Expert Review Comments on the IPCC WGIII AR5 First Order Draft – Chapter 11

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4983	11					Lay out of chapter did not follow outline sugessted	Rejected, Lead author meeting agreement followed
13513	11					Lay out of chapter did not follow outline sugessted	Rejected, Lead author meeting agreement followed
4996	11					Consider to delete table ,since it is not adding much to subsection, and not providing complete summary to what is presented in subsection	Accepted, Text has been shortened, table has been deleted
13526	11					Consider to delete table ,since it is not adding much to subsection, and not providing complete summary to what is presented in subsection	Accepted, Text has been shortened, table has been deleted
8838	11					Further, after such explanation it would be interesting to have a discussion on how the resulting GHG impacts of these changes can be accounted for products (e.g. for bioenergy)	Rejected, Accounting rules are not in scope of AR5
8779	11					For this first draft I have no comments. I will waiting for the next version.	Accepted, Thank you
9100	11					One individual part (section or sub section) of "Forestry" should be composed. It makes clear that what is the contribution of forestry and forest products to governments and any sectors. Also role of forestry is clearer. And what governments and/or any sectors should do on Forestry. That way relation between “forestry” and “another chapters” would be more clearly and practically. [e.g.] “7.4.3 Renewable energy, 7.5.4 Renewable Energy in chapter 7”, “10.4.1.3 Material substitution, material reuse and waste (material efficiency), which covers recycling materials in chapter 10 ”. “Urban forestry”, which is mainly explained in chapter 12 and told some other chapters, is obviously one of “forestry”. But it is not enough to be covered in “agriculture and forestry” combined word in sections (or sub sections).	Accepted, Addressed in SOD
10237	11					Need to be improved in terms of format	Accepted, Revised for SOD
10236	11					Need to improve nearly all figure in terms of format: x-axis legend below the figure (e.g. Fig 11.2, 11.3), need to homogenize (Fig 11.1 left anf right), digital separator is "." …	Accepted, Figures have been revised for SOD. Will be further improved with professional help at final draft stage
16617	11					The 20% figure may have been correct for the 1990s but no longer is, given the increases in total emissions since then. If this is the basis for the high figure (34%) in the final sentence it cannot be justified -- at least if you use the verb "is" rather than "was"! Make sure that all figures described in the present tense refer at least to the 2000s, and if possible to the 2005-2010 period.	Accepted, Update for 2000s
16618	11					Are the demand-side reduction potentials in agriculture included in the agriculture figure? If not, they should be given separately. Also, do not give the high figure for agriculture ("up to 4.30 Gt") without also giving the low one, as for the forest sector. and deleted the unquantified and citation-lacking assertion that "a large proportion" of the potential is from soil carbon sequestration.	Accepted, Add for SOD
16619	11					Here, the "large portion" of the AFOLU mitigation potential is said to be in soils AND vegetation, but again without quantification and without a citation. Drop this sentence.	Rejected, Quantify and add references instead
16620	11					The question should be phrased "What are the co-benefits…" rather than "Are there any co-benefits.."	Accepted, Changed fo SOD
16537	11					Since as mentioned in the text the "Asia" figures are due to combining opposite trends in tropical (S and SE Asia) vs temperate (E Asia), it is important to separate out the tropical parts of Asia. Otherwise one gets the impression that deforestation is low in SE Asia, whereas just the opposite is true.	Accepted, Revise
16538	11					Clarify in the table heading that these represent net change (gain minus loss).	Accepted, Revise
16601	11					This appears to be the same data as in Figure 11.12, just rearranged in a different way (OECD vs non-OECD; where do the "Economies in Transition" fit in?). Thus it has the same problems as Figure 11.12 and Table 11.9; I suggest it be deleted.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16615	11					This table completely leaves out the Norwegian program, which is has the largest commitment of funds of any country and has already achieved the most reduction in emissions (mostly in Brazil). It's important to add it.	Accepted, Added for SOD
16558	11					I doubt whether such a large table, simply summarizing options but without quantification of their potential contributions, really adds much (or will be read). Suggest you delete it.	Rejected, It describes the practice and provides the reader with the key papers to read on each measure. Potentials are given in the costs and potentials section (11.6)
16563	11					This table is quite confusing and should be deleted. Among its problems are: a) no indication of what the separate rows within cells represent -- different estimates? Different time periods? Something else? b) no indication of the units for the numbers in the table; c)Cells that correspond to partly overlapping areas (e.g. Canada and USA", "Canada", "USA", "Europe & Russia", "Europe", "Former Soviet Union (Russia),", etc.). Most fundamentally, it's not clear what's the point it's supposed to demonstrate.	Accepted, This table went very wrong in formatting - it will be replaced in SOD
16570	11					The "reduction of FSC losses" line has high uncertainty and isn't comparable in assumptions to the others; it also is based to some extent on unpublished data ("Extrapolation from…."; "(in prep.)" I suggest deleting that part, and making the rest (Stehfest et al. 2009 results) into a Figure, which would be easier to interpret.	Accepted, Text was strongly revised and new references inserted
16586	11					Delete -- same point as # 68.	Rejected, Improved but retained - saves space
16588	11					This table could be shortened considerably by eliminating the "could" and "can" assertions, leaving only those for which there is empirical evidence.	Accepted, Shortened and Revised for SOD
16596	11					Since there has been a peer-reviewed publication (Kindermann et al.) comparing the potential of forest mitigation according to these three models, I don't understand why this table presents what are apparently new, unpublished figures from those authors, and doesn't cite that paper. This leaves the chapter open to some of the same criticisms as AR4. Also, some of the numbers in the table appear to be lacking their final digits (e.g. Total for $100 for reduced deforestation and for forest management). The term "forest management" needs clarification. Finally, a Figure would show this information more clearly than such a large table. But in that case, it would have to show something beyond what Fig. 11.10 shows.	Accepted, Revised for SOD
16598	11					Given the new countries joining the OECD (Mexico, Chile, etc.) it's no longer a useful shorthand for "rich countries". Furthermore, this table mostly emphasizes how uncertain the estimates are (20-fold range for the global total). I suggest it be deleted.	Accepted, Is it not good to show uncertainties? Was replaced for SOD anyway
16528	11					This figure has several problems: i) using units of GtC/yr is inconsistent with other chapters of AR5 and with other figures and text within this chapter, and looks particularly strange for emissions of CH4 and N20; ii) in both 11.1a and 11.1b, the fourth column is for a time period that overlaps with earlier columns, but is not visually distinguished or separated from those columns, making it appear incorrectly that the fourth column is for a subsequent period; iii) the quite considerable amounts of emissions from "fires" are stacked on top of those from deforestation, giving the incorrect impression that these are non-overlapping categories, which they are not; iv) the relation between the two sides of the figure (11.1a vs. 11.1b) is quite unclear -- is it that a is gross while b is net? Or that b represents additional emissions not included in a?	Accepted, Revise for SOD
16597	11					The point labelled "Sohngen (Copenhagen Consensus)" seems to be from a study that is not listed in the Literature Cited. Is it a peer-reviewed publication?	Accepted, Zotero updated for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16599	11					This figure is very hard to interpret, since several of the X-axis categories would seem to be overlapping. For example: is it true that cropland management does not include actions that might help restore cultivated organic soils, nor rice management, nor restoring degraded lands, nor agroforestry? Does the "livestock" total exclude all grazing land management, and does it include the demand-side activities discussed earlier, which seem to have large potential from the data presented there? Do "Setaside", "LUC" and agroforestry overlap at all with forestry activities?	Accepted, Yes- these are all mutually exclusive. Clarified in the legend or replaced with better figure for SOD
16609	11					This is the Wise et al. figure and suffers from the unrealistic aspects already mentioned. There is no reason to include its projections as opposed to any of the others.	Accepted, Place holder only - scenarios not projections
16533	11					This figure is very confusing. Visually, all the reader can distinguish is that each panel has several lines, often crossing and with quite different trends, and which turn out to represent quite different kinds of variables (land areas, livestock numbers, fertilizer). There is no way one can see which region is most important for which variable, nor how they might or might not be correlated with each other. Rather than having the separate panels be regions, I suggest reversing the panels-vs-lines relation, so that each panel represents a separate variable (e.g. a for arable land, b for pastures, c for forest land, d for cattle, etc.) This will allow you to stack, and separately color, the values for each region, so that the reader can see which are the largest ones and how the scales (e.g. for arable vs pasture vs forest land) compare. I would also suggest using a more neutral term that "reforming economies" for the EIT countries.	Accepted, Figure revised for SOD, including actual numbers. A regional breakdown has been agreed as cross-cutting issue for all chapters.
16546	11					As with Figure 11.1, the third set of columns appears visually to be simply a later period than the first two, whereas in fact it combines them. There needs to be a visual break of some kind between 2 and 3. Also, it needs to be explained how "land use change" relates to the other bars (is it the combination of all of them?) and whether the "deforestation" and "secondary vegetation" bars are tropical only (since boreal and temperate forests are shown separately). Finally, where in this figure would forest degradation show up?	Accepted, Revise figure for SOD
16575	11					This figure can also be deleted. It has no quantitative data, and it's not at all clear what the differences among its components (e.g. two kinds of arrows, 5 kinds of shapes, 5 colors) are supposed to represent.	Accepted, Figure has been revised for SOD
16577	11					The text (p. 34. lines 16-17) says that this figure demonstrates different synergies and trade-offs for demand vs supply side measures. However it's not indicated in the figure where the boundary between demand and supply sides is. Should indicate that on the figure, or delete it.	Accepted, Figure was completely redrawn
16587	11					Delete -- same point as # 68.	Accepted, Considering all comments on this graph, we have improved the design for the SOD
16591	11					This figure doesn't make the point for which it is cited (number 73), and failing that, it's not clear what it contributes other than indicating the great uncertainty of model predictions. Unless you wish to assert that in the text, it can be deleted.	Accepted, Revise figure for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5518	11					General comments- It would be very helpful for the reader if the authors could somehow divide the discussion into forestry, wild lands, and agricultural lands. These different land uses are currently interspersed and it is difficult to follow. There seems like the discussion on forest lands often eclipses the discussion on agricultural lands, and particularly the challenges to food production. If these topics could be divided- following a similar outline for each it would be a much more effective way to present information. Finally- I realize that there are sections to be written to integrate a greater discussion of sustainability- but these are critical and I would encourage the authors to follow through on this linkage. Finally, the chapter makes no mention of how AFOLU interacts with urban spaces. This seems like a small but significant factor that merits discussion. There is an increasing trend to integrate ecosystem processes into urban areas- including bioretention systems to capture rainwater, green roofs and urban agriculture. The potential impacts for this type of development should be mentioned	Partially Accepted, We wish to integrate across land uses more rather than less, but the issue of under-represented land uses is well made and will be addressed in the SOD
5515	11					Adding a column with target area for each program would be helpful	Accepted, Good idea - revised for the SOD
3762	11					An entry on the co-benefit of mitigation from RED for biodiversity conservation is warranted	Accepted, Interactions between REDD+ and biodiversity were included
3764	11					This table ought to include UNREDD and the REDD+ Partnership	Accepted, UNREDD was included in the table
4275	11					Overall Excellent. In several places discussing forest disturbances, leaves impression (without actually saying so) that insect and disease disturbances are insignificant compared to fire. Mantions invasive alien species only in passing on page 43 line 19, even though they are a possibly significant feedback.	Accepted, Thank you
11975	11					In general, this is an excellent chapter and a real "tour de force" of all the critical issues on AFOLU. Mostly, the specific comments are simply recogninisng taht there are biodiversity considerations, alongside emision considerations, of AFOLU mitigation options	Accepted, Thank you
11977	11					The explanatory notes need to state what is included here, especially whether it includes plantations.	Accepted, Add for SOD
11986	11					Explain "technical potential" in teh footnote	Rejected, It will be in the glossary
18231	11			10		• Table 11.1 (Trends in extend of forest 1990-2010); page 10, indicates that South America and Africa are the regions with more loss of forests. This trend diminishes in both regions during 2005-2010. The arguments of the report refer particularly to the diminution of deforestation in Brazil. The source of the data is report FRA 2010, published by FAO. Probably, many countries have not been able to update data of deforestation and forest degradation, because limitations in taking a baseline in the field, which forces them to maintain the same deforestation rates.	Noted, This is a statement - not clear what action is required
18232	11			16		• In table 11.2 (Summary of production-side mitigation options in the AFOLU sector); page 16, regarding mitigation options in the productive forest sector, are included: reducing emissions from deforestation and forest degradation (REDD), afforestation/reforestation, improvement of forest management, plantations, sustainable management of the native forest, agroforestry and bioenergy generation by forests and plantations. In brief, these are different mitigation measures that each country adopt or will adopt in accordance of their forest-environmental policies. In the context of the Convention on Climate Change, Venezuela does not adopt REDD mechanisms, however the country have been developing management actions for sustainability of forests which result in voluntary mitigations.	Noted, This is a statement - not clear what action is required

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18230	11			7		• In graph 11.1 (Global trends in CO2 eq emissions from AFOLU (a) and net C emissions from land use, 1 land use change and forestry activities (b), Gt C/yr.); page 7, it shows that the largest emission of CO2 to the air comes from deforestation and burning, which raised significantly after the 90`s. It is hard to extrapolate or infer the situation of Venezuela within these numbers, since they are adding trends. Similarly, it is observed regarding the raise of the C global, that there are slight fluctuations in more than a decade.	Noted, We do not say anything about Venezuela, nor is the figure intended for any one country to infer trends from it
2367	11					The cost elements are not clear and not overly recent. Recommendation to contact some key countries in which ambitious REDD+ efforts are underway (Brazil, Guyana, Indonesia, PNG, DRC). It is highly unlikely that those programs are already featured in peer reviewed academic literature, but they are just now being implmented at scale for the first time. Thus, IPCC should attempt to get best available information to make this chapter as relevant as possible to the next politicians who want to implment REDD+ measures. (Consider text boxes with case examples)	Accepted, Policy section rewritten and REDD+ text improved
15172	11					not readable/comprehensible as is	Accepted, This table went very wrong in formatting - it will be replaced in SOD
16223	11					REDD+ Partnership is not in the table; it came out of Copenhagen--now has many countries and $billions in pledges	Accepted, REDD+ partnership was included in the table
16220	11					Note the BAU scenario against which these reductions should be compared (in GTCO2e/yr)	Accepted, Add for SOD
16209	11					Is this based on the remote sensing assessment from FAO FRA? Or just the self-reported country data? The former is at least using a uniform methodology; the latter suffers from multiple different approaches and accuracies. Also surprising not to use non-FAO derived estimates, at least to bound these estimates (e.g. Hansen et al PNAS 2009?)	Accepted, State source
2570	11					Refer to GEA Chapter (Knowledge Module) 20 on land use and water for bioenergy	Accepted, Table has been deleted. Its content has been used in section 11.7 using the corresponding references. Reference by the reviewer is not complete. The issues correlating land use and water for bioenergy are considered in the bioenergy annex (ch. 11)
13339	11					Not clear what the units are.	Accepted, Added for SOD (in MtCO2/yr)
13311	11					Text is deformed, reformat.	Accepted, Revise figure for SOD
7082	11					In the row "Natural assets", in the first column, need to change first sentence to include "planted and other forests." Also, in the discussion of plantations later in this same part of TAble 11.7, it should be noted that the potential for the types of adverse impacts suggested for plantations are highly site specific and can often be mitigated by a variety of means.	Accepted, Table has been deleted. Its content has been used in section 11.7
7083	11					In the row "Economic factors", in the first column, add the fact that "Demand for forest products give economic incentives for keeping land in forest rather than converting to non-forest uses."	Accepted, Table has been deleted. Its content has been used in section 11.7
7062	11					Somewhere in this section, it would be useful to observe that although increasing amounts of fertilizer are being used in forest management, the amounts are small compared to those used in agriculture . e.g. see USEPA (2012), INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990 – 2010 - which observes that "Direct N2O emissions from fertilizer application to forest soils have increased by 455 percent since 1990, but still account for a relatively small portion of overall emissions."	Accepted, Section 11.2.3 has been largely revised for SOD, reduced in page number and information.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4273	11					At first of this chapter there is used C and CO2 for emission and sink, I think that should be good if only one (C or CO2) is used instead of both	Accepted, Revised for SOD - all should be converted to CO2-eq.
2149	11					better understanding of the rural livelihood effects of curent carbon finance institutions in case those become more and more frequent in agricultural contexts - in particular, how do MRV requirements from carbon finance interfere with optimal agricultural production planning and implementation, etc.	Rejected, Not sure where this is suggested to go
2146	11					as it is first discussed in the text, put "co-benefits" in the first column	Accepted, Revised for SOD
2138	11					section Bioenergy/Natural assets: add: "May lead to competition for biomass used for bioenergy production or used as organic fertilizer in crop production"	Accepted, Table has been deleted. Its content has been used in section 11.7
2139	11					also point out that biomass residues can become scarce in a region if too many biomass projects are implemented, thus driving up prices for this biomass waste, that was basically without a price before. This can compromise economic viability of residues based bioenergy - as e.g. happening in the context of the CDM in India	Accepted, Table has been deleted. Its content has been used in section 11.7
2128	11					drop the CO2e on the vertical axis to the left of figure 11.1.a - it's Gt C only, I guess. - Calrify the figures in general - are they consistent? - 111.1.b does not cover deforestation? - Why not combining the two figures into one only?	Accepted, But change to CO2 in the figure instead
7496	11					ALFOU. My comments have already been submitted. (uploaded document 254).	Noted, No action required
10183	11					1. Points in this table are important and interesting and could be discussed in more depth in some cases, e.g. competition between global benefits and local negative effects. 2. On the horizontal level of the table, are points under the different categories (i.e. risks, uncertainties, co-benefits and spill-over, respectively) related or unrelated? 3. This table might become clearer if points are related to specific mitigation measures.	Accepted, Revised for SOD
10185	11					How can increasing desertification be an opportunity?	Accepted, Incorrect - revised for SOD
10189	11					For Amazon: the same text used for context as well as objectives and strategies	Accepted, Incorrect - revised for SOD
10174	11					not all symbols in the graph are represented in the legend	Accepted, Revise figure for SOD
10176	11					Values for total economic mitigation potential are not the same although deriving from the same publication, e.g. cropland management is higher than grazing in the figure but lower in the table for <100 USD/tCO2 eq.	Accepted, Table removed
10187	11					Text: 1. lines 11-17 repeats lines 6-11, 2. FFICT and UCT scenarios/pathways are not discussed or described in the main text	Accepted, Revise figure for SOD
10171	11					Figure legend explaining the colour scheme is lacking	Accepted, Revise figure for SOD
11811	11					An interesting reference for the bioenergy part of the table maybe: Schulze et al. GCB Bioenergy doi: 10.1111/j.1757-1707.2012.01169.x	Accepted, This is new since FOD - has been revised to include newer references
7163	11					Overall comments:	Noted,
7164	11					It is useful to have a discussion on the 'definition of forest' in the beginning of the chapter, unless this topic has been touched upon in other chapters. Internationally accepted definitions should be used to avoid misunderstanding, and mis-interpretation of this chapter and to encourage mitigation measures that in fact encourage the opposite: destruction of natural ecosystems and loss off biodiversity by developing (high-carbon) monoculture ecosystems. E.g. the Indonesian definition of forest is: an area≥ 0.25 ha, crown cover ≥ 30%, tree height ≥ 5 m. This may include any type of tree. If for example in tropical regions a natural existing peat swamp forest is being converted into an acacia plantation (which following the Indonesian definition is considered as reforestation), from a national-definition-point-of-view nothing happens: forest remains forest.	Rejected, Refer to standard IPCC / UNFCCC definitions (national)

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7165	11					Since anthropogenic GHG sources in the AFOLU sector include fluxes from management of land (crops, forests, grasslands, wetlands) and land use change, all main sources and/or sinks should be broadly discussed while looking at mitigation measures to reduce fluxes from these activities. Unfortunately, this is not the case. Illustration: the word peatland or wetland has been used < 20 times in this chapter, the word 'forest' has been used > 500 times. No Figs. on 'fire' as a source or 'drained peat' as a source (fire is partly shown in fig. 11.1, but the other figs. are on forest only), which both are major AFOLU emission sources. Throughout the document I have tried to give suggestions to also include wetlands/peatlands/fire part in the various sections	Rejected, The chapter is about mitigation, not emission sources (which are the focus of WGI)
7166	11					No mitigation measures are given for reducing emissions from managed peat (in. table 11.2, only soil C restoration on peatlands and improved land management are mentioned), while it has been demonstrated that peat oxidation is a major and increasing GHG source: 'CO2 emissions from drained peatlands in the world have increased from 1.1 Gton CO2 yr-1 in 1990 to 1.3 Gton CO2 yr-1 in 2008 (Joosten et al., 2012, page 14). Because of more and more scarcity of mineral soil in e.g. SE Asia, pressure on peatlands for agricultural (booming oil palm business) development is increasing. Suggestion: include wetlands/peatlands and fires throughout the whole document (e.g. in tekst, tables and figures) and in the discussion since these are major (potential) GHG emission sources within AFOLU, which should be considered in mitigation policies (e.g conservation of peat and rewetting of peat (PRC projects), measures to avoid fires etc), but also optimizing management in drained peat for agriculture (optimizing drainage systems, high water table etc) and encouraging paludicultures as an alternative for crops that need deep drainage. REDD+ does not only include forest conservation, sustainable forest management and enhancement of carbon stocks in forest, it also takes into account conservation and rehabilitation of soil carbon stocks which more clearly should be addressed in this chapter	Accepted, Included
7167	11					· Discussion is missing on implementation of mitigation measures e.g. by global initiatives such as Roundtables. 1) how and where to implement 2) how to increase the platform or basis of the (right!) stakeholders that support measures 3) how to implement as effective as possible taking into account future development trends, future demand trends etc. E.g. for production of bioenergy there could be a discussion on	Accepted, Added to policy implementation section
7168	11					o Continued globalization of bioenergy production over the next 20 years, including concentration of bioenergy production into regions and farmers cooperatives, debates about 'free trade' and 'protectionism'.	Accepted, Added to policy implementation section
7169	11					o The globalization-related changes in power relations (un-balanced power) and the related risks of exclusion of participant(s) (groups) such as small farmers, local communities, and poor countries from the debates. Debates and discussions within the participant groups could then become decentralized; how te deal with that?.	Accepted, Added to policy implementation section
7170	11					o Different participant groups have different forms of engagement (pragmatic and functional, justifiable, familiar). Understanding between participants and interactions between them needs to be promoted.	Accepted, Added to policy implementation section
7171	11					o Because the focus is on GHG emission savings which is one of the main drivers behind the production of bioenergy, the risk of exclusion of social vulnerabilities should be considered in mitigation measures.	Accepted, Added to policy implementation section
7172	11					o The debate on the indirect impacts of large scale bioenrgy production related to food supplies, food prices, and food scarcity.	Accepted, Has already been done, but has also been improved for SOD in bioenergy annex
7173	11					Good implementation procedures are the key to successful GHG emission reductions	Accepted,

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7174	11					In this chapter it shall be more clearly highlighted that a very important mitigation measure to reduce GHG emissions and to produce sustainable products in the AFPLU sector is to define 'no-go-areas' for agricultural expansion and land use planning. Kaper et al., 2008 concluded that the most sustainable case for 'choice of agricultural land' considers not to use 1) forest land, 2) steep terrain, or 3) vulnerable peat soils if the crop needs drainage. Wicke et al (2008) and Germer and Sauerborn (2007) studied the sustainability of production of palm oil (as a bioenergy crop). They concluded in their studies that in order for products to be sustainably produced from palm oil and its derivates, only (non-peat) low-carbon degraded land should be used for palm oil production and plantation management should be improved. With growing demand for both food and fuel export, as well as for domestic biodiesel production, it is likely that significant further land use conversions to oil palm will occur (Koh and Wilcove 2007; Levanget al., 2008) and will put further pressure on peat swamp forests (Rijenders and Huijbregts, 2008; Fargioneet al., 2008). Land use planning and good governance is mentioned as a tool to sustainably produce biofuels, however, this is at the end of the document (page 70) under sectoral policies and should be mentioned earlier.	Rejected, Policy prescriptive - entirely inappropriate for IPCC
7175	11					Throughout the document there is some repetition of topics. I think the chapter could be easily shortened by avoiding this repetition	Accepted, Addressed in SOD
7193	11					Full and effective participation, broad platform (means meaningful influence of all relevant rights holder and stakeholder groups who want to be involved throughout the process, and includes consultation and free, prior and informed consent).	Accepted, Added to policy implementation section
7194	11					Good governance (includes accessibility, people's participation, transparency, accountability etc).	Accepted, Added to policy implementation section
7195	11					Implementation is understood to include on-going planning/decision-making as well as the implementation of the activities.	Accepted, Added to policy implementation section
7196	11					In the section 'successful implementation' it would also be interesting to have a discussion on the current status of mitigation measures. Mitigation projects (e.g. REDD (+) projects etc) are running, but most of them are not very successful until now. What is the problem? What should be improved? Another brief discussion related to this could be on 'validation of carbon credits' which is extremely complicated (in terms of monitoring, reporting, verification of baselines, project scenario's leakage etc) at the moment for project proponents, again, it would be good to relocate some of the text of 11.10 to this section, e.g. lines 29 onward, page 69 .	Accepted, Added to policy implementation section
7203	11					Page 45. Section 11.5.3. Perhaps this is a good paragraph to clearly show the separation between 1) climate impacts 2) human induced impacts and 3) natural disturbances. Impacts that have to be addressed can by summarized in 1) Offsite impacts resulting in a change in GHG emissions 2) On-site changes in GHG emissions 3) ILUC impacts.	Accepted, Addressed in SOD
7186	11					Does re-vegetation belong in this category? So, revegetation with vegetation that does not fulfil the requirements of the 'forest-definition'	Accepted, Clarified for SOD
7187	11					Land-based agriculture. Missing mitigation measures: Peat soil conservation (not only restoration), peat soil rewetting (or is that meant with restoration of organic soils?), crops on peat that do not need drainage (paludicultures)	Accepted, Added to table
7188	11					o Bioenergy. No bioenergy products from high carbon land (such as palm oil on peat).	Rejected, Not clear what action is suggested
7189	11					Mitigation measures to reduce fires missing? E.g. Zero-burning practices for land clearing, fire detection and control, and rewetting to avoid peat fires. Fires is one of the major sources, mitigation measures should be included.	Partially Accepted, Can Discuss further but can increase fuel load and lead to greater C loss-so not correct as a blanket statement

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7199	11					This table needs revisions. Below an example of how the second column of the table could be optimized (avoid the word potential in the table, this is already in the title, the following question has to be answered in the table 'what are the potential impacts of AFOLU mitigation measures".	Accepted, Table has been deleted. Its content has been used in section 11.7
7210	11					Suggestion: insert Global land area of Wetlands and/or peatlands under 'crops' since this is a category in AFOLU	Accepted, Revised for SOD
11159	11					Unfortunately, initiatives from many smaller developing countries tend to be very small scale. The nature of the scale, coupled with the wide differences in socio-economic and cultural differences over thousands of tribes etc especially in Africa means that these case examples are not identifiable. Specific success stories - eg. policy changes and continuing streamlining of land policies among countries in Afica that enhance the role of AFOLU in CC mitigation;	Accepted, Revised for SOD
10596	11					There is a GAP in the whole chapter (and report) on FISHERIES and AQUACULTURE. For example Table 11.2 could have a Fish section covering mitigation options. Useful examples are included in: FAO, 2011. Energy-smart food for people and climate, UN Food and Agricultural Organisation, Rome. 65 pp. http://www.fao.org/docrep/014/i2454e/i2454e00.pdf Also if need a CA on fish, are some good people at FAO who might assist - eg Frank Chopin or Cassandra DeYoung	Accepted, Fisheries and aquaculture added for SOD - new CA on this topic has joined the team
3961	11					Indian Research papers published in literature may be cited for crop residues production as well as feed and fodder deficit data given in report of 12th Plan submitted to Govt. of India (2012-2017). This information may be included "Over the last two decades (1985-86 to 2005-06) availability of various types of feed has increased. Even though availability of feed resources vary from area to area, but during this period, the India as a whole recorded 52% (240.7 to 365.8 Mt), 76.0% (19.6 to 34.5 Mt) and 1.8% (124.3 to 126.6 Mt) increase in crop residues, concentrates and green forages respectively. In spite of this, there is a gap in the availability vs. requirement. As per estimates, the deficit of dry fodder, concentrates and green fodder currently is 10, 33 and 35 percent respectively, which by 2020 is likely to be 11%, 35% and 45%."	Rejected, Too country specific - we cannot cite every paper and report for every country - this is a synthesis
15348	11					Smithers, R.J.; Cowan C.; Harley, M.; Hopkins, J.J.; Pontier, H. and Watts, O. (2008) England Biodiversity Strategy: Climate Change Adaptation Principles. Conserving biodiversity in a changing climate. Defra, London. 16pp.	Rejected, Not sure what is suggested here. This is an adaptation report - not a mitigation paper
16051	11					In general , the chapter is OK structured and written, but has, in my opinion, some major drawbacks related to forestry which should be improved in the next version. These drawbacks are: 1. The estimates of forest mitigation potential should be much more geographical explicit and linked to types of forest ecosystem and baselines/additionality. For example, very few studies from Scandinavian boreal forests are referred to and used. Many of these studies are considerably more specific than the US/North America and global studies referred to in Ch. 11, both regarding forest manangement options included, simultanously including bioenergy and "normal" end-uses of forest fibre (e.g. competition to the existing forest industries and substitution impacts), and regarding analysing additionality. 2. Carbon leakage impacts should be more thoroughly discussed (for example that decreased harvest in country A will in most cases lead to increased harvest in other countries, thus reducing the direct carbon sequestration impacts in country A).Because of time limitation I have managed to comment just so generally . If references are needed to Scandinavian/European articles , just contact.	Accepted, Revised for SOD
15228	11					In general, I think the chapter is well-balanced among different approaches. It is an improvement from AR4 to combine forest and agriculture in mitigation efforts related to land use, they are indivisible in practice and it is good to see an integrated holistic approach to those.	Noted, Thank you

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14418	11					Overall the chapter is a good summary of the complexity of managing agricultural and forest landscapes for C storage and GHG reduction in terms of ecological capacity, as well as social and economic constraints.	Noted, Thank you
14419	11					11 Throughout chapter parentheses for citations are not consistently formatted.	Accepted, Zotero updated for SOD
17999	11					The definition of spill-overs used in this section seem to deviate substantially from the topics discussed elsewhere in the report (e.g. carbon leakage, technological spill-overs, etc.). See my comment on section 11.7.3.	Parially Accepted, Section has been reviewed. The reviewer should consider that spillovers from AFOLU differ from other sectors anyway. . However the text has been improved to clarify this difference
6780	11					Suggest add "interaction of desertification and crabon ",controlling desertification of lands is important sustainable development,and it can increase the carbon sequestation in lands.Inorganic carbon is important in arid region,so add some content about land use change on inorganic carbon.	Accepted, Included as a potential co-benefit (section 11.7)
18922	11					Try to convert into figure (absolute and % values; time range normalization needed for that); consider adding historic values (see Section 11.2.2) to that.	Accepted, Converted to figure for SOD
18931	11					Some issues brought up in this table have been critically discussing with regard to sustainability (negative effects and emissions from production of fertilizers; improving crops and breeds might include GMOs that are by some critically discussed; water availability in cropland leading to increase of competition for water; long term effects of dietary additives such as antibiotics;). Please consider discussing these issues here or in the sustainability section with reference to the table.	Parially Accepted, Added refs but these issues are mainly dealt with in trade-offs section
18932	11					Giving ranges once the data is available sounds very good. Please consider turning it into a figure - possible several figures, one for each of the 5 world regions + 1 global.	Accepted, This table went very wrong in formatting - it will be replaced in SOD
18914	11					Four comments: (1) In a) I suggest to change the order within the bars, having deforestation at the top, as this is most volatile - this will help comparing changes in the other aspects much better. Also try to separate the last stack from the others (e.g. by a vertical dashed line) as this one does not follow the time sequence of the others. (2) This figure should in my view be ammended by historic data from Ch.5 (or that historic data should go into separate figures). (3) In the caption line 4 it says "1990-2007" with respect to a) but this range is only found in b). (4) In line 10 there is a citation software error.	Accepted, Revised for SOD
18919	11					As the increase is very different for poultry please consider adding that data, too, if available. In order to be able to better compare world regions, consider having the same y scales for all figures here.	Accepted, Text revised to include non-ruminants
18926	11					I like the figure but have a few comments: (1) Could you clarify whether the last range is the sum of the other two or whether this is based on other data? (2) There should be a legend explaining the single points (i.e. which shape which study). As the other legend uses squares try to have a different symbol than a square for the single points. (3) I suggest to align the single points with the bars of the same colour, as otherwise the viewer asks him/herself whether it has any meaning that they are set aside. (4) I think it would be very good to also give the total over the different aspects, if nothing speaks agains adding the Pan data and if this is available for the other studies. (5) As the numbers labeled can already be read from the y-axis, consider replacing those values by % values, which would be interesting to have as additional information in the figure.	Accepted, Changed for SOD
9446	11		32		32	A trend is a real, observed phenomenon. It is not driven by a projection unless that projection causes people to act differently than they otherwise would have.	Rejected, No page number - cannot act

