soil, particularly for weed control before planting, whereas biotech soybean cultivation is generally a no-till method and doesn't need any soil preparations, so farmers save time, money and labor. (No till also limits the release of greenhouse gases). Because they can sow earlier in the season, farmers are also able to grow two crops in a year rather than just one. In South America, because of the spread of transgenic crops, millions of hectare land is double cropped. (https://geneticliteracyproject.org/2017/02/09/gmo-free-soybeans-future/) [Nazimi Acikgoz, Turkey]	Accepted, We have adquately covered the importance of CA-based sustainable intensification (e.g. NT, residue mangement, crop diversificataion) to address the issue of CC adaptation, mitigation and food security
15878	78	18	81	32	in this section of the document, a sub section addressing the "Food-land degradation-climate nexus" is NEEDED… not having this sub-section is not very coherent with de focus of this SR. This sub section should refer to on-going initiative e.g. Land Degradation Neutrality adopted at COP 13, UNCCD (https://www.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality-report-science-policy) taking advantages from the work done by the Science Policy Interface on "Sustainable Land Management Contribution to Successful Land-based Climate Change Adaptation and Mitigation" (https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change: https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change). This sub-section needs also to refer to other initiatives such as the 4P1000: soils for climate and food security launched at COP 21, UNFCCC (https://www.4p1000.org) [Jean-Luc Chotte, France]	Noted, Dealt in chapter 3
16868	78	18	81	32	In this section of the document, a sub section addressing the "Food-land degradation-climate nexus" is NEEDED… not having this sub-section is not very coherent with de focus of this SR. This sub section should refer to on-going initiative e.g. Land Degradation Neutrality adopted at COP 13, UNCCD (https://www.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality-report-science-policy) taking advantages from the work done by the Science Policy Interface on "Sustainable Land Management Contribution to Successful Land-based Climate Change Adaptation and Mitigation" (https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change: https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change). This sub-section needs also to refer to other initiatives such as the 4P1000: soils for climate and food security launched at COP 21, UNFCCC (https://www.4p1000.org) [Rattan Lal, United States of America]	Noted. Dealt in chapter 3
10766	78	18	81	36	This section is only considering specific techologies and not improving the integration between crops and livestock for better use of biomass and waste. [Anne Mottet, Italy]	Accepted, added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18514	78	18	81	36	This section is mereley presenting specific techologies in isolation; doesn't address improving the integration between crops and livestock for better use of biomass and waste. [Aziz Elbehri, Italy]	Repeat of comment 18512
17920	78	9			Remove first % [Donald Smith, Canada]	Accepted
17922	78	13			Change "reduce" to "reducing" [Donald Smith, Canada]	Accepted
27372	78	18			Sustainable land management, and its constituent practices, should be the foundation for considering various agricultural practices included in the assessment. Chapter 3 provides a useful overview of SLM technologies and practices. Various other terms are used to group sets of practices -- climate-smart agriculture, sustainable intensification, conservation agriculture. The use of multiple different aggregate packages of practices is confusing, confounding, and undermines the analytical potential of the assessment. Understanding potential contributions of the constituent practices is extremely important. It is almost meaningless to talk about the contribution of "climate-smart agriculture" or "sustainable intensification" without knowing which constituent practices are or are not included in the assessment / analysis. The term "sustainable intensification" suffers in particular from tautological thinking. Measures to increase productivity, that are sustainable, are labelled sustainable intensification. It is really not a useful term, particularly in a scientific assessment which should be able to clearly explain the contributions of particular practices. [Doreen Stabinsky, United States of America]	Noted. CSA has been introduced to conote any practices that contributes to food security, adaptation and mitigation. SI and CA has been introduced as potential CA that offer synergy on adaptation and mitigation without compromising food security
25986	78	18			There is hardly mentioning of people, synergies and tradeoffs with development, i.e. challanges and opportunities for local communities and vulnerable people. There figure deals with livelihoods in a very superficial manner [Hans Poertner and WGII TSU, Germany]	Accepted, figure removed
17924	78	19			With correct manipulations of the phytomicrobiome followed by utilization of sustainable levels of crop residues it is possible to establish a "Food and fuel" relationship, rather than a "Food versus fuel one". Again, I could supply a bit of text. [Donald Smith, Canada]	Noted, text deleted
24458	79	1	79	3	It is not clear from Figure 5.3 what type of livelihood asset is referred to - please specify, so reader can easily understand (given sustainable livelihoods encompass five capitals financial, biophysical, social, human and natural capital according to Chambers et al. 1991/ DFID 1999) [Barron Joseph Orr, Germany]	Figure removed
3854	79	7	79	7	I like the walk though different versions of "climate friendly" agriculture. Chapter 7, with which there are some overlaps, could borrow some of this! [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Thanks.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21032	79	7	80	2	More discussion is needed here how and under what conditions sustainble intensification results in land sparing (since intensification per se often does not - this could be brought out much more clearly). Also the notion developed earlier of "sustainability in the broad sense" - when and how do I know whether a given intensification is sustainable? What are the appropriate metrics and considerations? Bring the concept from the abstract to the practical (or demonstrate that the concept actually has little operational meaning in the absence of clear metrics). [Andy Reisinger, New Zealand]	Accepted, SI section is now ended with a caution statement that increased profitability through SI may lead to increased area under production due to higher rate of adoption. We would like to add the X-chapter box on Agricultural intensification, land sparing and land sharing here
9470	79	7	80	2	Sections 5.8.6.2 and Section 6.9.2.5 In Chapter 6 refer to Sustainable Intensification. Please check for overlap/consistency with Chapter 6 [Minal Pathak, India]	See Cross-Chapter box on Agricultural Intensification
14600	79	7	80	2	In section 5.8.6.2: Often, higher cropping intensity unfortunately led to soil nutrients mining aggravating dessertification. Such practice should be discouraged in this section. [Rattan Lal, United States of America]	Noted, Lowering cropping intensity is not an option in many tropical agro-ecosystem. However, we are dealing this from SI perspective
3266	79	8	80	1	The opinion/review paper allows for a nuanced perspective on SI: Loos J, Abson DJ, Chappell MJ, et al (2014) Putting meaning back into “sustainable intensification.” Frontiers in Ecology and the Environment 12:356–361. doi: 10.1890/130157 [Karlheinz Erb, Austria]	Accepted, we have included the issue of gender, equity and accessibility in other section. The SI within this sections is from production perspective only
11550	79	23			Please emphasize such sections on solutions, and supply practical details. This does come out in other parts of the report, for instance the various practical options (no tillage, rainwater harvesting, green walls of natural vegetation, etc) with co-benefits. Perhaps a cross-reference would do it. Please also discuss a combination of intensification and conservation agriculture. Getting more out of an area in every way. A schematic here that attracts reader attention to the various solutions and their multiple co-benefits will be highly valuable. [Debra Roberts, South Africa]	Noted, we will consider making a schematic for next version
15680	80	4	80	27	Authors may find this study relevant, Onyeneke R.U.; Igberi C.O.; Uwadoka, C.O. and Aligbe J.O. (2018). Status of Climate-smart Agriculture in Southeast Nigeria. GeoJournal, 83 (2): 333 – 346. http://doi.org/10.1007/s10708-017-9773-z." [Robert Onyeneke, Nigeria]	Accepted, Yes, but very specific case of Nigeria. Have included at broader level though
26556	80	5	80	9	Arakelyan, I., Moran, D., & Wreford, A. (2017). CLIMATE SMART AGRICULTURE. Making Climate Compatible Development Happen, 66. is a useful review, both conceptual and substantive. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Not peer-reviewed
1366	80	5	80	27	Climate-smart approaches discussed are largely practices/techniques and technologies. What of approaches to address unequal access or ensure equal access to resources such as information, extension, etc? Climate-smart, if it is to address resilience and adaptive capacity, must address these underyling socio-economic factors in access to technologies, practices, etc. that can enhance biophysical aspects of agriculture, increase productivity, and reduce emissions. [Tonya Rawe, United States of America]	Accepted, added this point
2398	80	9	80	9	There is no clear definition of what climate-smart agriculture covers or not. [Anne-Laure Sablé, France]	Rejected, defined in text

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1364	80	9	80	9	Why has the climate-smart approach been contested? [Tonya Rawe, United States of America]	Repeat of comment 20932
9436	80	10	80	44	The report also outlines the already proven agricultural practices and technologies that provide benefits to farmers and nutrition security -including conservation agriculture, agroecology, etc. (p. 5-80), which is good. However, these sustainable alternatives receive relatively little political support and funding from national and international governance institutions. The IPES-Food (2016) provides some suggestions of what needs to change: that different public research agendas need to be redefined around different priorities (i.e., to not solely focus on increasing productivity, but recognize the many important role that diversified food systems encompass: to adapt to climate change and transition to healthier diets); food policy processes need to shift incentives towards these alternatives to enable them to emerge from the margins. [Helena Shilomboleni, Canada]	Good suggestion. This has been dealt under the section "enabling conditions and gaps"
2394	80	13	80	17	The mitigation component has been questioned (see consistency with chapter 6-25 line 31-32): Powlson D. S. et al. 2014. Limited potential of no-till agriculture for climate change mitigation. Nature Climate Change. DOI: 10.1038/NCLIMATE2292 There are too few studies from tropical regions while hopes of carbon sequestration are highest there. It remains unclear to what extent additional biomass inputs contribute to carbon sequestration. (de Rowe A. et Al. 2010. p.149) Source: De Rouw A., Huon S., Soulileuth B., Jouquet P., Pierret A., Ribolzi O., Valentin C., Bourdon E., Chantharath B. 2010. Possibilities of carbon and nitrogen sequestration under conventional tillage and no-till cover crop farming (Mekong valley, Laos). Agriculture, Ecosystems and Environment 136 Despite the equal contribution of inputs and the absence of erosion, the conventional system stored significantly carbon, whereas the no-till system lost carbon, and above that, the difference in storage between the two systems was significant. (de Rowe A. et Al. 2010. p.158) Source: De Rouw A., Huon S., Soulileuth B., Jouquet P., Pierret A., Ribolzi O., Valentin C., Bourdon E., Chantharath B. 2010. Possibilities of carbon and nitrogen sequestration under conventional tillage and no-till cover crop farming (Mekong valley, Laos). Agriculture, Ecosystems and Environment 136 [Anne-Laure Sablé, France]	Agreed. Therefore we are highlighting the importance of devising context-specific mitigation and adaptation measures throughout the chapter
264	80	19	80	22	Improving water use efficiency by proper field management (small water harvesting ponds, mulches to prevent evaporative losses, bunds or contour and/or terraced cultivation to reduce runoff, deficit irrigation (Geerts S, Raes D (2009) Deficit irrigation as an on-farm strategy to maximize crop water productivity in dry areas. Agricultural Water Management 96:1275–1284)) helpt to achieve climate-smart agriculture. [Eline Vanuytrecht, Belgium]	Accepted. We have included precision water mangement as potential CSA to offer synergy between adaptation and mitigation. The ref suggested is old to be included thouth
10768	80	29	80	44	Very unclear su-section on conservation agrculture. Agroforestry is not part of conservation agriculture at all. No mention of low adoption rates [Anne Mottet, Italy]	Accepted, CA now explained in greater detail
18516	80	29	80	44	A missing point in the discussion on conservation agriculture is the low adoption rates. Morever, agroforestry is really not part of conservation agriculture at all. [Aziz Elbehri, Italy]	We have now separated agroforestry from CA. But agroforestry is there in different section as an strategy of adaptation and mitigation

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1498	80	29	80	44	See also critical notes on CA: Giller et al. (2015). Beyond conservation agriculture. Frontiers in Plant Science 6(OCTOBER),870; Giller et al. (2009). Conservation agriculture and smallholder farming in Africa: The heretics' view. Field Crops Research 114(1), pp. 23-34 [Pytrik Reidsma, Netherlands]	Suggested reference analyzed and cited
2396	80	30	80	44	Trade-off of conservation agriculture are missing: "the apparent success of Sasakawa Global 2000 in promoting CA (Ito et al., 2007) appears largely to have been due to its promotion within a technology package including inputs of fertilizers, pesticides and herbicides." (Giller K. E. 2009. p. 7) Source: Giller K. E., Witter E., Corbeels M., Tittonell P. 1 October 2009. Conservation agriculture and smallholder farming in Africa: The heretics' view. Field Crops Res. doi:10.1016/j.fcr.2009.06.017 The mitigation component has been questioned (see consistency with chapter 6-25 line 31-32): Powlson D. S. et al. 2014. Limited potential of no-till agriculture for climate change mitigation. Nature Climate Change. DOI: 10.1038/NCLIMATE2292 [Anne-Laure Sablé, France]	Suggested reference analyzed, trade-offs of CA included
7168	80	30	80	44	Suggest add one sentence on the limitations of CA e.g. competing uses for crop residues in small-scale farming systems. See excellent work by CIMMYT and others. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Multiple use of crop residue in the contest of CA highlighted
27374	80	4			Neufeldt, H., Jahn, M., Campbell, B. M., Beddington, J. R., DeClerck, F., De Pinto, A., ... & LeZaks, D. (2013). Beyond climate-smart agriculture: toward safe operating spaces for global food systems. Agriculture & Food Security, 2(1), 12. [Doreen Stabinsky, United States of America]	Accepted, added and cited
10550	80	9			by whom has the climate smart agriculture approach been contested and how? In 2017 Central America has approved a subregional strategy for climate smart agriculture (EASAC) [Zitouni Ould-Dada, Italy]	Sentence removed
17926	80	13			Add and "s" to "landscape" [Donald Smith, Canada]	Done
17928	80	31			Change "21st" to "20th" [Donald Smith, Canada]	Fixed
1368	81	43	80	43	Reference is made to impacts on supply chain activity, "especially shipping and storage." Can this be elaborated briefly? How does these impacts manifest? This can help elaborate on the interaction between climate change impacts and food loss as well as signal how climate change impacts other aspects of food security (beyond production). [Tonya Rawe, United States of America]	Noted, section removed
8244	81	2	81	2	The phrase 'to be taken into account' is suggested to be changed to 'to take into account'. [Muhammad Mohsin Iqbal, Pakistan]	Accepted, changed
21034	81	2	81	31	I struggled to derive any value from this discussion - far too abstract and theoretical. [Andy Reisinger, New Zealand]	Noted. This concept has been developed and promulgated by several national science foundations. Important to include here. Added more specifics

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16414	81	3	81	12	Please explain what "scientific efforts" and "challenges for the scientific community" you have in mind. Interdisciplinary research and partherships are mentioned almost everywhere and for everything. What added value do you exactly seek here? [Lorenzo Giovanni Bellù, Italy]	Rejected, explained in text
7170	81	4	81	4	FEW like NCP is another unnecessary concept and acronym. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted, removed FEW
266	81	9	81	10	Van Gaelen et al (Van Gaelen H, Vanuytrecht E, Willems P, Diels J, Raes D (2017) Bridging rigorous assessment of water availability from field to catchment scale with a parsimonious agro-hydrological model. Environmental Modelling & Software 94:140–156) did for example good efforts to brigde water modelling from agricultural field scale to catchment scale. [Eline Vanuytrecht, Belgium]	Accepted added reference
8246	81	20	81	20	Please see if the phase 'project use of fresh water for agriculture is estimated to 70% in additional withdrawl' can be changed to 'projected use of fresh water for agriculture is estimated to be 70% in addition to - -'? [Muhammad Mohsin Iqbal, Pakistan]	Repeat of comment 24958
16416	81	30	81	31	Why the business as usual scenario assumes current trends of increasing meat consumption? Please justify and give references. [Lorenzo Giovanni Bellù, Italy]	Noted. Trends of meat consumption are increasing
19580	81	33	83	25	There are also valleys and watersheds that are highly exposed to floods related to climate variability and extreme events associated with poor land use. [Ibouraïma Yabi, Benin]	Noted, Hotspots section removed
16418	81	33	95	5	The entire section 5.9 overlaps with Chapter 6, with parts of Chapter 1 (parts of section 1.3.3 in particular) and some subsections (e.g. 5.9.3.2) with parts of sections 5.8.1, 5.8.4 and 5.5. Please mainstream the structure of the entire report. [Lorenzo Giovanni Bellù, Italy]	Noted, Hotspots section removed
8746	81	34	95	5	the structure of this subsection is not clear; it is hard for the reader to get a clear overview of the hotspots regions; suggest to have subsections by hotspot areas (eg Hindu-Kush Himalayan region, sub-Sahara Africa, urban, coastal) [Delphine Deryng, Germany]	Noted, Hotspots section removed
8748	81	34	95	5	need specific mention to SIDS and their specific context [Delphine Deryng, Germany]	Noted, Hotspots section removed
858	81	5			see Liu J., Yang H., Cudennec C., Gain A.K., Hoff H., Lawford R., Qi J., de Strasser L., Yillia P.T., Zheng C., 2017. Challenges in operationalizing the water-energy-food nexus. Hydrological Sciences Journal, 62, 11, 1714-1720, http://dx.doi.org/10.1080/02626667.2017.1353695 [Christophe Cudennec, France]	Accepted added reference
17930	81	20			Change "project" to "projected requirement" [Donald Smith, Canada]	Fixed
17932	81	20			Add "increase by" after "to" [Donald Smith, Canada]	Accepted, added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17934	81	20			Change the part of the sentence after the "%" to "; this resource is already under severe pressure" [Donald Smith, Canada]	Accepted, added
17936	81	22			Insert "water" before "quality" [Donald Smith, Canada]	Accepted, added
17938	81	28			remove "'s" from "world's" [Donald Smith, Canada]	Fixed
17940	81	29			Add "s" to "integrate" [Donald Smith, Canada]	Fixed
8680	82	1	82	2	add reference on the effect of heat-stress on crop ocuring at anthesis: e.g. Deryng et al. 2014 Global crop yield response to extreme heat stress under multiple climate change futures, Environ. Res. Lett. 9 034011; Gourdji et al 2013 Global crop exposure to critical high temperatures in the reproductive period: historical trends and future projections Environ. Res. Lett. 8 024041; Teixeira et al. 2013 Global hot-spots of heat stress on agricultural crops due to climate change Agricult. Forest Meteorol. 170 206–15 [Delphine Deryng, Germany]	Noted, section removed
268	82	1	82	2	reference for heatwave damage to crops: Semenov MA, Shewry PR (2011) Modelling predicts that heat stress, not drought, will increase vulnerability of wheat in Europe. Scientific Reports 1:1–5 [Eline Vanuytrecht, Belgium]	Noted, section removed
19662	82	3	82	3	Livestock … are affected by heat stress by reduced milk production, low fertility and feed shortages. [Birgit Kuna, Germany]	Noted, section removed
16752	82	14	82	14	Add a “.” before “Long”. [Jing Wang, China]	Noted, section removed
14602	82	7	83	25	5.9.2 Floods are of different types. Bangladesh, Eastern India and parts of China frequently suffer by devastating flash floods and river water floods. A Box may be provided in the report about the consequences of floods in the report. [Rattan Lal, United States of America]	Noted, section removed
10552	82	7			increased infiltration of rainwater through reforestation and SLM practices wil contribute to reduce flooding, also protection of mangroves will reduce coastal floodings [Zitouni Ould-Dada, Italy]	Noted, section removed
26992	83	38	44		Glad to see the report has discussed the role of neglected and underutilized species in food security. Many of these species are being used by indigenous communities throughout the world. It would be effective if authors could discuss some neglected species and who are using them for what purpose, medicinal or food supplments or climate change adaptation. You could refer to wind rice in North American and buckwheat in the Himalayas. [Laxmi Pant, Canada]	Noted, section removed
21036	83	1	83	3	Please check this statement with WGI. [Andy Reisinger, New Zealand]	Noted, section removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8024	83	13	83	15	I have actually work on research founded by the Virginia Department of Transportation which using hydrodynamic modeling investigate flooding in critical urban areas of Hampton Roads region in Virginia, USA. I would be very happy if it could be included as a reference. The results of this research are in the journal paper: https://www.researchgate.net/publication/324751687_Modeling_the_Impacts_of_Sea_Level_Rise_on_Storm_Surge_Inundation_in_Flood-Prone_Urban_Areas_of_Hampton_Roads_Virginia [Luca Castrucci, United States of America]	Noted, section removed
25586	83	31	83	33	"subsistence food *systems*" in my view are marginal worldwide - the vast majority of farmers are either selling produce or selling labour off-farm to survive - and I don't think a definition of systems can refer to activities. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted, section removed
1370	83	33	83	36	Reliance on family labor may not always indicate a higher level of resilience -- as the inability to access other labor (because of economic or social constraints) can limit the productive potential of a household, or if reliance on family labor is resulting in a disproportionately high labor burden for women in the household. [Tonya Rawe, United States of America]	Noted, section removed
9632	83	34	83	36	The concept of resilience of livelihood is not yet treated in this chapter. Efforts are currently undertaken to better assess and measure resilience of lifelhoods. REF: Speranza, C. I., Wiesmann, U., & Rist, S. (2014). An indicator framework for assessing livelihood resilience in the context of social–ecological dynamics. Global Environmental Change, 28, 109-119. REF Jacobi, J., Schneider, M., Bottazzi, P., Pillco, M., Calizaya, P., & Rist, S. (2015). Agroecosystem resilience and farmers' perceptions of climate change impacts on cocoa farms in Alto Beni, Bolivia. Renewable Agriculture and Food Systems, 30(2), 170-183. REF: Jacobi, J., Schneider, M., Pillco Mariscal, M., Huber, S., Weidmann, S., Bottazzi, P., & Rist, S. (2015). Farm resilience in organic and nonorganic cocoa farming systems in Alto Beni, Bolivia. Agroecology and Sustainable Food Systems, 39(7), 798-823. [Markus Giger, Switzerland]	Noted, section removed