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7055	11					It appears that throughout this chapter the "net co2 fluxes from management of land (croplands, forests, grasslands, wetlands)" is collectively referred to as "land use" but this is not clear. For instance, in the next sentence, the categories suddenly switch to land use, land use change, and forestry. And then in the next sentence, the terminology seems to change again - this time to "land management and land use change". This shifting of terminology makes it almost impossible for the reader to know exactly what is included in the various parts of the discussion. At the beginning of this section (perhaps in 11.1) the text should clarify what is meant by the various terms and the terms should be used consistently throughout.	Accepted, This should be dealt with in the glossary - but we should also use consistent terminology in SOD
3531	11					It is appreciated that Agriculture and Forestry are treated in a single sector AFOLU. I suggest to avoid to personalize the text.	Rejected, Cannot see what personalize means here
15205	11					glad to see review of REDD	Noted, Thank you
2147	11					may further emphasize the role of co-benefits in policies - e.g. the EU nitrate directive may has been the most effectice mitigation instrument for agriculture in the EU - and a similar soil-directive, still under discussion, could similarly benefit mitigation via soil carbon sequestration - while both these directives have not been aimed at supporting CC mitigation.	Accepted, Comment on the impacts of Nitrate Directive on mitigation of N2O was included
2148	11					add: better understanding of the combined C- and N-cycles - e.g. the influence of SOC levels on N2O emissions and also the dependence of N2O emissions on fertilizer types (incl. Legumes).	Accepted, Was reflected in SOD
7216	11					Gaps in knowledge and data. Add a bullet: Better data on the extent and depth of peatlands on a global scale.	Accepted, Added for SOD
4991	11					Title suggested in ouline fits more with content of section rather than this title . Delete the words (New developmen in)	Accepted, Changed for SOD
4992	11					In subsection 11.2.1 something on consumption of woodfuels in developing counteries can be added to subsection	Accepted, Done
13521	11					Title suggested in ouline fits more with content of section rather than this title . Delete the words (New developmen in)	Accepted, Change for SOD (duplicate comment)
13522	11					In subsection 11.2.1 something on consumption of woodfuels in developing counteries can be added to subsection	Accepted, Done
14428	11					It would be easier for a reader to compare the relative significance of a particular land cover if all numbers were reported in Gt.	Accepted, Done
18923	11					Try to convert numbers in this and the following sections into figures.	Accepted, Change to consistent units for SOD
16540	11					This section is densely packed with numbers, which are not easily understood when they simply follow each other in text. It would be helpful to reduce the text and express some of the changes and comparisons among estimates in Figure or Table form.	Accepted, Section rewritten for SOD
7184	11					Trend of C fluxes in land use and land use change. An overview is missing on C fluxes (per climate zone) in the AFOLU sector. It would be good to have a table with the main sources and sinks, ordered on source or sink sizes. This illustrates the relative importance of certain measures in terms of carbon 'gains' and GHG emissions reductions	Accepted, Section rewritten for SOD
18927	11					This section has a lot of numbers in the text. These are very hard to digest and make it difficult to keep with the flow of the text. So, please consider moving numbers into a table or better a figure and focus the text on contextualizing and interpreting the data.	Accepted, Section rewritten for SOD
16556	11					Another section with many numbers presented in text -- reduce the text and give the information as a Table or Figure.	Accepted, Section rewritten for SOD
3959	11					Contribution of ruminants towards methane emissions is missing so it should be added in this chapter	Rejected, Incorrect - ruminant methane is discussed throughout
15159	11					possible to replace some wordy, data laden text with figures?	Accepted, A new table is added that will reduce the amount of text

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15160	11					a very interesting section, and perhaps the heart of the chapter. But, it repeats on itself across all subsections, especially on the topics of bioenergy/biofuels, diets, and land tradeoffs. The message seems to come through that there is a need to be create multi-criteria land uses (without a myopic focus on mitigation). That's a good message, but could be much better organized and tightened throughout the entire section.	Accepted, Agreed - have made more central to the storyline on the chapter for SOD
3960	11					Mitigation technology options and practices being adopted in feeding strategies of ruminants are to be given in this sub-section	Accepted, New table has been constructed and updated with more recent references
8839	11					Would biomass based materials (biomass-baded plastics, natural fibre for material reinforcement, fine chemicals from forest residues, …) deserve a place in this section as well?	Accepted, Added reference here
15161	11					section cn be reduced/ tightened	Accepted, Revised for SOD
17353	11					Changes is global diet. This study needs to be better explained. Does it mean that is possible to conceive a diet that would be "healthy" for all persons in the world and still be healthy? There is more than one assumption here involved, as culture etc are all mingled with food. This is a difficult proposition and deserves further elaboration.	Accepted, Revised, references added
5750	11					The reasons for food loss/waste could be added as per pag. 26 of the FAO Energy-smart food report (http://www.fao.org/docrep/014/i2454e/i2454e00.pdf)	Accepted, Revised, references added
11814	11					This whole section is very conceptional is data and/or examples could make it more tangible for the reader and its arguments more convincing	Accepted, Section edited. Published papers to support examples not readily apparent.
12074	11					Please add a discussion on the point that timing of mitigation benefits from actions (e.g. bioenergy, forest management, forest products use/storage) can vary and that timing of benefits needs to be considered in judging the effectiveness. Cherubini et al (2012) gives examples for how timing of benefits varies for forest management to produce wood for energy or wood for products that have different use lives. [Cherubini, F., Guest, G. and Stromman, A. (2012). Application of Probability Distributions to the Modeling of Biogenic CO2 Fluxes in Life cycle Assessment. Global Change Biology Bioenergy, 1 - 15.]	Accepted, Commentary on timing of mitigation benefits added to end of section.
12079	11					Given the importance of assessing the risk of alternate mitigation strategies I suggest there is a great opportunity for the authors to prepare a table for this section that has as its columns the risks to mitigation noted in this section (ie nonpermanence/ reverablity; saturation; human and natural impacts (threats?); displacement/leakage) and as its rows the alternate strategies identified in previous sections of this report. I think the magnitude of risk OF NOT ATTAINING MITIGATION BENEFITS would differ greatly, for example, between afforestation, avoided deforestation and biomass use for enegy from roundwood in forests. I think riskiness issues and uncertainties in risk could be identified. This would provide a dimension of understanding risk that is not shown in many model estimates of mitigation benefit where there is assumed certainty (mostly) in carying out the mitigation activities at least for a given scenario. I'll forward a table where we attempted to do this for the U.S, for forest sector mitigation actions for the Forest Sector report of the forthcoming U.S. National Climate Change Assessment.	Accepted, This is an excellent suggestion, however a published study that provides a quantitative basis for this analysis is not available. The US National Climate Change Assessment update, noted in this comment, has not been published (12/2012) and is "scheduled to be completed in 2013" http://www.globalchange.gov/what-we-do/assessment. This chapter is also for AFOLU rather than forestry alone and similar assessment, as suggested, for agriculture is not readily apparent either. Was Table forwarded to Chapter team?
4993	11					Suggest to remove subjection 11.4.4 since most of information are tackled in 11.10 and in other section of chapter 11	Rejected, Retain here as per IPCC outline

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13523	11					Suggest to remove subjection 11.4.4 since most of information are tackled in 11.10 and in other section of chapter 11	Rejected, Retain here as per IPCC outline (duplicate comment)
16574	11					This section is a good candidate for deletion so as to reduce the length of the chapter to the allotted amount. It is rather general, lacks quantitative data, and mostly just makes the point that the system is complex. That is well known!	Partially Accepted, Section was strongly revised and shortened
7198	11					o A lot of text. Text is very suitable for illustrating it in a figure. E.g. show in a figure what the effects are from mitigation measures (ARR, REDD, PRC) on food prices, production, competition for land etc. maybe a separate figure for production of bioenergy.	Rejected, Only 3 paragraphs - correct section?
16585	11					This is another section that can be deleted to save space. It is general and conceptual, lacking quantitative data and mostly just listing the many factors that are involved, without suggesting which ones are most important nor what should be done about them.	Accepted, Retained here as per IPCC outline but shortened
17354	11					Interesting table. Please consider adding gender issues in particular with relation to land ownership issues and ressource managment affecting transitions.	Rejected, Wrong table / section
4994	11					Suggest to remove whole section since most of information may be covered in adaptation report	Noted, Need to make links to adaptation
13524	11					Suggest to remove whole section since most of information may be covered in adaptation report	Noted, Need to make links to adaptation (duplicate comment)
7201	11					Another example of a land use – climate feedback: the drainage of peat for agriculture makes the soils susceptible to fire. The global warming (increase in number of dry (El Nino) years) causes the fire frequency to increase. The particle load in the atmosphere increases, which causes not only health problems (steep increase in respiratory illnesses in e.g. the tropics), but also a reduced penetration of sunlight and therefore a reduced photosynthesis of trees	Noted, Noted, but reference not available for SOD
7202	11					o compounding pressures. Also mention compounding pressures of grasslands, wetlands and croplands.	Noted, Section restructured and shortened due to page limitation
2142	11					some more details on these measures would be nice - or more explicit reference that the reader should consult these othe rdocuments for these practices. - may provide a table or so.	Accepted, Text modified
2144	11					may refer Smith, P. and Olesen, J.E. (2010) 'Synergies between mitigation of, and adaptation to, climate change in agriculture', Journal of Agricultural Science, 148, pp. 543–552; may also take up the more critical assessment of synergies in Rosenzweig, C. and Tubiello, F. (2007) 'Adaptation and mitigation strategies in agriculture: an analysis of potential synergies', Mitigation and Adaptation Strategies to Global Change, 12, pp. 855–873; may also add a sentence at the end of this section such as: "Systemic approaches to sustainable agriculture, such as organi cagriculture, have a good potential to realise these synergies, as many of the aforementioned practices are core-practices in these production systems, which are applid in optimal combinations (El-Hage Scialabba, N., Müller-Lindenlauf, M., 2010. Organic agriculture and climate change. Renewable Agriculture and Food Systems 25, 11; Muller, A., Osman-Elasha, B. and Andreasen, L., 2012, The potential of organic agriculture for contributing to climate change adaptation, in: Halberg, N. and Muller (Eds), Organic Agriculture for Sustainable Livelihoods, Earthscan Publishers)."	Accepted, Reference and text included
4995	11					Insubsection 11.7.1.2 consider to adress environmental & health cobenefits associated in using wasted polluted water from industry or water produced in oil exploration field for establishing of forest plantation	Accepted, Section redrafted considering the comment
13525	11					Insubsection 11.7.1.2 consider to adress environmental & health cobenefits associated in using wasted polluted water from industry or water produced in oil exploration field for establishing of forest plantation	Accepted, That is the same comment as in line145:,section redrafted considering the comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17988	11					Introductory sentences like the ones in Chapter 10 might be a good idea to prepare the reader for the following discussions: "Besides economic cost aspects, several other aspects have implications on the final deployment of mitigation technologies. Co-benefits, co-costs, risks and uncertainties associated with alternative mitigation technologies as well as public perception thereof can affect investment decisions of companies and priority setting of governments." Additionally, the structure of the section is not consistent with the agreements made in Wellington (p. 36) whereby both co-benefits and co-costs should be discussed under the sub-section headings 'socio-economic effects' and 'environmental and health effects' instead of framing the co-cost discussion under the risk headline. This would imply that sections 11.7.2.1, 11.7.2.2 and the paragraph on ecosystem markets in 11.7.3 should be integrated with the corresponding sections in 11.7.1. There is no obvious reason why Chapter 11 would want to deviate from the agreements made in Wellington on the structure of the sections on co-benefits, risks on the one hand and barriers and opportunities on the other.	Accepted, The whole section has been restructured considering this and other comments
10258	11					Sections 11.7 and 11.8 either might be merged thus their covers similar aspect and there are several times duplication of the ideas presented (See Table 11.11 and 11.12)	Rejected, Stick to IPCC chapter headings
2145	11					I suggest to add some paragraph specifically on soil carbon sequestration and it's double role for mitigation and adaptation in agriculture, the latter via imporved water absorption and retention capacity, thus increasing resilience agains water scarcity and heavy rains (water logging, erosion), improved soil fertility, etc.	Accepted, Included in the table and some mention in the text

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3761	11					A great deal has been published on the potential co-benefits and risks of REDD+ on biodiversity, and in general this topic could be given more coverage in the report. For example: Forests provide habitat for over two-thirds of known terrestrial species (Raven, 1988). Thus a REDD+ mechanism that pays for climate mitigation is also expected to benefit forest-dependent biodiversity by conserving forest habitat that would otherwise have been cleared (Busch et al., 2011). However, a REDD+ mechanism whose incentives are focused solely on carbon storage risks undesirable consequences for biodiversity. Such a REDD+ mechanism could favor the conservation of higher-carbon forests over higher-biodiversity forests (Putz and Redford, 2009; Paoli et al, 2010; Siikamaki and Newbold, 2012) or could displace agricultural activity into low-carbon but biologically important landscapes (Miles and Kapos, 2008). There is substantial interest in policies to increase the biodiversity benefits or ameliorate the biodiversity risks associated with REDD+. This includes more closely linking the objectives of the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biodiversity (CBD) (Secretariat of the CBD 2009), but extends more broadly as well. Harvey et al. (2009) distinguish pro-biodiversity policies between those that contribute to greater climate mitigation and those that present a tradeoff with weakened or delayed climate mitigation. Policies that promote both greater biodiversity conservation and greater carbon storage include increasing finance for REDD+ (Busch et al., 2011, Strassburg et al., 2012), strengthening institutions to handle large financial flows under REDD+ (Ring et al., 2010), minimizing leakage of deforestation to regions with high forest cover and low deforestation rates (da Fonseca et al., 2007; Busch et al., 2011), and ensuring that definitions of forest proclude incentives for the conversion of natural forest to low-carbon, low-biodiversity plantation crops (e.g. oil palm) (Sasaki and Putz, 2008). Policies that present tradeoffs between biodiversity conservation and carbon storage include geographically prioritizing the conservation of forests that are richest in biodiversity (Kapos et al., 2008; Venter et al., 2009; Strassburg et al., 2010; Larsen et al., 2011; Gardner et al., 2012), monitoring the impacts of REDD+ on biodiversity (Gardner et al., 2012), and enacting safeguards to prevent the afforestation of biologically significant grasslands (Stickler et al., 2009). A commonly suggested policy to increase the biodiversity benefits of REDD+ is supplementing carbon payments with biodiversity payments (Venter et al., 2009; Strassburg et al., 2010; Dinerstein et al., 2010; Busch et al., 2011; Collins et al., 2011). Busch, J., Godoy, F., Turner, W., Harvey, C. (2011). "Biodiversity co-benefits of reducing emissions from deforestation under alternative reference levels and levels of finance." Conservation Letters, 4:101-115. Collins, M.B., Milner-Gulland, E.J., Macdonald, E.A., Macdonald, D.W. (2011). Pleiotropy and charisma determine winners and losers in the REDD+ game: all biodiversity is not equal. Tropical Conservation Science, 4(3):261-266. da Fonseca, G.A.B., Rodriguez, C.M., Midgley, G., Busch, J., Hannah, L. and Mittermeier, R.A. (2007). "No forest left behind." PLoS Biology, 5(8):1645-1646. Gardner, T.A., Burgess, N.D., Aguilar-Amuchastegui, N., Barlow, J., Berenguer, E., Clements, T., Danielsen, F., Ferreira, J., Foden, W., Kapos, V., Khan, S.M., Lees, A.C., Parry, L., Roman-Cuesta, R.M., Schmitt, C.B., Strange, N., Theilade, I., Vieira, I.C.G. (in press). A framework for integrating biodiversity concerns into national REDD+ programmes. Biological Conservation, doi:10.1016/j.biocon.2011.11.018 Harvey, C.A., Dickson, B. Kormos, C. (2010). Opportunities for achieving biodiversity conservation throug	Accepted, The argument has been included as a potential environmental effect. Some of the mentioned references were included.
15201	11					highly repetitive of 11.3	Accepted, The whole section has been restructured considering this and other comments
7205	11					o Suggestion: change title in 'positive environmental and health effects'	Accepted, The whole section has been restructured considering this and other comments. In the new version, positive and negative potential impacts are discussed together (as in the other chapters of the WG III)

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7207	11					Add: 1) Reduction of fire: decrease respiratory illnesses, increase plant growth. 2) Rewetting of peat: decreasing soil subsidence -> decreasing flooding risk -> decreasing salt water intrusion in coastal areas, decreasing DOC loads because of peat-erosion in rivers and streams -> decreasing negative impacts on fisheries	Accepted, Reduction of fire included in the table. Impacts on floods, fisheries and salt water intrusion should be discussed in 11.5
17994	11					This paragraph has only one reference which is clearly not enough to substantiate the many claims made here - which are partly redundant. The sentence on carbon credits should mention that this only applies if a hypothetical carbon market is introduced and also covers the agricultural sector.	Accepted, The whole section has been restructured considering this and other comments
7206	11					o Suggestion: change title in 'negative environmental and health effects'.	Accepted, The whole section has been restructured considering this and other comments. In the new version, positive and negative potential impacts are discussed together (as in the other chapters of the WG III)
7208	11					Another example of a negative effect: Rewetting of peat might cause high methane fluxes in the first years after rewetting	Accepted, Considered, but not included because it is discussed in section 11.2
15202	11					this si the land/water section!	Noted, We thank you for the statement
17996	11					The paragraph is the only discussion of risks which is consistent with the agreements made in Wellington. Please consider a broader discussion of risks and uncertainties along the classification of risks and uncertainties provided in Section 6.7. Please liaise with the other sector chapter LAs to discuss the process by which a more consistent approach can be reached.	Accepted, The whole section has been restructured considering this and other comments. The term "uncertainties" was avoid to reduced potential confusion. However, issues that are not yet clear were included in the text as areas for further research
17997	11					This paragraph on public perception should have its own third-level heading according to agreements made in Wellington rather than be framed under 'risks'.	Accepted, The whole section has been restructured considering this and other comments
11177	11					Concept of this section is not clear.This section can be deleted.	Accepted, The whole section has been restructured considering this and other comments
17998	11					The definition of spill-overs used in this section seem to deviate substantially from the topics discussed elsewhere in the report (e.g. carbon leakage, technological spill-overs, etc.). I would suggest to integrate the paragraph on ecosystem markets into 11.7.1.2 or into the policy section and to integrate the paragraphs on the scale of impacts into the introduction to the section 11.7. Additionally, please avoid the usage of the term trade-off which is inconsistent with agreements made in Wellington (p.35).	Parially Accepted, Text has been reviewed. The discussion on terms like risks or trade-offs for this section is still open. The nature of spill-overs in the AFOLU sector is different than in the other sectors.
17993	11					This short paragraph on innovation could well be moved to the section on socio-economic effect	Accepted, The whole section has been restructured considering this and other comments
13354	11					This section requires revision for grammar, clarity of sentence structure and use of language before it can be judged for content.	Accepted, Section has been reviewed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18000	11					An introductory sentence along the example of Chapter 9 referring to the agreement reached in Wellington (p. 36) might be helpful for readers: "Barriers and opportunities are referred to as conditions that hinder or facilitate the implementation of the analyzed measures."	Accepted, Introductory sentences were added
7209	11					Technological barriers and opportunities. Rewetting as a mitigation option requires knowledge on building dams. Building dams in rural areas can be a challenge and there are many examples of the dis-functioning of such dams. Future developments should focus on opportunities, e.g designing simple but robust constructions that can be build by using local products (to avoid that transport emissions are relatively large compared to the emissions that can be avoided through rewetting).	Accepted, Caveat added
18002	11					The use of opportunities in this paragraph is inconsistent with the agreements made in Wellington (p. 36) by which they should be interpreted as favourable conditions to mitigation options. It would thus be interesting which opportunities exist that would foster or prevent the mentioned "future developments".	Parially Accepted, Consistency improved
18003	11					This sub-section on public perception should be integrated with the sub-section on public perception in 11.7.	Accepted, Moved to 11.7
18766	11					Mitigation potential (global and regional) should be discussed in this section and not as stated there in the "Cost and Potentials" section. We should discuss this at SIE-3 and other relevant X-Cut sessions at LAM3.	Accepted, Potentials given here as well as in the costs and potentials section (11.6 - bottom up only)
18767	11					Please communicate to Ch.6 what data would be desirable for this section.	Rejected, Already done at LAM2
18768	11					Please communicate to Ch.6 what data would be desirable for this section.	Rejected, Already done at LAM2 (duplicate comment)
8831	11	0				Generally this is a very comprehensive chapter bringing together state-of-the-are information on all relevant aspects.	Noted, Thank you
16518	11	0				Congratulations to the AR5 team for the welcome decision to integrate the land use chapters into a single AFOLU chapter. This has made it possible to consider in detail the interactions among agriculture, forests, bioenergy and other land uses, which is a major advance over AR4. To the degree that I have critical comments relating to this decision, it is that in some of the sections of this chapter the integration has not be done as much as necessary, so that analyses remain "siloed" and thus incomplete or even misleading.	Accepted, Has been further integrated for SOD
16519	11	0				Given the damaging criticisms of AR4 for a few citations of non-peer-reviewed literature, it is particularly important to avoid this error in AR5 chapters. There are a few cases in this chapter where this problem appear to be present; although this would be a minor point in reviewing most publications, here it is of key importance. Thus I would urge special attention to these cases, pointed out individually below.	Rejected, This comment seems to have been spliced so cannot act on it in isolation
16520	11	0				The different sections vary in the units they use for emissions and sequestration, and in a few places do not make it clear what the units are at all. This variation causes needless confusion, and the units should be standardized both within this chapter and between it and the rest of AR5. The main options are tCO2eq and tC; in a few places PgC, which is the same as GtC, is used. Since the standard unit for emissions in other sectors (and thus in other chapters) is tCO2eq, I urge the authors to convert all emissions and sequestration figures to this unit. This will also avoid the strange feature of having non-CO2 gas emissions expressed in "tCeq", apparently calculated by multiplying quantities of CH4, N2O, etc. by their GWPs and then dividing by 3.67 to convert them into C units.	Accepted, Made all units consistent for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16521	11	0				It is anachronistic, and substantially reduces the policy value of this chapter, to continue the AR4 practice of expressing mitigation potentials in the format "X GtCO2e at a carbon price of $ Y". This had a justification at the time of AR4, when it was expected that international negotiations would lead to a global carbon market in which competition would equalize supply and demand at a single carbon price. But this expectation no longer corresponds to reality. We do not have a single carbon market or a single carbon price, and the result of the negotiations in Durban (with its decisions on what will be negotiated over the rest of the decade) make it clear that we will not have them in the foreseeable future. Rather, policies are being made in a bilateral and multilateral, pledge-and-review framework, in which the major payments being made for AFOLU emissions reductions and sequestration are being done through non-market mechanisms (e.g. the Brazil-Norway Amazon Fund arrangement) and with different carbon prices, or even no explicit carbon price, depending on the particular donor and recipient nations involved. In these circumstances, to continue presenting results in a framework that assumes a global carbon price is to put a great deal of effort into analyses which the policymakers will find outdated and mostly irrelevant.	Noted, We can only review what has published - so if the literature uses these metrics, we have to reflect them
16522	11	0				As a followup to my previous comment (#4) I would point out that it is also anachronistic to present analyses only for carbon prices up to $ 100/tCO2eq. Policymakers are now considering options which effectively imply higher prices than that, though often expressed in different ways.	Noted, We can only review what has published - so if the literature uses these metrics, we have to reflect them
15973	11	0				There is a lot of interesting information in the document, however it is sometimes not represented in a very clear and structured way, especially at the beginning of the chapter. Sometimes too much detail is given which makes the main message unclear, figures, bullet points, etc. could be used in many places to represent the main issues. Numbers throughout the text from different authors, makes text sometimes heavy, comparable figures/tables may increase readability.	Accepted, Revised for SOD
15975	11	0				The overall structure of the document could be improved, sometimes, it seems there is no connection between various chapters & sub-chapters	Accepted, Revised for SOD
12356	11	0				Chapter 11 shows the effect development of bioenergy can have on the carbon stock in soil and vegetation and that transformation of these carbon stocks can lead to emissions of CO2 to the atmosphere, higher than the amount of CO2 saved by the substitution of fossil fuel. The chapter also emphasize the effect on land use and competition with production of food and fiber and visualize the consequences for land use of different bioenergy scenarios, for instance in fig 11.14. These consequences can be dramatic.	Noted, Statement - not clear what action is required
12357	11	0				The chapter elaborates on the effect of different diet scenarios on the emissions of GHGs from the food chain. The difference between scenarios with high consumption of animal products and low animal product scenarios in 2050/2055 could be up to 10 Gt CO2-eq. This figure is significant higher than the effect of technical mitigation measures. Land-use related GHG-emissions and the effect on land use play an important role. The effect of different diets on land use is mentioned clearly in WGII chapter 19 with reference to the same publication as in WGIII chapter 11. One of the studies conclude that, to limit the GHG concentration to 450 ppm CO2-eq, a global adoption of the "healthy diet" would reduce global GHG abatement costs by about 50% compared to the reference case.	Noted, Statement - not clear what action is required
12358	11	0				It would be very useful if the effects of different bioenergy scenarios on emissions and land use could be compared and collocated with the effects of different diet scenarios with comparable units, for example Gt CO2-eq and million km2 land or percentage of the global land area. Eventually could the effect of technical mitigation and reduction of food-supply chain losses and wastes also be included.	Accepted, Revised, included new Table in section 11.4.4

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18239	11	0				Final comments: The document presents a series of numerical data that allow visualize trends, especially CO2 emissions to carbon sinks. However, the evaluation of IPCC shows that in section 11.11 (Gaps in knowledge and data); pages 71-72, the need of increase knowledge on other environmental variables, space information, dynamic of world ecosystems, forestry practices, among others, so can be obtained a current description of forest, based on a reliable and timely data. In this sense, it is recognized an information deficit, which should be solved to improve decision making process in management of forests and climate change.	Accepted, Have expanded on uncertainties
14263	11	0				The chapter is coherent, well written covering almost all aspects pertaining to mitigation in Agriculture, Forestry and Land use Section	Noted, Thank you
14264	11	0				Repitition of same things, at some places, has made the chapter lengthy. I think synthesis of these can make the chapter concise	Accepted, Edited for SOD
14265	11	0				The main purpose of the revision of Assessments Reports, after every four years, under auspices of IPCC is to have a synthesis of the work done in that period. So fresh refercnes are required to be quoted. Whereas the present manuscript have many citations of the period prior to 2007. This requires serious attention of the CLAs, LAs and ERs.	Accepted, Updated all references for SOD
15135	11	0				very interesting overall. Strong messages don't jump out at reader though. In places, there are surprisingly detailed descriptions of specific studies. This becomes a somewhat random aggregaton of detail rather than providing a synthesis. It would be helpful to take draft as is and pull out the the synthetic messages (thus chopping away unnecessary detail as well as helping to decrease the chapter's page length. Make sure it's not just a lit review (mentioning that someone worked on a particular topic), but that it presents a coherent story and contributes value-added (i.e. more than the sum of its parts).	Accepted, Used multi-functional land use as the central narrative for the SOD
15136	11	0				delete "either/or" statements, i.e. any vague sentences that say trends or stocks go up or down or could increase or decrease, depending on site or how things are modeled. Doesn't contribute to the synthesis (just the page length). (and no need to say that "anything can be everything"	Accepted, Removed for SOD
15137	11	0				Similarly, cut any calls for the need for more data or study; doesn't *inform* here.	Accepted, Removed for SOD
15138	11	0				Chapter is heavily, but somewhat narrowly, referenced. There seems to be a high degree of self-citation and nepotism (i.e., referencing colleagues from research groups and partnerships). Be cautious with this: a global assessment must draw widely, and fairly, on the literature. Given past controversies and media flare-ups, it's wise to tread carefully and judiciously here.	Accepted, Checked for over self-citation in SOD
15139	11	0				a formatting issue to be sure, but the citations are a mess- it would be easier to read and cut the length if all citations were consistent (i.e. use only surnames in in-text citations!). Is it not possible to issue all authors with the same referencing software and citation style guidance?	Accepted, Zotero updated for SOD
15140	11	0				writing to ban from chapter: "being" is not a strong verb; "impacted" or "impacted upon" is weak (doesn't tell much) and some argue it's not a verb; "etc." tells nothing, so there's no point including…	Accepted, Removed for SOD
15001	11	0				This chapter should include some discussion of the role of indigenous peoples in protecting forest land. This has been particularly salient in Brazil, where indigenous reserves are in some cases among the best-protected land in the Amazon. In many countries, active engagement of indigenous populations can amd must play a critical role in any strategy to reduce emissions from forest destruction and degradation. This issue may merit a separate section within chapter 11.	Accepted, Included in chapter, but not as separate section

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15003	11	0				In chapter 11, or perhaps more appropriately in chapter 13, it would be very useful to have a text box that would describe the evolution of REDD+ as an international effort. It would include discussion of national actions, such as Brazil's reduction in deforestation and establishment of the Amazon Fund; of the role that donor countries such as Norway are playing in stimulating interest and investment; the role of the Forest Carbon Partnership Facility at the World Bank; evolution of REDD+ as an area of agreement in the UNFCCC negotiations; interest among subnational governments as manifested through the GCF, involving governors from the U.S., Brazil, Indonesia, Mexico and other countries; and perhaps also the role that NGOs have played through supporting REDD+ projects (e.g., Noel Kempff Mercado in Bolivia), and the interest in REDD+ that was manifested in U.S. climate legislation with extensive REDD+ financing provisions in 2009.	Accepted, A figure with the evolution of REDD+ was included, as well as some information on national programs and bilateral cooperation for the REDD+
7666	11	0				Chapter 11 does not reflect that since AR4 the literature has fundamentally changed how we consider bioenergy as a mitigation option. Especially the papers by Searchinger et al. (2008) and Fargione et al. (2008), both in Science 319, have been followed by a vast literature. This literature is in contrast to the very optimistic view on bioenergy as an important mitigation option provided by earlier IPCC reports, not least the SRES report. I had expected that this chapter provides a critical review of the previously far too optimistic IPCC assessments as far as bioenergy concerns.	Rejected, The text reflects this later literature very well, and is not overly optimistic for bioenergy. See new concensus bioenergy annex.
14775	11	0				The chapter focuses on global discussion on emission budgets and mitigation potential. However in AFOLU sectors mitigation actions need to take place at the local scale, predominantly by small-holders. I'd recommend the author team writes more about the issues at the local scale. There are a number of specific challenges at the small scale: measurement of carbon storage and mitigation potential, uncertainties associated with bottom-up estimates, access to mitigation finance schemes by farmers, lack of capacities, identification of efffective mitigation options, etc.	Accepted, Issues regarding local character of AFOLU measures are included
8216	11	0				QUOTATION OF REFERENCES AND AUTHORS IN THE TEXT ARE VERY INCONSITENT SOME AUTHORS HAVE THEIR INITIALS INCLUDED IN THE TEXT OTHERS DO NOT HAVE INITIALS. SOME AUTHORS ARE QUOTED BY THEIR FIRST NAMES IN THE TEXT WHILE IN THE LIST OF REFERENCES THEY ARE CITED IN THEIR SIR NAMES	Accepted, Zotero updated for SOD
2321	11	0				The National Comunications on Climate Change from Parties to UNFCCC could be useful for this kind of report as they provided informations and data related to mitigation of GHG emissions in each country. But on the whole, no reference is made to such documents	Rejected, Peer-reviewed analysis preferred
12037	11	0				Chapter seems to be conclusive, good incorporation of current land-use patterns, good discussion of competition between food and feed production and bioenergy	Noted, Thank you

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13303	11	0				The chapter was effective in summarizing the current knowledge of emission potential mitigation for the AFOLU sector based on large scale modelling studies published in the scientific literature. The chapter requires a more general introduction to AFOLU presenting in a brief and precise manner the interactions between sources of GHGs from AFOLU; how mitigation of one source or gas may compliment or contradict other mitigation of other sources or gases. My main, more specific criticism, lies in a generally poor treatment of the role of the nitrogen cycle in the text and analysis. Reactive nitrogen in the biosphere has increased proportionately to CO2 in the atmosphere over the past 100 years, with the increase in agricultural intensification (Galloway, J.N., Aber, J.D., Erisman, J.W., Seitzinger, S.P., Howarth, R.W., Cowling, E.B., Cosby, B.J., 2003. The nitrogen cascade. BioScience 53, 341-356). I find that N2O emissions are treated in a very peripheral manner throughout the text. Within the agricultural sector, there are important tradeoffs between CH4 and N2O and mitigation strategies for one may result in increases in the other gas. Likewise the interactions between soil carbon and nitrogen cannot be ignored and some acknowledgement of interactions must be clear within the discussion. Specific examples and suggestions are given in my comments throughout the text. The chapter drowns in technical jargon from a variety of different fields and is often quite difficult to follow. Particularly the last few sections. Finally, as the authors are no doubt aware, there are problems throughout the text with citation and brackets around citations Al citations require verification.	Accepted, add new reference and expand N2O sections where appropriate
7528	11	0				This executive summary indicates that messages from this chapter are not matured, not balanced and not comprehensive. Important messages form AR4 are forgotten. Huge revision is required respecting AR4.	Noted, Comment not specific enough to allow action - what huge revisions since AR4 are you suggesting?
7529	11	0				This chapter deals with AFOLU, but large parts of discussion look at agriculture sector and bioenergy. The most important issue in AFOLU is land use change / deforestation, so these related issues should be most highlighted in this chapter. Because the main draiver of deforestation is agriculture. However, discussion in forestry sector including deforestation is shrunk and does not have progress comparing with AR4. CLAs and LAs should consider priority of mitigation options in AFOLU.	Rejected, We consider the mitigation in the different parts of the AFOLU sector to be balanced
7551	11	0				Where is discussion on Research and Development and Technology transfer? This discussion is important for R&D and mitigation options in developing countries especially for REDD+.	Rejected, Already dealt with in section 11.11
9077	11	0				I roughly understood the reasons of the integrated assessment of AFOLU in the AR5. But topic in Forestry sector were scale-down from AR4, and were biased toward "bioenergy" issue.	Accepted, Bioenergy text was shortened and revised
13956	11	0				the chapter as a whole is lacking context of responsibility for emissions, therefore responsibility for mitigation. This is necessary for equity reasons, and should be connected to the discussion in chapter 5. it is also necessary because it is not appropriate to weigh costs and benefits, and the distribution of those costs and benefits, without also an assessment of who is undertaking action and who might be benefiting from that action. if the benefits of carbon sequestration are principally as an offset for developed country emissions, but the sequestration is undertaken in developing countries, this is absolute essential to include in the calculus of cost-benefit analysis.	Rejected, Whilst equity issues are discussed, responsibility for emissions is a policy issue and policy prescriptive text must be avoided. That discussion does not belong in Ch11
13989	11	0				several other references to include with regard to mitigation potential (or lack thereof) of conservation tillage. J.M. Baker, et al. 2007. Tillage and carbon sequestration -- what do we really know? Agriculture, ecosystems and environment 118: 1-5; A. Meyer-Aurich et al. 2006. Cost efficient rotation and tillage options to sequester carbon and mitigate GHG emissions from agriculture in Eastern Canada. Agriculture, ecosystems and environment 117: 119-127	Rejected, Focus on post-2007 literature