24460	83	38	83	38	The following reference could complement the text: Padulosi, S., Thompson, J. & Rudebjer, P. (2013): Fighting poverty, hunger and malnutrition with neglected and underutilized species (NUS): needs, challenges and the way forward. Bioversity International, Rome. [Barron Joseph Orr, Germany]	Noted, section removed
1372	83	44	83	44	Reference is made to a reduction in diversification in some regions. Which regions (other than the one captured in box 5.5)? And because of what factors? Environmental (crops are no longer viable)? Farmers' choice? Changes in the model of agriculture practiced (diverse to mono-crop)? A change in farmers' ability to utilize native varieties and sell in the market? [Tonya Rawe, United States of America]	Noted, section removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17344	83	27	87	36	This section should include a clear articulation of the impactof climate change on non-cultivated food supply. Across Africa for example, large sections of population either rely on local biodiversity for food or to suppliment their cultivated food supply. This includes, ants, catepillars, wild-berries etc. The impact of climate change on these important food sources need to be well articulated and assessed. [Robert Ddamulira, United States of America]	Noted, section removed
17942	83	5			Add "to" before "crops" [Donald Smith, Canada]	Noted, section removed
10554	83	27			public purchase (school feeding) can strengthen local food systems (experience Brazilian School Feeding Programme) [Zitouni Ould-Dada, Italy]	Noted, section removed
17944	83	30			Change "affecting" to "on" [Donald Smith, Canada]	Noted, section removed
10556	83	38			Small scale farmer mainly produce for subsistance/feeding the family, but also try to sell their surplus. It is important to understand for what different crops are produced for. Some varieties of sorghum are drought tolerant, sorghum often is produced as animal food or for producing local brew. Rice/maize is a staple food, for self consumption and sale of surplus. [Zitouni Ould-Dada, Italy]	Noted, section removed
17946	83	43			Make bean singular [Donald Smith, Canada]	Noted, section removed
11552	83				This section should include a table listing these underutilized species, each with their nutritional, agricultural and climate-change related benefits, including their basic growth requirements (soils, temperature, water requirements). Such information in an IPCC report would be very powerful: a go-to list for policy makers to consider in their country's agricultural policies. [Debra Roberts, South Africa]	Noted, section removed
1374	84	1	84	3	What are the actual "gender-related issues"? Women's role is described, but what is the implication or result? Different impacts on women? Their lack of access to necessary and relevant resources? The reality that their lack of control over decision-making means that plans may not meet their needs? [Tonya Rawe, United States of America]	Noted, section removed
2582	84	6	84	6	In Box 5.5, first paragraph: "barely" -> "barley". [William Lahoz, Norway]	Accepted
11554	84	4			Please consider a parallel section on Climate change and Food Systems in Developed Countries. They have completely different issues and will need completely different priorities and solutions. These two sections would provide a good balance illustrating how the world is not one unified place. A table showing how these regions differ with respect to, for example, area of land under agriculture, yield per ha, number of farms, percent commercial farms, main food products, populations and projected growth, consumption, vulnerabilities, options, solutions etc. would be very illuminating. [Debra Roberts, South Africa]	Noted, section removed
17948	84	6			Line 4 for of paragraph one in text box: Make beans singular [Donald Smith, Canada]	Accepted
17950	84	6			Line 7 of paragraph 1 in text box: Define "HKH" here [Donald Smith, Canada]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17952	84	6			Line 1 of paragrpah 2 of text box: Remove HKH definition [Donald Smith, Canada]	Accepted
17954	84	6			Line 1 of paragraph 6 of text box: Make 'beans" singular [Donald Smith, Canada]	Accepted
716	85	5	85	6	There is no title in the figure 5.31. Revise [Roberto Abeldaño, Mexico]	Rejected, the title is there
1376	85	5	85	8	Can a developed country be included in the graph to provide comparison? [Tonya Rawe, United States of America]	Figure removed
16420	85	7	85	7	What is the source of Figure 5.31? [Lorenzo Giovanni Bellù, Italy]	Figure removed
714	85	9	85	9	Error! Reference source not found. [Roberto Abeldaño, Mexico]	Corrected
2584	85	9	85	9	Reference source not found. [William Lahoz, Norway]	Corrected
1378	85	9	85	10	Complete reference to food and nutrition security situation in SSA would also highlight levels of malnutrition (including levels of micro-nutrient deficiency, stunting) [Tonya Rawe, United States of America]	Text removed
21038	85	2	90	1	I feel this section needs a lot more work to give it efficient structure and convey a few points clearly. At the moment it reads more like a stream of consciousness. [Andy Reisinger, New Zealand]	The whole setion is redrafted with additional evidence and new structure. We brought more evidence of climate related imapcts on food sectruity for Africa. Some Africa information moved to other sections
19582	85	5		6	Please, remember the source of the figure (5.3. 1). Also treat the legend to make it well legible [Ibouraïma Yabi, Benin]	accepted
25988	85	6			Figure 5.31: it would be more useful to see CO2 emissions by sector in Africa, rather than the total amount, [Hans Poertner and WGII TSU, Germany]	Figure removed
16422	86	8	86	8	What is the source of Figure 5.32? [Lorenzo Giovanni Bellù, Italy]	Figure removed
19664	86	9	86	9	explain "GCM" [Birgit Kuna, Germany]	Text removed
1380	86	16	86	34	And what about impacts on the different pillars of food security, given the focus of the report? (Addressing food security is also important, since international climate agreements (Paris Agreement) specifically reference food security) How might projections interaction with other socio-economic factors to impact food security? Alternatively, the section on "market structure" could be retitled to include food security. Either way, food security -- because it has more of a human element than "food systems" or "market structures" should be better addressed or explicitly called out as a focus of these sections. [Tonya Rawe, United States of America]	The new structure of the chapter identified climate and non-climate factors to food security. Market structures are combined with issues of governance and food versus cash crops.
17524	86	28	86	29	Please check the references of this sentence [Noureddine Benkeblia, Jamaica]	Noted. References checked.
16754	86	33	86	34	Could multi-model ensembles overcome the uncertainty of crop response to increased atmospheric CO2 if there models were not improved to reflect the mechanism of crop response to atmospheric CO2? [Jing Wang, China]	Text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17956	86	24			Insert "in this area" after "systems" [Donald Smith, Canada]	Text removed
17958	86	28			Opening bracket just before year [Donald Smith, Canada]	Text removed
17960	86	29			Opening bracket here [Donald Smith, Canada]	Text removed
17962	86	33			Remove "but" [Donald Smith, Canada]	Text removed
8248	87	11	87	11	The word 'security' seems to be redundant, may be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Repeated word deleted
8250	87	12	87	12	'These reduce - -' is suggested to be changed to 'This reduces - -'. [Muhammad Mohsin Iqbal, Pakistan]	Corrected
8252	87	14	87	14	The phrase '- -in Africa in how - -' is suggested to be changed to '- - in Africa as to how - -'. [Muhammad Mohsin Iqbal, Pakistan]	Corrected
1382	87	14	87	17	Can more be said about the findings of this study? There is still a tendency in global policy dialogues for food security to be equated solely with food production, when food security is far more than the amount of food produced. [Tonya Rawe, United States of America]	The whole setion is redrafted with additional evidence and new structure.
1384	87	18	87	22	What would the consequences be (for climate/land use interactions) of putting more land under cultivation? [Tonya Rawe, United States of America]	The whole setion is redrafted with additional evidence and new structure.
24462	87	19	87	22	See UNCCD (2017: 58): "In Africa, approximately 16 per cent of the vegetated land surface is assigned as cropland, of which about 23-24 per cent shows signs of decreasing or unstable land productivity." UNCCD (2017): Global Land Outlook, first edition. Bonn, Germany https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf; [Barron Joseph Orr, Germany]	The whole setion is redrafted with additional evidence and new structure.
25990	87	25	87	28	Need to consider global economic structures here as well, e.g. subsidised food production and export form the EU. [Hans Poertner and WGII TSU, Germany]	Accepted. But the whole section is redrafted with additional evidence and new structure.
56	87	32	87	33	GMO? [Nathalie Jeanne Marie Hilmi, France]	Text removed
1386	87	32	87	40	Is the Green Revoution approach likely to be effective in addressing climate and food security (given the discussion in box 5.5)? And what of the focus on internationally traded commodities rather than food for domestic consumption and therefore direct food security (and food sovereignty)? Does the emphasis on internationally traded commodities (a) miss the opportunity to develop local food systems and (b) render producers vulnerable to international price shocks? [Tonya Rawe, United States of America]	The whole setion is redrafted with additional evidence and new structure.
58	87	40	87	40	and the economic development of Africa [Nathalie Jeanne Marie Hilmi, France]	Text removed
11556	87	16			Please elaborate. Worse how? [Debra Roberts, South Africa]	The whole setion is redrafted with additional evidence and new structure.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1388	88	9	88	16	Are there other approaches (more sustainable and socially and economically accessible) ways of closing yield gaps than a heavy reliance on chemical fertilisers? That seems the only option really discussed here, yet there are negative consequences for the land and for climate of potentially creating a high level of dependence on inorganic fertilizer. [Tonya Rawe, United States of America]	Accepted, other approaches added
1390	88	20	88	35	This section lacks attention to policies to address all aspects of food security -- beyond biophysical aspects of food production and a focus on technologies. What of policies to address causes of vulnerability (e.g. unequal access to extension and climate informaiton), secure and gender-equitable land tenure policy to create incentives to invest in more sustainable land management practices, gender-equitable access to finance to address the short term cost of adopting new techniques? Re: the last, a study has shown that what the literature and experts say are the barriers to farmers adopting climate-smart practices does not always match what farmers themselves identify as the barriers, e.g. the long-term cost is not foremost in farmers minds (despite what the literature and experts say). Farmers are concerned with the short term cost, given the time scales on which they operate. See USAID. “Adoption of Climate-Smart Agriculture in Africa: Constraints, Incentives, and Recommendations.” Prepared by Integra LLC. September 2016. https://issuu.com/integrallc/docs/adoption_of_climate_smart_agricultu [Tonya Rawe, United States of America]	The whole setion is redrafted with additional evidence and new structure.
25588	88	27	88	35	See my comment on p.69 and suggestion of Morton (2017) Climate change and African agriculture: unlocking the potential of research and advisory services. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Added reference
17964	88	15			Elaborate on "nature" [Donald Smith, Canada]	The whole setion is redrafted with additional evidence and new structure.