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13990	11	0				other miscellaneous references. D.S. Powlson, et al. 2011. Soil carbon sequestration to mitigate climate change: a critical rexamination to identify the true and the false. European journal of soil science 62:42-55; J.D. Unruh. 2008. Carbon sequestration in Africa: the land tenure problem. Global environmental change 18: 700-707.	Partially Accepted, Added these references for SOD if appropriate
12924	11	0				Only for the structure of the chapter… When there are sub-section in each section, breaf introduction should be included before the sub-sections. For example, Line34-38 in section 11.3 and Line13-27 in section 11.3.2.	Accepted, Added few sentences at the beginning
5455	11	0				Only forest with sustainable harvesting can remove CO2 from the atmosphere continuously. Natural forests without harvesting can not act as such CO2 pump. To increase wood products stock in human society and to substitute wood for energy intensive materials and fossil fuels can reduce CO2 in the atmosphere. The importance of sustainable foresty and wood utilization is described little in this chapter.	Accepted, Wood utilization has been discussed more in SOD
11182	11	0				It is not appropriate to devide all the mitigation options into production side and demand side. This approach can only focus on the industrial aspect of AFOLU sector such as agriculture and timber production. However, mitigation options related to land-use sector especially forest-related options are not limited in these industrial activities.	Rejected, The division of options into demand and production side measures does not only focus on industrial aspects of the AFOLU sector
11057	11	0				Overall, my major comment is that the issue of technological barriars to mitigation practices in the agricultural sector is not emphasized nearly enough. It is so often assumed by those not so familiar with the primary literature that practices such as reduced tillage for increasing soil carbon storage or improved nitrogen fertilizer management for reducing N2O emissions are highly proven and reliable strategies across systems and locations. Unfortuntately, at this point in time, this is not the case, and much more work is needed to better define what the most effective practices are for particular locations, and to quantify their effectiveness. In this regard, I have provided a few examples, and some references in along with my comments below (including some in press articles that were sent via email to comments@ipcc-wg3.de).	Accepted, Barriers have been emphasized more
2607	11	0				This chapter has a lot of good information but is poorly organized and has poor transition between paragraphs and even between sentences. It does not have a balance in the materials that are presented and the summary has not balanced by much of the material that was introduced before the policy sector. Combining forests and agriculture also contributes to this imbalance since each is discussed in a section but frequently the information is really mostly applicable to agriculture. By combining them, it ends up suggesting that forests should mitigate impacts that are really from agriculture. In the front part of the chapter, there are many sentences that are too long so the take home messages are lost.	Accepted, Thorough edit has been done for SOD
18983	11	0				General Comment: The chapter is substantiated and does a good synthesis. There are nonetheless a few points of critique by the TSU that we would like to share. We are submitting these comments so that they may guide the author team in their work on the chapter. The core comments are labelled "Main Comment".	Noted,
18984	11	0				Main comments: Storyline. When reading the chapter no storyline emerges and key messages do not stick out. The FAQs, particularly FAQ 11.1, 11.2 and 11.3, though, address the core questions the chapter should answer. The structure and content of the chapter should be improved in such a manner that it becomes clear which sections contribute to which key messages.	Accepted, Coherent narrative developed for SOD - new introduction and executive summary outlines this narrative
18985	11	0				Main comments: Data and accessibility. The chapter covers a lot of data, which is good but which also constraints the flow of the text significantly. Please move more numbers into tables and figures and restrict the text to providing the context and interpretation.	Accepted, Streamlined the text

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18986	11	0				Main comments: Potentials. The chapter is very detailed on the bio-physical potential. It would be good to extend on the economic potential if possible as this is the one that the policy makers are particularly interested in. We are aware that there is a great range between existing studies, that the ranges are great for different soils and Tiers assumed – please try nonetheless to provide more insights into the economic potential taking into account existing uncertainties.	Partially Accepted, We can only review the literature that exists - and almost all of this is of the kind that provides potential as Gt Co2-eq. at a given C price
18987	11	0				Main comments: Redundancies. There are redundancies in Sections 11.3 (options), 11.4 (system perspective) and 11.6 (cost & potentials) concerning mitigation options and their associated potentials. Consider to have a central table that can be referenced throughout.	Accepted, Redundancies removed and whole chapter shorter by 20%
18988	11	0				Main comments: Co-benefits, risks and SD. For all sectoral chapters there must be more clarity about how and where risks, co-benefits and sustainable development is covered in the section “Costs and potentials” (11.6) and what in Section “Sectoral implications of transformation pathways and sustainable development” (11.9). The upcoming meetings (SIE-3, LAM3) should work on this.	Accepted, Has been better developed for SOD
18989	11	0				Main comments: Scenario linkage. With the lack of data from the scenario database this section needs attention. Please start collecting, reviewing and where possible synthesizing bottom-up data as soon as possible to have an appropriate counterpart for the scenario data.	Accepted, No data was delivered from Ch6, so we could not include in the FOD.
18990	11	0				Main comments: Policies. In the policy section it would be good to focus on policy experience rather than listing plans whose implementation is unclear.	Accepted, Restructured around assessment of existing that has been implemented rather than policies not yet implemented
18991	11	0				In contrast to AR4 there have been discussions and a consensus not to provide global mitigation potentials from the sectoral chapters, as these numbers do not take interdependencies into account. In the upcoming process there needs to be discussion among the sectoral chapters how to deal with AR4 numbers. At this stage it seems reasonable not to cite the AR4 mitigation potentials as we will not provide any updates to these numbers in AR5.	Partially Accepted, Accepted - have only provided updates - but we feel that global mitigation potentials should still be given
18992	11	0				Please improve the coverage of regulatory uncertainty concerning aforestation.	Rejected, Why? No rationale given
5081	11	0	0	0	0	in your list of mitigation strategies I would use yield enhancing and input reducing technical change	Partially Accepted, Have included, but some technologies do both
7394	11	0	0	0	0	This chapter should include a section (and a statement in the executive summary) that considers and discusses the role of GHG metrics (GWPs etc) for AFOLU. As a sector whose main emissions are non-CO2 gases, but much of its perceived mitigation potential is CO2, the choice of metric is of major importance. I would expect a section that (a) recognises this, (b) exemplifies it by showing how the significance of agriculture compared to other sectors changes under different metrics, (c) identifies the areas within AFOLU where abatement options and LCA results might be affected by different metrics (in particular where e.g. reductions of CH4 come at the price of increasing N2O), and (d) considers the role of metrics in AFOLU abatement trajectories, including their impact on regional mitigation potential in the context of international trade (see Reisinger et al, 2012, accepted for Climatic Change), and also recognises the interaction between metrics and RD&D cycles. This could link with Section 3.10.3 but build on it by demonstrating the particular importance of GHG metrics for the AFOLU sector. More literature coming out over next few months on metrics for agriculture and policy options for implementing new metrics.	Accepted, Linked to section 3.10.3

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10131	11	0	0	100	100	A general commnet: I am quite a bit concerned about the framing of mitigation in agriculture in this chapter, this can have serious unintended political consecuenses. It is important not to mix issues.I think you are mixing reduction of net emissions and how this could be funded and this leads to the unrational discussions that developing countries should not mitigate and agriculture should not be part of the convention. My frame would go like this; 1.Separate mitigation as a biophysical phenomenon of the politica decisions on financing. 2. Agriculture on existing land areas, separate mineral soils and organic soils.3. Existing agriculture on mineral soils, mitigation is a co-benefit for adoption climate smart practices increasing productivity, organic matter in oils, biomass including trees, reducing waste by more effeicient use of nutriensts and water, improving animal healt and nutrition, improving resilience etc. the real extra cost is MRV cots as and when the emission reducitons are reported.This should be funded by increased and climate smart normal agricultural investments by farmers, governments, private sector, ODA etc. 4. Agriculture on drained peatlands is unsustainable, the peatlands should be rewetted, here climate money is needed for rehabilitation, finding alternative livelhoods, PES etc. 5. AGriculture as a driver of landuse change, this is the difficult part and intimately related to REDD+, which will not succeed if a holistic landscape land use planning approach is not taken including development of agriculutre on existing areas on forest fringes and protection agreements to forests. This is the small holder piece. Then we have large scale commercial farming (soya in Brazil, oilpalms in Indonesia and elsewhere etc.), this is partly a policy driven (biofuel policies), ppartly demand driven (increasing demand of meat the main driver,) and here the demand side has to be managed.	Partially Accepted, Items 1, 2, 3 and 4 already done. Discussion of leakage in REDD+ programs and land planning policies were included in section 11.10
14734	11	0	1			use the chronological order to cite the authors: (Wise et al., 2009; Plevin et al., 2010; Searchinger, 2010; Havlik et al., 2011; Popp et al., 2012). This happens in several places of the text.	Accepted, Zotero updated for SOD
10235	11	1		103		General comments on chapter 11: Overall Chapter 11 covers well most of the AFOLU sector, but the writing can be greatly improved (many repetitions between sections, sections to review and / or complete). The references are incomplete, and are often the same references that recur in the text, it should also include more existing reviews on the various points discussed in this chapter. Many sections still need to be updated. See specific comments below for more details	Accepted, Thoroughly edited and updated for SOD
14549	11	1				General comment: this chapter pulls a great deal of very useful information in one place. I think it is a move forward to have all AFOLU together and the authros have done a great job in complining much information. It still neds more synthesis in pulling the different information together but this is a great start	Noted, Thank you
14550	11	1				General comment: I would like to see a discussion of land availability before numbers are given for potenial mitigation. Also where numbers are given for potential mitigation I would like to see wherever possible the amount of land impled to be used for this mitigation, particualrly for afforestation, reforestation bioenergy. This would help to judge trade off of different otpions and conflicts with other land use (e.g. food). Having land availablility first would help tp put the numbers we see in context. It would also aid in seeing where the land could be sued for either forest mitigation (aff/ref) or bioenergy, but not both, to avoid double counting	Partially Accepted, The land availability is completely linked to the mitigation potential and the land use, so these issues have to be treated holistically
5533	11	1	1	73	29	The general comments are now at the end.	Noted, Not a specific comment
5662	11	1	1	73	29	General comments on Chapter 11 AFOLU	Noted, Not a specific comment
5663	11	1	1	73	29	I have read and re-read this paper, some statements and figures are questionable and in my opinion it misses a fundamental option when considering mitigation alternatives to help reduce increases in GHGs over time.	Noted, Not enough information in this comment to take action

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5664	11	1	1	73	29	The paper assumes that the use of wood products is a major cause deforestation. It never considers the annual growth of trees compared to annual demand for wood or its sustainability. It assumes that cutting trees is deforestation, yet cutting cereals is not de-farming! In most cases both are harvesting.	Rejected, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5665	11	1	1	73	29	I estimate that the growing stock of trees on all land formations is of the order of 544 Gt wood containing 272 Gt C. The annual growth from accessible trees is of the order of 18.4 Gt wood (9.2 Gt carbon) and the annual demand for wood products is an estimated 3.5 Gt wood (1.8 Gt C) or 19% of sustainable supply, (Openshaw, K. Supply of woody biomass, especially in the tropics: is demand outstripping sustainable supply? International Forestry Review. Vol. 13(4) 2011. ISSN 1465 5489.) I attach a copy for your information. Note the (low heat) energy value of dry wood = 18.7 GJ/tonne.	Rejected, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5666	11	1	1	73	29	Much more wood could be used, especially substituting it for fossil fuels and sawnwood/panel products for steel and concrete, without making inroads into the woody growing stock. The paper is silent on this. It assumes that energy crops will have to be grown to meet increased demands for renewable fuels and planting trees in all formations will sequester more atmospheric carbon and could supply more wood products.	Rejected, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5667	11	1	1	73	29	Each year, plants capture about 100 billion t of atmospheric carbon (NPP) of which about half is by land plants and each year the same quantity is returned to the atmosphere through respiration in plants and animals, rotting, wildfires etc. Only a small fraction of this carbon is used by humans for food and fuel etc. With improved management much more could be used. By way of contrast, the current use of fossil fuels produces about 8 billion t of carbon (IEA). If you don't use the annual growth of biomass (an estimated NPP of 53 Gt C for land plants – see my article), you lose most if not all of it.	Rejected, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5668	11	1	1	73	29	The paper talks about using switchgrass (Panicum sp.) and silvergrass (Miscanthus sp.) to produce bioenergy (ethanol). It may be cheaper and more practical to use these grasses and crop and wood waste to produce methanol etc. by the dry distillation of such biomass, or use it directly. I don't know if the 'energy' chapter discusses this?	Rejected, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5669	11	1	1	73	29	Figure 11.3 (page 12) gives global trends for three time periods. On the emissions side deforestation is separated from land use changes. This is very misleading. I suspect that some of this could be harvesting and thus is 'temporary deforestation'? What happens to these 'deforested' areas? Do they remain in a bare state or are they reclaimed to trees through natural regeneration or replanting? Nature abhors a vacuum and some plants will occupy these lands. I suspect most of it is 'land use change'!	Rejected, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5670	11	1	1	73	29	The principal causes of deforestation are clearing woody areas for farmland by the subsistence sector because of population increase and expanding cash crops to meet the increasing demand for food and energy. In order to reduce deforestation, agricultural productivity has at least to keep pace with population increase. But this is difficult for the subsistence sector, which has little means to improve its productivity. And by 2050 the population in developing countries is likely to increase by 2 billion of which up to half could be in rural areas. Such programs as REDD+ may be ineffective in slowing down deforestation, especially if subsistence agricultural productivity does not improve. The paper is quiet on ways to make this happen.	Rejected, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5671	11	1	1	73	29	Simple inputs could help improve productivity. For example, intercropping with marigolds (Tagets sp) in the field or home garden can reduce nematodes in the soil. Adding wood ash, lime, compost and mulch can improve soil fertility and friability. Planting brassicas (cabbage) with (nitrogen fixing) black beans can reduce the incidence of black bean aphids. Again planting napier grass (Pennisetum purpureum) around the rim of the field and then rows of molasses grass (Melinis minutiflora) between rows of maize, reduces the number of stem borers in the maize and increases the number of parasitic wasps that prey on the stem borers. Such a system may increase the maize yield by up to 30% and the two grasses provide nutritious animal feed. Similarly, a South American legume called Desmodium uncinatum (silverleaf) inhibits witchweed or striga (Striga asiatica), a major weed in some countries, when intercropped with the above grasses and maize and may more than double the yield of maize. Again, no-till farming helps maintain soil fertility and friability. These are all 'low-cost' options.	Rejected, This is an eclectic collection of marginal individual practices - does not fit here
5672	11	1	1	73	29	Agroforestry systems can be a substitute for shifting cultivation and provide nitrogen inputs to at least maintain fertility. Abandoned agricultural and marginal lands can be reclaimed by 'biomass crops' rather than clearing forests for palm oil, soy bean and pastoral agriculture. Land invaded by Imperata cylindrica grass, an aggressive weed species growing in many developing countries, can be reclaimed by planting nitrogen-fixing trees such as Gliricidia sepium and Leucaena leucocephala. Similar dry areas can be reclaimed with Prosopis sp. Much of this work could be undertaken by the subsistence sector, thus helping with poverty alleviation.	Rejected, Thanks - but agroforestry is already included. Perhaps missed by the reviewer.
5673	11	1	1	73	29	A constraint is lack of adequate education. The above mentioned initiatives could greatly offset lack of education, but governments could help by introducing practical subjects in the school syllabus and run adult education classes. These could demonstrate simple and cheap agricultural techniques coupled with demonstration plots.	Partially Accepted, Included in the barrier section
5674	11	1	1	73	29	The paper talks about land use, but what is lacking is a table giving broad land use classes for the world. Section 11.2.1. First and foremost a table of land use should be given and inventories of the biomass growing on the land areas should be determined, particularly in areas of actual or potential use.	Accepted, Have given land area tables for the SOD (from central data spine)
5675	11	1	1	73	29	The following is an estimate of land use (Table 1).	Partially Accepted, Other estimates available (in core data spine) but this was considered for the SOD
5676	11	1	1	73	29	Table 1. Land use for the world 2006: units million hectares and 109 dry tonnes of woody biomass2. World Forest Woodland Arable Grassland1 Desert Built up Arctic 14894 4021 1224 1638 4170 1787 298 1788 area 100 27 8 11 28 12 2 12 % 543.80 450.71 9.28 79.71 0 4.10 0 Growing stock 18.35 12.44 0.36 5.33 0 0.22 0 Annual yield Note. 1 Grasslands include wetlands. 2. This is above ground biomass; total biomass is 20-33% more. Annual yield is accessible yield. Total yield is 21.58 x 109 t. Carbon content is 50% of dry wood weight. Source. FAO 2009 (State of the world's forests adjusted) and search of the WWW. Openshaw, K. 2011. □	Partially Accepted, Other estimates available (in core data spine) but this was considered for the SOD
5677	11	1	1	73	29	Another table that should be in the text is an estimate of organic soil carbon in section 11.5.3 (page 45). The following is my estimate based on Chapter 2 –Land use and soil carbon in different agro-ecological zones by D. J. Greenland (1995).	Rejected, Very old reference - more up to date references available

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5678	11	1	1	73	29	Table 2. Estimate of soil carbon by land use types: units million hectares and 109 t carbon Land type Area Soil carbon Land type Area Soil carbon Forest/woodland 5213 600-900 Desert 1787 85-130 Arable 1638 165-250 Built up 298 30-50 Grassland 2870 115-170 Sub-total 13106 1380-2100 wetland 875 35-50 Arctic 1788 190-280 Peat 425 350-550 Total 14894 1570-2380 Source. R. Lal et al. 1995. Soil management & greenhouse effect. CRS Press, 1995. ISBN 1-56670-117-1.	Rejected, Very old reference - more up to date references available
5679	11	1	1	73	29	With similar soil and rainfall types, there is more organic soil carbon under forests than under wood lands and grasslands, which have more than under arable agriculture.	Noted, Statement - not a comment
5680	11	1	1	73	29	Some of the units are not consistent. Weight is usually in metric tonnes of carbon or carbon dioxide equivalent, but some it is given in short tons. GC or GCO2 is the common weight but sometimes Pg is used. Sometimes CO2 is given as CO2. Likewise N2O is given as N2O etc.	Accepted, Harmonized units for the SOD
5681	11	1	1	73	29	The text needs a good edit as there are grammatical and spelling errors and too many brackets in parts.	Accepted, Thoroughly edited for the SOD
5682	11	1	1	73	29	In my opinion, there are too many references, some have up to twelve (P 44). These should be reduced.	Accepted, Selected only key references
5798	11	1	1	103	20	You could shorten the text considerably if you concentrated on messages and findings instead of listing study's results as it happens quite often throughout the text. This may be a choice of style, but if references are used as such and not chained following each other the text will be shorter without losing content.	Accepted, Thoroughly edited for SOD
18287	11	1	4			insert "and since it comprises a high diversity of management technologies and climate and location specific influences that interact with mitigation measures."	Rejected, Wrong page and line number - cannot locate
5703	11	10		11		After the sub-paragraph ‘11.2.2 Trends of C fluxes from land use and land use change’, it will be useful to give a composite picture of C fluxes/emissions from Land Use, Land Use Change and Forestry (LULUCF) just after page 11. The treatise on AFOLU can be started thereafter, and it may also be indicated as to what additional land uses need to be added to LULUCF to make it more comprehensive in terms of reporting for all land uses coalescing in AFOLU.	Rejected, This is already done in figure 11.3
11113	11	10	1	10	2	there is information that suggests that China's large-scale afforestation program is not a success, rather, on-the-ground surveys have shown that, over time, as many as 85 percent of the plantings fail. See at Earth Science Reviews, Excessive reliance on afforestation in China's arid and semi-arid regions: Lessons in ecological restoration - Review Article, Pages 240-245, Shixiong Cao, Li Chen, David Shankman, Chunmei Wang, Xiongbin Wang, Hong Zhang	Accepted, This is too country specific
5701	11	10	10	10	14	The text in these lines may be rephrased as “In addition, during the period from 2000 to 2010, ambitious tree planting programmes in countries such as China, India, The United States and Vietnam- combined with natural expansion of forests in some regions- have added about 7 Mha of new forests annually. However, due to deforestation in many other countries in Asia, Africa, and Central and South America, the net increase in forest area at the global level during the same period was reduced to 2.92 Mha y-1.	Accepted, Rephrased for SOD
16210	11	10	13			These numbers don't seem to match up right: 7 mha added ANNUALLY(?) in China, US etc vs. 8.3 M ha lost or 5.2 Mha lost in the tropics… is that number of added forest supposed to be over a longer time period?	Accepted, Checked numbers and revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10589	11	10	14			Could add that in 2010 New Zealand, as part of its ETS, had 18.3Mt CO2 available from Kyoto plantation forests to offset other GHG emissions totalling 71.7 MtCO2eq/yr, 11.9 MtCO2eq higher than 1990 levels. Ref: MfE, 2012. New Zealand's greenhouse gas inventory 1990-2010 and net position, Environmental snapshot, April 2012. Ministry for Environment, http://www.mfe.govt.nz/publications/climate/greenhouse-gas-inventory-2012-snapshot/index.html	Noted, Too country specific - we cannot cite every paper and report for every country - this is a synthesis
14592	11	10	15			This section has several issues that I would be happy to help resolve in more detail. Ther is poor explanations or confusion here between co2 emissions from forest area change versus all land use change, between global and torpical only estimates, between gross and net emissions, and between fluxes due to human activity (LUC) versus fluxes due to indirect human induced change cliamte and CO2. The most up do date and comprehensive model results are not being used. I can provide input from Houghton et al 2012 and more recet data provided for WG1 and for the global Carbon project annual budget, I will just have to check with modelling groups. The section does not use the most appropriate references and mis uses others (e.g. le quere for fire. it totally lacks a proper discussion of the ucnertainties and recent estaitmes (SD across models alone is not th euncertainty). Pan et al is comapred to other refs that do not report on the same thing without explaining this. I list some additional line by line points below that are not dealt with in this general summing up	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
15961	11	10	16	14	47	Section provides a nice overview of sinks & emissions per landcover type, a figure visualization the differences in sink/emissions per landcover type could provide a nice visual overview of the relative contribution of each	Noted, No space
7335	11	10	16	10	34	Better clarification is needed on why there are such big discrepancies among the estimates of C flux from land use change, especially between Houghton 2010 and Piao 2009. The reader should be given some idea as to at least what sign is most realistic. And which study is cited for the numbers in lines 31-32?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
16541	11	10	19	10	23	Is the considerably lower estimate from Piao et al. explicable by the different time period (i.e. by large emissions before 1901)? Or is there some other explanation for why it is so much lower?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
7058	11	10	19	10	23	It is important to note that the Piao et. al. study from which these conclusions were drawn, observes that "...the effects of wood harvesting and forest regrowth are not included in our study, although they may play a significant role in shaping historic C fluxes...". The importance of such factors have been found to be very significant in more recent studies (e.g. Pan et. al.) and the text here should be modified to make clear that (a) the study in question did not examine wood harvesting and forest regrowth (as well as forest management and harvested wood products), and (b) these additional factors have been found to be very important to net carbon fluxes to the atmosphere attributable to forests. (See Pan, Y., Birdsey, R., Fang, J., Houghton, R., Kauppi, P., Kurz, W., et al. (2011). A Large and Persistent Carbon Sink in the World's Forests. Science Vol. 333 , 988-993.)	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
11805	11	10	19	10	23	It would be good to include here the mechanism, namely that the amount of C lost due to LUC is the same but that bthere is increased growth (hence uptake) on the remaining land	Accepted, Included
2603	11	10	19	10	19	"(RA Houghton, 2010)." should be "(Houghton, 2010)."	Accepted, Zotero updated for SOD
5494	11	10	20	10	23	How have inputs such as fertilization and irrigation contributed to NPP and does this have an impact on the overall balance on emissions?	Rejected, Not known - we can only review what is known and published - these references mainly deal with LUC and not managed land so no relevance here Fertilized crops take up more carbon but are then harvested.
12373	11	10	20	10	20	The acronym NPP should be spelled out the first time it is mentioned.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16211	11	10	22			total' C emissions--not clear if this is net or gros, especially given the numbers above--I think they mean 'net' here (not total) which to me implies gross.	Accepted, Specified net vs. gross throughout
16542	11	10	24	10	36	Successive sentence in this part give different impressions of when the increasing trend ended. The initial sentence ("All studies agree…") says it was till "the middle of the 20th century", and the sentence at the end of that paragraph ("Within variations between...") suggests no further increase from 1980 to 2000, but then the first sentence of the following paragraph ("A major contribution to the overall increasing trend...") indicates increase through the beginning of the 21st century. Rephrase to clarify (or simply show the trend in a Figure).	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5805	11	10	24	10	34	This is confusing. Please re-order text so that periods are ordered along the time axis - "1990 - 2009 …" belongs at the end of the paragraph.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
2604	11	10	28	10	28	"(RA Houghton et al., 2012)." should be "(Houghton et al., 2012)."	Accepted, Zotero updated for SOD
12371	11	10	30	10	32	In line 30-31 the mean values of annual C-flux in the 1980s are estimated to 1.1 +/- 0.8 Gt C/yr and in the 1990s 1.1+/-0.g Gt C/yr, while the Median values are estimated to resp 1.3 and 1.1 Gt C/yr. The negative value in the 1990 s for the mean value seems not consistant with the positive value for the median value for the same period.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
16212	11	10	32			is that supposed to be 'negative' 1.1? Why the dash? It is not supposed to represent uptake in the 1990s, right? Remove the dash.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
18925	11	10	34			Correct reference to "Figure 11.1b"	Accepted, Revised for SOD
9101	11	10	35	11	32	See reference literature; Hashimoto S (2012) A New Estimation of Global Soil Greenhouse Gas Fluxes Using a Simple Data-Oriented Model. PLoS ONE 7(8): e41962.	Accepted, Included in SOD
16213	11	10	35			be careful: use 'net' c flux to atmosphere when you mean it; don't confuse with 'gross' flux.	Accepted, Specified net vs. gross throughout
7550	11	10	35	11	32	Hashimoto estimated global emission of CO2, CH4 and N2O from soil of land uses including forests and farm lands. I recommend authors to refer the latest scientific paper. Hashimoto S (2012) A New Estimation of Global Soil Greenhouse Gas Fluxes Using a Simple Data-Oriented Model. PLoS ONE 7(8): e41962. doi:10.1371/journal.pone.0041962.	Accepted, Included in SOD
16543	11	10	37	11	1	The phrase "fire emissions from tropical deforestation" immediately raises the question of where these emissions are represented in Figure 11.1a -- in "fires" or in "deforestation"? If they are additional to, not part of "deforestation", it seems that deforestation should described as the "dominant source." If on the other hand these overlap, then it is incorrect to stack the boxes showing them in Figure 11.1a.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12372	11	10	4			Please consider to replace the column "Country/area" with "Region". The word "total" after the name of each region could be deleted, as it is obvious information, and not consistantly used. The text in the section describes the forest cover in the period 2000-2010. It would be useful to find the same period in the table.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14413	11	10	4			Can you add figures for the corresponding reductions in emissions from deforestation?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod. the table shows both areas with increase and decrease in forest area. its not simple to convert forest area change to emissions or uptake e.g. the emissions.r/regrowth are not all immediate and they will depend on the model of clearing or planting and the land transition types before/after forest area change, etc. Since latest houghton data is from FRA we could ask him to break out the forest data, but point these things out . but there would still be the issue of legacy fluxes not matching the timeline of forest area change.
14424	11	10	4			First column. Change ‘Country’ to ‘Continent’. There are no data at the country scale.	Accepted, Revised for SOD
11202	11	10	6	10	14	Suffers from potential definition problems vis-a-vis 'forests' 'new forests' and the distinction between natural forests (ecosystems) and planted forests/plantations. This might be corrected with insertion of the 'planted' in between the words 'new forests' (at line12).	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
11978	11	10	6		14	Needs some recongnition here that although new forests take up carbon, there's a time lag between C emissions from deforestation and C uptake. Soemthing like "However, this net approach may mask differences in the C content of newly regrowing forests, to that lost from deforestation of old growth forest".	Accepted, Added discussion of time issue in the redraft
7549	11	10	6	10	14	While planting programs increase forest area, natural/semi-natual forests are decreasing. They are not compatible often. Please don't look at only total forest area.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
10102	11	10	6	10	8	The important role of drained peatlands should be mentioned here as a significant source of emissions, conserving existing wetlands /mires is an importatn mitigation action likewise rewetting of drained peatlands.	Accepted, Added for SOD
7183	11	10	7	10	8	o (“known as REDD+”). See earlier comment. REDD+ programs include the following activities: 1) decreasing emissions from forest deforestation 2) decreasing emissions from forest and/or peatland degradation 3) preserving and accumulation of carbon stocks through a. forest conservation, b. sustainable forest management c. rehabilitation and restoration of damaged areas, 4) the creation of additional benefits such as a. improvement of local people’s welfare b. improved preservation of biodiversity c. improved protection of other ecosystem services	Accepted, A better description of REDD+ was added
16539	11	10	8	10	10	This sentence is quite important; it definitely needs one or more separate citations. The reduction in deforestation in Brazil is coming to be well known, but not a corresponding change in Indonesia, so it is important to have a strong reference for that change. I would also suggest expanding, for 2-3 sentences more, on what were the "concerted efforts" that resulted in these successes.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
2602	11	10	8	10	8	"(J.G. Canadell and M.R. Raupach, 2008)."should be "(Canadell and Raupach, 2008)."	Accepted, Zotero updated for SOD
3538	11	10				What is the situation with regard to 'Settlement' which is another land use category of LULUCF in addition to forest, cropland, grassland, wetlands?	Accepted, Refer to C1h3 in SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14776	11	10				Petrokofsky et al. (2012) is reviewing comparative advantages of different methods for assessing carbon stocks in AFOLU sectors, with particular attentions to uncertainties in estimates -> Environmental Evidence 2012, 1:6 doi:10.1186/2047-2382-1-6 ,http://www.environmentalevidencejournal.org/content/1/1/6/abstract , The large variabilities found among estimates of carbon fluxes are due part to differences in methodologies. This is especially true in estimates at smaller scales than continental.	Accepted, Added to uncertainty Discussion
6930	11	10	15			Please coordinate and ensure consistency with WGI, Chapter 6 on the land C fluxes. Suggest to refer to WGI AR5 Chapter 6 here whenever appropriate. Many parts of this section stray into the WGI area of expertise and will overlap with the assessment provided by Chapter 6. This should be avoided to avoid duplication and/or inconsistencies.	Accepted, Working with WGI authors to ensure this (ongoing)
10239	11	10	15	14	47	Need to clarify since the beginning of theis section that there terrestrials ecosystems a global terrestrial sink, resulting from the photosynthesis/respiration-mineralization inbalance, and separate sources from LU and LUC.	Accepted, Clarified for SOD
15477	11	1005	35	1006	5	The authors lists a number of sweeping comments on the negative impacts of reforrestation/afforestation by just relying on two references. The impact on water use can be positive or negative depending on the location. Surface flow water runoff can be far higher in grassland systems than in forest systems. Sodium increase in soils from forests only occur in certain regions of the world. Although forests do decrease the pH, in many regions reforrestation returns soil conditions to the "natural" state before the soil was deforestated and soil conditions dramatically changed for agriculture. A far more balanced view is required here - and certainly shouldn't rely on just two references.	Rejected, Cannot locate comment = wrong page number
7609	11	11	0			The forest has large influence for the increase and decrease of GHG gas through deforestatin and reforesttion, forest growth, way of forest manegement. However, I feel to have few descriptions about the forest and fortry. I expect substantiality of the description about the forestry.	Accepted, Better description of forest practices provided in section 11.3 for SOD
15959	11	11	1	11	31	This paragraph is unclear, it appears that there is no change in the C fluxes since the 1980's up to now, this is also indicated by figure 11.3; the paragraph could be substantially shortened, also to increase readability	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
15956	11	11	1	11	66	The C02 emissions in the tropics are well explained and quantified, however the net sinks in the temperate zones are described in a generic way, adding more quantitative information on this would help relative comparison	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
18924	11	11	1			"... of gross": Add "AFOLU"	Accepted, Specified net vs. gross throughout