11558	88	18			If possible, please replace “trees” with “indigenous trees” wherever possible. This issue is not sufficiently appreciated and has been misunderstood in the past. It needs to be heavily emphasized. [Debra Roberts, South Africa]	Corrected
11560	88	27			Please explain why Africa “will require… zero-carbon energy”? When as you mentioned, current emissions in Africa are a fraction of what they are elsewhere? Are similar demands made for the developed world? Of course a high-carbon trajectory should be avoided at all cost. Perhaps soften it by inserting “aiming for” or “ideally”. [Debra Roberts, South Africa]	The term "ideally" was added. But this whole setion is redrafted with additional evidence and new structure.
24464	89	2	89	2	Firstly, please consider adding at the end of the 4th bullet: while considering informal institutions and locally adapted formalisation processes to avoid unintended consequences e.g. overlapping land tenure and respective resource conflicts. Secondly, please consider adding at the end of the 6th bullet: particularly to vulnerable groups. [Barron Joseph Orr, Germany]	Text added
14604	89	2	89	2	Perverse outcomes/unintended consequences need to be considered, particularly where vulnerable groups are concerned [Rattan Lal, United States of America]	Text removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
722	89	2	89	2	There is a text overlay in figure 5.34 legends [Roberto Abeldaño, Mexico]	Accepted but this figure was changed
25992	89	2	90	1	The climate aspect of this box and the previous section are very generic, and it is actually more about the general food system development in Africa. The climate aspect should be strengthened here. [Hans Poertner and WGII TSU, Germany]	Accepted. The whole setion is redrafted with additional evidence and new structure.
16424	89	2	90	1	Please give sources for Box 5.6 [Lorenzo Giovanni Bellù, Italy]	References added
17966	89	2			Final bullet in list within text box: Insert "to" to replace "of" [Donald Smith, Canada]	Corrected
11562	89				In the bullet list of issues, should “underutilized species” not be part of this list? For example, quinoa holds huge potential in terms of nutritional value, yield and tolerance as a plant, but is unknown in Africa. There may be heat and drought tolerant species of highly nutritious crops that would make valuable additions to African agriculture. [Debra Roberts, South Africa]	Added underutilised species
24466	90	5	90	15	The issue of telecoupling could be added here, given the land use displacement caused by consumption of land from given countries which rely on import of food products and consume land where the respective good is produced. Often, both such consumption and production patterns are unsustainable while they lead to more GHG emissions than if respective goods were domestically produced and exacerbate climate change (for the issue of telecoupling, see IPBES report on land degradation and restoration IPBES 2018 LDRA https://www.ipbes.net/assessment-reports/ldr). [Barron Joseph Orr, Germany]	Telecoupling is mentioned in passing as an issue. It is discussed elsewhere in the chapter in more depth
14606	90	5	90	15	Telecoupling, which is well-address in the IPBES Land Degradation and Restoration Assessment of 2018, should be considered here. [Rattan Lal, United States of America]	Telecoupling is mentioned in passing as an issue. It is discussed elsewhere in the chapter in more depth
10770	90	11	90	15	"Climate change mitigation include reduction of livestock farming" accrding to whom? What does this has to do with long supply chains? Why is it in the same list as sustainable intensifcation? No jstification is provided here. [Anne Mottet, Italy]	Rejected. This box is illustrative of the issues; justification for why mitigation through changing livestock is given elsewhere in the chapter and two references provided here. It is widely discussed in the literature. See recent review: http://www.risefoundation.eu/images/files/2018/2018_RISE_LIVESTOCK_FULL.pdf.
18518	90	11	90	15	The statement "Climate change mitigation include reduction of livestock farming" is quite contestable. Not clear how you arrive at this bold assertion. Not clear how such a statement relates to long supply chains. And not clear why it is listed as part of the sustainable intensifcation. There seem to be little justification for it. Need to rethought. [Aziz Elbehri, Italy]	Rejected. This box is illustrative of the issues; justification for why mitigation through changing livestock is given elsewhere in the chapter. It is widely discussed in the literature. See recent review: http://www.risefoundation.eu/images/files/2018/2018_RISE_LIVESTOCK_FULL.pdf
7290	90	11	90	16	Please check throughout chapter 5, whether "climate mitigation" and "climate adaptation" need to be replaced by climate change mitigation or climate change adaptation. [Mariam Akhtar-Schuster, Germany]	Noted. Editorial

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21040	90	13	90	14	This statement wrongly assumes that longer transport distances automatically mean higher footprint. See comment on page 38. [Andy Reisinger, New Zealand]	Rejected. Reducing overseas footprints or the circular economy in no way implies the view that the transport footprint is the contributing factor.
25994	90	21	90	21	Very generic use of the term 'resilience' here. Be more explicit. [Hans Poertner and WGII TSU, Germany]	Noted. The need to build resilient supply chains is widely discussed in the literature and the term well understood. However, text modified for clarity.
16426	90	2	91	1	Please justify why you are focusing in Europe. How about other OECD countries? [Lorenzo Giovanni Bellù, Italy]	Accepted - text modified
11564	90	2			In this section showing a graph of emission efficiency makes good sense (compared to the global approach earlier in the chapter) as it can guide choices of crops and animals. This section should include North America, Russia, and other top emitting/consuming industrialised countries. It is not helpful to use Europe as example, and leave out the others. [Debra Roberts, South Africa]	Rejected. This box is simply to use an example, Europe, to illustrate the issues in a simple way. This is not a review of all HICs.
24468	91	18	91	18	Box 5.7 could be enriched by making a clear link to the multiple benefits of integrated land-use planning and also to land degradation neutrality (see Orr et al. 2017). [Barron Joseph Orr, Germany]	Comment partily accepted. Integrated land-use planning benefits are discussed in the updated version of the box. Details about LDN implications are stated in chapter 4.
14608	91	18	91	18	Box 5.7 could be enriched by making a clear link to the multiple benefits of integrated land-use planning and also to land degradation neutrality (see Orr et al. 2017). see Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality (https://doi.org/10.1016/j.envsci.2017.10.011) [Rattan Lal, United States of America]	Comment partily accepted. Integrated land-use planning benefits are discussed in the updated version of the box. Details about LDN implications are stated in chapter 4.
21042	91	4	92	1	This section needs some quantification and should use examples from different countries - e.g. Ireland, New Zealand, but also various countries in Africa and south-east Asia. Quantification is necessary to gain a better sense of how much these practices can lower overall carbon footprints of those systems [Andy Reisinger, New Zealand]	Noted, section deleted
17968	91	12			remove "d" from "integrated" [Donald Smith, Canada]	Comment accepted. Correction incorporated in the new draft.
6808	92	2	94	5	5.9.6 Urban areas: Three pages of text is quite informative but seems long for SRCCL. Especially with its debatable 20 km urban extents (why not 10 or 50km), this theme does not seem crucial. [Nazimi Acikgoz, Turkey]	Rejected: with increasing urbanization, cities are becoming hotsopts of sustainable food systems. Therefore, we consider that this section deserves one and half IPCC page.
15670	92		94		Authors should document adaptation strategies in aquaculture. Aquaculture is becoming an important business in urban areas. [Robert Onyeneke, Nigeria]	Rejected: Adaptation strategies in aquaculture is out of scope of this section. We would like to focus on urban agriculture in gerneral in this section.
17970	92	18			Line 3 of second full paragraph within text box: Remove "In" [Donald Smith, Canada]	Accepted, fixed
17972	92	18			Line 4 of seciond full paragraph within text box: Change "of" to "for" [Donald Smith, Canada]	Accepted, fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10558	92	40			there are important experiences of urban and periurban agriculture, combined with community organization and food and nutrition education, contributing to food security in different regions - organoponics/simplified hydroponics, vertical farming, etc [Zitouni Ould-Dada, Italy]	Taken into account by mentioning hydroponices and vertical farming, however we are unable to address the reviewer comments on education as the reviewer did not suggest the relevant literature
17134	92				Box 5.7: Nogueira et al (2016) is cited reporting that integrated crop-livestock-forest systems showed a reduction of 75% in GHG emissions compared to no-tillage systems. I could not find the reference in the list, but there is apparently a confusion here. No-tillage is a must in integrated crop-livestock-forest systems. In fact, integrating crop, pasture and trees in a single area or paddock is an improvement in crop rotation scheme which is essential for the success of no-till systems. [Pedro Luiz Oliveira de Almeida Machado, Brazil]	Accepted, text removed
17136	92				Box 5.7: Additional to the reference of Gonçalves et al. (2017) I suggest to include Oliveira et al (2018) who reported that in the trasition area of Cerrrado and Amazonia biome, integrated crop-livestock-forestry systems favours large carbon and nitrogen accumulation at 1-m depth particularly due to the presence of trees in the system (Oliveira et al., 2018). Reference: Oliveira, J.M., Madari, B.E., Carvalho, M.T.M., Assis, P.C.R., Silveira, A.L.R., Lima, M.L., Wruck, F.J., Medeiros, J.C., Machado, P.L.O.A. Integrated farming systems for improving soil carbon balance in southern Amazon of Brazil. Regional Env. Change, 18: 105-116. [Pedro Luiz Oliveira de Almeida Machado, Brazil]	Noted, Box has been rewritten
25996	93	16	93	17	Ecological footprints already include the carbon footprint. [Hans Poertner and WGII TSU, Germany]	Taken into account: here the paper of the authors use ecological footprint as synonym to land footprint. We changed it into land footprint.
15678	93	1	94	45	Authors should document adaptation strategies in aquaculture. Aquaculture is becoming an important business in urban areas. [Robert Onyeneke, Nigeria]	Rejected: Adaptation strategies in aquaculture is out of scope of this section. We would like to focus on urban agriculture in gerneral in this section.
16428	93	40	95	5	Section 5.9.6.2 reads rather obscure and disconnected from the chapter and the report - especially the part on "social missions". Please revise it. [Lorenzo Giovanni Bellù, Italy]	Accepted: section has been revised based on other comments and part on "social missions" is taken out.