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3758	11	11	12	11	32	Three relevant references on emissions from LULUCF are: 1) Baccini, A., S.J. Goetz, W.S. Walker, N.T. Laporte, M. Sun, D. Sulla-Menashe, J. Hackler, P.S.A. Beck, R. Dubayah, M.A. Friedl, S. Samanta, and R.A. Houghton. 2012. Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps. Nature Climate Change 2:182-185. doi:10.1038/nclimate1354; 2) Houghton, R.A., G.R. van der Werf, R.S. DeFries, M.C. Hansen, J.I. House, C. Le Quéré, J. Pongratz, and N. Ramankutty. 2012. Chapter G2. Carbon emissions from land use and land-cover change. Biogeosciences Discussions 9:835-878. doi:10.5194/bgd-9-835-2012.; and 3) Nancy L. Harris1,*, Sandra Brown1, Stephen C. Hagen2, Sassan S. Saatchi3,4, Silvia Petrova1, William Salas2, Matthew C. Hansen5, Peter V. Potapov5, Alexander Lotsch6 Baseline Map of Carbon Emissions from Deforestation in Tropical Regions Science 22 June 2012: Vol. 336 no. 6088 pp. 1573-1576	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
15958	11	11	12	11	15	This seems to be twice the same information, though with different emission figures, confusing	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12374	11	11	12	11	32	Here are a lot of different figures that seem partly also to conflict. Please consider to put the most important figures in a matrix or table so it would be easier to compare and perceive the meaning.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14414	11	11	12			Again, these numbers seem to say that deforestation (land use change) is far, far more important than “agriculture” (“land use”).	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5806	11	11	12	11	22	Please rephrase this paragraph in a more concise way. Instead of using one sentence / study you could combine sentences.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
11114	11	11	14	11	19	the numbers provided, i.e. 1.5 (without confidence intarval) and 1.2±0.7 are NOT different from a statistical point of view, so it cannot be stated that "Global emissions from land use change estimated for 2008 by Le Quere et al. (2009) suggest a slightly lower value"	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
16545	11	11	17	11	20	Another important sentence that needs a supporting citation.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12375	11	11	2	11	3	Please consider the language in the sentence, especially the word "rather" which seems to not be correct.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5702	11	11	2			Please check the words ‘southern Asia’. It seems, these need to be replaced with the words “South-Eastern Asia”	Accepted, Changed in SOD
10103	11	11	2	11	2	South East Asia large emissions due to draining conversion of peatlands to biofule plantations and agriculture, large fires have resulted in globally significan increased emissions	Accepted, Added for SOD
11806	11	11	21	11	23	Is there a reference for this statement or are you refering to the Zhao and Running paper? IN the latter case, why then the "Thus"?	Accepted, Change

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13309	11	11	22	11	24	Suggest that clarify how Zhao and Running have made estimates of global NPP.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5538	11	11	22	11	23	. "--- indicate the reduction in global NPP of 0.55 Gt C for the period 2000-2009". Land based NPP is of the order of 53 Gt C. So the above reduction is about 1%.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5539	11	11	26	11	26	"--- up to 2100 --- fertilization might result in additional terrestrial uptake by global ecosystems in the range of 105-225 Gt C". This figure of an uptake of between 1.05 and 2.25 Gt C per year seems very optimistic.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14593	11	11	27	11	28	what is the reference for this?	Accepted, Added for SOD
10104	11	11	27	11	27	Are you dealing with CH4 emissions from melting permafrost somewhere else?	Rejected, No - this is not an emission from managed land and cannot be mitigated by AFOLU management
14594	11	11	31	11	32	this does not seem relevant	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12870	11	11	4	11	4	Add here "Spatial analysis of Landsat data indicates that expansion of industrial agriculture is the main cause of tropical deforestation (Gibbs et al. 2010)." Gibbs, H.K., A.S. Ruesch, F. Achard, M.K. Clayton, P. Holmgren, N. Ramankutty, and J.A. Foley. 2010. Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. Proceedings of the National Academy of Sciences of the USA 107: 16 732-16 737.	Accepted, Added for SOD
2605	11	11	5	11	6	"(Y. Pan et al., 2011) Richter and Houghton, 2011)" should be "(Pan et al., 2011; Richter and Houghton, 2011)"	Accepted, Zotero updated for SOD
16544	11	11	6	11	7	I don't see how increasing secondary vegetation sinks can reduce the net conversion of primary forests to ag land - perhaps of forests overall, but how does increase growth of secondary vegetation reduce the loss of primary forest?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
15957	11	11	6	11	6	Secondary vegetation sinks are not well explained	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12376	11	11	6	11	8	Please consider to define "secondary vegetation" and "primary production".	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
15150	11	11	6	11	11	resutls of FACE sites could be covered here; those experimental findings contradictory to what's here?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
8834	11	12				Position the numbers (the bar values, or x-axis values) so that they do not overlap any symbol (bar, error bar)	Accepted, Revised for SOD
8317	11	12				The difference of definitions between a land-use change and deforestation must be made clear.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14595	11	12				Need looking at carefully, not clear where all data comes from, lots of overlap (double counting), not comparable sources. Total LUC, Le quere et al result is houghton model, richeter and houghton is update, piao only on other estiamtes but lots out there, pan not LUC but forests only. USe Houghton et al 2012 synthesis or WG1 data (I can liaise). Pan paper itself in temepratue and boreal forests this is not LUC but all forest biomass change from inventories (ie LUC plus residual sink due to claitme and CO2). In tropics pan et al had totally different approach. confusing to show them together (it was in the Pan paper too). Pan and shevliakova mean different things by secondary vegetation. The real strength of Pan et al is that they pulled together an incredible data base of inventories to confirm a sink in extant forests that is likely due to climate and CO2. Other than that, the forest LUC in the tropics is just the same as houghton as it uses the bookeeping model and FAO data.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
7059	11	12				(1) The value for boreal forests is shown incorrectly. In the Pan et. al. paper it is 0.5 +/- , not 0.05 +/-. (2) In addition, the value from Pan et. al. for the net global forest sink should be included. (3) Finally,the legend does not accurately reflect the respective categories in the Pan et. al. paper. Each sink and source should be labeled as done in the Pan et. al. study to make clear, for instance, that the bars shown to the left for "land use change", "deforestation", and "secondary vegetation" all refer to tropical forests.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5807	11	12				Please rework figure: Years should be given below all other graphic elements, legend should have white background to eliminate horizontal lines which disturb the text, boreal forests are given in the legend but not shown in the graph, numbers do not need to be shown (if you need them, put them in a table and delete the figure), and add space between the title of the vertical axis and numbers on the axis.	Accepted, Revised for SOD
10590	11	12				This is a tricky figure to interpret. Do the bars for years 1990-2007 add anything? Suggest delete. If stay, then put a gap between first two bars as is done for 1990-1999 and 2000-2007 graphs. Boreal forests so small they are invisible so maybe better as a footnote in caption. What is a "tropical intact forest"?	Accepted, Revised for SOD
11115	11	12				The figure is not clear as to what "land use change" means: does it include deforestation? what is secondary vegetation? Whereas land use change and deforestation are human activities, "secondary vegetation" does not mean anything without definition. Also, land use CHANGE data should be separated from carbon balance of existing forests (of any type)	Accepted, Revised for SOD
2618	11	12				This figure was not clear because of the items that it included. Why was there a tropical intact forests group by itself?	Accepted, Revised for SOD
8926	11	12				Although the presentation is common, it seems methodologically incorrect, to compare activities such as land use change and deforestation with vegetation forms. The activities result in change of land use and in turn leads to changes in average annual C fluxes	Accepted, Revised for SOD
8927	11	12				given the massive deforestation of tropical and subtropical forests, the decreases in C fluxes appear very low, numbers verified?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14415	11	12	1			Chart legend: what is the difference between deforestation and land use change?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
15151	11	12	1	12	2	graph is difficult to read and context of figure is confusing. One category is ""land use change", but other categories are also land-use change (like deforestation and secnfdary veg, perhaps). Note that the time periods metioned are not all decades (eg 2000-2007)	Accepted, Revised for SOD
14425	11	12	1			Number formatting is inconsistent between the figure and the text. The text uses the U.S. standard of a decimal mark as '.', the figure uses the European standard of the decimal mark as ','.	Accepted, Revised for SOD
16214	11	12	11			"total c flux" is it total?	Accepted, Specified net vs. gross throughout

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5541	11	12	11	12	12	How is the forest sink of 2.0 to 3.4 Gt C/yr estimated? Annual growth of woody biomass is of the order of 9 Gt C/yr.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
9078	11	12	11	13	35	It would be better to add a latest article relating to carbon emissions as follows: Harris, NL et al. (2012) Baseline map of carbon emmissions from deforestation in tropical regions. Science 336: 1573-1576.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
10592	11	12	11			Not clear how the range of sink estimates quoted relates to Fig 11.3 sinks which appear to average 3.51 GtC/yr.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
16547	11	12	18	12	18	Presumably "higher results" means higher sequestration -- clarify.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12380	11	12	18	12	18	The term "….report higher results" is used. The meaning of this is not clear to us. Please consider to rephrase or explain.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14597	11	12	18			what results, net sink?? Higher than what?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14596	11	12	18	12	31	Inversions of atmopsheric measurments capture the total net flux from alnd ude to all drivers, it cannot distinguish LUC from indirect environmental change drivers (Cliamte and CO2). It cannot distinguish forest from non-forest. This is not comparable to Pan without explanation fo the fact that Pan is just forests, although forest LUC and sinks are the largest factors there is also other LUC and sinks.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5045	11	12	18	12	18	what is an "Inverse modelling studies" bottom up?	Accepted, No - clarified in redraft of the section for the SOD
14598	11	12	19			Again compared to what?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12381	11	12	23	12	30	In the preceeding text contributions to sink or source from the different forest types are given in Gt C. For temperate forest the contribution is given in per cent. This makes it not easy to compare. Please add the contributions also in Gt.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
18928	11	12	24			"sink": Add "increase" after it - at least I think that is missing.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
16548	11	12	25	12	26	Is it increased forest area, or sequestration by forests that originated in earlier decades, that is the main contributor to the sink in the US and China?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14723	11	12	25			" increased forest area in US (Y. Pan et al., 2011)(Yude Pan et al., 2009; Masek et al., 2011)", should it be (Pan et al., 2009; Pan et al., 2011;; Masek et al., 2011)?	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5808	11	12	26	12	30	Please consider deleting this text. The period of 7 years is quite short if statements on forest developments are to be made. Trends often show only if you use longer time series with repeated measurements, for the reasons you mention here: single-year (extreme) events can distort the picture. IF you need a reference: any forest inventory textbook should do.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14724	11	12	29			"2010; Zhao and Running, 2010(Y. Pan et al., 2011)" should it be " 2010; Zhao and Running, 2010; Pan et al., 2011) ?	Accepted, Zotero updated for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12377	11	12	3			The mean value and uncertainty could be given for all other parameters in the same way as for boreal forests in the draft. More information in connection to the legends makes it redundant to print the values in connection to the bars, resulting in better readability.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12378	11	12	3			The strongest sink seem to be "secondary vegetation" Can it be explained what "secondary vegetation" is	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
12379	11	12	3			The categories land use change and deforestation should be merged, as deforestation is one type of land use change. The text below the figure should say: "…land use change for the periods 1990-1999, 2000-2007…", since the periods are not decades.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
13310	11	12	3	12	10	Many problems with brackets around citations, need to fix citations throughout the document	Accepted, Zotero updated for SOD
12382	11	12	30	12	30	The unit "Pg" is used. To improve understanding, the consequent use of one unit should be practiced, eg Gt.	Accepted, Harmonized units for the SOD
10593	11	12	30			Best to stick with Gt as used in rest of report - not Pg	Accepted, Harmonized units for the SOD
10591	11	12	4			Do sources arise from deforestation and sinks arise from reforestation and afforestation? If so could clarify	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
5540	11	12	missing words: with defores			This figure cannot be true. About 99% of deforestation is caused by land use changes. The table is equating harvesting with deforestation!	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
8318	11	13				Forest fires are important as a source of carbon emission. Then this figure should show carbon emissions derived from forest fires.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
11203	11	13				Suggest inserting the word 'unsustainable forms of' prior to 'shifting cultivation' at line 17. Science has shown that low intensity shifting cultivation can even act as a carbon sink in certain circumstances and net emissions may be neutralised over the medium and long term - sustainable systems of rotational farming also generate range of other benefits for soils and biodiversity. cf. Thilde Bech Bruun & Andreas de Neergaard & Deborah Lawrence & Alan D. Ziegler (2009) Environmental Consequences of the Demise in Swidden Cultivation in Southeast Asia: Carbon Storage and Soil Quality Hum Ecol (2009) 37:375388. See also Ziegler, A. D., Agus, F., Bruun, T. B., van Noordwijk, M., Lam, N. T., Lawrence, D., Rerkasem, K., and Padoch, C. (2009). Environmental consequences of the demise in swidden agriculture in Montane Mainland SE Asia: Hydrology and geomorphology Human Ecology (2009) 37	Accepted, Revised for SOD
15960	11	13		13		figure is interesting but not clear, difference between sinks/sources is difficult to distinguish, increasing size of the figure, or indicating sinks with negativenumbers, could improve readability	Accepted, Revised for SOD
15152	11	13				too small as is	Accepted, Revised for SOD
14599	11	13				see earlier comments about pan et al data that should be explained better here than was in the original paper	Accepted, Revised for SOD
7537	11	13		13		Positive and negative bars are not distinguishable.	Accepted, Revised for SOD
11807	11	13				Whether bars are negative (below x axis) or positive (above x axis) is as far as I understand not visible from this figure	Accepted, Revised for SOD
5809	11	13				Please consider giving signs with the numbers. It is not easy to detect the X-axis in Asian Russia, Australia & New Zealand and Europe.	Accepted, Revised for SOD
10594	11	13				Could be more logical to discuss stocks before sinks in this section	Accepted, Revised for SOD
2619	11	13				This figure works well.	Noted, Thank you
12871	11	13	1			Fix the distortion in the map, which is currently compressed latitudinally. Preferably use an equal-area global map projection.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14426	11	13	1			Since there isn't a common 'x-axis', describing a bar as above or below the axis is not sufficient. Because the bars are of different lengths it is possible to infer when a bar is meant to be positive or negative, but this is not sufficiently clear for a general audience.	Accepted, Revised for SOD
14427	11	13	1			Numerical values do not reflect the direction of the bars. The numbers on the figure currently only indicate magnitude of the flux, but not direction of the flux. Perhaps putting a '-' sign when appropriate would be sufficient to show when the bars indicate a net source or sink.	Accepted, Revised for SOD
16215	11	13	10			number here is 13 M ha converted; harmonize this with the earlier numbers on deforestation (5.2-8.3 M ha/yr), or recognize the difference.	Accepted, Revised for SOD
16549	11	13	12	13	13	Does this "20% of global emissions" figure refer to the 90s or the 2000s? Is this figure consistent with your other estimates? Seems too high, at least for the 2000s, particularly since it says GHG emissions, not CO2 emissions.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
14601	11	13	12			according to houghton modelling results presented in Friedlingstein et al 2010 (global carbon project budget calcualtion) LUC total is about 12% of net emissions in the 2000s. This would be consistent with other data you present here e.g. le Quere (fireldingstein was the update o fle quere). stick to that data	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
16550	11	13	13	13	15	Is degradation 15-19% higher than deforestation, or does it add an additional 15-19% to the deforestation amount? If the first, it would be very large, and should show up as a large separate segment in Figures 11.1a and 11.3.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
11979	11	13	13		14	Maybe add here that forest degradation leads to increased vulnerability to drought and fire in some forests, such as teh Amazon (Nepstad, D.C., Stickler, C.M.,Soares, B.& Merry, F. 2008. Interactions among Amazon land use, forests and climate: Prospects for a near-term forest tipping point. Philosophical Transactions of the Royal Society B 363:1737–1746. Ray, D.; Nepstad, D. C. & Mourinho, P. 2005. Micrometeorological and canopy controls of fire susceptibility in mature and disturbed forests of an east-central Amazon landscape. Ecological Applications 15: 1664-1678. Laurance, W.F. 2004. Forest-climate interactions in fragmented tropical landscapes. Philosphical Transactions of the Royal Society. 359: 345-352.)	Accepted, Dealt with in the section on susceptibility to future climate change (11.5)
14602	11	13	13	13	18	forest degradation should have its own paragraph. See also Imai et al 2009, archard et al., 2004 an d Putz et al 2012 synthsis in conservation letters http://onlinelibrary.wiley.com/doi/10.1111/j.1755-263X.2012.00242.x/abstract	Accepted, Added for SOD
5542	11	13	13	13	14	"Additionally forest degradation, particularly selective logging is responsible for 15-19% higher C emissions than reported from deforestation alone. (Huang and G.P. Asner 2010)". Much of this is harvesting and compared to annual growth should not be considered as C emissions. Also, if the logs are converted into sawnwood and panel products, they are still a store of C!	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
2620	11	13	13		18	degradation is used frequently in this chapter but is a 'human value' laden word that is typically seen as negative. It needs to be clearer. Is it a loss of productive capacity? Is it a loss of nutrients like after fires? Forest degradation is written as the impacts of firests which is correct but then shifts to NTFP and shifting cultivation which does not fit into the same category. This mixes impacts that are major and others that do not fit into the same grouping. These have very different spatial and temporal scales.	Accepted, Glossary issue
16551	11	13	15	13	17	Why is shifting cultivation called degradation -- isn't it clearing of forests, but just on a smaller scale? If so it would seem to be deforestation.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5543	11	13	15	13	17	“Forest degradation includes --- collection of firewood and NTFP, and production of charcoal ---“. This is harvesting not degradation. Much fuelwood collection is dead wood and charcoal production is usually managed on about a 15 year cycle unless areas are being cleared for agriculture. Collection of NTFP in most cases in managed sustainably!	Accepted, Agreed - clarified what is deforestation and what is harvest for SOD
12386	11	13	18	13	25	It is not clear if "wildfires" and its figure of 2.0 Gt C/yr for 1997-2001 is limited to forest fires, since this is under the heading "Forests". But it seems less consistent with line 24: "…global emissions from all types of fires in diffrenent ecosystems in 2010 were as high as 2,2 Gt C. Forest fores contributed with 0,3 Pg C (= 0,3 Gt C). This should be clarified.	Accepted, Agreed - clarified for SOD
12383	11	13	2			It is a bit confusing that tropical deforestation and regrowth is added in the same figure that shows the flux. May be it is a good idea streamlining fluxes in the world map figure, and add a separate figure or table separating the deforestation and regrowth in tropical areas.	Accepted, Revised for SOD
12384	11	13	2	13	3	The axis' in the figure should be more clear. It would be helpful if sinks were represented with not only negative bars, but also with negative values.	Accepted, Revised for SOD
15153	11	13	22	13	22	Delete "Data available …" sentence	Accepted, Deleted
11293	11	13	22	13	35	The mixture of raw numbers and proportions would be better shown through graphs that show both simultaneously (e.g. pie charts that visually demonstrate proportions while overlaying actual quantitative numbers).	Accepted, Revised for SOD
11808	11	13	23	13	35	You are not only refering to forest fires but this is in the forest section, maybe a special section on fires may help? Or move the estimates of fire emissions in specific sectors to their respective subsections.	Accepted, Agreed - clarified for SOD
16216	11	13	24		25	use same units (have GT and Pg in same sentence). Not celar where the other 1.1 Gt are? You should 0.8, 0.3 out of 2.2---where are the rest?is 0.3 for forest firest NOT including forest fires that lead to conversion for agriculture? Or is 0.3 boreal? Not clear how this 2.2 has been parsed.	Accepted, Harmonized units for the SOD
12387	11	13	25	13	27	Is the figure 0,7Pg C for the increase in 2010 of emissions from fires from deforestation and degradation or is this the contribution from high emissions in S America and SE Asia? Please clarify.	Accepted, Clarified for SOD
5544	11	13	25	13	26	Units –PgC not Gt?	Accepted, Harmonized units for the SOD
5810	11	13	25	13	25	Please use either Gt or Pg consistently.	Accepted, Harmonized units for the SOD
2621	11	13	27			the contribution of peat fires needs to mention that this is being done to plant palm oil plantations so this is not a simple deforestation example. If written as is, it appears to be driven by someone wanting to cut the forests for the wood but it is a conversion of forests to other uses.	Accepted, Agreed - clarified for SOD
15154	11	13	28	13	28	Delete "be in the"	Accepted, Deleted
5545	11	13	29	13	31	. “Additionally, biomass burning --- could contribute up to 42-52 % of global black carbon emissions and comprise as high as 2600 Mt of black carbon per year”. I think this should be 2.6 Mt C not 2600 Mt c per year. The US EPA black carbon world figures for 2000 are as follows in Mt C: Biomass burning 2.70 (36%); Domestic 1.90; Transport 1.44; Industry 1.47;	Accepted, Checked numbers and revised for SOD
5546	11	13	29	13	31	“Additionally, biomass burning --- could contribute up to 42-52 % of global black carbon emissions and comprise as high as 2600 Mt of black carbon per year”. I think this should be 2.6 Mt C not 2600 Mt c per year. The US EPA black carbon world figures for 2000 are as follows in Mt C: Biomass burning 2.70 (36%); Domestic 1.90; Transport 1.44; Industry 1.47; Energy 0.05; Other 0.04; Total 7.60. Therefore, 42-52% for biomass burning seems high.	Accepted, Checked numbers and revised for SOD
14726	11	13	31			(van der Werf et al., 2006) instead of (Van Der Werf et al., 2006).	Accepted, Zotero updated for SOD
5547	11	13	33	13	33	I think 47.7 Mt of black carbon should be 0.477 Mt. (the US figure is 0.266 Mt C).	Accepted, Checked numbers and revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13313	11	13	34	13	34	Should indicate that the CATF is a special report, not a scientific publication, not peer-reviewed.	Accepted, Replaced with peer reviewed paper. Plus Zotero updated for SOD
12388	11	13	35	13	35	In the preceeding text, a lot of relevant information about emissions of black carbon was given in Gt or Mt. It would be very useful if the figure "11 % of China's total black Carbon output" could be given also in Gt or Mt.	Accepted, Checked numbers and revised for SOD
15155	11	13	36	14	2	is it worth being so non-committal?	Accepted, Revised for SOD
14603	11	13	36	13	37	is this really correct, what is meant by this number. My undesrtanting from memory of the shevliakova paper is they do LUC but do not really model croplands in terms of their emissions, it is merely conversion between forest PFT, and grassland PFT and possibly some very generic crop PFT, but not emissions for extant/permanent croplands. I suspsect this is the LUC emission from conversion of natural lands to croplands and if so is double counting with deforestation emissions, which is not a problem if it is clearly flagged. If it really is ongoing emissionf rom croplands after LUC is it is land use emissions not land use change emissions , then this number seems very high. Surely croplands are more or less in balance once established.	Accepted, Section redrafted for SOD - new synthetic studies available since the Fod
13314	11	13	38			remove bracket, no closing bracket	Accepted, Zotero updated for SOD
5046	11	13	39	13	39	I don't think caroplands chan have a "negative C balance" mayber some words are missing	Accepted, Checked numbers and revised for SOD
14600	11	13	6	13	13	I would put this text earlier up front with information onf orest area change on page 9 line 18	Accepted, Checked numbers and revised for SOD
7060	11	13	6	13	7	The FAO work, suggesting a net reduction in global forest biomass, was performed before the analysis by Pan et al. which shows that, contrary to the findings shown here, global forest carbon stocks are increasing. The Pan et. al. work involves many of the world's leading forest carbon experts and should not be dismissed so easily. Its findings should be included in this text - espeically given that the results are highlighted immediately above in Figures 11.3 and 11.4. (See Pan, Y., Birdsey, R., Fang, J., Houghton, R., Kauppi, P., Kurz, W., et al. (2011). A Large and Persistent Carbon Sink in the World's Forests. Science Vol. 333 , 988-993.)	Accepted, Checked numbers and revised for SOD
14725	11	13	7			(FRA, 2010; FAO, 2011) instead of "(FRA, 2010)(FAO, 2011)."	Accepted, Zotero updated for SOD
12385	11	13	8	13	8	"…decreases soil C-stocks by 12-30 %". Please clarify if this is 12-30 % of the C-stock in the soil effected, or of the global C-stock in soils	Accepted, Checked numbers and revised for SOD
13312	11	13	9			change: reduced to declined	Accepted, Checked numbers and revised for SOD
4389	11	13		13		inconsistent units (Gt C, Pg C) affect readability	Accepted, Harmonized units for the SOD
4388	11	13		13		fig would be clearer if negative numbers appeared as such, as 0 axis is not easily readable	Accepted, Revised for SOD
12186	11	13	25	13	25	Two different units Gt C and Pg C for tha same item makes the comparison difficult	Accepted, Harmonized units for the SOD
12187	11	13	25	13	27	It is not clear, which previous year and what is the source?	Accepted, Revised for SOD
16217	11	14				Mangroves belong in the forest section; can be separated out, but should be in that section.	Accepted, Agreed - moved to forest section
14604	11	14	1	14	2	compared with?	Accepted, Revised for SOD
14606	11	14	13	14	15	this is the only place in this whole section you talk about mitigation potnetial, belongs later as my understanding is this part is about trends	Accepted, Agreed - moved to potentials section
8928	11	14	14			the C sequestration of permanent pastures might be as shown but the emissions of the grazing animals should be mentioned too to avoid misinterpretation	Accepted, Clarified for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3759	11	14	16	14	30	A relevant reference on emissions from peat lands is: Murdiyarso D, Hergoualc'h K, and Verchot LV (2010) Opportunities for reducing greenhouse gas emissions in tropical peatlands. Proc Nat Acad Sci,107(46):19655-19660.	Accepted, Added for SOD
15156	11	14	16	14	30	need references for peat	Accepted, Agreed - added for SOD
14607	11	14	16			suggest add text to make clear there si ahole carbon balance on peatlands: "while CO2 UPTAKE AND CO2 and CH4 release…."	Accepted, Revised for SOD
7061	11	14	16	14	47	The text should also note, however, that methane releases can be significantly affected (often reduced) when peat is drained. This is not to justify draining peat, but a fair and complete treatment of the topic requires that this complex phenomena (impacts of drainage on methane emissions) be discussed here. To ignore it compromises the objectivity of this document. To the extent possible, the role of methane with respect to GHG emissions from wetlands, should be woven throughout this section (which completely ignores the phenomenon and its potential significance). See, for instance, - Segers R (1998) Methane production and methane consumption: a review of processes underlying wetland methane fluxes. Biogeochemistry, 41, 23–51. - Wahlen SC (2005) Biogeochemistry of methane exchange between natural wetlands and the atmosphere. Environmental Engineering Science, 22, 73-94 - Lay DYF (2009) Methane dynamics in northern peatlands: A review. Pedosphere, 19, 409-421. - Inubushi, K, et. al. (2005) Factors influencing methane emission from peat soils: Comparison of tropical and temperate wetlands, in Nutrient Cycling in Agroecosystems, Volume 71, pg 93-99	Partially Accepted, Added post 2007 reference and revised for SOD
16553	11	14	17	14	18	Saying "as high as" is misleading unless you give a low estimate also. It's particularly confusing when you say "as high as" a range -- is the high figure 2 or 3?	Accepted, Revised for SOD
12389	11	14	20	14	20	It is not clear if the figure "500 000 km2" includes all global drained peatland.	Accepted, Checked numbers and revised for SOD
10167	11	14	21	14	22	an increase of 0.2 Gt CO2/yr from 1.1 to 1.3 Gt CO2/yr represents an increase of 18.18% not >20%	Partially Accepted, Cannot be that precise - but we have added approx. numbers
5811	11	14	21	14	22	Please recalculate your percentages or give values in line 21 with more decimal places: 1.3 - 1.1 = 0.2 < 1.1*0.2. If the difference was larger than 20% of the 1.1, the value given for 2008 should be "1.4"	Accepted, Checked numbers and revised for SOD
18929	11	14	21	14	22	The difference between 1.1 and 1.3 is not 20% - is this due to the numbers having been rounded? Please consider adding a significant digit or mentioning that this difference is due to rounding.	Partially Accepted, Cannot be that precise - but we have added approx. numbers
5549	11	14	25	14	25Sounc	Sounding should be surrounding.	Accepted, Revised for SOD
12390	11	14	26	14	26	Please clarify if "wetlands" in this context means "drained wetlands in developed countries".	Accepted, Checked numbers and revised for SOD
14608	11	14	27	14	20	this is the only place in this whole sectionw here you talk about future cliamte impacts on ecosystem, well there is a bit on croplands. Be consistent. I think it is fine to have it here. For peatland futures Also refer to Joanna Clarke et al papers and recent Gallego sala nature cliamte change paper on global boglands	Accepted, Moved to climate susceptibility section and added references
16552	11	14	3	14	5	Are "grasslands" and "pastures" as used here synonyms? If not, what are the areas to which these two estimates of GHG flux correspond?	Accepted, Glossary issue - clarified for SOD
8602	11	14	3	14	15	Please, consider contributions on tropical savannas such as Grace, J., San José, J., Meir, P., Miranda, H. & Montes, R. 2006. Productivity and carbon fluxes of tropical savannas. J. Biogeogr. 33:387-400 and San José, J. & Montes, R. 2007. Resource apportionment and net primary production outcome across the Orinoco savanna-woodland continuum. Acta Oecol. 32:243-253.	Partially Accepted, Replaced with post 2007 papers
10240	11	14	31	14	31	an an subitem header as previously (line 3: grasslands, line 16 wetlands"), could be "other ecosystems".	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5495	11	14	31	47		Agreed that it is important to include this- but not clear on lakes how human influence- apart from changes in climate can alter these to be sources or sinks- so not clear if it is appropriate here or in a separate section on unmanaged ecosystems	Accepted, Agreed - moved to a new section on unmanaged ecosystems and put lakes and permafrosts there (briefly as unmanaged)
14609	11	14	31	14	40	delete frost sentence and give subheading of mangroves and put ins eparate paragraph from text below	Partially Accepted, Moved mangroves to forest section
11809	11	14	31	14	47	Are lakes and mangrooves a part of wetlands? Or should this be a new sub-section?	Partially Accepted, Moved mangroves to forest section
18930	11	14	31			Start this paragraph with "Others:" following the logic of previous paragraphs.	Accepted, Moved mangroves to forest section
16554	11	14	32	14	33	Do these figures for mangroves overlap with those for forests? (Mangroves are forests after all; were they included in the previously given figures for forests?)	Accepted, Moved mangroves to forest section
4276	11	14	40	14	44	Refers to potential changes in fluxes from lakes without giving an indication of the magnitude of these fluxes, leaving the reader the impression the fluxes are large enough to matter but not knowing how big they are. Magnitude of flux is given later for saline lakes only. Possible reference (there are probably better and more recent ones, but it is a start): Campbell, I.D., Campbell, C., Vitt, D.H., Kelker, D., Laird, L.D., Trew, D., Kotak, B., LeClair, D., and Bayley, S. 2000. A first estimate of organix carbon storage in Holocene lake sediments in Alberta, Canada. Journal of Palaeolimnology 24: 395-400. This paper estimates that Alberta Lakes may represetn 1/1700 of total global lake sediment carbon, and that Alberta lakes sequester ~ 15 gCm-2yr-1, or .23 TgCyr-1 in total, which would make the global total (assuming the 1/1700 is accurate) 391 TgCyr-1 for global lakes.	Accepted, Agreed - moved to a new section on unmanaged ecosystems and put lakes and permafrosts there (briefly as unmanaged)
14610	11	14	40	14	47	New paragraph on disolved organic carbon in lakes and rivers. Presuming that is that the lake emissions being referred to are DOC, but may also be due to plant die back and exposed carbon rich soil? This is all about future, do we have anything on trends. Some disussion there may be a lot of DOC in river run off that is not accunted for in budgets, or is emitted elswehere from where the carbon is sequestered. I seem to rememebr a paper a long time ago by pacala that estiamted this in the USA, but I am sure there are more recent refs.	Accepted, Agreed - moved to a new section on unmanaged ecosystems and put lakes and permafrosts there (briefly as unmanaged)
12391	11	14	43	14	44	Could it be explained why a wet scenario will result in more C-emissions from lakes in N.USA than a dry scenario?	Accepted, Checked numbers and revised for SOD
14605	11	14	6			again I assume this is due to LUC and thus has some overlap witht eh forest number and the crop number, no problem there as long as it is clear.	Accepted, Checked numbers and revised for SOD
5369	11	14	16	14	47	Rooney et al (2012) describe another anthroprogenic impact on wetlands that I think is worth mentioning in this chapter as I dont see any other chapter taking this up. Rooney, R.C., S.E. Bayley, and D.W. Schindler, Oil sands mining and reclamation cause massive loss of peatland and stored carbon. Proceedings of the National Academy of Sciences, 2012. 10.1073/pnas.1117693108	Accepted, Added reference for SOD
11116	11	15				suggest to replace "measures" with "options"	Accepted, Revised for SOD
14727	11	15	0			CO2, CH4 and N2O instead of CO2, CH4 and N2O	Rejected, No difference in comment replace list
12392	11	15	1	15	15	A lot of interesting information, but not easy accesible. A table with the different sources mentioned in the text, emissions in the same units, eventually also in percentages would improve the information value.	Accepted, Tabulated for SOD
14612	11	15	1			when you do have data…I would like to see some total numbers here not just %. Becomes confusing. First you have % global totals, then % agric emissions. But don't know what total emissiosn and total agric emissions are.. Have the numbers presented been checked for consistency with WG1?	Accepted, Tabulated for SOD
11906	11	15	1	15	32	Consider add a figure to show the trends of non-CO2 GHG and shorten the statements.	Partially Accepted, Tabulated for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10595	11	15	1			What about a similar section for forests? Whole chapter needs to clearly dsitinguish between agriculture and forests throughout the text. When discussing both could use the term LULUCF. Also helps reader if keep to same order (eg forests discussed before agriculture) in each section.	Partially Accepted, But used AFOLU instead of LULUCF as LULUCF did not include agricultural emissions
12393	11	15	10	15	12	For better transparency; Indication of type of gas could be given inside the brackets for rice cultivation, biomass burning and manure management.	Accepted, Checked numbers and revised for SOD
7185	11	15	10	16	10	If CH4 emissions from rice cultivation account for 11% of the agricultural non-co2 emissions and biomass burning CH4 for 12%, why is CH4 from biomass burning not given in fig. 11.1	Accepted, Checked numbers and revised for SOD
12394	11	15	15	15	29	A lot of interesting information, but not easy accesible. A table with the different sources mentioned in the text, emissions in the same units, eventually also in percentages would improve the information value.	Accepted, Tabulated for SOD
10106	11	15	15	15	17	What about china, East Asia is missing, increased fertilizer use is a major source of N2O emissions from China	Accepted, Checked numbers and revised for SOD
13316	11	15	18	15	20	Expand discussion of N. N fertilizer requires significant contribution of energy to convert N2 to reactive N. Generally more reactive N in the biosphere. Link increase in crop residues to increased crop production. Give a more precise description of N cycle.	Accepted, Expanded text on N - under-represented
16555	11	15	2	15	2	Give a date to explain what you mean by "at present".	Accepted, Updated with 2010 values and tabulated for SOD
14611	11	15	2	3		again the question , is this CO2 emissiosn from LUC and from established corplands (LU)	Accepted, Checked numbers and revised for SOD
11062	11	15	2	15	14	Two comments in this paragraph: (1) The USEPA reference appears to be used in more than one instance to support statements regarding global emissions; this reference is a primary source for US emissions but not global emissions, thus it seems that there is an error here or that another source would be a better primary reference. (2) The units used here are CO2eq and thus it appears these units are inconsistent with those used earlier in the chapter, for example, Fig. 11.1 which uses C not CO2. Units should be clarified and consistent.	Partially Accepted, These are the USEPA global estimates - but should be augmented with other studies
2622	11	15	2		5	Shouldn't deforestation and conversion to agriculture also show up here??	Accepted, Checked numbers and revised for SOD
14613	11	15	20			wy are crop residues a N source in particualr, why is this in addition to crop production?	Accepted, Clarified for SOD
13665	11	15	20	15	21	Change (South Asia) to (South, southeast and east Asia)	Accepted, Revised for SOD
13666	11	15	22			Add the following reference because it updates the global estimation of CH4 emission from rice cultivation and showing the greatest contribution of south, southeast and east Asia: Yan, X., Akiyama, H., Yagi, K., and Akimoto, H.: Global estimations of the inventory and mitigation potential of methane emissions from rice cultivation conducted using the 2006 IPCC Guidelines. Glob. Biogeochem. Cycles, 23, GB2002, doi:10.1029/2008GB003299 (2009); a PDF file for the reference is attached.	Accepted, Added for SOD
14614	11	15	24			suggest instead ot "rpduction cycle" to say "trends in"	Accepted, Revised for SOD
10107	11	15	24	15	15	It would be usefull to mention trends in animal numbers development in different regions and relate the emissions to produced units (of protein) FAO Getrber et all 2012 LCA anaylis of milm and a new report just coming on meat	Accepted, Added reference for SOD - provided breakdown of numbers
9326	11	15	26			The increase of harvest rice' is not clear.	Accepted, Clarified for SOD
5048	11	15	26	15	26	what is harvest rice in "increase of harvest rice" is this harvested rice land?	Accepted, Clarified for SOD
5049	11	15	29	15	29	the numbers in this paragraph cast doubt on 76% estimate	Accepted, Check numbers and revise for SOD
9327	11	15	30	15	32	Please see if the word 'from' in line 30 and 32 can be replaced with 'in'.	Accepted, Revise for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14617	11	15	33			eems odd that in this section you give mitigation potential for AFOLU sections not icnluded in comparable AR4 chanpter in past, but you don't give the updated mitigation ptoential of things that were presented in AR4, even though there must be newer estaimtes. SOme people will jsut look to heare and will not want to look back to AR4 so at least summarise and update what was in AR4, rather than merely present totally new sectors. However I also appreciate this hcapter is already over page limit. Covnersely you could cut down what is presented on bioemergy, and more sumarise what wsa in SRREN.	Accepted, reduce bioenergy section - refer back to AR4 and show updates
2606	11	15	33			suggest to add the part to emphasize "the sensitivity and uncertainty of carbon budget"	Accepted, Do in climate susceptibility section
10242	11	15	34	15	35	It is written: "Greenhouse gases can be reduced by production-side mitigation measures (i.e. by reducing GHG emissions per unit of land or per unit of product)". This kind of sentence is dangerous, thus it could be completely wrong when balance take into account the whole dimension of the land, and crosscutting issues. As it is stated in the item 11.1, the balance should consider feedbacks between mitigation options related to land surface. For instance, in Africa, most future policies will rely on increasing N-fertilizer level, and thus more N2O emission by unit of land, but this will avoid degradation of other lands, and at the end certainly less GHG emissions. It should also be stated here that mitigation technology options and practices should be compared with baseline emissions, thus mitigation in the AFOLU sector are rarely absolute, but relative to other alternative which must comply with increasing food and biomass demand.	Partially Accepted, Clarify for SOD
7539	11	15	34	15	38	Chapter 9 in AR4 focused on both sides measures.	Accepted, Revise for SOD
16557	11	15	35	15	36	"by reducing demand" is a misleading way to describe demand-side options; the most feasible ones change the composition of demand towards foods that produce lower emissions, rather than reducing the amount of food people have to eat.	Accepted, Revise for SOD
5550	11	15	36	15	36	"Reducing the demand for --- fibre products". I have argued that demand could be substantially increased to use much more of the annual growth of biomass including bioenergy and biochar. This would give employment opportunities, especially to the rural poor.	Rejected, Does not belong in this section
5047	11	15	4	15	4	I don't think I believe "In total 76% of GHG emissions on croplands comes 4 from the application of fertilizers and 7.6% - from field operations (Ceschia et al., 2010)." as I think the emissions from tillage, uptake from no till, emissions from fossil fuel use, legumes, histosoils, rice etc are such that 76% is high	Accepted, Check numbers and revise for SOD
10105	11	15	4	15	14	I do not think it is good idea to lump CH4 and N2O this way, the different sources presented play different role in emissions of these two gasses	Accepted, Revise for SOD
13664	11	15	4	15	5	Is this estimation (76% from fertilisers and 7.6% from field operation) included CH4 emissions from rice cultivation? If not please recalculate.	Accepted, Check numbers and revise for SOD
5812	11	15	40			You mean chapters 8 and 9, not 7 and 8.	Accepted, Revise for SOD
15158	11	15	41	15	43	awkward to get through; fix phrasing	Accepted, Revise for SOD
12395	11	15	44	15	44	It says that measures described in detail in AR4 are not described further here. Have new information since AR4 changed any of the conclusions on measures? For instance, new information on pay-back time and the possible responses on the climate and the albedo? Due to the albeo, afforestation in boreal areas could have a negative climate effect. Please consider to include such information in the chapter. It would also be helpful with a sum-up of the information on measures in AR4.	Accepted, Refer back to AR4 and show updates
13315	11	15	5	15	5	Not clear what "field operations" is referring to, clarify in text.	Accepted, Clarified for SOD
16218	11	15	6			going back and forth here with CO2e and C; perhaps try to keep consistent	Accepted, Harmonized units for the SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15157	11	15				weak section overall, repetiitve, and can be tightened	Accepted, Conducted a thorough edit for the SOD
3539	11	15				When data is updated, please include figures to illustrate trends and changes.	Accepted, Revised for SOD
15607	11	15	1	15	32	Consider mentioning projected emissions from animal agriculture. Pelletier N. and P. Tyedmers (2010). Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Sciences of the United States of America 107(43), 18371-74. Available at: http://www.pnas.org/content/early/2010/09/27/1004659107.full.pdf+html.	Accepted, Expanded and updated livestock sector for SOD
13963	11	15	1			Appropriate references for global data needed. The US GHG inventory is an inventory of US GHG emissions and should not be used as a reference for global emissions. All uses of the US GHG inventory in this section should be removed and appropriate data and data sources added.	Rejected, The USEPA also produces reports on global emissions - it is that one we use here - but have included new data too
10241	11	15	1	15	32	This section is by far too short and incomplete, thus AFOLU sector is responsible for the majority of N2O emissions and more than half of methane emissions. This section should highlights that there are still too many uncertainties both for source and sink. Concerning sink, add regional estimates (e.g. Bernardier A.B. and Conant R.T. 2012. Global Change Biology (2012) 18, 928–935, doi: 10.1111/j.1365-2486.2011.02554.x). Concerning sinks, see papers by Chapuis-Lardy et al. (Chapuis-Lardy L., Wrage N., Metay A., Chotte J.L, Bernoux M. 2007. Soils, a sink for N2O? A review. Global Change Biology. 13, 1-17. Doi: 10.1111/j.1365-2486.2006.01280.x). Also it should be stated somewhere that human activities in AFOLU influence also indirect emissions (e.g. termites communities may change with LU and managements options).	Accepted, Expanded on the importance of the sector in emissions of N2O and CH4
7538	11	15		31		Dividing mitigation options into production-side and demand-side is not good idea. Even AR4 deals with both side options in Chapter 9. All options are linked tightly each other. All options should be summerized in a table. Categorization by sectors and common options (i.e. Agricilture, Forestry, other land uses , land use change and bioenergy) is enough.	Rejected, Since demand side measures in agriculture were not considered at all in AR4, it is useful to consider here. We deal with the inter-relatedness of the options in the systemic section
3170	11	15	33			Sections 11.2 and 11.3: streamline the tables and the prose; much of the prose in the main text repeats the tabular points.	Accepted, Revised for SOD
5370	11	15	34	15	36	Much later on in Chapter 11 considerable discussion is devoted to the Wise et al (2009) paper in Science that shows how intelligent climate policy can also mitigate land use emissions. I strongly encourage the authors of Chapter 11 to bring those ideas up to this point in the chapter or at least introduce those ideas up here. This framing of either production-side or demand-side is too simplistic and is not in keeping with the more nuanced set of options availiable to society that are covered in the Wise et al (2009) paper and which are described later in Chapter 11 itself.	Partially Accepted, It is a matter or where best to place this material
3541	11	15				In the title 'Production-side mitigation measures', I have the impression that the term 'Production' is appropriate for sectors like industry. But for AFOLU, probably not. I would suggest that we say something like 'Source-side mitigation measures'.	Rejected, This terminology does not help - but we will seek alternatives, or define better
3540	11	15	40		45	Please check the correct way to write references in IPCC documents. Replace 'i.e.' with 'for e.g.' on line 45.	Accepted, Zotero updated for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9092	11	15	40	15	45	I think measures already described in AR4 should be described again (or at least included in Table 11.2), if new estimates of carbon sequestration potential were published after AR4 because the number of such publication, especialy at country-scale, increased after AR4 publication. For example, please include the following paper, which estimated the soil C sequestration potential in Japanese cropland by high input carbon practices, in references of "Croplands-agronomy" in Table 11.2; 1); Yokozawa, M., Shirato, Y., Sakamoto, T., Yonemura, S., Nakai, M., Ohkura, T. (2010) Use of the RothC model to estimate carbon sequestration potential of organic matte application in Japanese arable soils. Soil Science and Plant Nutrition, 56, 168-176. In addition, the following papers should be included, too; 1) Alvaro-Fuentes J;Paustian,K 2011: Potential soil carbon sequestration in a semiarid Mediterranean agroecosystem under climate change: Quantifying management and climate effects. Plant and Soil, 338, 261-272; 2) Prechtel A, von Lutzow M, Schneider BU, Bens O, Bannick CG, Kogel-Knabner I, Huttl RF 2009: Organic carbon in soils of Germany: Status quo and the need for new data to evaluate potentials and trends of soil carbon sequestration. JOURNAL OF PLANT NUTRITION AND SOIL SCIENCE-ZEITSCHRIFT FUR, 172, 601-614; 3) Girmay G, Singh BR, Mitiku H, Borresen T, Lal R 2008: Carbon stocks in Ethiopian soils in relation to land use and soil management. Land Degradation & Development, 19, 351-367; 4) Maquere V, Laclau JP, Bernoux M, Saint-Andre L, Goncalves JLM, Cerri CC, Piccolo MC, Ranger J 2008: Influence of land use (savanna, pasture, Eucalyptus plantations) on soil carbon and nitrogen stocks in Brazil. European Journal of Soil Science, 59, 863-877; 5) Katterer T, Andersson L, Andren O, Persson J 2008: Long-term impact of chronosequential land use change on soil carbon stocks on a Swedish farm. NUTRIENT CYCLING IN AGROECOSYSTEMS, 81, 145-155; 6) Schulp CJE, Veldkamp A 2008: Long-term landscape - land use interactions as explaining factor for soil organic matter variability in Dutch agricultural landscapes. Geoderma, 146, 457-465; 7) VandenBygaart AJ, McConkey BG, Angers DA, Smith W, de Gooijer H, Bentham M, Martin T 2008: Soil carbon change factors for the Canadian agriculture national greenhouse gas inventory. Canadian Journal of Soil Science, 88, 671-680.	Partially Accepted, Agree to refer back to AR4 - but many of the references listed are far too specific - there are 10s or 1000s of references in this filed and be have to choose the most synthetic - we cannot cite all individual studies
12926	11	15	1	15	32	Since the mechanisms of N2O and CH4 production in each ecosystem, these GHG should be discussed in sepeartely. After the trend of contribution of these GHG emission is discussed, detail of these source or regional distribution of the source of each GHG should be discussed in different sub-sections like in "Trend of N2O emission" and "Trend of CH4 emission" sub-sections.	Accepted, Disaggregated
11204	11	16				Table 11.2: In final cell on left hand column it would be useful to add specific reference to and "including through recognition of communal/customary tenure systems" after 'community forests'. In the right hand column it might be good to add the above references of Agrawal and others?	Accepted, Add for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10243	11	16		20		Most references are not listed, thus it is difficult to judge if there are all adequate! It should be given here priority to paper already synthetizing available information (review paper) for instance a search on the ISI web of Science with the key words “crop* carbon review” in the field “title” return only 4 papers. Citing review paper will permit to cite fewer references and allowing readers to summarized and synthetized information. For the “Croplands – tillage/residues” (page 17) : Tillage effect have to be differentiated from the residues effect; As it is, it sums too different management options: tillage and residues, tillage without residues, no-tillage and no-residues, and no-tillage and residues For “Biochar” (page 17): researches are still in the infancy, and first meta-analysis showed that biochars is not always synonymous of increasing biomass productivity (e.g. Jeffery et al. 2011. Agriculture, Ecosystems and Environment 144 (2011) 175–187, doi:10.1016/j.agee.2011.08.015) Livestock – feeding (page 18): It should be underline that some dietary additive suggested here might be forbidden or limited in some countries (e.g. bST in Europe) “Other mixed biomass production systems”: this heading is too vague, it would be better to consider on one hand something like integrated crop-livestock systems, and double-cropping systems. □	Accepted, Replace many papers with reviews since 2007 in SOD
10622	11	16				Please consider the paper Caparrós et al. (2011). This paper analyzes avoided degradation costs in Spain and in Tunisia. Caparrós, A., Ovando, P., Oviedo, and Campos, P., 2011. Accounting for carbon in avoided degradation and reforestation programmes in Mediterranean forests. Environment and Development Economics 16(4): 405-428.. This paper reviews different studies which estimate economic and physical potentials for bienergy and forestry options in Europe.	Rejected, Considered but too country specific
9448	11	16		20		Table 11.2 is helpful however it mixes one nascent set of mitigation options (REDD) with numerous technologies that on their own do not constitute mitigation options. Avoided deforestation is a potential outcome of set of incentives and rules that provide the mechanisms for mitigation. Other technologies in the list would require similar rules and incentives to be mitigation options. Biochar is not a mitigation option. A scheme to promote farmers to make and bury biochar is a mitigation option.	Partially accepted, A sentence was added in the opportunities column
11980	11	16				"Forest management in plantations". Not clear why this is a mitigigation option	Rejected, Improved management in plantations can enhance C sinks
2364	11	16				This table is very helpful and contains good information in a concise form. Consider to add "abatement cost" and "investment needs" (link appropriatelywith 11.10 and avoid duplication)	Rejected, Better to leave these until the later sections where these are dealt with
6825	11	16		19		The table starts with some activities and describes the impact eg avoided emissions or additional sequestration. These explanations are useful to explain the impact on the atmosphere - should be extended to all activities in the table, perhaps as a separate column? in some cases eg bioenergy, impacts may be in other sectors eg energy	Accepted, Harmonize the table entries across all practices for the SOD
3542	11	16				Check again the way references are writen; for e.g. Gibbs, Brown et al. 2007; Saatchi, Harris et al. 2011; Lehtonen and A. 2005 are not common ways to present references.	Accepted, Zotero updated for SOD
14618	11	16				row 2, afforestation, reforestation, needs more up to date refs.	Accepted, Replaced references with post-2007 reviews
14619	11	16				row 4. forest management in plantations. Surely this is overlap with section above Also how will improving productivity of fruits, cofee, gum etc improve carbon balance	Rejected, Less emissions per unit product - but removed specification of the fruits
14620	11	16				sustaitnable management in native forests, this is not so much management but conservation really it is REDD and more clear to state as such.	Rejected, Conservation includes management