19666	94	22	94	22	To add: Another study did not find an increased heavy metal content or air pollution impacts in urban agricultural food (Ercilla-Montserrat M et al. 2018. A study on air quality and heavy metals content of urban food produced in a Mediterranean city (Barcelona). Journal of Cleaner Production). [Birgit Kuna, Germany]	Accepted
25998	94	23	94	32	Need to specify how urban agriculture contributes to adaptation and mitigation in SSA. [Hans Poertner and WGII TSU, Germany]	Accepted
8254	94	39	94	39	The word 'urban' in 'urban pollutants' seems to be superfluous, may be deleted. [Muhammad Mohsin Iqbal, Pakistan]	Accepted, deleted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11566	94	20			These 'cautions' should however be balanced against the benefits, so perhaps a note on how the down sides can be alleviated (eg prevent standing water to stop breeding of disease vectors and water borne diseases, reduce urban pollution by general large-scale urban greening, etc). [Debra Roberts, South Africa]	Accepted
17974	94	42			Remove first "%" from all "%" pairs on this line and the next [Donald Smith, Canada]	Accepted, deleted
21044	95	29	91	30	These brief discussions cry out for a section on policies necessary to actually achieve the modelled outcomes - a section that is currently absent and a major gap for this chapter. Page 96/97 talks about policy alignment but this is the only real thing that is mentioned (and that is pretty meaningless in this generality). [Andy Reisinger, New Zealand]	Accepted, added section on specific policies
26000	95	3	95	5	This framework needs to be explained. [Hans Poertner and WGII TSU, Germany]	Accepted, text deleted
10772	95	29	95	30	Wrong statement. Livestock systems are not the biggest source of deforestation. According to IPCC AR 5 and to Gerber et al, 2013, livestock account for about 20% of emisions from deforestation [Anne Mottet, Italy]	Text removed
18520	95	29	95	30	Contestable wording. Livestock systems are NOT the biggest source of deforestation. According to IPCC AR 5 and to Gerber et al, 2013, livestock account for about 20% of emisions from deforestation [Aziz Elbehri, Italy]	Text removed
15880	95	29	95	35	move and reduce this paragraph somewhere in P95 L11-19, where livestock issues are addressed [Jean-Luc Chotte, France]	Text removed
16870	95	29	95	35	Move and reduce this paragraph somewhere in P95 L11-19, where livestock issues are addressed [Rattan Lal, United States of America]	Text removed
21128	95	30	95	32	Maybe it's for the SPM, but then what does the IPPC recommend in regard to the 1,5 degrés objective and SDG objective, and so in terms of model, between increasing the productvity and the total emissions vs decreasing the emissions by 30 % (5-95 l36), vs having some models like the integrated crop livestick forest in Brasil (5-91 l18). [Valerie Dermaux, France]	Text removed
1392	95	8	96	30	The section is titled "pathways to low-carbon, climate-resilient food systems," but the discussion is primarily of mitigation/reduction of GHG. There is no discussion of practices to enhance climate resilience, other than the two lines (27-28). There is also a heavy focus on livestock systems with little discussion of hte changes that could be made in other models of agriculture, such as those with a heavy reliance on monocultures and on inorganic inputs. [Tonya Rawe, United States of America]	Accepted, text removed. Other models of agriculture discussed in section 5.7.1
25382	95	8	102	8	The chapter 5.10 lacks concreteness when it comes to action policymakers can take to make their food systems compatible with the Paris Agreement. This is particularly true when it comes to concrete policies and measures to tackle the demand side - including through dietary changes and reduction of food waste. [Kaisa Kosonen, Finland]	Accepted, added policies and measures
19584	95	3		5	There is also good territorial planning and land governance to secure the cultural spaces over the long term [Ibouraïma Yabi, Benin]	Accepted, text deleted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17976	95	3			Insert "A" before "climae" [Donald Smith, Canada]	Accepted, text deleted
9638	96	32	96	32	In this chapter it will be necessary to discuss the political economy of support to agriculture. In many rich countries agriculture and with it overproduction and overconsumption is heavily subsidized. There is for instance support for meat, milk or cheese production and marketing in Switzerland, but also in other countries. In many developed countries agriculture is motivated by commercial interest with support from governments. Sugar and fat consumption is promoted also in countries where overconsumption is the norm. Only a few countries have established limitation on sugar contents for softdrinks, most have not. A tax on meat consumption was proposed in Denmark. But climate smart agriculture does not have a huge lobby, but energy and input intensive agriculture has...This limits the scope for adjustment of the food system. REF: Jarosz, L. (2009). Energy, climate change, meat, and markets: mapping the coordinates of the current world food crisis. Geography compass, 3(6), 2065-2083. REF: Eshel, G., Shepon, A., Makov, T., & Milo, R. (2014). Land, irrigation water, greenhouse gas, and reactive nitrogen burdens of meat, eggs, and dairy production in the United States. Proceedings of the National Academy of Sciences, 111(33), 11996-12001. REF: Springmann, M., Mason-D'Croz, D., Robinson, S., Wiebe, K., Godfray, H. C. J., Rayner, M., & Scarborough, P. (2017). Mitigation potential and global health impacts from emissions pricing of food commodities. Nature Climate Change, 7(1), 69-74. REF: Stoll-Kleemann, Susanne, and Uta Johanna Schmidt. "Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors." Regional Environmental Change 17.5 (2017): 1261-1277. REF: Edjabou, Louise Dyhr, and Sinne Smed. "The effect of using consumption taxes on foods to promote climate friendly diets–The case of Denmark." Food policy 39 (2013): 84-96. [Markus Giger, Switzerland]	Rejected. Whilst we don't disagree with the importance of the political economy providing lock-in to current ways of doing (see for example https://doi.org/10.1017/sus.2018.9), the issues raised are best placed within chapter 7 whose focus is on policy and its implementation.
1394	96	33	96	34	Can the "recent agricultural policies" be discussed or described in some detail? Giving specifics of policies that have led to undesirable outcomes can signal what not to do and what needs to changed in policy. What policy has led to, driven, or incentivised the focus on relatively few commodity crops? What has incentivised the global intensification of agriculture in ways that impact soil, water, air quality, and biodiversity so negatively? [Tonya Rawe, United States of America]	Accepted - text modified
1396	96	32	97	10	While policies to address the demand side are quite important and not yet sufficiently explored in policy dialogues, what of policies to address the supply side? Incentives to adopt sustainable land management practices? [Tonya Rawe, United States of America]	Accepted - text modified
1398	96	32	97	10	The section does a good job of addressing agriculture (as food production) and environment. There is less attention -- and more could be given - to policies regarding agriculture as a livelihood (policies to address unequal access to productive resources like land, credit, extension,esp through a gender lens, that enable food producers to produce more food, access & adopt & investment in sustainable management practices, and grow their livelihoods). [Tonya Rawe, United States of America]	Accepted in part. Text modified and new table inserted with some of these elements.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11568	96	10			Re “food production does not necessarily reduce biodiversity” – actually, it does (eg the ‘edge effect’ where species disappear from disturbed border areas). Used land never retains all its biodiversity compared to (especially untouched) wild lands and this is why there always remains a need for complete conservation/preservation of remaining wildlands. However, biodiversity loss can be much reduced through suitable agricultural practices. [Debra Roberts, South Africa]	Accepted, text changed in section 5.3.2
17978	96	17			Remove "ing" from "altering" [Donald Smith, Canada]	Noted, text deleted
17526	97	36	9	40	Please check this paragraph. [Noureddine Benkeblia, Jamaica]	Noted. Sentence checked
24470	97	3	97	3	[The following can either fit here or on p. 98 (lines 17-29):] An effective means to ensure demand for different agricultural goods (ideally produced in a fair and eco-friendly manner) is for governments to establish/strengthen public procurement/sourcing from rural associations/cooperatives/family farmers. This can be incentivised through respective policies, e.g. per school feeding programmes (see e.g. Drake, L., Woolnough, A., Burbano, C.& Bundy, D. (2016): Global School Feeding Sourcebook: Lessons from 14 Countries. London: Imperial College Press. <https://openknowledge.worldbank.org/handle/10986/24418>). Such demand created by governments could incentivise farmers' diversification of income sources as well as climate-smart agriculture in the frame of inclusive and environmentally sound sourcing while raising adaptive capacity and adding value (not only economic) including at the local level. [Barron Joseph Orr, Germany]	accepted- text modified
6810	97	3	97	3	….. Alternative proteins, such as laboratory or “clean meat”. This theme is promising. Cultured meat in vitro will have lower environmental impact than livestock and this potential must also be examined as part of the research agenda to characterize the scientific opportunity. Advances in animal agriculture have depended on research and development and there is a continuing need to capitalize on scientific opportunity to respond to the growing challenges. SRCCL should draw attention of politicians. I would elevate this to the summary section. [Nazimi Acikgoz, Turkey]	Agreed it is important but it is one route, out of many, for mitigation - and all are needed. So request for it to be elevated rejected, but the message that it is part of the mix is valuable
21046	97	22	97	33	Here again there is an explicit assumption that food from distant markets will increase total carbon footprints, without any recognition that this food could have much lower footprinti if it was produced in more efficient systems. The same goes for a more critical evaluation of the benefits (or not) of food self-sufficiency - is this really the best way to deal with climate change (noting that reliance on self-sufficiency isn't a great way of dealing with climate change impacts either, unless we assume that all countries can remove all vulnerability to climate extremes of all foods they consume). A more critical evaluation of the role of trade is needed rather than falling into value-driven assumptions. [Andy Reisinger, New Zealand]	Rejected. Risks from trade are not only about GHG emissions from transport. This discussion makes clear that that is not the only issue; it focuses on reliance on trade as a risk in a world of climate disruption
24472	97	23	97	24	This sentence cannot be understood, please rewrite "Recently, agriculture has more commercialised […]". [Barron Joseph Orr, Germany]	rewritten

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24474	97	40	97	42	Please consider the following: Firstly, specify "higher" than what? Secondly - as a transition from this sentence to the next paragraph -, consider the role of environmental/sustainability standards as well as respective certification schemes that can reduce environmental footprints under certain conditions in given contexts (see e.g. Raynolds et al. 2007 [Raynolds, L. T., Murray, D. & Heller, A. (2007): Regulating sustainability in the coffee sector: A comparative analysis of third-party environmental and social certification initiatives. Agriculture and Human Values 24(2): 147-163.] and Duchelle et al. 2014 [Duchelle, A. E., Kainer, K. A. & Wadt, L. H. O. (2014): Is Certification Associated with Better Forest Management and Socioeconomic Benefits? A Comparative Analysis of Three Certification Schemes Applied to Brazil Nuts in Western Amazonia. Society & Natural Resources 27(2): 121-139.]). More specifically, fair trade certification for cooperatives and, overall, geographic indication based on 'community-corporation protocols' for participatory socio-environmental certification. The (socioeconomic and biophysical) conditions are to be considered under which such (quality) assurance systems can contribute to more transparent, ethical and inclusive sustainable trade relations among up- and downstream value chain actors, while praising for a more equitable share of benefits. This can be operationalized e.g. through the abovementioned standards and certification systems provided they are locally adapted and consider local value addition as well as socioeconomic and environmental conditions of the contexts from which given products are sourced while minimising carbon footprints along respective value chains. [Barron Joseph Orr, Germany]	Noted. Text has been highly modified so specific reference to sentence no longer applies. However, the issues raised added to Table
17980	97	22			Insert "the" after "in" [Donald Smith, Canada]	editorial
18	98	1	98	9	Again this passage fails to mention the need to curtail financial speculation with food, as well as to resolve the inevitable problems of a world food trade system oriented solely toward profit rather than toward supplying food in fulfilment of a basic human right to life. [Thomas Reuter, Australia]	Rejected. The evidence on speculation being bad for food security vs being beneficial is very weak.