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7611	11	16		16		"Plantation" meams about 5 to 20 years rotation forestry in tropical regions. It is not include planted forest such as Europa and Japan. Replace "forest manegement. FAO classifies plantation of fruit and cocoa, coffee ,NTFP in agricultural land. Fruit and cocoa, coffee, NTFP will be delete from "Forest manegement in plantion" in plantations" with "forest mangegement in planted forest" option.	Accepted, Done
7612	11	16		16		I think "Protection for wild fire" is very important for GHG gus reduction. Plese add "Protection for wild fire" or "Wild fire manegement" in option.	Rejected, Evidence is not clear - some studies this increases fuel load leading to larger fire events - have discussed, not placed in the table
9328	11	16				Most of the reference listed pertain to pre-AR4 period, i.e. before 2007. It is suggested that references pertaining to 2007 and the later years only may be given.	Accepted, Replaced references with post-2007 reviews
7336	11	16				citations all messed up	Accepted, Zotero updated for SOD
5705	11	16				Table on Forestry Option needs to be reoriented in tune with the terminologies that are being used in the UNFCCC decisions and text on REDD-plus. At the top of the Table, under heading Option, 'Forestry' should be replaced by "Forestry (REDD-plus)". Next, elements below "Forestry (REDD-plus)" will need to be regrouped. For example, 'Afforestation/Reforestation' and 'Forest Management in Plantations' could be grouped together under the new sub-head "Enhancement of Forest Carbon Stocks", 'Improved Forest Management' could be put under "Sustainable Management of Forest", and similarly, 'Sustainable Management in Native Forest' could be put under "Conservation". The terms in bold font are coming from the UNFCCC decisions on REDD-plus.	Accepted, Revised for SOD
7540	11	16		16		REDD is the name of a policy in UNFCCC, and it is not appropriate as a name of a mitigation option.	Accepted, Revised for SOD
7541	11	16		16		Categorization of mitigation options is not reasonable and not comfortable. Respecting Subsection 9.4.2 in AR4, categorization and illustration should be revised.	Accepted, Revised for SOD
7542	11	16		16		Replace "forest manegement in plantations" with "forest management in planted forests" because plantation means short rotation forestry in toropical regions. Use generic words. Delete "in native forest" in "sustainable forest management in native forest". "Native" is not appropriate but generic SFM here.	Accepted, Revised for SOD
5551	11	16		16		REDD will not be successful in reducing deforestation, if agricultural productivity, especially for the subsistence sector does not increase in line with population increase and the increase demand for food and fibre products. REDD may be most successful in attacking forest degradation. Under Forestry options, which I would rename Tree planting and management options, I would have: Encouraged the planting/management of trees outside the forest, especially on farm in shelterbelts and along roads, rivers and railways (RRR), Use trees to improve fertility and soil friability. But above all need good inventory information on all land use types, especially in areas of high population densities.	Accepted, Discussed in the policy section (11.10)
11810	11	16				IN the option "Forest management in plantations": Why are fruits and NTFPs named here? Are they a mitigation option? If yes, explain how.	Rejected, Less emissions per unit product - but remove specification of the fruits
10262	11	16				To improved Forest Management : Add fresh reference: Routa,J., Kellomäki, S. and Strandman, H. : Effects of Forest Management on Total Biomass Production and CO2 Emissions from use of Energy Biomass of Norway Spruce and Scots Pine. BioEnergy Research: Volume 5, Issue 3 (2012), Page 733-747.	Rejected, Considered but too country specific
11117	11	16				This table is a simple list of possible options - a reference would be needed to later sections where quantitative assessments are provided. However, it would be nice to have an indication of the relative importance of the various options. Also, the references in this format are not informative at all, maybe some quantitative information from them would be interesting.	Accepted, Reference to later sections will be added for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11118	11	16				For reducing deforestation…, REDD (actually: REDD+) is only a program for developing countries, however, deforestation may also be a (considerable) problem for countries such as Australia (mentioned in the draft), Russia, Canada, Finland and others. Thus, additional forms of mitigation are required.	Accepted, Revised for SOD
11119	11	16				For afforestation: the definition of afforestatin and reforestation may not be important here at all (most people know what these are), and providing any definition may result in a conflict with "official" definitions under the Kyoto Protocol - please check and modify	Accepted, Revised for SOD
11120	11	16				"Sustainable management in native forests" - this is a rather odd term. "Improved forest management" should cover management in native forests, thus, preserving carbon in UNMANAGED forest should be mentioned here.	Accepted, Revised for SOD
11160	11	16				Difference between the "Improved Forest Management" and the "Sustainable management in native forest" is not clear. These can be merged into "Sustainable forest management"	Accepted, Revised for SOD
11161	11	16				"Plantations" and "planted forest" should be discriminated. Orchards, cacao, coffee and rubber trees are not always defined as "forests".	Accepted, Revised for SOD
11162	11	16				In the table, use of unclear terms should be avoided as possible. For example, "native forest"	Accepted, Revised for SOD
11163	11	16				Forest fire control, water level control in the peat forest should be included as mitigation options.	Accepted, Revised for SOD
2623	11	16		20		What is 'forest degradation' - it needs to be defined. Does the Afforestation/Reforestation part need to include that it is afforestation only if it was not in forest conditions for 50 years? The Biochar is not something that is just found in agriculture but is also practiced in forests. The Grasslands - fire mgt includes fire prevention but this is part of the ecophysiology of grasses - they self generate fires. Fire prevention has to be cautiously implemented if the ecosystem needs it. The unhealthy forests in western US are due to fire prevention. There needs to be a definition for Degraded soils. The Bioenergy from dedicated crops are plants that have a significant potential to become invasive so this should be approached cautiously, i.e., probably not a good idea to plant outside of their normal range.	Accepted, Defined in glossary and clarified in the SOD; biochar in forestry is difficult economically and practically. The impacts on forests negative of wood used for production. But unlikley, as charcoal more valuable as a fuel
12397	11	16	1	16	2	Production of artificial meat is one way of reducing emissions from production of meat. Especially ruminant meat may show dramatic reduced GHG-emissions when artificially produced. Could also be assessed being a measure reducing the demand side (meat demand).	Accepted, Included mention in livestock demand-side Discussion
12396	11	16	1	20	2	Please consider to start the explanation box by giving a reference to which greenhouse gas the measure is relevant.	Partially Accepted, Changed table to include gas or reference to other section
12872	11	16	1			This table currently omits forest management actions that are adaptations to future climate change. Add a line "Column 1: Adaptation of forest management to climate change. Column 2: Prescribed burning, mechanical thinning, and retention of large trees; These adaptation measures also mitigate greenhouse gas emissions because long-term storage of carbon in large trees outweighs short-term emissions from prescribed burning; Fire management to control bark beetle outbreaks, projected to emit, in boreal forests in Canada, 8-67 Mt C y-1. Column 3: Stephens et al. 2009, Hurteau and Brooks 2011, Kurz et al. 2008. Stephens, S.L., J.J. Moghaddas, C. Edminster, C.E. Fiedler, S. Haase, M. Harrington, J.E. Keeley, E.E. Knapp, J.D. McIver, K. Metlen, C.N. Skinner, and A. Youngblood. 2009. Fire treatment effects on vegetation structure, fuels, and potential fire severity in western U.S. forests. Ecological Applications 19: 305-320. Hurteau, M.D. and M.L. Brooks. 2011. Short- and long-term effects of fire on carbon in US dry temperate forest systems. BioScience 61: 139-146. Kurz, W.A., G. Stinson, G.J. Rampley, C.C. Dymond, and E.T. Neilson. 2008. Risk of natural disturbances makes future contribution of Canada's forests to the global carbon cycle highly uncertain. Proceedings of the National Academy of Sciences of the USA 105: 1551-1555.	Accepted, Revised for SOD
9079	11	16	1			Some references in this table were not cited in the References section	Accepted, Zotero updated for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9080	11	16	1			For description in "Sustainable management in native forest" , it would be better to add biodiversity issue.	Accepted, Revised for SOD
14615	11	16	26			suggest instead of "harvest rice" to say "rice production".	Accepted, Revised for SOD
14616	11	16	26			should you make the point here that carbon realeased as CH4 was taken up as CO2 so small net change in carbon, but methane greater raditive forcing effect in the short term. (in the longer term the CH4 turns back to CO2)	Accepted, Revised for SOD
9130	11	16	28			To avoid confusion, it is better use "plantation" and "planted forest" separately. Column 1 : change "Forest management in plantations" to "Forest management in planted forests and plantations", Column 2: "Planted forest are" to "Planted forests and plantations are", "timber, fruits" to "timber, or fruits".	Accepted, Revised for SOD
5496	11	17				Biochar in the agricultural recommendations- while this amendment has its devotees- research on behavior in soils is mixed with some studies showing N immobilization and yield decreases. Also it isn't clear in others if an observed response is the result of a pH increase or some other factor related to the char. I would suggest that char be replaced here with a more generic reference to residuals based soil amendments. There is a wealth of literature on benefits associated with organic amendments derived from residuals and this would have the added benefit of reduced landfill emissions for redirected organics. Using this term also would include biochar as a type of amendment and so would not upset any char devotees.	Accepted, Moved biochar to amendments section and treated as char. It is correct that biochar can deprive plants of N through ammonium sorption if added in large quantities without consideration for N supply from soil or other inputs. Positive effects on retention / supply to plants look to cancel out negative effects later, so small annual additions may be best; Biochar would have potential to impact crop yield in multiple ways, only one of which is pH - others are direct supply of mineral nutrients, improved retention of nutrients, water retention, rooting / root interactions, etc.; Biochar is distinct from other ammendments and while belonging in a soil ammendments section, does require a separate entry
14621	11	17				row 6, not sure if you need LUC here	Accepted, Revise for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14622	11	17				row 7. biochar. Not sure this fits here quite as biochar probably produced from wood products, like timber in long lived prodcuts where you store it may not be so critical. I guess it may icnrease crop productivity, but this is a side issue to the carbon storage.	Partially Accepted, Moved biochar to amendments section and treated as char. It is correct that biochar can deprive plants of N through ammonium sorption if added in large quantities without consideration for N supply from soil or other inputs. Positive effects on retention / supply to plants look to cancel out negative effects later, so small annual additions may be best; Biochar would have potential to impact crop yield in multiple ways, only one of which is pH - others are direct supply of mineral nutrients, improved retention of nutrients, water retention, rooting / root interactions, etc.; Biochar is distinct from other ammendments and while belonging in a soil ammendments section, does require a separate entry
11907	11	17				Add a new reference for nitrient management: Akiyama et al. (2010) Evaluation of effectiveness of enhanced-efficiency fertilizers as mitigation options for N2O and NO emissions from agricultural soils: meta-analysis. Global Change Biology, 16: 1837-1846.	Accepted, Add for SOD
11908	11	17				Add a new reference for rice management: Ito et al. (2011) Mitigation of methane emissions from paddy fields by prolonging midseason drainage. Agriculture, Ecosystems and Environment, 141: 359-372.	Accepted, Add for SOD unless review / meta-analysis is available
5706	11	17				Please add an additional row, and discuss enhancement of soil organic carbon separately for cropland management and grassland management.	Accepted, Revise for SOD
13317	11	17				The real mitigation potential of biochar is not established. It could be removed from this table as its inclusion is premature.	Rejected, We are specifically asked to consider it in the chapter outline

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5552	11	17				Land-based agriculture. Croplands-set-aside & LUC. I have never heard of 'holly forest'. What is it? It does not seem to be very common. It should be explained. Will it make significant in-roads? Biochar. This could be produced using crop residues (and tree waste), but at what cost? Who will pay for the spreading on fields? Surely soot serves the same purpose? This could be collected from chimneys? Under grassland could promote browse (and shade) trees. Under this heading could be a section on reclaiming land such as that invaded by 'weed' species, irrigated land that has become saline etc.	Partially Accepted, Moved biochar to amendments section and treated as char - and removed specific details such as holly forest. No one has made a global assessment of the potential for economic biochar deployment. Currently, lack of a price on carbon abatement (and/or a methodology for claiming a price at least for directly for sequestered carbon, however small) is a barrier. Refining predictability and certainty of crop impacts by matching biochar and soil, making biochar from wastes rather than virgin biomass, improving availability and cost of pyrolysis technologies, adopting sensible deployment strategies (e.g. small annual applciations / with fertiliser) have potential to make it attractive economically. Soot has been used in soil traditionally, but likely to be enriched in toxic PAH compounds - though not made an analysis of that literature.
15608	11	17				For grasslands management option, consider citing: Thornton P.K. and M. Herrero (2010). Potential for reduced methane and carbon dioxide emissions from livestock and pasture management in the tropics. Proceedings of the National Academy of Sciences of the United States of America 107(46), 19667-72.	Accepted, Added for SOD
10597	11	17				Why "Land-based" agriculture? I guess trying to distinguish from livestock - so better term is "Agronomy".	Rejected, Agronomy often only refers to cropland so land-based is better
10598	11	17				Biochar rewording suggestion: Biochar is a soil amendment that sequesters C from source biomass and could possibly increases "crop" productivity in some soils.	Accepted, Moved biochar to amendments section and treated as char - Accepted wording change. Slight change to suggested wording to include effects on soil-derived greenhouse gas emissions (N2O) - see edit in Table 11.2
10599	11	17				last line "mgt" in full	Accepted, Revised for SOD
13964	11	17				under agronomy -- remove reference to agricultural biotechnology unless real data can be provided that unequivocally link a particular new variety to a measurable increase in soil carbon content. Include references (e.g., ongoing work by Six of UC Davis) regarding use of compost and manures in cropping systems and measured increases in soil carbon content.	Rejected, It has to be considered - even if it is just as a future possibility. We cannot pretend it doesn't exist
13965	11	17				under nutrient management, remove reference to increased fertilizer input reducing land conversion pressures. This is a simplistic and highly contestable link. See for example several recent reviews of the science by doug boucher/union of concerned scientists.	Accepted, Remove for SOD or see comment on line 558