7172	98	10	98	16	There are some excellent examples of crop, livestock and flood insurance that have arisen specifically in response to climate change challenges. See CCAFS and other CGIAR examples plus WFP procurement platform work with Imperial College and a set of re-insurers. [Sonja Vermeulen, United Kingdom (of Great Britain and Northern Ireland)]	Agreed that there are some excellent examples. WINNERS added to table
1400	98	17	98	29	The discussion of policy here could fit better under the preceding discussion of policy (pg 96 line 32 to 97, line 10). While some policies may be more specific to markets, trade, finance, and insurance, they relate to food production, incentives/subsidies, public awareness of diet/food choice, etc. -- which overlap well with the discussion re: policies for the agriculture, food, environment, health nexus. [Tonya Rawe, United States of America]	Accepted - sections combined

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19622	98	19	98	23	Lines 19 to 23 are suggested to be deleted because of below arguments: 1. Renewable subsidies are given to production of renewable energy with the objective of making the market price of this type of energy competitive with other energy sources. Whereas fossil fuel subsidies are given to consumption of fossil fuel. 2. Definition of what constitute as fossil fuel subsidies is controversial, hence, estimate by the IEA of 260 US$ Billion subsidies is challenged depending on what is measured as subsidies. 3. Statement on moving subsidies from fossil fuels to renewables is wrong. [sadegh ziayan, Iran]	Text modified in rewrite, so comments no longer apply
24476	98	34	98	34	Please consider the relevance of establishing good governance structures e.g. through the creation of government entities/ministerial units responsible for coordinating among ministries (cutting across different administrative levels). This could facilitate synergies among different agricultural and environmental (sub)sectors by creating an enabling public/policy environment for mitigation and adaptation as well as to avoid/reduce/reverse land degradation (for the respective response hierarchy, see Orr et al. 2017: 64). Such government structures could facilitate the design of concerted sustainable rural development measures (including through land-based mitigation and adaptation measures to climate change) for achieving Land Degradation Neutrality at national level. [Barron Joseph Orr, Germany]	Accepted.
1404	98	34	99	47	The discussion earlier in the report of gender and other social inequity dynamics raises the need here to discuss social justice and inequality and how governance and institutions must be designed to be inclusive and to facilitate participatory processes for formulating policy, strategies/priorities, and budgets. [Tonya Rawe, United States of America]	Accepted. Participation and social justice outlined in the text now
1402	98	42	99	6	While the statement on pg 99 lines 4-6 may be the frequent focus of adaptation actions, successful adaptation in fact requires action and investment at multiple scales and across sectors. It requires changes in national and local governance to ensure plans, priorities, and budgets are set in participatory ways that promote inclusion of the priorities and needs of the most vulnerable; This is stated in line 6, but the impression left by the two sentences is that adptation can be taken care of less through national policy and national action. Adaptation also requires working across social, economic, and environmental sectors. And on the flip side, mitigation policy will also need to better take into account social actors and issues of fairness in process to ensure no negative impacts from mitigation actions, especially those in the land sector. [Tonya Rawe, United States of America]	Accepted. Paragraph rewritten to clarify
21048	98	44	99	6	These statements are inconsistent with the AR5, which found that adaptation is strongly connected across scales (i.e. not just national/local), and the strong and growing role of cities, states and businesses in mitigation. [Andy Reisinger, New Zealand]	Accepted. Clarification added to the sentence
10560	98	34			civil society play an important role in food system governance [Zitouni Ould-Dada, Italy]	Accepted. Civil society, and other actors, added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26994	99	24	47		It looks impressive that authors have referred to the literature on polycentric governance. As mentioned above they could also look at how socio-ecological and socio-technical systems are being integrated for the benefit of food and agricultural systems. it would be particularly halpful to understand multi-level perspective on changes in food and agricultural systems. [Laxmi Pant, Canada]	Accepted- Socio-technical references added.
20	99	1	99	47	this passage fails to consider the need for some kind of global framework for mitigating the impact of food supply crises. For example, export bans on wheat in one country may keep prices stable there while effectively killing the poorest in other countries. Given the vagaries of future climate change impacts, which means that nobody can be entirely sure they will be able to feed themselves from domestic production, this creates the nees for a global food solidarity treaty. This chapter must address this issue somewhere, or it will most certainly be subject to public criticism on these grounds. [Thomas Reuter, Australia]	Accepted. Text added
24478	99	38	99	39	Please cut and paste both these sentences between the sentence that ends and the one which starts in line 25 on the same page (p.99). Even though some readers know what is meant with polycentric systems/approaches, it would facilitate the understanding if a brief explanation follows the respective first mention polycentric systems/approaches. [Barron Joseph Orr, Germany]	Rejected. No sentence has been provided

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20262	99	6			After this line please insert new para: Asia, with extremely high concentration of population and natural diversities, has already emerged as the region where the impact of the present uncertainties of climate change, low growth in agriculture and other manmade disasters is the most severe where already 700 million people live under food poverty. It is urgent therefore to investigate the medium to long term food grains production and consumption scenarios in Asia for developing strategic policies and measures keeping in view the country prospects and the UN Sustainable Development Goals (SDGs). In this context, several micro-level questions are important for drawing broader pictures: (i) What is the importance (e.g. in terms of allocation of available resources) of food grain production and consumption to individual producer or consumer? (ii) How do changes in household income affect the quantity and diversity of the food basket? (iii) How do the allocations change with varying income levels and over time? (iv)What is the degree of sensitivity of consumer's decisions regarding quantity and composition of food purchased to market parameters such as food prices? While the above and similar information are no doubt important in designing national policies, these have special significance for disadvantaged communities under major stresses such as those residing in the various deltas (vulnerable regions) of Asia and Africa and/or those more exposed to the uncertainties mentioned earlier. For example, in Asia, Bangladesh and Vietnam have such disadvantaged communities dominate in two specific regions--highlands (hills) and coastal areas. In many of these regions, people face sustained declines in food consumption in recent years due to global warming induced climate change and other economic shocks. In the highland areas, the frequency of drought or near drought condition has increased over the last 50 years and, in the coastal areas, the frequency of floods and cyclones has increased many folds over the same period. In recent decades, although both the countries are making rapid economic progress in real terms with medium to high rates of growth, these countries have also been identified as the major victims of climatic hazards in highlands and natural disasters including salinity encroachment in the coastal farmlands due to sea level rise. Along with adverse effects on natural resources and agriculture including food production, many other social and economic disruptions are also evident in these areas. The highland and coastal communities are increasingly being displaced and many families are on the move searching for shelters in urban areas as temporary migrants and/or looking for alternative livelihoods (see chapter 2 of this study and Kabir, forthcoming). These transformations, while undergoing a somewhat silent movement at present, are more likely to gather momentum over time and create a large mass of 'climate refugees' in respective countries adding to major social	Rejected. The propose paragraph does not deal with governance issues. Also, no references are provided
17982	99	32			Change "deal" to "of dealing" [Donald Smith, Canada]	Accepted. Change made
17984	99	34			Change "of" to "in" [Donald Smith, Canada]	Accepted. Change made
21050	100	1	100	32	This section lacks any citations - is it an assessment? Based on what? [Andy Reisinger, New Zealand]	Accepted. Text has been removed
1406	100	1	100	32	The discussion of knowledge, extension, etc. would be stronger with a link to the governance and institutions section, as a means of elaborating the importance of participatory approaches to designing systems for the generation and dissemination of knowledge and technology to meet the needs of farmers themselves. [Tonya Rawe, United States of America]	Accepted. Participation has been expanded along the sections

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24480	100	22	100	22	Please consider adding what is underlined to this sentence: Farmers need access to efficient and environmentally sound market chains that they can rely on to dispose of their products at competitive and stable prices without comprising food and nutrition security. [Barron Joseph Orr, Germany]	Rejected. Text has been deleted
24482	100	28	100	28	Please specify cooperatives compliant to cooperative principles for collective marketing that is mutually beneficial (not only for the benefit of cooperative managers/heads but for all cooperative members). The cooperative principles are guidelines by which co-operatives put their values into practice. 1. Voluntary and Open Membership 2. Democratic Member Control 3. Member Economic Participation 4. Autonomy and Independence 5. Education, Training and Information 6. Co-operation among Co-operatives 7. Concern for Community (see <https://ica.coop/en/whats-co-op/co-operative-identity-values-principles> [Barron Joseph Orr, Germany]	rejected. Out of the scope of the chapter
21052	100	34	100	47	It would be useful to note that for mitigation, as basic capacity building aspect is improving the ability of countries to do MRV of their emissions and mitigation options, which generally means helping them shift to Tier 2 based inventories that can capture the benefits of improving productivity. Wilkes A, Reisinger A, Wollenberg E, van Dijk S. 2017. Measurement, reporting and verification of livestock GHG emissions by developing countries in the UNFCCC: current practices and opportunities for improvement. CCAFS and GRA, Vermont and Wellington. https://cgspace.cgiar.org/bitstream/handle/10568/89335/CCAFS_Report17.pdf [Andy Reisinger, New Zealand]	Accepted. Measured added
22	100	1	101	3	Secion 5.10.5 fails to consider the relevance of Indigenous and Local Knowledge (ILK). Have a look at the work of IPBES in this area [Thomas Reuter, Australia]	Accepted. A section on ILK has been added
6812	100	34	101	2	5.10.5.1. Capacity building. Table 5.5 Areas of capacity building for climate change and food systems. This is an important section I would enrich with the following points: Food security is forcing many countries to rearrangement of their national agricultural research systems. Brazil is typical example in this respect. Brazil has brought all food related research organizations into one unit and establishes its EMPRAPA (Brazilian Enterprise for Agricultural Research) for national research activity. Bringing together Federal and State experiment station, Universities and private sector, Brazil is now second after USA in agricultural biotechnology. How about developing countries? They didn't combine all manpower, infrastructure, genetic material and money into one research system? Why university's research armies not incorporate in to agricultural research system? SRCCL has to emphasize its importance to mitigate impact of CLIMAT CHANGE to food security. This subject seems to be one of the important issues so I would elevate it to the summary page of SRCCL. [Nazimi Acikgoz, Turkey]	Rejected. Table has been now deleted
27560	100	35	105	15	The work done here is substantive with clear examples and case studies from Africa and elsewhere. [Daniel Mailumo, Nigeria]	Noted. Thank you

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10562	100	15			the issue is not only in adopting new agricultural technologies, but in improving local technologies in a participatory manner, through on-farm experimentation, farmer to farmer exchange, consideration of women and youths, etc [Zitouni Ould-Dada, Italy]	Accepted. Text added
17986	100	25			Change "aceptable" to "acceptability" [Donald Smith, Canada]	Rejected. Text has been changed and reworded
10564	100	34			it is also important to build the capacity of local and government institutions, but also of local and indigenous leaders [Zitouni Ould-Dada, Italy]	Accepted. Text added
24484	101	2	101	2	Please add to the cell in the intersection of the first row and the third column of Table 5.5: "Value addition (including in loco/ level of production or sourcing of goods in natura). It does not have to be mentioned in the table, yet it is important to consider value addition beyond economic/financial value towards the other four capitals (contained in cell I 64) of the sustainable livelihoods framework/system (see Chambers et al. 1991/ DFID 1999). [Barron Joseph Orr, Germany]	Rejected. Table has now been deleted
2586	101	2	101	2	Perhaps the authors could include tools (models, observations) in Table 5.5. Amongst other things, these tools would help understand the impact of food policies (models) and monitor the impact of food policies (observations). [William Lahoz, Norway]	Rejected. Table has been now deleted
8136	101	5	101	8	There are also knowledge gaps in how to improve crops [Peter Neofotis, United States of America]	Accepted, added text
15882	101	1	102	8	the section on Knowledge Gaps needs to address the key issue of "Soil Organic matter and Land". Soil organic carbon is at the crossroad of the 3 post rio convention. Recently it has gained in attention since soils are a source but also a sink for CO2. Plenty of international initiative have mobilized the scientific international community to better design research agenda. See Land Degradation Neutrality (UNCCD-SPI), the 4P1000 initiative, the international workshop by FAO, the work done by ITPS (FAO) in the Global soil partnership, see also de SPM of the IPBES "Land Degradation Report Assessment adopted in Medellin in 2018. [Jean-Luc Chotte, France]	Rejected. Soil and land degradation, as well as international initiatives belong to chapters 3,4, 6 and 7.
16872	101	1	102	8	Ihe section on Knowledge Gaps needs to address the key issue of "Soil Organic matter and Land". Soil organic carbon is at the crossroad of the 3 post rio convention. Recently it has gained in attention since soils are a source but also a sink for CO2. Plenty of international initiative have mobilized the scientific international community to better design research agenda. See Land Degradation Neutrality (UNCCD-SPI), the 4P1000 initiative, the international workshop by FAO, the work done by ITPS (FAO) in the Global soil partnership, see also de SPM of the IPBES "Land Degradation Report Assessment adopted in Medellin in 2018. [Rattan Lal, United States of America]	same comment that above
16756	101	5	102	8	The contents of knowledge gaps should be expanded to cover the impact of climate change on food and nutrition security. [Jing Wang, China]	Accepted, added text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6814	101	5	102	8	5.10.6 Knowledge gaps: It would seem the lead authors have limited interest in plant breeding in this report, which is a crucial in food security. They find: “For food security gender, equity, ethnicity has been accepted as ‘important’, whereas agricultural technology transfers as ‘can help...’ “ So, some very important plant breeding activities like TRITICALE (a new crop, triticale, has been created by hybridizing two old crop species and is now grown all over world) and importance of key issue of Green Revaluations redesigned plant varieties, with short statute, are not put into words. Therefor it is suggestable to review, not only this chapter text, also entire report. (FAO's World agriculture: towards 2015/2030 emphasizes: “Food insecurity for some vulnerable rural groups in developing countries may well worsen. By 2030, climate change is projected to depress cereal production in Africa by 2 to 3 percent. Improved seeds and increased fertilizer use should more than compensate, but this factor will still weigh heavily on efforts to make progress”. I would encourage the lead authors to reconsider the role of plant breeding not only in this chapter but for the entire report. [Nazimi Acikgoz, Turkey]	Accepted, added paragraph on plant and animal breeding
1408	101	5	102	8	An additional knowledge gap is a more socio-economic assessment of the "potential" of various climate-smart practices to deliver the migitation potential flagged from a biophysical perspective. While studies talk about how much CO2 could be sequestered in soil, for instance, there is not yet discussion of the potential for this it actually happen once barriers and incentives to adoption of the techniques, practices, and technologies are considered. [Tonya Rawe, United States of America]	Accepted, added text
11572	101	5			Knowledge gaps around options and solutions and their (co-)benefits, trade-offs are increasingly important now that the world is looking for solutions. The need for forecasts is reduced if the systems are more resilient to change. The question guiding this section should be “where should we focus our research attention going forward, what knowledge would have the biggest impacts, what do we need to know to move towards a sustainable and food-secure future”. And the answer is not (only) “better models” and “more detailed risk assessment”. This section has the potential to have a powerful impact. [Debra Roberts, South Africa]	Accepted, added new first paragraph
11570	101				Table: this table is not easy to understand. It would be better to convert this to text, so that the meaning of the different row-column combinations can be better explained. Each category can be one paragraph. [Debra Roberts, South Africa]	Accepted, changed to text
2400	102	4	102	5	Knowledge gaps on the mitigation side also include embedded emissions (overseas' footprints) of food systems as well as comparison of GHG emissions per type of food systems (smallholder food system and large scale commercial food system as it is mentioned in the chapter). [Anne-Laure Sablé, France]	Accepted, added text
24486	102	6	102	6	For evidences on the scope for local adaptation strategies concerning extreme weather events and shocks, see Rodriguez-Osuna et al. (2014) could be added as directly related evidences stemming from subnational production networks (see complete reference in cell I 34). [Barron Joseph Orr, Germany]	Accepted, added text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17574	102	10	107	24	Very little is said on what can be achieved through genetic improvement regarding food security (and nutrition) and no role is acknowledged to genetic engineering. Suggest a different approach. [TURI FILECCIA, Italy]	Accepted, added sentences on genetic improvement regarding FS. Genetic engineering beyond scope
8750	102	10	109	12	this is the only chapter with a Supplementary Material; it would be best to integrate the relevant information in the chapter' sections and delete the SM for consistency with other chapters [Delphine Deryng, Germany]	Supplementary Material removed
16430	102	10	109	12	The role of the supplementary material is not clear. If you decide to keep it please revise it carefully and delete all repetitions (there are in several instances copy-paste text passages from Chapter 5) and make sure that in the main body of the text you indicate what information the reader can find there. [Lorenzo Giovanni Bellù, Italy]	Supplementary Material removed
6816	102	10	109	12	5.11 Supplementary Material: This subsection covers topics like “food production”, feed production”, “food loss and waste”, “food loss” which were already been covered in other sections. Other topics to cover might include: Green Revaluation, Plant Breeding, Climate-smart agriculture, Genome Editing, Genetic engineering and cell-cultured meat. These would be relevant to the main themes but new information to cover. [Nazimi Acikgoz, Turkey]	Supplementary Material removed
17988	102	28			Write out "815" [Donald Smith, Canada]	Supplementary Material removed
2588	103	9	103	9	I think text is missing. [William Lahoz, Norway]	Supplementary Material removed
1410	103	9	103	10	A sentence seems to be unfinished… "On a gender basis, (Tulchinsky 2010)." [Tonya Rawe, United States of America]	Supplementary Material removed
8256	103	30	103	30	'have' needs to be changed to 'has'. [Muhammad Mohsin Iqbal, Pakistan]	Supplementary Material removed
10566	103	14			over-consumption, overweight and obesity are related to malnutrition [Zitouni Ould-Dada, Italy]	Supplementary Material removed
17990	103	30			Insert "being" before "overweight" [Donald Smith, Canada]	Supplementary Material removed
17992	103	32			Insert "being" before "overweight" [Donald Smith, Canada]	Supplementary Material removed
17994	103	33			Insert "being" before "overweight" [Donald Smith, Canada]	Supplementary Material removed
17996	103	37			Insert "Being" before "overweight" [Donald Smith, Canada]	Supplementary Material removed
17998	104	5			singular [Donald Smith, Canada]	Supplementary Material removed
18002	104	5			Make "oats" sigular [Donald Smith, Canada]	Supplementary Material removed
18000	104	31			Remove first % [Donald Smith, Canada]	Supplementary Material removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1412	105	11	105	14	Can the differing implications be explained & quantified? [Tonya Rawe, United States of America]	Supplementary Material removed
18004	105	8			Insert "," after "grain" [Donald Smith, Canada]	Supplementary Material removed
18006	105	11			Move opening bracket to just before year [Donald Smith, Canada]	Supplementary Material removed
18008	105	19			Make "soybeans" singular [Donald Smith, Canada]	Supplementary Material removed
18010	105	20			Insert "of the cake" after "%" [Donald Smith, Canada]	Supplementary Material removed
18012	105	29			Remove first % [Donald Smith, Canada]	Supplementary Material removed
18014	106	35			Replace "ton" with "tonnes" [Donald Smith, Canada]	Supplementary Material removed
18016	106	36			Remove % [Donald Smith, Canada]	Supplementary Material removed
724	107	11	107	11	comma in "'opportunity food losses.'" must be changed [Roberto Abeldaño, Mexico]	Supplementary Material removed
6818	107	25	107	33	23 Expansion of agricultural land. Where is coming "Globally, 4900 billion ha land was under agricultural production in 2015 (FAOSTAT 2015)" (line 27). This must be a miscalculation. Land under agricultural production was in 1961/63 1351 million Ha and 1997/99 1506 million Ha. So, incensement is %11. How can we claim "Although there was a marginal increase in total agricultural land over the period between 1961 to 2000" Here, lead authors want address the land expansion, instead of improvement of HIGH-yield crops (http://www.fao.org/docrep/005/y4252e/y4252e06.htm) [Nazimi Acikgoz, Turkey]	Supplementary Material removed
18018	107	11			Retain only final % in the series [Donald Smith, Canada]	Supplementary Material removed
1414	108	11	108	22	Consider the gender lens on closing yield gaps -- see World Bank, "The Cost of the Gender Gap in Agricultural Productivity" available at http://documents.worldbank.org/curated/en/847131467987832287/The-cost-of-the-gender-gap-in-agricultural-productivity-in-Malawi-Tanzania-and-Uganda and FAO 2011 SOFA report (already cited elsewhere in the chapter) [Tonya Rawe, United States of America]	Supplementary Material removed
6554	108	23	108	28	I would add that indigenous knowledge systems should be weaved/intergrated into technological approaches for a more holistic outcome and radical transformation of agriculture [Ojong.E nee Enokenwa Baa, South Africa]	Supplementary Material removed
2402	108	25	108	27	Mono-cropping and high dependency on synthetic inputs don't always go side by side with intensive tillage: no-tillage can also present the same characteristics. Source: Giller K. E., Witter E., Corbeels M., Tittonell P. 1 October 2009. Conservation agriculture and smallholder farming in Africa: The heretics' view. Field Crops Res. doi:10.1016/j.fcr.2009.06.017 [Anne-Laure Sablé, France]	Supplementary Material removed
18020	108	12			Remove first % [Donald Smith, Canada]	Supplementary Material removed
18022	108	13			Remove first % [Donald Smith, Canada]	Supplementary Material removed

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18024	108	25			One of the high technology approaches could be phytomicrobiome management. Again, I could provide some concise text. [Donald Smith, Canada]	Supplementary Material removed
11574	108				Figure: The percentages are shown twice – legend is unnecessary. Instead, please also show percentage of arable land. [Debra Roberts, South Africa]	Supplementary Material removed