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15230	11	17				Croplands - nutrient management. Missing remark about organic fertiliser inputs. Fertiliser input can minimised GHG emissions if they are from organic sources or from green manure, for example. Beneficial in economically poor regions and low yielding locations. Ref. "Increased carbon sequestration by a management practice may increase other GHG emissions and, as such, decrease or even negate the sequestered CO2 in the soil. The application of synthetic fertilizer, for example, was considered to result in net GHG emissions when considering emissions from fertilizer production and nitrous oxide emissions after application (Powlson et al., 2011)". From Bellarby et al. 2012. Bellarby, J., Tirado, R., Leip, A., Weiss, F., Lesschen, J. P. & Smith, P. 2012. Livestock greenhouse gas emissions and mitigation potential in Europe. Global Change Biology, in press. http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2012.02786.x/abstract	Accepted, Add for SOD
15231	11	17				"Biochar favours C sequestration, but does not increase soil fertility." Galvez et al. 2012. Galvez, A., Sinicco, T., Cayuela, M. L., Mingorance, M. D., Fornasier, F. & Mondini, C. 2012. Short term effects of bioenergy by-products on soil C and N dynamics, nutrient availability and biochemical properties. Agriculture, Ecosystems & Environment, 160: 3-14.	Accepted, Have provided review that considers all studies rather than citing many studies. I would be cautious citing this work, it does not actually assess effects on plants, only (limited) 'indictators' of soil fertilty. Also, only one type / rate of biochar.
14429	11	17				Typo. Row "Croplands – water management". Correct 'avaialability'	Accepted, Revise for SOD
11064	11	17				Column 2, Row 7: Summary information on biochar does not include potential impacts on N2O emissions although mentioned in text.	Accepted, Revise for SOD
11063	11	17				Column 3, Row 2: none of the references for Croplands-nutrient management are included in Reference List. Perhaps more importantly, none of them is more recent than 2005. Several efforts have been made since then to integrate information regarding mitigation potential for cropland nutrient management, for example: Eagle et al., 2012. Greenhouse Gas Mitigation Potential of Agricultural Land Management in the United States: A Synthesis of the Literature. Nicholas Institute for Environmental Policy Solutions NI R 10-04, available at http://nicholasinstitute.duke.edu/ecosystem/land/TAGGDLitRev. Also see comment and references below for section 11.8.3	Accepted, Update with post 2012 references
12398	11	17	1	17	2	Cropland - water management may also include drainage of too wet soil, to gain better harvests.	Accepted, Revise for SOD
12399	11	17	1	17	2	It could be mentioned that bio char does have a number of other advantageous properties in the soil environment	Accepted, Revise for SOD
11526	11	17	1	17	1	you may also refer to Meyer-Aurich et al. 2012 in the second line of the table on page 17 (croplands-nutrient management) In Meyer-Aurich et al 2012 we elaborated on the issue "fertilizer input to increase yields causes GHG emissions but reduces land conversion pressures and increases residue for recirculation to soils (Meyer-Aurich, A., Olesen, J., Prochnow, A., Brunsch, R. (2012). Greenhouse gas mitigation with scarce land: The potential contribution of increased nitrogen input. Mitigation and Adaptation Strategies for Global Change:1-12. doi:10.1007/s11027-012-9399-x.)	Accepted, Remove for SOD or see comment on line 550
13667	11	17				Description column, line 4: Add 'use of nitrification inhibitors', because the effectiveness of this option has well demonstrated.	Accepted, Add to SOD
13668	11	17				References: Add the following reference because it analyzed average mitigation potentials of nitrifivation inhibitors to reduce N2O from cloplands: Akiyama, H., Yan, X., and Yagi, K.: Evaluation of effectiveness of enhanced-efficiency fertilizers as mitigation options for N2O and NO emissions from agricultural soils: meta-analysis. Global Change Biol., 16, 1837–1846 (2010); a PDF file for the reference is attached.	Accepted, Add to SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13669	11	17				Description column, line 4: Add 'organic matter management (composting and aerobic decomposition of rice starw and stubbles)', because these options are well known and their effectiveness has well demonstrated as shown in Yagi et al., 1997 (Yagi, K., Tsuruta, H. and Minami, K.: Possible options for mitigating methane emission from rice cultivation, Nutrient Cycling in Agroecosystems 49: 213–220, 1997); a PDF file for the reference is attached.	Accepted, Find a more up to date reference, but add to SOD
13670	11	17				References: Add the following reference because it provides an avarage mitigation rate of improved mid-season drinage to reduce CH4 from Japanese rice fields by a nation-wide field campaign: Itoh, M., Sudo, S., Mori, S., Saito, H., Yoshida, T., Shiratori, Y., Suga, S., Yoshikawa, N., Suzue, Y., Mizukami, M., Mochida, T., and Yagi, K.: Mitigation of methane emissions from paddy fields by prolonging mid-season drainage. Agric. Ecosys. Environ., 141, 359– 372 (2011); a PDF file for the reference is attached.	Accepted, Add to SOD
14623	11	18				row 4, bioenergy from forestry residues, column 2. The last logn sentence is a qulifying statement that is otut of line with the rest of the table which describes the category, but does not discuss its effects. This belongs in main text discussions	Accepted, Revise for SOD
9329	11	18				Against 'Degraded soils - restoration', under column 'Description', the phrase 'soil fertility reduction', is suggested to be changed to 'soil fertility improvement'.	Accepted, Revise for SOD
5707	11	18				In the row for ‘Degraded soils- restoration’ in the second column, replace words ‘soil fertility reduction’ with “soil fertility reduction or enhancement”.	Accepted, Revise for SOD
13318	11	18				Under manure management, could refer to anaeorobic digestions.	Accepted, Revise for SOD
13319	11	18				Under livestock should seperate genetic selection and manipulations of rumen microbial community.	Accepted, Revise for SOD
5553	11	18				Livestock. Under this section or under bioenergy should mention small and large-scale methane production.	Accepted, Revise for SOD
11294	11	18				Under header 'Livestock', row 'Livestock-feeding', column 'Description', one should be cautious about referencing 'antibiotics' in this positive context; in the current political climate this could be distorted as an endorsement.	Accepted, Change wording for SOD
15232	11	18				Manure management - What is missing In my opinion, also in AR4, is an analysis on how much GHG emissions could be saved in N fertilisers production, distribution, etc, if all manure would be managed and used efficiently for food production, i.e. substituting emissions from some % of synthetic N, even when emissions from manure remains similar. Globally, about 50% of manure is not returned to agriculture land, so if they were and synthetic N inputs adjusted accordingly, there will be some additional savings in GHG emissions.	Accepted, This has been addressed in Davidson, Ready et al. and Erisman et al., so we can perhaps find these numbers
12844	11	18	0			Please add a new block 4 after Livestock-Manure management, with the title: Crop-livestock integration. Coupling crop and livestock production offers possibilities for better utilisation of animal manure. In this way artificial fertiliser can be saved and subsequently emissions associated with fertiliser production are avoided. Reference: Oomen et al., 1998. Publication is attached	Partially Accepted, Covered generically under better use of livestock manures
12402	11	18	1			Combustion or catalysis of air from livestock rooms has been reported as a possible technique of reducing methane emissions from ruminants. Applying these techniques on large farms may be possible without too high costs. Please consider to include this in table 11.2, if relevant references are found in the literature.	Noted, Literature does not exist as far as I can ascertain - concentration too low for combustion from animal house.
12403	11	18	1			The table lists a number of mitigation options. in the 3.row, 2.colon the expression "soil fertility reduction" is used. Is this correct?	Accepted, Revise for SOD
12400	11	18	1	18	2	Organic soils - restoration. In some countries existing peatlands may have a demonstrable risk for changed land use. E.g. drainage of the water and use for crop production or grasslands will release CO2 to the atmosphere compared to if the areas had not been converted. This comparison with a "business-as-usual scenario" for peatlands is comparable to REDD concept on forest management.	Noted, Statement - not a comment
12401	11	18	1	18	2	Degraded soils; Reduced soil compaction is relevant in countries with a high degree of motorized agricultural machinery. Has relevant publications on this topic been investigated?	Accepted, Add for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7656	11	18	17	18	17	I recommend to cite Shinkai et al. (2012) as a reference for mitigation options in "Livestock - feeding". They reported reduction of enteric methane emission from dairy cattle using cashew nut shell liquid (CNSL). Shinkai et al. (2012) Mitigation of methane production from cattle by feeding cashew nut shell liquid. J. Dairy Sci. 95:5308-16	Accepted, The section does not try to include every reference but focuses on comprehensive post 2007 reviews. These cover the use of oil by-products
14267	11	18	26	19	44	Repitions in Sec. 11.2.3 and 11.2.3.1 needs to be removed.	Accepted, Sections completely revised for 2nd order draft
7657	11	18	35			I recommend to cite Fukumoto et al. (2006) or (2012) as a reference for mitigation options in "Manure management". They reported reduction of N2O emissions from animal manure composting by promotion of nitratation. Fukumoto et al. (2006) Reduction of nitrous oxide emission from pig manure composting by addition of nitrite-oxidizing bacteria. Environ. Sci. Technol. 40(21):6787-91. Fukumoto (2012) Nitratation Promotion Process for Reducing Nitrogen Losses by N2O/NO Emissions in the Composting of Livestock Manure, Soil Health and Land Use Management, Dr. Maria C. Hernandez Soriano (Ed.), ISBN: 978-953-307-614-0, InTech.	Accepted, The section does not try to include every reference but focuses on comprehensive post 2007 reviews. These cover reducing emissions from manure treatment.
7655	11	18	40	18	40	Ahh et al. (2011) is not listed in References.	Accepted, Zotero updated for SOD
7658	11	19 or 20	18 or 18	19 or 20	22 or 22	I recommend to cite Ogino et al. (2007) or (2012) as a reference for mitigation options in "Integration of biomass production with subsequent processing in food and bioenergy sectors" or "bioenergy (and biomaterials) from organic wastes". They reported GHG mitigation by producing animal feed from food residues/wastes. Ogino et al. (2007) Environmental impact evaluation of feeds prepared from food residues using life cycle assessment. J. Environ Qual. 36(4):1061-8 Ogino et al. (2012) Life-cycle assessment of animal feeds prepared from liquid food residues: A case study of rice-washing water. J. Environ Qual. (in press)	Noted, References have been reviewed and included where possible
15962	11	19				unutilzied forest growth is not very clear, not clear why the distinction is made with forest resideus , an example may clarify	Accepted, Text has been revised
13320	11	19				Under, Other mixed biomass production systems: This discussion is not clear as to how it reduces carbon emissions. It is definitely agronomically a good idea, but the link between good environmental practice and mitigation of GHGs should be made much more clear	Accepted, Text has been revised
13321	11	19				Under, Integration of biomass production with subsequent pocessing in food and bioenergy sectors: Same comment as above, this explanation is not clear as to how it mitigates GHGs. Reformulate explanation.	Accepted, Text has been revised
13322	11	19				Space between words: category.Environment	Accepted, Text has been revised
5554	11	19				Integrated systems. The principal wood products from agroforestry systems are fuelwood and poles. Timber is a minor product. There are also NTFP. Under this should also mention inter-cropping with species that inhibit pests as mentioned on page 1 – General comments.	Accepted, Text has been revised
10600	11	19				Change "Bioenergy" to "Biomass for energy" and in sections below change "bioenergy" to biomass - which is the resource provided from agriculture that is converted to bioenergy.	Accepted, Text has been revised
14674	11	19				In row 1 on this page, agroforestry can also be for biofuel feedstock biomass production.	Accepted, Text has been revised
9131	11	19	35			Column 1: change " Bioenergy from forest unutilized forest growth" to " Bioenergy from unutilized forest growth".	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5497	11	20				Bioenergy from crop residues- can be expanded to include residuals from food processing. Food processing residuals can be used either directly as soil amendments or as a source of energy through anaerobic digestion, c digestion with manures has been shown to be more effective- with nutrients largely preserved	Accepted, Text has been revised
3847	11	20				2nd. Row, 2nd column. Why not include as conventional agriculture crops sugar cane, as an example from dedicated crops? This is a real example while some of the ones quoted are not yet in the market?	Accepted, Text has been revised
5555	11	20				Under bioenergy, should emphasize much more use of annual growth for bioenegy, especially for direct use of wood for rural industries including charcoal production (and biochar) and electrical generation with conventional boilers (small-scale) or by gasification, for large-scale production. Need inventory data of waste products, especially animal waste for methane production and direct use for electrical generation where industrial production of meat is undertaken (pigs, poultry and cows etc.).	Accepted, End uses of bioenergy are treated in other chapters, but the text has been revised
5556	11	20				Bioenergy from dedicated crops. Mention is made of oil from Jatropha sp. This can be grown in low-rainfall areas but production is a function of water and nitrogen availability. It is good as a hedge plant in keeping animals in or out. Then the oil-bearing fruit could be used on a small-scale for heating. Large-scale Jatropha plantations have been relatively disappointing in India. Regarding switchgrass and Miscanthus sp. if grown for ethanol production the economics are not very favorable. It is not very cost effective to break down the cellulose into simple sugars (See Scientific American). It should be cheaper to use the grasses and other 'waste' biomass to produce methanol etc. by dry distillation, or used directly for energy. The methanol could be used directly as a fuel or as a building block for other organic compounds, including energy.	Rejected, Too detailed
15233	11	20				Bioenergy from crop residues - Crop residues are not considered wastes in many situations. For example, in econonmically poor rural regions, crop residues as wheat and rice straw are used for animal feed, construction, etc. In addtion, maintaining or increasing SOM need returning of crop residues to soils. Seems essential to add these concerns and further analyse (here or elsewhere) how much global agriculture residue is left for bioenergy generation once other uses are taken into account. This will avoid double counting and/or counter effective policies (e.g. increase soil erosion and SOM losses due to residues removal).	Accepted, Text has been revised
14624	11	20	13	20	17	language needs improving here	Rejected, Not clear which section this asks about
5548	11	20	13	20		. 500,000 km2 = 50 M ha.	Rejected, Wrong page and line number - cannot locate
7613	11	20	14	20	14	"maximum sustainable technical potential" is incomprehensible term for citizen. This sentence would be improvec	Accepted, Clarified
5557	11	20	14	20	15	"--- maximum sustainable technical potential" for 1.8 GtCe/yr abatement from 2.27 Gt biomass C. Explain what is GtCe? The conversion from biomass C to Ce is 79% and is extremely high; normally a 50% conversion is the upper limit. Also, the sustainable potential, subtracting existing use of wood alone is over 7 Gt C (see my article), this does not take into account crop residues.	Accepted, Checked numbers and revised for SOD. If I understand the comment properly: only 50% of the carbon abatement is from bicohar C, 30% is from fossil fuel substitution in energy from pyrolysis, 20% from suppression / avoided N2O and CH4 emission; not sure about 7Gt - Woolf et al only considered wood (and other resources) that could conceivably be availble, given competing needs / uses
12404	11	20	16	20	16	Use Gt in stead of Pg since Gt already is used ;	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5051	11	20	16	20	16	I waw early drafts of "Woolf et al" on biochar and would have been very reluctant to use given assumptions about land coverage. Don't know if they fixed them, hope so.	Accepted, Checked numbers and revised for SOD
5558	11	20	16	20	16	1.0 GtCe/yr from 1.01GtC. This is a 99% conversion. This is impossible.	Accepted, Checked numbers and revised for SOD. If I understand the comment properly: only 50% of the carbon abatement is from bicohar C, 30% is from fossil fuel substitution in energy from pyrolysis, 20% from suppression / avoided N2O and CH4 emission; not sure about 7Gt - Woolf et al only considered wood (and other resources) that could conceivably be availble, given competing needs / uses
5559	11	20	16	20	16	"--- and the accrual of 66-130 Pg (GtC) abatement over 100 years". This seems very high at 0.66 – 1.30 GtC per year.	Accepted, Checked numbers and revised for SOD
10602	11	20	16			use Gt not Pg - especially in same sentence!	Accepted, Corrected units for the SOD
14625	11	20	17			suggest replace "supports" with "indicates"	Accepted, Revised for SOD
14626	11	20	19			I am not sure what this means	Accepted, Clarified for SOD
15234	11	20	19			Assumed increases in productivity are very uncertain. See for example: "Biochar favours C sequestration, but does not increase soil fertility." Galvez et al. 2012. Galvez, A., Sinicco, T., Cayuela, M. L., Mingorance, M. D., Fornasier, F. & Mondini, C. 2012. Short term effects of bioenergy by-products on soil C and N dynamics, nutrient availability and biochemical properties. Agriculture, Ecosystems & Environment, 160: 3-14.	Accepted, Revised for SOD. I am cautious citing this work, it does not actually assess effects on plants, only (limited) 'indictators' of soil fertilty. Also, only one type / rate of biochar. I have dealt with this by citing Jeffery et al' in the box and now also Table 11.4.
10601	11	20	2			Suggest just "Production mitigation measures not considered in AR4". But Bioenergy was included extensively in AR4 - though spread across several chapters. So why does it come under this sub-heading? So could have "11.3.1.1 Biochar" and put all Bioenergy section into the Biomass/bioenergy annex rather than here.	Accepted, Moved to bioenergy annex
5050	11	20	29	20	29	biochar is not necessarily a stable C-rich co-product it is highly vcombustable after production, some percentage oxidizes on application. Also it comes in very different rates from fast and slow pyrolysis and also creates vastly different amount of C in char under fast and slow. we did an economic analysis considering c prices in McCarl, B.A., C. Peacocke, R. Chrisman, C.C. Kung, and R.D. Sands, "Economics of Biochar Production, Utilisation and GHG Offsets", Biochar for Environmental Management: Science and Technology, Chapter 19, Edited by Johannes Lehmann and Stephen Joseph, Earthscan Publications, UK, 341-358, 2009. and in Kung, C.C., and B.A. McCarl, "Economics of Taiwanese Biochar Production, Utilization and GHG Offsets: A Case Study on Taiwanese Rice Fields", 2011. (that paper is under second review at an energy journal)	Accepted, Revised for SOD. I think this is captured in the box with the range in estimates of cabron stability in biochar (haf life ranging from 50-10,000 yr).
15963	11	20	3	21	8	Chapter on Biochar is not very clear, some sentences do not seem to be complete.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10244	11	20	4	21	8	Biochar: as stated before, Biochar application is still controversial, potential risks (HAPs, hydrophobicity, …) have to be considered, even more that this is a nearly non-reversible option thus biochar is stable! Biochar can also be made with animal wastes (manure but also bones when processing the animals)	Accepted, Revised for SOD. Hydrophobicity seems to be very short term and not likely to be a problem at real rates of application - however, contaminants worth a note. Now added to the box "Standards to ensure that biochar is produced in a way that does not conserve or create toxic contaminants are also required, to regulate deployment."
16559	11	20	4	21	8	Given the small amount of field data showing that biochar is an effective mitigation technique in practice, this section could be shortened very considerably.	Accepted, Shortened and revised for SOD. Actually the scale of the opportunity warrants maintaining share of document, but if the document is shrinking…. The stabilisation of carbon is the main element of the abatement from biochar and is both pretty certain and also - importantly - verifiable (comparitively at least) and not reversible with land use change.
5498	11	20	4	21	8	The discussion on biochar makes it clear that research to date on this amendment has not provide clear answers on appropriate ways to use this amendment or on predictable results related to use of char. High variability in outcomes suggests that recommendations for use of this amendment are not appropriate. A recent review (Ippolito et al, 2012) noted a wide range in results for plant productivity with biochar with approximately 50% of studies reporting yield reduction. The authors suggested N immobilizationas the primary cause of reduced yield with immobilization observed for low temperature biochars. High temperature biochars, while they are less likely to result in nutrient deficiencies are sited here as high in potentially hazardous PAHs. Energy balance for biochar production is related to both feedstock characteristics and gassification conditions. Using nutrient rich, wet materials such as animal manures to produce biochar with no net or a negative energy balance as well as loss of a significant portion of N does not seem to be a viable or recommendable practice. As the primary end of these materials is on highly weathered tropical soils, and as characteristics of chars and associated outcomes are highly variable- it would seem that the end use market is not likely to enforce the strict production guidelines necessary to produce high quality amendments	Accepted, Revised for SOD. The Spokas review is now cited in Table 11.4 - in conjunction with Jeffery et al - is a better assessment than Ippolito, who focuses on soil N. Crop N supply would not be suppressed if bicohar was added each yr in small amounts (or beyond yr 1 after a large slug) - that is reported in the literature - Spokas says 50% studies are +yield, 30% no change and 20%- ... not good enough, but we're still learning about when / where / how much.
6826	11	20	4	21	8	Biochar section could be shortened - highly speculative and uncertain impacts. Reducing energy output of biomass to produce char means alternative (fossil?) energy supplies required.	Accepted, Shortened and revised for SOD, but not uncertainty alongside the scale of potential.
3543	11	20		21		Are there examples of implementation of biochar? Please provide. The problem I see here is the origin of the biomass used in the production of biochar; if the biomass is derived from forest, that is an issue. Please include some text on life cycle analysis to demonstrate that biochar is environmentally sound.	Accepted, Revised for SOD. More elaboration in box now on 'sustainable' restriction in the analysis of Woolf et al. No, no real whole-field scale examples, sadly.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13323	11	20				Biochar does deserve mention as a possible mitigation method currently being researched, but I feel an entire section over estimates its potential as a panacea for mitigation.	Partially Accepted, The estimate of potential is quite detailed, it is *potential*. I think we can be more cautious about what can actually happen - but that applies to all mitigation options e.g. diet change. Must admit I worry a bit that we may be double counting resources v/v bioenergy - but actually, bioenergy and bicohar are not both in the final analysis.
14430	11	20	11	20	24	This section emphasizes the large potential abatement from using biochar, but simultaneously emphasizes that the effects on N2O are not predictable. This section could be shortened and streamlined for clarity regarding the unknowns of biochar management.	Accepted, Revised for SOD. Sensitivity analysis is included in the box - the N2O / CH4 component is not critical.
5371	11	20	4	21	8	This seems to be an overly optimistic discussion of biochar. Do any of these studies look at the energy or life cycle impacts associated with mechanically encorporating the biochar into the soil? The biochar isn't just droped on the top of the soil is it? This section would benefit from a few sentences that shed light on the difference between "maximum sustainable technical potential" and what might happen in the messier real world. Also be careful of words like "sustainable" that might be described (or might not be described) in the paper being cited but are not described in Chapter 11. "Sustainable" has many different potential means and will be read by different readers in very different ways.	Accepted, Revised for SOD. Biochar has been incorproated into the soil as per / with other residues. It can also be surface applied to perrenial crops and probably stubble (not to bare soil). Intended not to involve any additional soil disturbance. Sustainable - fair point - but in the space available?
10603	11	21	1			Lehmann reference missing. Guess "y" in this section means "years". Put in full.	Accepted, Which Lehmann reference? Yr has been expanded to 'years'
8835	11	21	10	21	17	What about exhaustpipe emissions (GHG and non-GHG emissions)?	Rejected, Not a land use issue - belongs elsewhere in the volume
12405	11	21	10	21	46	It would be useful with consideration of pay-back times for different biomass-fractions and how/if the pay-back time will affect the climate.	Rejected, Too detailed for the chapter. The issue is mentioned however.
10444	11	21	10	21	46	This paragraph is too dense for 1st time read. Please rewrite	Accepted, Section was shortened
5813	11	21	10	21	21	In your list, you forgot to include replacement effects. Biomass used in bio-energy production could also be used in other products, notably if "biomass" is wood of any kind. The net effect is thus not only the balance between energy systems, but also between e. g. HWP CO2-replacement in both biomass utilization paths. So, if wood that could be used in e. g. building materials is used in bio-energy instead and the construction is built from concrete instead of wood the net effect is negative - you have higher emissions than you would have had without bioenergy use.	Noted, Trade-offs are discussed in section 11.4 and in the Bioenergy Annex

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7190	11	21	10			Bioenergy. It is important to highlight the significance of considering the whole life-cycle of bioenergy production in the light of 'sustainability'. An example of a bioenergy that has been identified as low-carbon energy source, is that produced from palm oil. With advanced understanding it has turned out that when oil palms, are grown on peat they instead create a 'carbon debt' and increase overall global carbon emissions (e.g. Fargioneet al., 2008; Gibbs et al., 2008). There are some lines that touch on this topic (e.g. lines 29/30 page 22, lines 29-34 page 21), but this is not enough. Considering the total life cycle (production to end-of-life) includes: production, processing, transport, packaging, 'end-of-life'. Transport, processing and packaging is not mentioned in this chapter, shall this be discussed here (if food-demand is being discussed then its perhaps logical that also the other issues are being discussed)? Or elsewhere? Is this production-side or demand-side? Table 11.4 could be extended with mitigation measures in the total life-cycle of products from the AFOLU sector.	Noted, These issues will be discussed in the LCA/MCA annex
12076	11	21	10	21	21	In this section please note that the mitigation benefit of bioenergy will critically depend on the varying timing of emissions and sequestration associated with use of various biomass sources. There are different pathways of causation for use of biomass for energy and each different causation pathway/ biomass source leads to a different sequence and timing of biomass emissions and C sequetrationon the land. For example one causation pathway is a policy supporting planting energy crops including trees (for energy) and then using it for energy. Sequestration occurs before emissions. A policy that supports use of logging residue causes logging residue to be used for energy rather than decay in the forest. In this case emissions occur before avoided emissions (which occur over time - and depend on avoided decay rate). I would argue that it is critical to understand these causation pathways and timing to understand the emission offset over time. Each pathway entails a different risk of attaining offsets. Please find a place to discuss how risk of attaining offset benefits can vary notably among the alternate causation pathways/ use cases.	Noted, Timing issues will be discussed in the Bioenergy Annex
5499	11	21	11	21		Start this paragraph with the last two sentences- add a graphic to the paragraph to clarify what you are talking about showing the range of potential sources and sinks associated with biofuel production	Accepted, Text has been revised
15163	11	21	11	21	18	hard to follow	Accepted, Text has been revised
5052	11	21	11	21	11	the biofuel points seem to miss regrowth and carbon uptake, cargon replacement of long term sequestered carbon in replaced fossil fuels, emissions from inputs like N fertilizer to raise feedstocks. hauling related emissions. Indirect effects on livestock from higher prices of commodities	Rejected, This issue is discussed in the LCA Section Bioenergy Annex
10604	11	21	11			Production of biomass and use of bioenergy……..	Accepted, Text has been revised
2624	11	21	11	22	47	These paragraphs jump from agriculture and then to forests which suggests that agricultural impacts are the same as forest impacts. They are different and their impacts are different. This could be confusing for the reader and will probably make them attribute ag impacts as really being forests. Combining forests and agriculture doesn't work well since they have different contexes and different mitigation efforts. THis can be confusing for the reader. This chapter should mention rural communities who use forests for energy. Most of the discussion appears to be relevant for commercial or industrialized operations. There are many other models of forest uses and management.	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12072	11	21	18	21	21	In order to evaluate the net effect of shifting from fossil energy to bioenergy an evaluation is needed of the change in emissions associated with a set of processes within a system boundary over some time horizon. The comparison is between the operation of all the processes with the system boundary in one case versus all the processes in another case. It is not correct or at least misleading to suggest that the comparison is between two separate systems. Please consider an alternative such as - "The net effect of harnessing the climate change mitigation benefit of bioenergy use is determined by estimating the change in emissions and radiative forcing over a given time for biomass and fossil energy processes within a given system boundary." If you think you are replacing one system with another you can miss the need to include emissions for forest or ag land in the case where fossil fuels are used in the comparison of the with bioenergy case to the without bioenergy case.	Noted, This issue is discussed in the Bioenergy Annex
15162	11	21	2	21	4	delete sentence	Accepted, Text has been revised
5560	11	21	2	21	2	What is 'y'?	Accepted, Text has been revised
5055	11	21	20	21	20	int the statement about "between total climate forcing of the 19 bioenergy system" I would include and massociated market adjustments in iLUC and livestock herds	Accepted, Text has been revised
7667	11	21	22	21	24	This is a very misleading statement. Even if bioenergy systems replace coal they could cause higher CO2 emissions compared to coal use for centuries, see for example Searchinger et al. (2008) and Fargione et al. (2008) and Holtsmark, B. 2012 Harvesting in boreal forests and the biofuel carbon debt. Climatic Change 112: 415—428.	Accepted, Text has been revised
14728	11	21	23			" of reliable empirical data". Please explain to which data is this referred to.	Accepted, Text has been revised
5053	11	21	25	21	25	in the sentence "Alternative methods of quantification lead to variation in estimates of GHG 24 savings" neglects the substantial regional variation in yields plus big differences in hauling needs for low yielding items.	Accepted, Table with Regional Values has been added
5054	11	21	25	21	25	in the statement "However, GHG emissions from LUC of some bioenergy schemes" you are missing big references, searchenger et al and fairgone et al both in science 2007 plus a wide variety of estimates as summarized in recent nas report led by tyner	Accepted, Text has been revised
11981	11	21	29		31	LUC bioenergy schemes may be large. Maybe add "and entail negative biodiversity impacts if natural ecosystems are converted to cropland"	Accepted, This issue is discussed in the Bioenergy Annex
5500	11	21	35	46		Is there sufficient knowledge of albedo affects to put as much emphasis on it as you have here?	Noted, This issue is discussed in the Bioenergy Annex
15164	11	21	35	21	46	paragraph can be tightened. Betts reference not in ref. list. Kirchbaum et al 2011 also not in ref. list. What's temporal difference in albedo effect?	Accepted, Text has been revised
10605	11	21	35			Albedo effects are not just from biomass plantations - could delete from here. (Need to check throughout this section on the use of "bioenergy" often used where "biomass" is the proper term - eg "forest bioenergy" and page 22 line 1 "Bioenergy feedstock supply....."	Accepted, This issue is discussed in the Bioenergy Annex
16560	11	21	38	21	41	It should be clarified that this sentence refers to temperate and particularly boreal regions, not the tropics.	Noted, This issue is discussed in the Bioenergy Annex
11982	11	21	38		40	ditto. Again maybe need to add that when forests are convented to croplands - biodiversity is negatively affected although albedo maybe increase.	Noted, This issue is discussed in the Bioenergy Annex
6827	11	21	9			The bioenergy section needs some rationalisation and context eg compare total supply estimates with total energy demands, and relate supply potential with different bioenergy types to reflect conversion efficiency and hence derive GHG mitigation potential eg 1 tonne 'raw' biomass contains X GJ (avoided coal), or Y GJ if refined as liquid biofuel (avoided petrol or diesel). For example, EU seems to favour bioethanol over biodiesel for lower total emissions?	Rejected, These issues are covered in other Chapters of the Report
5561	11	21	9	21	46	Bioenergy. If annual growth is used to manufacture bioenergy then there will be no net-CO2 emissions, because if it is not used it will be returned to the atmosphere. If there is a land use change, using the biomass, rather than burning it in situ, makes environmental sense.	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5562	11	21	9	21	46	. Bioenergy. If annual growth is used to manufacture bioenergy then there will be no net-CO2 emissions, because if it is not used it will be returned to the atmosphere. If there is a land use change, using the biomass, rather than burning it in situ, makes environmental sense.	Noted, The section needs to be much shorter - how does it fit with other chapters and x-cut piece
5563	11	21	9	21	46	Paragraph from line 35. I had difficulty in following the logic.	Accepted, Text has been revised
12073	11	21	9	22	47	The climate mitigation benefits of current period use o f(e.g. change in radiative forcing) of using forest-based or ag-based biomass can differ widely over time yet there is no discussion in this section about this time dimension of mitigation benefits. To judge merit of actions we need to clarify the timing of benefits. I think such a discussion is needed here and in section 11.3.3 where mitigation effectiveness is discussed. Some examples - planting of trees that are later used for energy decreases raditive forcing prior to harvest and emission which would then increase radiative forcing. Use of logging residue for energy causes a change from a no use case where there is slow emission in the forest and slow build up of radiative forcing with a case where there is burning and immeadiate increase in radiative forcing. The benefit could be viewed is the difference in the two radiative forcing curves. Increase in use of roundwood for energy from an existing forest calls for estimate of the change in radiative forcing over time between a no use for energy case and a roundwood use for energy case. In this case the benefit of decreased radiative forcing may be many decades into the future. Cherbini et al. (2011) gives a simplified example of the timing in the change in radiative forcing for a case of roundwood use and forest regrowth. The main point is that time dimension of mitigation benefit (change in radiative forcing) matters. Where benefits are aquired over time the uncertainty of benefit can also be greater. [Cherubini, F., Peters, G., Berntsen, T., Stromman, A. and Hertwich, E. (2011). CO2 Emissions from Biomass Combustion for Bioenergy: Atmospheric Decay and Contribution to Global Warming. Global Change Biology Bioenergy, 413 - 426.]	Noted, This issue is discussed in the Bioenergy Annex
11164	11	21	9	22	47	Information regarding the life cycle assesment of bioenergy crops should be incorporated in this section	Accepted, This issue is discussed in the LCA Section Bioenergy Annex
3544	11	21				In the section on bioenergy, it will be very helpful to provide clear answers to the following questions: what is bioenergy? How bioenergy carries potential for climate change mitigation and give some examples of countries? What are the different options of bioenergy (i.e. sources of bioenergy)? What are the barriers for the adoption of bioenergy? For e.g. bioenergy should be implemented in a sustainable manner and should not compromise the food security which is a priority in developing countries.	Accepted, This issue is discussed in the Bioenergy Annex
5372	11	21	2	21	8	The Wise et al (2009) paper and its UTC scenario describes how "stabilized C can be monitized". Suggest referencing that paper here so readers understand that there has been some thinking about this issue and the benefits that would accrue under such a policy/scenario.	Accepted, Text has been revised
5373	11	21	29	21	31	The GHG emissions can be "more than a hundred times larger" than just burning fossil fuels. 100 times!! Wow that's a big number. Are these 100 times worse than fossil fuel bioenergy schemes realistic or are they implausibly bad ideas that would never be put into practice. If it is the later, then perhaps cite literature that surveys a more realistic set of bioenergy options. I have no doubt that some bioenergy options are potentially worse than burning natural gas in a highly efficient natural gas turbine to generate electricity but I am skeptical that most bioenergy options are 100 times worse than burning coal in an 50 year old power plant.	Noted, No action needed
8836	11	21				Maybe the report could devote a section or box on the accounting discussion of these exhaustpipe emissions (see EEA opinion http://bit.ly/onyPg7)	Noted, These issues will be discussed in the LCA/MCA annex
10245	11	21	9	27	11	This section is too long and can be shortenned	Accepted, Text has been revised
14432	11	22				This bioenergy text could be made more concise to reduce page length.	Accepted, Text has been revised
11983	11	22	1		1	"Primary and secondary residues". I couldn't find where these were defined. Maybe add a definition?	Accepted, A definition will be included in the Glossary