16758	109	9	109	10	Please provide more references to support the conclusion. Only a study could not support such an important conclusion. [Jing Wang, China]	Supplementary Material removed
1726	109	52	109	52	An idea of the total technical mitigation potential in agriculture is missing in this section. I would propose the following based on European studies, but I assume other papers in other continents show similar order of magnitudes: "All in all, the technical potential for emissions reductions in agriculture, not counting avoided deforestation and peatland restoration, does not exceed 10-15% of agricultural emissions. References supporting this statement: Wollenberg, E., Richards, M., Smith, P., Havlík, P., Obersteiner, M., Tubiello, F.N., Herold, M., Gerber, P., Carter, S., Reisinger, A., van Vuuren, D.P., Dickie, A., Neufeldt, H., Sander, B.O., Wassmann, R., Sommer, R., Amonette, J.E., Falcucci, A., Herrero, M., Opio, C., Roman-Cuesta, R.M., Stehfest, E., Westhoek, H., Ortiz-Monasterio, I., Sapkota, T., Rufino, M.C., Thornton, P.K., Verchot, L., West, P.C., Soussana, J.-F., Baedeker, T., Sadler, M., Vermeulen, S., Campbell, B.M., 2016. Reducing emissions from agriculture to meet the 2 °C target. Global Change Biology. https://doi.org/10.1111/gcb.13340 Pérez Domingez, I., Fellmann, T., Weiss, F., Witzke, P., Barreiro-Hurlé, J., Himics, M., Jansson, T., Sapultra, G., Leip, A., 2016. An economic assessment of GHG mitigation policy options for EU agriculture (EcAMPA 2) (No. EUR 27973 EN, 10.2791/843461), JRC Science for Policy Report. European Commission Joint Research Center, Ispra, Italy. Pellerin, S., Bamière, L., Angers, D., Béline, F., Benoît, M., Butault, J.-P., Chenu, C., Colnenne-David, C., De Cara, S., Delame, N., Doreau, M., Dupraz, P., Faverdin, P., Garcia-Launay, F., Hassouna, M., Hénault, C., Jeuffroy, M.-H., Klumpp, K., Metay, A., Moran, D., Recous, S., Samson, E., Savini, I., Pardon, L., 2013. Quelle contribution de l'agriculture française à la réduction des émissions de gaz à effet de serre ? Potentiel d'atténuation et coût de dix actions techniques, Synthèse du rapport d'étude. INRA, France. ADEME, 2013. L'exercice de prospective de l'ADEME « Vision 2030-2050 ». Agence de l'Environnement et de la Maîtrise de l'Energie. [Valentin Bellassen, France]	Supplementary Material removed
18026	109	9			One of the other ways to increase crop yield could be through phytomicrobiome management. [Donald Smith, Canada]	Supplementary Material removed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9438	110	1	110	10	References: Akram-Lodhi, A.H. (2013), Hungry for Change: Farmers, Food Justice and the Agrarian Question (Halifax, Fernwood). Clapp, Jennifer (2015), "Food Security and Trade: Unpacking Disputed Narratives," Background Report for the Food and Agriculture Organization of the UN, Trade and Markets Division (Rome, FAO). ---------- (2016), Food. Second edition, Cambridge, Policy Press. IPES-Food (2016). "From Uniformity to Diversity: a Paradigm Shift from Industrial Agriculture to Diversified Agroecological Systems." International Panel of Experts on Sustainable Food systems. www.ipes-food.org. Friedmann, H., and P. McMichael (1989), "Agriculture and the State System," Sociologia Ruralis , Vol. 29 (2), pp. 93–117. Holt-Giménez, E., and Shattuck, A. (2011). "Food Crises, Food Regimes and Food Movements: Rumblings of Reform or Tides of Transformation?" Journal of Peasant Studies, Vol. 38 (1): 109–144. McMichael, Phillip (2014), "Historicizing Food Sovereignty," The Journal of Peasant Studies, Vol. 41 (6), pp. 933-957. Pritchard, B. (2016) "Food and nutrition security: future priorities for research and policy", in Routledge Handbook of Food and Nutrition Security. Gerardo Otero (2011) "Neoliberal Globalization, NAFTA, and Migration: Mexico's Loss of Food and Labor Sovereignty", Journal of Poverty, 15:4, 384-402, DOI: 10.1080/10875549.2011.614514 Isobel Tomlinson (2011) "Doubling food production to feed the 9 billion: A critical perspective on a key discourse of food security in the UK. Journal of Rural Studies. DOI: 10.1016/j.jrurstud.2011.09.001 Wittman, Hannah, Nettie, Wiebe, and Annette Aurelie Desmarais, eds. (2010), Food Sovereignty: Reconnecting Food, Nature & Community (Oakland, Food First). Weis, Tony (2015) "Meatification and the madness of the doubling narrative" Canadian Journal of Food Studies. DOI: 10.15353/cfs-rcea.v2i2.105 [Helena Shilomboleni, Canada]	Noted, relevant references added
18584	110		148		References should be more diversified. For example, 10 citationS for Hererro (one of the chapter lead authors) can be found in 3 subsections over just 20 pages. Need to be careful about over using own references. [Aziz Elbehri, Italy]	Accepted, added more references
16760	110	1	149	45	The format of the references should be unified according to the requirement of IPCC report. [Jing Wang, China]	Noted. References will be formatted according to IPCC guidelines
24488	145	46	145	46	Need to be consistent in this citation: United Nations Convention to Combat Desertification. 2017. The Global Land Outlook, first edition. Bonn, Germany. [Barron Joseph Orr, Germany]	Reference fixed

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4098	149	1	149	45	Prafulla Kumar Mandal , Ex-Additional Director of Agriculture, West Bengal, India ,Recipient of Award (1) Leadership (SCSI),(2) Dr.KGTT(SCSI),(3) Gold Medal (IASWC,(4) Special Honour (SCSI),(5) Hrit Ratna (AIASA), (6) Asian Technical (WASWAQC), (7) Distinguished Extensionist (WASWAC), (8) Fellowship Award (CWSS-BCKV). Ref- 1. Food Security- FAO (2/2006). 2. Land degradation and Agriculture – FAO 3.The State of Food Security and Nutrition in the World 2017 - FAO 4. The food security challenge- Global Food Security. [Prafulla Kumar Mabdal, India]	Comment unclear
10732					References should be more diversified. For example, 10 citation for Hererro can be found in 3 subsections over just 20 pages [Anne Mottet, Italy]	Accepted, added more references
10778					2 important missing references: 1) FAO. 2017. The future of food and agriculture – Trends and challenges. Rome. http://www.fao.org/3/a-i6583e.pdf; 2) FAO. 2016. The State of Food and Agriculture - Climate change, agriculture and food security. Available at: http://www.fao.org/publications/sofa/2016/en/ [Anne Mottet, Italy]	Comment repeated (16348)
18522					References should be more diversified. For example, 10 citationS for Hererro (one of the chapter lead authors) can be found in 3 subsections over just 20 pages. Need to be careful about over using own references. [Aziz Elbehri, Italy]	Accepted, added more references
1500					The entire chapter appears to foster the notion that all changes to land are axiomatically degrading to environmental services--that none enhance them for certain services in a sustainable way. The Dutch polders and SE Asian wet rice systems have been substainable for 500 to 1000s years. [Billie Turner II, United States of America]	Rejected, Chapter goal is to seek sustainable land use solutions
1502					Throughout the document references are made to land sparing, largely from intesification of agriculture. While some global references make this case, other studies seriously challenge the claim. Rudel et a. 2009 PNAS show that intensification, if successful, expands cultivation. Meyfroidt and Lambin 2010 PNAS note that land sparing one locale leads to leakage in another. [Billie Turner II, United States of America]	Accepted, See box on Agricultural Intensification and Meyfroidt references
1504					Throughout the document references are made to climate change, conflict and migration. Missing is the multiple paper debate in PNAS on this issue in Africa. Begin with Hsiang and Meng 2014, PNAS. [Billie Turner II, United States of America]	Rejected, beyond scope of chapter
1506					The sustainability science section of PNAS has numerous research papers dealing with the topics in this chapter. I found none of them referenced or their content examined. [Billie Turner II, United States of America]	Rejected, comment is to broad
19374					Overall: The chapter has several overlapping statements with other chapters, while some of the contents are not specific which could undermine the quality of chapter. Would like to remind that it is an IPCC report. [Binaya Raj Shivakoti, Japan]	Noted

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26996					A referance to adaptive transition literatrue that integrates socio-ecological systems thinking with the socio-technical systems thinking would also make this Chapter more relevant to the chapter on socio-technical transitions, whch I guess is being focused more on energy systems transitions. This has become relevant in developing country context as well. Here are some examples. Ramos-Mejía, M., Franco-Garcia, M., & Jauregui-Becker, J. M. (2018). Sustainability transitions in the developing world: Challenges of socio-technical transformations unfolding in contexts of poverty. Environmental Science & Policy, 84, 217-223. doi: doi:10.1016/j.envsci.2017.03.010 Wieczorek, A. J. (2018). Sustainability transitions in developing countries: Major insights and their implications for research and policy Environmental Science & Policy, 84, 204-216. doi: doi:10.1016/j.envsci.2017.08.008 [Laxmi Pant, Canada]	Accepted, see section 5.3.1.2
24640					Occurance in crops due to climate change may require anticipatory actions. [Lizzy Igbine, Nigeria]	Rejected, unclear
24936					It is a general comment. Issues of climate change are real and they will affect food security in term of availability and accessability. Also agriculture production has significant contribution on climate change. Thus, I suggest to have a sub section in the chapter which address the issue of political economy by giving some tips on how policy makers will be informed with regards to the issue of climate change [Prudence Lugendo, United Republic of Tanzania]	Accepted- political economy and political ecology references have been added where relevant
19380					There is a need to add more coverage of impacts of sea level rise - salt water inundation and intrusion on food availability and accessibility. It would be good to see how much arable land loss due to coastal erosion, salt water intrusion and inundation. Food small island ccountries loss of arable land due to sea level rise, salt water inundation and intrusion is a major issue affecting food security. Salt water intrusion is also affecting wells and availability of water for irrigation [VILIAMU IESE, Fiji]	Accepted, see Box on Migration in the Pacific
19384					There should be coverage or mention in the report the post disaster situation on food security. Food aid's role on shifting diets to processed food and contributing to bad nourishment. [VILIAMU IESE, Fiji]	Accepted, added text on food aid