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10177	11	22	1	22	47	The discussion on the trade-off between mitigation within the agroforestry sector, in the form of production of bioenergy, and biodiversity could be expanded, with for example reference to where in the world this trade-off potentially has the largest effects and where it has less effects.	Rejected, We have very strict space limitation
14729	11	22	17			“conversion”. Is it referred to feed conversion?	Accepted, Text has been revised
5565	11	22	17	22	17	(--- biofuel production base on lignocellulosic resources), ADD especially through dry distillation.	Accepted, Text has been revised
5057	11	22	18	22	18	offsets also depend on energy product replaced with higher offsets when it is elecricity (McCarl, B.A., "Bioenergy in a greenhouse mitigating world", Choices, 23(1), 31-33, 2008.)	Accepted, Text has been revised
11984	11	22	19		19	"other products" maybe add e.g. food	Accepted, Text has been revised
5564	11	22	2	22	8	The main biomass resources are: a) using more fully the annual growth of wood, crops and dung; b) primary and secondary residues etc.; c) biomass from cropping systems etc.	Noted, A Table explains each potential source of biomass
15349	11	22	20	22	23	Harley, M. and Hodgson, N. (2008) Review of existing international and national guidance on adaptation to climate change: with a focus on biodiversity issues. AEA report to Bern Convention Group of Experts on Biodiversity and Climate Change, Council of Europe. http://www.coe.int/t/dg4/cultureheritage/nature/bern/ClimateChange/default_en.asp	Accepted, Text has been revised
15350	11	22	20	22	23	Smithers, R.J.; Cowan C.; Harley, M.; Hopkins, J.J.; Pontier, H. and Watts, O. (2008) England Biodiversity Strategy: Climate Change Adaptation Principles. Conserving biodiversity in a changing climate. Defra, London. 16pp. www.defra.gov.uk/publications/files/pb13168-ebs-ccap-081203.pdf	Accepted, Text has been revised
15167	11	22	24	22	24	what's the point of this statement?	Accepted, Text has been revised
5708	11	22	24	22	47	As regards production of biofuels, trade-offs between production of biofuels like Jatropha, and food production in developing countries like India and other South Asian countries are considered to be very serious, which are further compounded by lack of information on impact of biofuel (Jatropha) cropping on soil quality. Text to this effect needs to be incorporated appropriately in this context.	Accepted, Trade-offs are discussed in section 11.4 and in the Bioenergy Annex
2569	11	22	24	22	30	Refer to SRREN Ch 9 explicitly	Accepted, Text has been revised
10606	11	22	24			Biofuels implies liquid fuels for transport - not what is meant here I think.	Rejected, Biofuels are liquid, solid and gaseous
14433	11	22	24	22	30	Adding specific outcomes regarding GHG uncertainty in a biofuel LCA would provide more information to the reader.	Accepted, This issue is discussed in the Bioenergy Annex
16561	11	22	27	22	28	The modifier "Where unregulated…" is too vague to be helpful. Suggest deletion of this sentence.	Accepted, Text has been revised
3848	11	22	29	22	29	The statement that full fuel-cycle GHG emission is uncertain conflicts with results from AR4. There it is claimed that as more precise evaluations are being made, the literature shows that iLUC is lower than previously assumed. Thus, a more complete discussion deserves to be included in the text.	Noted, This issue is discussed in the Bioenergy Annex
5566	11	22	29	22	30	This will not occur if significant use is made of annual growth of existing and new tree planting efforts.	Accepted, This issue is discussed in the Bioenergy Annex
15964	11	22	3	22	3	MSW - acronym not explained	Accepted, A definition will be included in the Glossary
5814	11	22	3			What does "MSW" stand for?	Accepted, A definition will be included in the Glossary
14431	11	22	3			MSW not previously described in the text.	Accepted, A definition will be included in the Glossary
3849	11	22	36	22	37	"Including GHG emission or CO2 sequestration associated with LUC". Please, check this sentence since direct CO2 sequestration associated with LUC will be extremely difficult due the large areas involved, the loe gas flux per area, and economic barrier.	Rejected, This is routinely done with LCA
2131	11	22	37	22	39	add the reference Muller, A. (2009). Sustainable Agriculture and the Production of Biomass for Energy Use, Climatic Change 94(3-4): 319-331 to the reference list as it adds a further, often neglected trade-off, namely between biomass use for energy production and biomass use as a fertilizer.	Accepted, Text has been revised
5058	11	22	42	22	42	tradeoffs with adaptaion are also a big factor	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5567	11	22	43	22	47	All the figures cited are less than the current annual growth of wood and much less if agricultural crop and animal residues are included.	Accepted, Text has been revised
12406	11	22	44	22	44	It would be interesting to know how much 100-300 EJ/yr bioenergy in 2050 is of the total demand for energy in 2050.	Accepted, Text has been revised
16219	11	22	44			put in context of global demand for EJ/yr. all these numbers mean what in the context of global demand? Give reader context	Rejected, Other chapters deal with total energy demand
5056	11	22	6	22	6	somewhere in the sentence "Biomass from cropping systems (annual and perennials) established on lands ranging from prime" I would have stuck the words "dedicated energy crops"	Accepted, Text has been revised
15165	11	22	8	22	8	Put (Table 11.3) at end of preceding sentence and delete "describes these resources". Suggest that this the way figures and tables are dealt with throughout (rather than writing sentences about what table and figures are showing)	Accepted, Text has been revised
15166	11	22	9	22	23	tighten paragraph	Accepted, Text has been revised
15609	11	22	12	22	12	Consider citing Stehfest et al (2009) after "…in diets…" Stehfest E., L. Bouwman, D.P. van Vuuren, M.G.J. den Elzen, B. Eickhout, and P. Kabat (2009). Climate benefits of changing diet. Climatic Change 95, 83-102.	Accepted, Text has been revised
5374	11	22	9	22	23	This is a very long paragraph that doesnt say anything concrete.	Accepted, Text has been revised
13324	11	23	1	23	16	Requires a discussion of undertainty around the impact of the removal of residue on soil carbon. Lack of extensive long-term studies.	Accepted, Text has been revised
5815	11	23	13	23	16	This is not completely true. If the wood is used for bioenergy the emission of the C stored in the wood is "immediately" and if the wood is left for decomposition the emissions are "gradually". However, you have to add the emissions of the fuels used (instead of the wood now left for decomposition) to generate energy to the balance.	Accepted, Text has been revised
5060	11	23	16	23	16	these are some implication fro increased fertilizer use plus there may be substantial storage losses (some of this is treated in Flugge, M., T. Buchholz, C. Canham, G. Marland, B.A. McCarl, S.M. Ogle, S. Prisley, and N. Sampson, "Accounting framework for GHG emissions from bioenergy and other biogenic sources", Draft report for EPA, 2011.	Accepted, Text has been revised
2132	11	23	16	23	16	add the following sentence: "A particular trade-off may arise however from the potential to use the biomass as organic fertilizers in certain sustainable agricultural production systems that rely on nutrient recycling, such as organic agriculture. Widespread adoption of biomass residues use for energy production is likely incompatible with widespread adoption of organic and related production practices, where compost and mulching play an important role (Muller, A. (2009). Sustainable Agriculture and the Production of Biomass for Energy Use, Climatic Change 94(3-4): 319-331). This is of particular relevance as application of these organic fertilizers tends to increase soil carbon levels (Cross Ref within the chapter). "	Accepted, We have improved the discussion on potential trade-offs
5568	11	23	17	23	21	This gives estimates of potential in 2050 for biomass as follows: agricultural residues, 15-70 EJ/yr (800 – 3745 Mt wood equivalent [we]); dung, 5-50 EJ/yr (270-2675 Mt we); forest residues, 0-110 EJ/yr (0-5890 Mt we). This gives a total of 20- 230 EJ/yr (1070 – 12300 Mt we). This is much less than the accessible annual growth of wood, estimated to be 980 EJ/yr (18350 Mt we). NOTE sometimes per year is given as yr-1 other times as/yr.	Accepted, The statement is correct
5061	11	23	19	23	19	dung also involves methane	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12077	11	23	22	23	30	By identifying forest biomass for energy from forest growth that is in excess of current use for paper and sawnwood it seems there is an unspecified assertion that policy should not consider cases where some current use of wood for paper and sawnwood could be diverted to use for energy. I think I would tend to agree with this point but I think you should make an explicit arguement that the reason for avoiding displacing current uses is that they will provide more mitigation benefit than use of wood for energy. It does not make sense (in this mitigation report) that you could argue that use of wood for energy should not displace use for paper and sawnwood simply because those markets have some priority. I think as a scientific issue I think there can be cases where uses of wood for paper could be worse than use for energy if the paper goes to lanfills and emits a notatble amount to methane.	Accepted, Text has been revised
7668	11	23	23	23	42	This text should take into account the findings in Holtsmark, B. 2012 Harvesting in boreal forests and the biofuel carbon debt. Climatic Change 112: 415—428. No other study to date has considered the long term consequenses of a permanent increase in harvesting forests. With regard to Cherubinie et al. (2011). The following forthcoming paper will here be very relevant and present another view: Holtsmark, B. 2012: The outcome is in the assumptions: analyzing the effects on atmospheric CO2 levels of increased use of bioenergy from forest biomass. GCB Bioenergy (in press)	Accepted, Text has been revised
2625	11	23	23		30	Natural forests and plantations are not discussed as separate forest types. Much of the industrial forestry is occurring on plantations even though natural forest management is occurring in some tropical areas. The discussion appears to be focusing on conservation of natural forests even though much of forestry is plantations globally.	Rejected, There is no space to discuss separate forest types. Plantations are included in the discussion, and we have improved the text.
5569	11	23	27	23	27	The sentence should read --- present global roundwood production (not industrial roundwood production). Fuelwood, charcoal and building poles account for over half of current use. These are not considered to be industrial production.	Accepted, Text has been revised
12407	11	23	29	23	29	Related to bioenergi from forest biomass and timing of C flows, is it possible to say more about the optimal timing and how long the pay-back time could be without affecting the long-term stabilization of the temperature?	Rejected, There is no space for detailed discussion
3851	11	23	29	23	29	Timing of C flows is really significant for temperate climate countries. Tree growth in tropical countries occurs in 10 to 20 years.	Accepted, Text has been revised
16562	11	23	3	23	4	Doesn't the energy cost of transportation represent a major constraint at least for dung and straw?	Accepted, Text has been revised
5502	11	23	30			Are there estimates of the % of forest land that is currently managed for biomass production and harvest?	Accepted, FAO Statistics provide these figures
8929	11	23	30			it should be made clear that a larger forest output cuts disproportionately the potential for C sequestration	Accepted, Text has been revised
12078	11	23	31	23	42	I think this paragraph should help the reader understand what kind of analysis framework is needed to assess the prospective mitigation benefit of forest biomass use. In my view it is critical to 1) carefully define the system boundaries that define what processes are inside the system (e.g. forest carbon change, energy emissions, fossil emissions, indirect land use change from market forces, change in wood products production/consumption) 2) define the time horizon for the evaluation e.g. 20 yrs, 100 yrs, more years?, 3) specify the metrics that will be used to estimate mitigation benefit, eg, radiative forcing (GWP), global temperature potential (GTP), other. 4) Specify the CHANGE in the system that is being evaluated - this will identify the fluxes before any changes (over time) and the fluxes of the system AFTER changes. This report could do a service to clarify what is needed to clearly evaluate the impact of forest biomass mitigation actions/system changes. We need to recognize that some minimal consistency is needed in defining analysis frameworks in order to compare evaluations and understand how alternate frameworks can influence findings.	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2626	11	23	36		42	These are industrial forests since non-industrial forest owners cannot afford fertilizers.	Accepted, Text has been revised
15168	11	23	40	23	42	is this statement necessary?	Accepted, Text has been revised
8930	11	23	40			from a climate protection perspective the intensification of forest productivity will then be rational when the C stored in harvested wood is sequestrated for a longer period such as lumber or furniture.	Accepted, Text has been revised
14774	11	23	41			There is currently an systematic review of literature to compare different methods for quantifying carbon/biomass in forest and other terrestrial system components. -> Environmental Evidence 2012, 1:6 doi:10.1186/2047-2382-1-6 , http://www.environmentalevidencejournal.org/content/1/1/6/abstract	Accepted, Text has been revised
11985	11	23	43		48	biodiversity considerations are important here - especially with the conversion of old growth forsets to planted production forests. Suggest add at end "In addition, conversion of old-growth forests to plantations generally entails negative impact biodiversity.	Rejected, Biodiversity issues will be discussed in Bioenergy Annex
15169	11	23	43	23	48	really? A bit controversial, but totally uncited…	Accepted, Text has been revised
7063	11	23	43	23	48	There is large body of literature documenting the carbon benefits of active forest management but these benefits are barely mentioned in this material. The value of active forest management in providing output while maintaining forest stocks needs much more attention herein. As a starting point, the Fourth Assessment Report should get far more credit. Importantly, it contained the following finding. "Each mitigation activity has a characteristic time sequence of actions, carbon benefits and costs. Relative to a baseline, the largest short-term gains are always achieved through mitigation activities aimed at emission avoidance (e.g. reduced deforestation or degradation, forest protection, and slash burning). But once an emission has been avoided, carbon stocks on that forest will merely be maintained or increased slightly. .... In the long term, sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual yield of timber, fibre, or energy from the forest, will generate the largest sustained mitigation benefit." (continued below)	Accepted, In the section regarding mitigation options, we have mentioned benefits from active forest management
7064	11	23	43	23	48	(continued from above) The only thing that has changed significantly since the Fourth Assessment Report was written (including the conclusion dealing with the long-term benefits of a sustainable forest management strategy), is the growth in literature examining the emissions profile over time of various forest management and forest product scenarios (i.e. the "carbon debt" literature). This new work has been very valuable in clarifying the factors that determine how "long-term" the period is before the benefits of a "sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual yield of timber, fibre, or energy from the forest" become apparent. This work has not, however, provided a basis for retreating from the conclusion in the Fourth Assessment Report. By giving so little attention to the benefits of a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual yield of timber, fibre, or energy from the forest, the draft Fifth Assessment Report risks giving the impression that these long-term benefits were discovered to be false. Nothing could be further from the truth. (continued below)	Accepted, In the section regarding mitigation options, we have mentioned benefits from active forest management
7065	11	23	43	23	48	(continued from above) Some newer references pointing to the value of working forests managed under sustainable forest management are shown below. - "Fox, T. E. et. al. (2004). The Evolution of Pine Plantation Silviculture in the Southern United States. In H. M. Rauscher, & K. e. Johnsen, Southern forest science: past, present, and future: Gen. Tech. Rep. SRS-75 (p. 394). U.S. Department of Agriculture, Forest Service, Southern Research Station." - This reference shows the dramatic improvements in standing stock and productivity that have been made possible through investments in sustainable forest management. (continue below)	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7066	11	23	43	23	48	(continued from above)- More reverences on the value of active forest management. - Ince, P. (2010), Global Sustainable Timber Supply and Demand, Chapter 2 in Sustainable development in the forest products industry, Chapter 2. Porto, Portugal : Universidade Fernando Pessoa, 2010: p. 29-41. This reference examines the distribution of deforestation around the world and finds that "...In general, the data show that the global regions with the highest levels of industrial timber harvest and forest product output are also regions with the lowers rates of deforestation. Thus, a ... appropriate economic hypothesis is that global loss of forest cover and carbon emissions from deforestation are driven primarily by systematic conversion of economically marginal forest land to other land uses.... [This] hypothesis suggests that forest products and industrial roundwood demand provide revenue and policy incentives to support sustainable forest management, and in turn industrial timber revenues and economical forest management have helped avoid large-scale systematic deforestation in those regions with the highest levels of industrial timber harvest." (continue below)	Accepted, Text has been revised
7067	11	23	43	23	48	(continued from above) More references documenting the benefits of active forest management include: -Gillespie, A; Gustavsson, L; Eriksson, E; Langvall, O; Olsson, M; Sathre, R; Stendahl, J; " Integrated carbon analysis of forest management practices and wood substitution"; Canadian Journal of Forest Research, Volume 37, Number 3, March 2007 , pp. 671-681(11) -Albaugh, T.; E. Vance; C. Gaudreault;, T. Fox; H. Allen; J. Stape and R. Rubilar; "Carbon Emsisions and Sequestration from Fertilization of Pine in the Southeastern United States", Forest Science, 2012 published by the Society of American Foresters, published online February 23, 2012 - Carle, J., & Holmgren, P. (2008). Wood from planted forests: A global outlook 2005-2030. Forest Products Journal Vol 58 , 6-18. - R. Sathre and L. Gustavsson in "Time-dependent climate benefits of using forest residues to substitute fossil fuels". in Biomass and Bioenergy 35 (2011), where the authors note that in addition to considering the type of fossil fuel being replaced, "biomass productivity is also important, with more productive forests giving greater cumulative radiative forcing reduction per hectare." (continued below)	Accepted, Text will be revised
7068	11	23	43	23	48	(continued from above) Yet more references documenting the benefits of active forest management include: - Perez-Garcia, J., B. Lippke, J. Comnick, and C. Manriquez, " An assessment of carbon pools, storage, and wood products market substitution lusing life-cycle analysis results", Wood and Fiber Science, 37 Corrim Special Issue, 2005, pp. 140 – 148 -Oneil, E. and B. Lippke; "Integrating products, emissions offsets, and wildfire into carbon assessments of inland northwest forests", in Biomass and Bioenergy 35 (2011)).Wood and Fiber Science, 42,2010, pp.144–164 - Hennigar, C., D. MacLean, L. Amos-Binks, "A novel approach to optimize management strategies for carbon stored in both forests and products", in Forest Ecology and Management, Volume 256, Issue 4, August 2008 (continue below)	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7069	11	23	43	23	48	(continued from above) Studies that fail to identify benefits related to active forest management often ignore substitution effects (as in J. Nunery and W. Keeton, "Forest carbon storage in the northeastern United States: net effects of harvesting frequency, post-harvest retention and wood products", Forest Ecology and Management, 2010) or consider only a limited time scale (for a discussion of the importance of time see R. Sathre and L. Gustavsson in "Time-dependent climate benefits of using forest residues to substitute fossil fuels".) In other cases, extreme circumstances are examined which are not representative of managed forests as as a whole. (continue below)	Accepted, Text has been revised
7070	11	23	43	23	48	(continued from above) In cases where studies fail to find benefits from active forest management it is often because they fail to include some of the GHG benefits of the forest product value chain. The benefits of "cascading" in the forest products value chain, for instance, are often ignored - as in Seidl, R. et. al. "Assessing trade-offs between carbon sequestration and timber production within a framework of mult-purpose forestry in Austria" in Forest Ecology and Management 248 (2007)), where the work excludes secondary GHG benefits associated with the use of forest products in a cascading fashion where the fossil fuel displacement benefits are first indirect (e.g. via displacing more fossil fuel intensive construction materials) and then direct (via use of wood debris as biomass fuel to directly displace fossil fuel). The benefits of cascading in the forest product value chain are is examined in more detail in Dornburg, V. and A. Faaij, "COst and CO2-emissions reduction of biomass cascading: methodological aspects and case study of SRF poplar", in Climatic Change (2005) ,71: 373–408.	Accepted, Text has been revised
5816	11	23	43	23	48	This statement is correct, but changing the forest type can be a viable option IF the wood cut is put to good use, i.e. in products with high replacement effects. According to Sathre & O'Connor the mean replacement effect of wood used in products is 2.1, so if 50% of the wood cut in the forest enter the product chain in any way the emissions are balanced and C stock changes on the landscape level are cancelled. (Sathre, R. and J. O'Connor (2010). "Meta-analysis of greenhouse gas displacement factors of wood product substitution." Environmental Science & Policy 13(2): 104-114.)	Accepted, Text has been revised
3852	11	23	45	23	45	Timing of C flows is really significant for temperate climate countries. Tree growth in tropical countries occurs in 10 to 20 years.	Accepted, Text has been revised
5570	11	23	45	23	48	With improved management, will have production from thinnings. Also, short-rotation tree growth, especially outside the forest, may compensate for conversion of old-growth forests.	Accepted, Text has been revised
5059	11	23	5	23	5	there are methane implications and lost sequestration form diversion of wood wastes	Accepted, Text has been revised
3850	11	23	7	23	7	Replace "but methane emission from wood chip storage" by "but methane emission from long-term wood chip storage". Rationale - CDM methodologies discussing this issue consider that storage for less than one year implies on negligible emission.	Accepted, Text has been revised
9484	11	23	7	23	8	What is the case "methane emissions from wood chip storage is important"? Do you mean wooden waste in landfill?	Accepted, Text has been revised
9485	11	23	8	23	8	The quote Wiersaari (2005) and Cherubini and Ulgiati (2010) are missing in the reference list.	Accepted, References have been cross-checked
5501	11	23	9	23		Distance and conversion technology are also really important factors here. Location of residues in relation to converision sites, energy use sites can have a large impact on both the economic viability of conversion as well as emissions balances	Accepted, Text has been revised
14675	11	23	16	23	16	When soils become depleted of organic matter they are less able to buffer against variations in water and nutrient levels and yield less on average, so that the ability of the crops to take up carbon dioxide is diminshed. Climate change conditions can be expected to result in more frequent and more extreme droughts so that having soils high in organic matter becomes more and more important.	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
4390	11	23	17	23	21	translating EJ in CO2 eq emission would help interpret bioenery potential, this comment applies to other parts of the text where EJ unit is used	Rejected, Translation to CO2 emissions is done in other chapters. Here, we don´t know which is the system replaced by the bioenergy option
15965	11	24				table is not clear, the different numbers in the same cell are not explained, it seems this table can be simplified considerably	Accepted, Table has been changed
9330	11	24				The table is not easily understable. There are many values under different columns. Are these the values reported by different authors or for different sub-regions by the same authors? How are the global and total figures on page computed?	Accepted, Table has been changed
5709	11	24				Can we define EJ (Exajoule) on this page, possibly in a footnote? Can some equivalence like 1EJ= energy produced by burning of …..million tonnes of dry biomass, or= energy produced by burning of ……million tonnes of oil, be also mentioned in the footnote? It will make the comprehension of the subject easier.	Accepted, EJ are defined in the Metrics Annex
5572	11	24				This table makes little sense at present. For example the waste sub-totals add to 7 EJ, yet for global the total is give as 1-3 & 11 EJ. The dung subtotals add to 22 EJ, but the total figures are given as 9-25 & 39 EJ. The unutilized forest growth adds to 2.9 EJ, (155 Mt we), but the global figures are 64 to 74 EJ (3.42 to 3.96 Gt we). The former figure is much too low and at present the estimated annual growth minus present use is 14.82 Gt. I do not understand the other columns.	Accepted, Table has been changed
10265	11	24		26		Please compare the figures also with this working paper: Anttila, P., Karjalainen, T. and Asikainen, A. Global Potential of Modern Fuelwood. 2009. Working Papers of the Finnish Forest Research Institute 118 http://www.metla.fi/julkaisut/workingpapers/2009/mwp118.htm ISBN 978-951-40-2160-2 (PDF) ISSN 1795-150X	Accepted, Text has been revised
10607	11	24				Define "Waste". Is it MSW for example? "Plantations" better as "Energy crops" perhaps. Whole tbale is confusing with lists of numbers in each box. If from different references, then need to assess and then use ranges. Why is there no regional data for Marginal/degraded lands- only a global total? Maybe not found in literature - if so needs a footnote to clarify.	Accepted, Table has been changed
11121	11	24		26		References will be needed for each number.	Accepted, Table has been changed
14434	11	24		26		This table needs better formatting and clarification. I do not understand the significance of the multiple ranges noted for each region in many columns.	Accepted, Table has been changed
14435	11	24		26		Reformatting table could reduce chapter length.	Accepted, Table has been changed
2627	11	24				Unutilized forest growth does not exist. You have to be able to define what this is since most forests are used by someone. Should these be targeted for conversion to a higher energy source if forest dependent communities use them?	Accepted, Table has been changed
5571	11	24	11	24	13	For an annual production of 1000 EJ/yr from biomass crops (53.5 Gt we) would require a planting area of between 3.6 and 5.4 million ha, assuming an annual yield of 10 to 15 dry t of biomass with an annual precipitation of 1500mm to 2000mm. This is about 1% of the forest area and 3% of the arable area, so it is possible. For 300 EJ/yr (16.0 Gt we), the required plantation area will be between 1.1 and 1.6 million ha.	Noted, There are many trade offs that need to be examined in addition to the energy potential
3853	11	24	14	24	23	The concept that large extension of land area is required for some biomass-based fuels to make real impact on global GHG mitigation has to be changed if new demand side technologies become available. An example is the extension of soils needed to power a hybrid plug-in fleet of cars, See Pacca and Moreira, 2011. - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	Accepted, Text has been revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15171	11	24	17	24	23	delete	Accepted, Table has been changed
12408	11	24	24			This table seems hard to understand and needs editing and more explanation	Accepted, Table has been changed
9081	11	24	24			More than one data are shown in one column. What does it mean? Each data was refered from different source?	Accepted, Table has been changed
15170	11	24	5	24	6	nutrient limitation is also a factor here…	Accepted, Table has been changed
11812	11	24	9	24	13	It would be interesting to include here the reason for this diference (e.g. different assumptions about land availability)	Accepted, Table has been changed
5375	11	24	14	24	16	If the Ramankutty et al, 2002 reference is supposed to support the assertion that we don't have good data on the slopes of lands then I think the authors should look up some more recent literature. Most GIS systems have digital elevation models that have useful resolution and certainly better than what was the case in 2002. I'm not sure if we are going to have perfect knowledge about this for the globe but I dont see this as a major issue given today's tools and datasets.	Accepted, Text has been revised
10623	11	25				Please consider the paper Ovando and Caparrós (2009). This paper reviews different studies which estimate economic and physical potentials for bioenergy and forestry options in Europe. Reference: Ovando, P. and Caparrós, A., 2009. Land Use and Carbon Mitigation in Europe: A Survey of the Potentials of Different Alternatives. Energy Policy 37(3): 992-1003.	Accepted, Text has been revised
16564	11	26	10	26	12	This is an important point but only makes the distinction between animal and plant products. There are also very large differences among the different animal products, with beef having much larger land requirements, and lowe efficiency in terms of either calories or protein, than chicken or pork (see, e.g. the Wirsenius et al. 2010 paper cited here). These between-animal-differences should be mentioned also; in terms of potential changes in trends, they are considerable more acceptable to a broad public than vegetarianism, and thus an important policy option.	Rejected, Changes in diet are discussed in Section 11.4
15235	11	26	12	27	2	It should mention that other analysis suggest available abandoned / degraded land does not amount to a very significant potential for bioenergy production and could impact food security and biodiversity conservation. Eg. Field, C. B., Campbell, J. E. & Lobell, D. B. 2008. Biomass energy: the scale of the potential resource. Trends in Ecology & Evolution, 23: 65-72.	Accepted, Text has been revised
5573	11	26	14	26	16	I would argue that the trade off may be much less serious if existing annual biomass growth is more fully used and if marginal land and land invaded by 'weed' species is converted to plantations. This latter should lead to a positive GHG capture.	Accepted, Text has been revised
10108	11	26	7	27	16	One importatn option are integrated food endrgysystems which optimise the use of resrources to produce both food and energy needed in househjolds and farm operations (FAO 2010 Making Integrated Food-Enery systems work for people and climate. Working paper 45.)	Accepted, Text has been revised
3854	11	26	8	26	8	When considering "efficiency in the use of biomass" consider results quoted in Pacca and Moreira, 2011 - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	Accepted, Text has been revised
5376	11	26	2	26	5	I read the footnote for this table as saying that there will always and everwhere be decreased econmies of scale for biomass production and therefore increased biomass production will lead to higher costs. I am not sure that is strictly true. Luckow et al 2010, Hamelink et al, 2005 and others have shown that there are potentially scales of economy that can arise from dedicated biomass production.	Accepted, Table has been changed
3855	11	27	14	27	15	Complete your information since there are plenty of literature explaining that hungry is mainly driven by difficulties in carrying out food distribution and poverty. Food supply is above consumption. This should be stated here and not further down in the text.	Accepted, Revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12843	11	27	15			Please add here another argument. Globally the human diet is based on 33% animal-based protein and 67% plant-based protein. In Europe this is just opposite; 67% animal-based protein and 33% plant-based protein (Data from FAOSTAT). As animal-based protein has a higher environmental impact than plant-based protein, a shift in developed countries is desirable.	Partially Accepted, Revised
15173	11	27	16	27	18	delete	Accepted, Deleted
10246	11	27	19	27	30	A third option (or can be included under (2)) are dietary shifts towards more local, more seasonal and less processed food. See for instance Weber C.L.W & Matthews H.S. 2008. Food-miles and the relative climate impacts of food choices in the United States. Envion. Sci. Technol. 42, 3508-3513.	Partially Accepted, The quoted article argues that shifting diets is more important than food miles because for most food production accounts for a much larger fraction of GHG emissions than transport. Nevertheless, less transport can reduce GHG as well. Text of second bullet has been revised; food miles vs. production is discussed further down.
12409	11	27	19	27	27	The demand-side is extremely important when assessing possibilities for reducing GHG emissions. Hence, it is very satisfactory that this aspect now is included in the report. Both the focus on reducing losses and changes in diets are highly relevant, since the goal is to still be able to supply a growing population with healthy food.	Noted, Thank you
6828	11	27	19		25	There could be a case for adding another here: local and seasonal food. Demonstrate why complete impact is not just an issue of distance (food miles).	Partially Accepted, See comment line 754
7614	11	27	21			"FSC" is the name of internatinal forest certification organaization that very famous in forest and consevation sector. "food in the supply chain" will be just use without abbreviating as coufuse with "certified sustainble wood" in Table 11.4	Accepted, Abbreviation removed
9082	11	27	21	27	22	In general, FSC stand for "Forest Stewardship Council" in forest sector.	Accepted, Abbreviation removed
11165	11	27	21			Food in the supply chain should not be abbreviated into "FSC" because this may be confused with "Forest Stewardship Council" .	Accepted, Abbreviation removed
9449	11	27	23		25	Changed diet is not a mitigation option, but rather a potential outcome of mitigation options. More discussion of interventions to change diet would be helpful here.	Rejected, Changed diet is a mitigation option. The interventions suggested are policies, not mitigation options
11295	11	27	23	27	24	It would be better if animal products were not so unilaterally dismissed and plant products not necessarily assumed to be less resource-intensive. Instead a brief discussion of the nuances would be in order (e.g. livestock v fish, or local fowl v air-freighted soya beans cultivated on recently deforested land). Species, locality and seasonality all matter a great deal when it comes to resource intensity. Insects in particular convert the calories they consume into consumable protein and fatty acids at very high efficiencies, largely because they are cold-blooded (see Durst, Patrick and Kenichi Shono 2010: 'Edible forest insects: exploring new horizons and traditional practices.' In P Durst, D Johnson, R Leslie and K Shono, eds, 'Edible forest insects: humans bite back. Bangkok: FAO Regional Office for Asia and the Pacific: 1-4). Moreover, the emissions that result from farm-to-table distances may outweigh food type; consuming seasonal food is therefore just as important a part of demand-side mitigation of emissions from AFOLU.	Accepted, Text has been revised and additional references included.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13528	11	27	25	27	25+	(3) Quality changes in nutrition and suitability (meaning: viable and healthy) of different kinds of diets, choosing between all different options (traditional, predominant, new and adaptable) the less resource intensive, to solutions involving both food supply chain (FSC) and food consumption chain (FCC).	Rejected, Statement - not a comment; not clear what changes should be made. Text describing losses and diet changes is rather nuanced, given the length restrictions.
15174	11	27	27	27	27	delete "Demand side options are summarised in" and append (Table 11.4) to previous sentence.	Accepted, Done, thanks
15175	11	27	28	27	34	wordy	Accepted, Revised
9083	11	27	28	27	46	In this idea, local food supply and comsumpition would be important. Eating and depending on imported foods from outside region or country cariies more carbon (or ecological) footprint.	Noted, Statement - not a comment. Moreover, this is not generally valid because production emissions are usually much higher than those related to transport. This is now discussed in the text.
7071	11	27	3	27	3	Add "forestry research" to sentence, i.e. in addition to "agricultural research".	Accepted, Revised for SOD
15176	11	27	35	27	40	tighten paragraph	Accepted, Revised
14730	11	27	35			: “avoidable’ or ‘potentially avoidable’ …” This need further explanations as the definitions are not clear enough in all parts of the world.	Accepted, Revised
10608	11	27	41	27	46	Also losses from use-by-dates in supermarkets, seasonal surpluses, etc. Point is that losses mean a waste of land use, water and energy. FAO, 2011 (referenced above) showed 32% of end-use energy and 22% of total GHG emissions are related to the food supply chain	Accepted, Revised; however, space limitations do not allow to discuss specific mechanisms behind losses and GHG reduction in much detail.
15177	11	27	45	27	46	delete sentence	Accepted, Done, thanks
13529	11	27	46	27	46+	Indeed, the challenge to reduce food wastes is not just a matter of data gaps, but also focus to include the views of key players, the householders.	Accepted, Revised, sentence deleted.
5749	11	27	6	27	9	please add "...services, such as integrated food-energy systems,.." (reference: http://www.fao.org/docrep/013/i2044e/i2044e.pdf)	Accepted, Revised for SOD
15966	11	27	7	22	11	Sentence does not seem correct	Accepted, Revised for SOD
13966	11	27				this section is an essential addition to the analysis. Some additional references include E.A. Davidson. 2012. Representative concentration pathways and mitigation scenarios for nitrous oxide. Environmental research letters doi: 10.1088/1748-9326/7/2/024005 and t. Garnett. 2011. Where are the best opportunities for reducing greenhouse gas emiaaions in the food system? Food Policy 36: S23-S32	Accepted, Revised
15002	11	27	12			This section should also discuss demand-side efforts to reduce consumption of wood and wood products harvested through unsustainable logging of primary forests. Third-party certification mechanisms such as the Forest Stewardship Council certification can help to drive demand toward more sustainable - and lower carbon - sources of wood and wood products. Laws, such as the U.S. Lacey Act, can be used to block imports of wood harvested illegally from protected areas, including those with primary forests.	Accepted, It does - see section beginning on page 30, line 4. There are several comments regarding use of certificated wood. Certification is to some extent discussed in the policy section (11.10); details on certification are discussed more extensively there.
4396	11	27	12	30	32	contribution of sea derived food products is not covered	Accepted, Revised, see description of Stehfest study.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7615	11	28				It is important to do't use wood by illegal logging before to use certificated wood. It is better to add such description.	Accepted, Revised, cross-reference to policy section (11.10) added, see above line 775
7072	11	28				Regarding the row "Substitution of wood for carbon intensive products"; an important reference is missing. In 2010, FP Innovations reviewed 66 studies that speak to the substitution effect. It is a key reference in this area. See Sathre, R., & O'Connor, J. (2010). A synthesis of research on wood products and greenhouse gas impacts - 2nd Edition. Vancouver BC: FPInnovations.	Accepted, This is no peer-reviewed publication. While it provides a useful overview, it does not change the conclusions we have reached in the text, so it does not seem justified to include the reference. A paper by the same authors has been added (see comment line 780).
5574	11	28				'Change consumption of wood products'. Mitigation option. Buying wood products from 'certified sustainable wood'. It can be argued that most wood products are sustainable, even though they may not be certified as such. This is because the rate of wood growth is an estimated 5 times more than wood demand! Also, according to FAO statistics only about 8% of industrial wood and zero percent of fuelwood is exported. Therefore, in practice, certification is only dealing with a small fraction of wood products. The other two mitigation options cannot be overemphasized.	Accepted, Revised, cross-reference to policy section (11.10) added, see above line 775
5817	11	28				Substitution: Please have a look at Sathre, R. and J. O'Connor (2010). "Meta-analysis of greenhouse gas displacement factors of wood product substitution." Environmental Science & Policy 13(2): 104-114 and Sathre, R. and J. O'Connor (2010). A Synthesis of Research on Wood Products & Greenhouse Gas Impacts. Vancouver, B.C., FPInnovations. TR - 19R: 123 and the literature cited therein, respectively. "Increased C stocks": Why don't you explicitly recommend to use MORE wood provided that it comes from sustainable sources? □	Accepted, Revised, the paper is now cited (see comment line 778). Table 11.4 includes a recommendation to substitute wood for other products under defined circumstances.
10609	11	28				Missing are energy efficiency opportunities on farms, forests, fisheries and throughout the food supply chain, - covered in FAO, 2011.	Accepted, Revised, energy savings from reduced losses in the food supply chain are now explicitly mentioned.
11122	11	28				Here, too, it would be nice to have at least indicative values of the relative potentials of the options. Also, a table heading is needed.	Partially Accepted, Table heading revised. Potentials are given elsewhere in the chapter.
11123	11	28				Last row: "coordinated understanding" - what does this mean?	Accepted, Revised
11166	11	28				Title of the table "consumption-side"? "demand-side"?	Accepted, Revised
11296	11	28	1	28	4	Storage technologies may be helpful; reducing farm-to-table distances in the first place would be even better. In this regard urban and peri-urban agriculture is a promising alternative.	Accepted, Revised, food miles are now explicitly mentioned.
16565	11	28	11	28	11	A citation like "Popp et al. paper in preparation" is an open invitation to the kind of criticism of sources that was so damaging to AR4. Delete it, and the assertions that depend on it.	Accepted, Revised, replaced by citation of Smith et al, submitted
12410	11	28	12	28	13	Production of artificial meat should be mentioned as one possible way of reducing the consumption side in the AFLOU-sector. It might be regarded as a change in diet, even if the meat more or less are of the same quality compared to meat from animals.	Accepted, Did not find any studies confirming that meat analogue is equivalent in terms of GHG emissions to other plant-based food. Also, the comment is difficult to integrate in the text which does not speak of meat but of animal products and plant-based products.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15611	11	28	12	28	13	Global studies cited in previous comment should be cited in Table 11.4 for "Change in diet" section.	Accepted, Not able to find out what the "studies mentioned in the previous comment" are.
16566	11	28	13	28	17	Same point as number 47 -- only distinguishes animal vs plant sources. I don't object to giving data that support vegetarianism, but you need to discuss other diet change options -- some of which are more broadly acceptable at present -- as well.	Accepted, We are not supporting vegetarianism - just exploring the relative impacts of animal and plant based food in the diet. Respective section was revised.
5504	11	28	13			Are there associated estimates of land base required for each diet described?	Accepted, Estimates of area savings added in Table 11.5
12411	11	28	13	30	3	This part deals with the effect of diets/diet changes on emissions from the whole food chain. The referred studies seem to indicate mitigation potentials of up to 8-10 Gt CO2-ekvivalents in 2050/2055, a very significant amount. It would be a great advantage if the assumptions could be clearified more; whether and how the effect of land use, land use change and deforestation is taken into consideration seem to differ between the referred studies. It would be useful to clearify this and if posible display the results in a comparable way e.g. an extension of table 11.5. The different diets seem also to result in quite different needs for land area. Given the limitations of arable land and the increasing competition between needs for food/feed, C-sequestration, bioenergy and ecosystem conservation, it would be useful to elaborate this more. Such information could also be taken into the context of 11.9 "Sectoral implications of transformation pathways and sustainable development", especially the land use implications. This issue is also mentioned clearly in WGII chapter 19, p.16, line 7-11 with reference to the same report (Stehfest et al.2009) ; "Dietary changes could reduce the land requirements of food cropping embodied in these tradeoffs. Specifically, a transition to a vegetarian diet would free up 2700 Mha of pasture and 100 Mha of cropland, 75% of which could be used for biofuel cropping (Stehfest et al 2009), whilst the remainder could revert to natural vegetation becoming a carbon sink (see 19.3.2.1)." This text implies that 27 million km2, 70 % of the global agricultural area is used for animal products.	Accepted, Revised.
5062	11	28	13	28	13	there is a ppaer coming out in climatic change about a healthy nowegian diet where fish are substituted so substitution can also be in animal protein categories	Accepted, Not able to find the paper, not clear what should be changed
11297	11	28	13	28	15	Re: comment #6 above the 'exception' here is duly noted, but in much of the developed world non-seasonal, non-local food is not actually exceptional at all.	Accepted, Noted and revised.
11167	11	28	13	30	3	Change of diet is very important option, but to avoid misleading, considerations for cultural aspect of variety of food must be reffered.	Accepted, Revised. These aspects are outside the scope of this part and need to be discussed elsewhere in the SOD
16567	11	28	17	28	22	This comparison actually makes my point (numbers 47 and 49) about the importance of comparing different kinds of animal-based diets, not just animal vs. plant. Going from the beef-based option to the pork-based one reduces emissions by 3.4 kgCO2eq; going from the pork-based meal to the soy-based one saves another 0.9 kgCO2eq. In other words, changing the kind of animal protein reduces emissions by 79% as much as going from animal to plant entirely. For a review of 16 such studies, see: DeVries, M., and I.J.M. deBoer. 2010. Comparing environmental impacts for livestock products: A review of life cycle assessments. Livestock Science 128(1–3):1–11	Accepted, Revised; also discussed in other parts of this subsection.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9450	11	28	17		23	Care should be taken to distinguish between average GHG intensity of food and marginal effects of diet switching. A large literature on this theme exists in LCA including the literature comparing attributional and consequential LCA. This turns out to be a particularly vexing problem for AFOLU. See for example, Lemoine, D., Plevin, R., Cohn, A., Jones, A., Brandt, A., Vergara, S., et al. (2010). The Climate Impacts of Bioenergy Systems Depend on Market and Regulatory Policy Contexts. Environmental Science & Technology, 44(19), 7347-7350. Thomassen, M., Dalgaard, R., Heijungs, R., & de Boer, I. (2008). Attributional and consequential LCA of milk production. The International Journal of Life Cycle Assessment, 13(4), 339-349.	Accepted, Revised, reference by Thomassen et al. Added; the other was not related to food.
13530	11	28	22	28	22+	It was argued that these are nutritionally comparable meals, but nutrition is not only a matter of calories and proteins. We all are concerned with the world hunger, but it can't mean open the door to the soy business, with all its risks, even from the point of view of GHG emissions. Real problems are complex, and they haven't magic solutions.	Rejected, We are exploring biophysical effects of assumed behavioral changes here, not recommending actions.
15179	11	28	23	29	1	what does this mean? Unclear as written	Accepted, Revised
9331	11	28	29			The phrase 'and a quarter respectively half of the wasted food --' is not clear.	Accepted, Revised
5503	11	28	6			Wasted food is a current priority for US EPA and they are likely to have data that would be useful. Jean Schwab-schwab.jean@epa.gov is a contact for this information	Accepted, Jean has been contacted
15178	11	28	8	28	11	doesn't make sense	Accepted, Revised
4391	11	28	8	28	11	phrase is confusing, especially the part "a quarter... saved"	Accepted, Revised
15610	11	28	13	28	14	Consider discussing that the consistent results for lower GHG emissions for most plant-based foods holds true around the globe, e.g. in studies in India, the United States, Italy, and U.K. Pathak H., N. Jain, A. Bhatia, J. Patel, and P.K. Aggarwal (2010). Carbon footprints of Indian food items. Agriculture, Ecosystems and Environment 139, 66-73. Marlow H.J., W.K. Hayes, S. Soret, R.L. Carter, E.R. Schwab, and J. Sabaté (2009). Diet and the environment: does what you eat matter? The American Journal of Clinical Nutrition 89(suppl), 1699S-703S. Weber C.L. and H.S. Matthews (2008). Food-miles and the relative climate impacts of food choices in the United States. Environmental Science & Technology 42(10), 3508-13. Available at: http://pubs.acs.org/doi/pdfplus/10.1021/es702969f. Baroni L., L. Cenci, M. Tettamanti, and M. Berati (2007). Evaluating the environmental impact of various dietary patterns combined with different food production systems. European Journal of Clinical Nutrition 61:279-86. Berners-Lee M., C. Hoolohan, H. Cammack, C.N. Hewitt (2012). The relative greenhouse gas impacts of realistic dietary choices. Energy Policy 43, 184-90.	Accepted, Revised; for reasons of limited space not all additional refs could be included.
16568	11	29	2	29	4	This is a good point except for the phrase "if cattle production contributes to deforestation" -- clearly it does. In fact, it is the major driver of deforestation in Latin America.	Accepted, There is no agreement to what extent cattle contributes to deforestation, see comment line 804. Reformulated, references added.
15967	11	29	2	29	2	iLUC / dLUC - acronym not explained	Accepted, Revised
9451	11	29	2		5	The Cederberg study has an attribution problem. That is, the authors admit that it is unclear how much land use change to attribute to cattle production. For more see Cohn, A., Bowman, M., Zilberman, D., & O'Neill, K. (2011). The viability of cattle ranching intensification in Brazil as a strategy to spare land and mitigate greenhouse gas emissions. Copenhagen, Denmark: CCAFS.	Accepted, Revised and references added.
15180	11	29	2	29	2	iLUC not specified until further down hapter	Accepted, Revised
9084	11	29	20	29	35	What concerns me is that the authors stated the changes in diets with a focus on meat. Think about cultural diversities, this demand-side option is no easy task.	Noted, We are exploring scenarios here - not recommending actions. A note on cultural and other aspects has been introduced.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9332	11	29	24			Please see if the word 'substited' is actually 'substituted'.	Accepted, Revised
15236	11	29	4			Suggest adding a recent quantified account of consumer-demand mitigation in Europe: For example, a recent analysis of the potential mitigation from various reductions in animal protein consumption including land use change emissions, calculated savings between 2 and 30% of total European emissions from livestock. From Bellarby et al. 2012. Bellarby, J., Tirado, R., Leip, A., Weiss, F., Lesschen, J. P. & Smith, P. 2012. Livestock greenhouse gas emissions and mitigation potential in Europe. Global Change Biology, in press. http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2012.02786.x/abstract	Accepted, Revised, references added.
16569	11	29	6	29	19	A quite useful paragraph; it could be improved (and shortened somewhat) by putting the numbers into a Figure.	Accepted, Text was thoroughly revised and shortened, no space for additional figure.
15181	11	29	6	29	19	rather detailed for synthesis; tighten paragraph (next paragraph too)	Accepted, Revised.
5818	11	29	6	29	35	Please avoid phrasing text like "X wrote …, Y wrote ...". Give the statement and a citation. This way, you save space and the text will be easier to read.	Accepted, Revised. Note, however, that this is less useful when one particular study is discussed in more detail. In that case, this would only result in awkward passive constructions that are difficult to read.
13531	11	29	7	29	35	However, research must be directed to a joint balanced solution of rich and poor diets, and the GHG emissions, avoiding the temptations to adopt any kind of global or unique answer for these regionally differenced issues.	Rejected, Proposing research strategies is beyond the scope of this section
15968	11	30				Table adds little more info, text is already explanatory, could be removed.	Accepted, Table deleted
5819	11	30				Table can be deleted, information is already given in the text (page 29).	Accepted, Table deleted
12412	11	30	1			The table should be extended with the information on p 29 line 6-19. An advantage would be to introduce a column for the emissions in 2050 or 2055 for different diet scenarios, if posible including also the CO2-emissions from landuse/landuse change.	Partially Accepted, Table deleted
5063	11	30	1	30	1	I think all this discussion about changing diet shopuld be tempered with a little discussion of how hard this is to get done. In the us there is a lot of talk about obesity and unhealthy food but it has proved very hard to change	Accepted, Revised. Implementation issues discussed elsewhere
9486	11	30	10	30	10	The reference quote as Christian Lauk et al. (2012) is Lauk Christian ("Laul Christian"in the reference list)?	Accepted, Zotero updated for SOD
12413	11	30	13	30	20	Could you please clarify if the buildings energy-demand over the lifetime are included in the analysis of the net CO2 emissions over a 100 year lifetime?	Accepted, Revised
15182	11	30	16	30	18	repetitive	Accepted, Deleted
16571	11	30	21	30	22	I assume that the "construction of one million flats per year" is using wood, correct? Clarify this.	Accepted, Revised
5505	11	30	21	30	32	Are wood structures suitable as multi family dwellings? Energy use in multifamily dwellings is a fraction of that in single occupancy homes- this should be considered in this discussion. One estimate of energy use and LCA costs of home construction is available at:State of Oregon Department of Environmental Quality. A life cycle approach to prioritizing methods of preventing waste from residential construction sector in the state of Oregon: Phase 2 report, version 1.4. Document 10-LQ-022; http://www.deq.state.or.us/lq/pubs/docs/sw/ResidentialBldgLCA.pdf.	Accepted, Revised
7074	11	30	21	30	32	This section should also refer to the important meta analysis by Sathre and Oconner - Sathre, R., & O'Connor, J. (2010). A synthesis of research on wood products and greenhouse gas impacts - 2nd Edition. Vancouver BC: FPInnovations.	Accepted, Revised, peer-reviewed paper cited

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7076	11	30	21	30	32	This section leaves the impression that there is no overarching conclusion to be drawn from these studies. This is incorrect. As a whole, these studies indicate that using wood from sustainably managed forests to displace more GHG-intensive non-wood materials will always yield mitigation benefits, although the timing of benefits will vary depending on the specific situation. It is important that this section include this overall conclusion and that it be reflected in the executive summary of the report as it was in the Fourth Assessment Report (Fourth Assessment Report, WGIII, Chapter 9, Executive Summary). Even the Nassen study reflects the benefits of active forest management and the resulting low GHG-intensity products, althought the results of this study are misrepresented in the current draft (the subject of the next comment).	Accepted, Revised. Note that Sathre and O'Connor (2010) and Werner et al. (2010) also identify cases in which emissions of wood use are higher. Although this is the exception rather than the rule, balanced treatment requires that this is mentioned.
5577	11	30	21	30	32	I think that the argument that GHG saving with wood products in place of steel and concrete may be small or zero is false. Wood from existing forest areas (especially under improved management) and areas of abandoned land under tree crops, will not only increase the sequestration of C, but also provides sustainable (and increased) sources of wood. The use of energy for steel and concrete production for building and furniture etc. is much more than for a similar building made of wood products.	Accepted, Revised, but note the caveats in row 825
11124	11	30	21	30	32	When "wood" is discussed, it is often forgotten that wood comes out of forest, and every single harvest reduces or destroys many other goods and services of forests. If this is also considered, then the wood - non-wood equation must be re-evaluated.	Accepted, Revised
5820	11	30	26	30	32	The study of Nässén et al. has weaknesses in the C cycle assessment (e.g., using wood for bio-energy only when it could be used in products requires CCS or it would increase emissions compared to fossil fuels, see Schulze, E. D. et al.: Large-scale bioenergy from additional harvest of forest biomass ... , doi:10.1111/j.1757-1707.2012.01169.x, for an - unfortunately also incomplete - overview and general problem discription). The "question whether promotion of wood ... " is also misleading as the situation where both options were equal is based on future options not available for quite some years to come. The weighing today is clear. So please be aware what messages you want to send.	Accepted, Revised
5456	11	30	26	30	32	The quotation of (Naessen et al., 2012) is irrelevant and gives wrong message. Their report is based on uncertain assumptions like CCS technologies, carbonation of concrete, and future carbon price. Considering middle term period until 2050, wood construction can reduce more CO2 than concrete construction. Promotion of wood construction is best mitigation measures in the construction sector.	Accepted, Revised, but note the caveats in row 825
10247	11	30	3	30	3	instead of "multiplication with 3.66667" it is better to use "44/12" which is more explicit	Accepted, Revised
3856	11	30	3	30	3	Do we really need all these decimal figures?	Accepted, Revised
15969	11	30	31	30	31	CCS - not explained	Accepted, This part was deleted
7077	11	30	31	30	32	The results of the Nassen et al 2012 study are misrepresented and the study is flawed. First, Nassen et. al. focused on a question that had not been examined previously, i.e. the effect of hypothetical future energy systems on the relative benefits of wood and concrete building systems. The future energy systems included CCS applied to both power production and industrial emissios, including emissions during calcination in the concrete manufacturing process. The study first points out that "Summing up the results from previous studies in this field we find it fairly well-established that, given the current energy system, increasing the share of buildings with wood frames would reduce overall GHG emissions, and a few studies also point out that this could be a cost-effective strategy." Then in the conclusions, the authors state that "Our analysis confirms the results from previous studies that for current conditions wood framed buildings will emit less CO2 during their life cycle than concrete buildings. Built on these earlier results arguments have been put forward that using wood frames in buildings should be stimulated. Still, in an elaborative scenario where CCS technologies are made available in the energy system,...(continued below)	Accepted, Revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7078	11	30	31	30	32	(continued from above)...the better carbon balance for wood frames is dependent on that CCS would also be used for the incineration of the relatively small and scattered streams of wood waste at the end-of-life of the building. Moreover, the carbon balances are sensitive to assumptions on the alternative use of the forest land in the concrete case, for which the land requirements for materials production are smaller than in the wood case." The findings in Nassen et. al., however, appear to have been affected by the study's having ignored the removal of CO2 from the atmoshpere accomplished in the initial growing of wood for construction. (See Table 2 in the study to see the carbon flows considered in the study) Instead, only regrowth is considered. Had carbon uptake by initial forests and the subsequent transfer of this carbon into wood-based construction materials been included for the wood-based system, in accordance with normal LCA practice, the wood-based systems would have shown benefits in both the current and future energy systems. (continued below)	Accepted, Revised
7079	11	30	31	30	32	(continued from above) This is because, had proper boundaries been used, it would have revealed that CCS applied to biogenic CO2 has a much larger benefit in reducing atmospheric GHGs (due to its removing carbon that was previsoulsy actively cycling in the atmosphere, so CCS results in a net negative flux of carbon to the atmosphere) compared to the removal of fossil fuel CO2 (which merely removes carbon that was added by fossil fuel burning, resulting in a net zero flux of carbon to the atmosphere). By excluding the initial uptake of carbon from the atmosphere, this difference is missed. We suggest, therefore, that due to limitations of the study, and the fact that its summary of previsou studies merely confirms other references used, this study be removed from the list of those used in the Fifth Assessment Report.	Accepted, Revised
5710	11	30	4	30	32	Research to make life of wood products longer is a workable proposition. Proper application of research has the potential of increasing the life of long-lived wood products like, door- window frames, lumber in house construction, and furniture, which will increase carbon sequestered in wood products. Flagging this kind of research here will be relevant.	Accepted, Revised
5575	11	30	4	30	4	Demand-side options related to wood and forestry. Should define 'socioeconomic'. I assume it mainly means the stock of carbon in long-lived wood products?	Accepted, Revised
11813	11	30	4	30	32	Here you only focus on construction wood.What about wood used for pulp and paper or furniture?	Accepted, The aggregate numbers from Lauk et al. (2012) and Pan et al. (2011) include all uses of forest biomass. No peer-reviewed studies were found on possible activities for maximizing C stocks in paper or furniture.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12075	11	30	4	30	32	It seems that section 11.3 divides, as almost unrelated ,many forest related mitigation actions - increased use of biomass for bioenergy, improved natural forest management (more growth), improved plantation management, forest conservation ("production" measures); decreasing wood consumption, increasing wood consumption to subtitute for other products, and increased storage of carbon in wood products. ("demand side measures). It seems we need a concept for how policies could encouage or support these measures in a coordinated way to get the greatest mitigation offset. It seems a way to do is ito have a discussion about how to use wood (or not use wood and let it accumulate in forests) that is parallel to the discussion about how to changing food diets (pg 28 line 13 to pg 30 line 3). The parallel idea is that we should look to modify our wood product use diet - bioenergy, wood for paper, wood for construction products - in a way that gets the most OVERALL mitigation - over time - from the combination of carbon increase in forests, biomass for energy, (offset of fossil emissions), wood product carbon storage, wood product production for construction products (offset of emissions from displaced construction products). The main point is that for given forest circumstances (forest age, growth, regrowth, current uses for wood) and current wood use/ wood use opportunities we need to identify what are the most effective combination of CHANGES in uses (or no use or decreased use) to mitigate emissions over time. Second we need to identify the coordinated policies that will support this integrated outcome - not just separate policies for forest management, bioenergy, and wood products use in construction that would likely not recognize the best mix of uses (no use). If this document does not recognize that there is a NEED to analyze our wood use DIET and determine the most effective diet then the question about the policy needed to attain the best diet will likely not be discussed elsewhere (in this document or by policy makers) . Cherubini et al (2012) gives a simplified set of examples comparing the radiative forcing reduction benefit associated with alternate use of roundwood for energy, and various products. Sathre and O'Connor (2010) review of estimated carbon offsets if wood is substituted for nonwood products in a range of cases. Ximenes et al (2012) give a good pair of real world examples comparing no harvest to harvest and use of wood for products and energy. I am not aware of a study that does a good job of comparing no harvest to several levels/uses for harvest for a range of conditions. There are many studies that include payments to add carbon to forests (and sometimes products) but these do not consider a policy that would pay builders to substitute wood for other materials as a way to get substitution benefits. Refs cited --- [Cherubini, F., Guest, G. and Stromman, A. (2012). Application of Probability Distributions to the Modeling of Biogenic CO2 Fluxes in Life cycle Assessment. Global Change Biology Bioenergy, 1 - 15.] [Ximenes et al. 2012. Greenhouse gas balance of native forests in New South Wales, Australia. Forests 2012 (3)653-683.] [Sathre, R. and J. O'Connor. 2010. Meta-analysis of greenhouse gas displacement factors of wood product substitution. Environmental Science & Policy 13(2010)104-114.]	Accepted, Revised.
9487	11	30	5	30	10	The quoted values do not match with the values in literature (10.1 GtC in 2008 vs. 11.5 GtC, 188 MtC/yr in 2007 vs. 247 MtC/yr).	Accepted, Revised (numbers for bitumen and plastics taken out, numbers for products plus landfills added, based on Pan et al. 2011). It was not clear where the numbers quoted by the reviewer come from and whether they refer to the same component (i.e. long-lived wood products that are currently used).

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7073	11	30	7	30	7	Plastics and bitumen should not be included in estimates of stocks of stored carbon because they do not represent removals of carbon from the atmosphere. Furthermore, a study based on such a definition is not particularly relevant in a section devoted to wood and forestry. For information on carbon stocks and changes in carbon stocks the Fifth Assessment Report should rely on the data in Pan et. al. (i.e. Pan, Y., Birdsey, R., Fang, J., Houghton, R., Kauppi, P., Kurz, W., et al. (2011). A Large and Persistent Carbon Sink in the World's Forests. Science Vol. 333 , 988-993.)	Accepted, Revised.
5576	11	30	8	30	10	"--- increase from 17 MtC/yr in 1900 to a maximum of 188 MtC/yr in 2007". This is nearly a 3 fold per-capita increase, which seems high. Whereas --- to 50-80 MtC/yr (line 10) seems more reasonable.	Accepted, Revised
9452	11	31	1		1	This section would benefit from a sub-section on the extent to which mitigation effectiveness depends on adoption choices by land users and, relatedly, the design of instruments to induce adoption.	Rejected, Dealt with later in the chapter
5070	11	31	1	31	1	in this section you could also mention additionality which is a problem with redd and afforestation and a number of other ag items. The real question is how much of this mitigation activity happened anyhow	Partially accept, Additional paragraph added to end of section introducing additionality; this is described elsewhere in the Report (Sect ??, and Glossary)
16573	11	31	10	31	11	"easy to track visually" is a dubious assertion -- one certainly can't see the below-ground effects, and even if one can see changes if one is present when plowing happens, it is much more difficult to track (let alone quantify) the effects over a large scale by remote sensing.	Accepted, Have reworded and caveated this statement: viz;. "Some activities that reverse carbon sequestration are relatively easy to track visually, such as deforestation and some changes in land-use such as the removal of residues from a ploughed field. Obviously, such an approach cannot assess all carbon pools (e.g. below ground). These techniques, which rely on remote sensing are essentially reliant on the development of calibration equations between the land-use change and carbon mitigation impacts."
5578	11	31	10	31	12	"Most activities that reverse carbon sequestration are relatively easy to track visually. A ploughed field with residues removed, the removal of trees etc". I would argue that this is not a reversal of C sequestration. Crop residues if not used will rot and/or be eaten by insects etc. and be returned to the atmosphere. If they are used for energy, the may substitute fossil fuels. What could be lost is some minerals (fertility) soil friability etc. The harvesting of wood from a sustainable supply will not affect C loss. Rather it should have a positive effect on C accumulation in wood products or the substitution of wood energy for fossil fuels.	Accepted, Added reference to remote sensing of forests for REDD (Gibbs et al. 2007)

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14629	11	31	12			surely it is as much carbon as is usually lost due to LUC or fire in a certain ecosystem type	Accepted, Agreed, however this will depend very much on the carbon stores and nature of disturbance. Not necessarily equivalent. Text added "There are relatively few data on how much carbon is lost when reversals occur and estimates will depend on a range of factors such as the carbon storage within the system and the nature of the disturbance. A first order estimate of the effects of plantation deforestation and conversion to pasture could be achieved from the reverse (e.g. reforestation from pasture)."
13969	11	31	13	31	15	this sentence requires a separate paragraph. Permanent removals should be described in the first paragraph of this section, then followed by a discussion of those types of mitigation for which non-permanence is an issue.	Accepted, Agreed and changed
15183	11	31	15	31	17	contradictory	Rejected, The statement is not contradictory. Frost damage affects the annual increment but doesn't reverse the stock increase (it just slows its increase)
14630	11	31	15	31	16	run these two sentences together and delete "The natural events that affect yields"	Accepted, Agreed and changed
14631	11	31	16			add example of fire	Accepted, Agreed and changed
14632	11	31	17			whether it is a reveral or not depends wha thappens after e.g. if there is a fire and the forest not replanted, or if the r is disease and the forest cannot regrow, then it is a reversal. The stored carbon is gone and not rpelaced.	Accepted, Agreed and changed
3857	11	31	20	31	24	Check for typo error.	Accepted, Typo not found.
5064	11	31	24	31	24	Kim, M-K., B.A. McCarl, and B.C. Murray, "Permanence Discounting for Land-Based Carbon Sequestration", Ecological Economics, vol. 64, issue 4, 763-769, 2008. do some work on permanance and show contract terms and unequal sequestration rates plus saturation and possible maintainence costs lead to value of sequestation being as low as 1/3 of a perfect detruction of methane on a co2eq basis	Accepted, Text inserted to cover this: " estimated the impact of differences in permanence on the value of carbon offsets using examples from cropland management and forest management, and developed a discounting function. "
14633	11	31	25	26		change order of sentence and give example what you mean (e.g. afforestation) and (e.g. fossil fuel substitution with bioenergy). Culd be owrth noting at end of this paragraph that peatlands sinks may not saturate, but C uptake very slow.	Accepted, Agreed.
5711	11	31	25	31	30	Can some idea/figures about saturation limit of carbon in different types of soils, say in %, or t ha-1, be given? This could give an idea about the capability of a particular soil to assimilate carbon in future.	Rejected, No - too much detail and too variable

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5065	11	31	25	31	25	post and six have a climatic change article on saturation in 2007. also there is an uncertainty question here as to what is the rate and Kim, M-K., and B.A. McCarl, "Uncertainty Discounting for Land-Based Carbon Sequestration", Journal of Agricultural and Applied Economics, 41, 1(April 2009), 1-11, 2009. deal with it theoretically and empirically	Accepted, Agreed and two papers cited.
5579	11	31	25	31	30	Saturation. I agree that there are saturation points for carbon stored in biomass and soils. However, in most systems, the C content is well below the saturation point. Also, even if the saturation point can be achieved, the removal of annual growth provides carbon that can be used in wood products for building etc. and as a sustainable energy source to substitute for fossil fuels.	Rejected, No support for the statement that "in most systems, the C content is well below the saturation point"
5821	11	31	25	31	30	It is currently debated whether the equilibrium hypothesis is correct or not. Studies from old-growth forests for example show that they can continue to sequester C in soil and dead organic matter even if net living biomass increment is near zero (see, for example, Luyssaert, S., E. D. Schulze, A. Borner, A. Knohl, D. Hessenmoller, B. E. Law, P. Ciais and J. Grace (2008). "Old-growth forests as global carbon sinks." Nature 455(7210): 213-215). The debate is ongoing, but I suggest to keep the paragraph in subjunctive as far as an equilibrium is concerned.	Accepted, Agreed and added
9132	11	31	29			"Smith, 2005" is not cited.	Accepted, Fixed
16572	11	31	3	31	4	The assertion that "soil and vegetation carbon sequestration forms a large proportion of the mitigation potential in the AFOLU sector" is surprising -- particularly since the previous section has just shown the large mitigation potential of demand-side changes. Is it still "a large proportion" if these demand-side options are included? What is that proportion? At minimum, this assertion needs to be quantified and supported by citations.	Accepted, Changed to significant component. This is value is covered in earlier sections.
13325	11	31	3	31	3	a large, not a lage	Accepted, Agreed.
14634	11	31	31			This paragraphs confuses natural drivers with indirect human drivers. Ie . A direct human driver is an intentional activity that affects C balance such as LUC. A Natural driver of GHG flux would be cliamte variability, fires, wind throw disease. If a natural driver is changing, e.g. due to human induced claimte change or pollution , then this would be an indirect humn induced change. So see line 25, future changes in clumate are not natural changes, they are indirect human induced drivers of hange in flux.	Accepted, Changed
9133	11	31	32			"Smith, 2005" is not cited.	Accepted, Changed
15184	11	31	35	31	36	delete sentence	Accepted, Retained. Linking sentence in revised paragraph
9134	11	31	36			insert "changes" after "indirect human-induced".	Accepted, Changed
15970	11	31	40	31	40	Displacement/leakage - it seems this is key to many sink/emission statements, this could be elaborated more, one can assume that previous text takes this into account, and many studies would build on this. Leakage/displacement seems to be one of the more important factors to take into account, as a basis for all other mitigation effectiveness studies, this could be discussed first	Accepted, Rearranged
5066	11	31	40	31	40	the statement "If reducing emissions in one place leads to increased emissions elsewhere, 40 the emissions no net resuction in emissions occurs" is rather rediculous as it assumes a one to one corespondance. A more realistic view is in Murray, B.C., B.A. McCarl, and H-C. Lee, "Estimating Leakage From Forest Carbon Sequestration Programs", Land Economics, 80(1), 109-124, 2004. where the percentage offset is computed	Accepted, Done
7191	11	31	40			o Leakage. Now only displacement leakage is mentioned. Also ecological leakage should be discussed when it comes to rewetting of peat soils as a mitigation measure. If in the area where the rewetting activity takes place is not hydrologically 'intact', then ecological leakage shall be considered (expressed in amounts of carbon).	Noted. Text augmented.
10248	11	31	41	31	41	rewrite	Accepted. Text revised.
14635	11	31	41			delete "the emissions	Accepted. Text revised.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14636	11	31	41			the net reduction might not be zero, it might be lower than one is aiming for, or it might even be negative (ie reduction elsewhere is greater than gain by activity) this would be perverse mitigation. I would suggest to say, net reduction in emissions would be lwoer than that of the planned activity alone	Noted. Text revised.
11065	11	31	41	31	41	typo needs correction in following wording "…the emissions no net resuction in emissions occurs…."	Accepted. Text revised.
9453	11	31	44		45	Trade statistics are not necessarily a proxy for emissions displacement.	Rejected. The text does not assume this for all trade statistics.
14637	11	31	46			ther are many publciations not on this patter of which Serchinger is at one extreme. In fact the jury is still very much out on quantifying iLUC. Needs some more thoughtful and in depth discussion as this is a critical point for this chapter.	Accepted. Text augmented.
5506	11	31	6	33	3	Excellent clear discussion	Noted.
6829	11	31	6		24	There is some confusion cause by apparent interchangeability between 'sink' and 'stock' - the former is a process and the latter is a reservoir - and the addition of 'storage', which could be sink or stock. Avoided emissions are accounting issues not sinks and hence have different impacts on the atmosphere. Avoided emissions cannot be re-emitted (reversed) becasue there is nothing to reverse!	Accepted. We've added sentences explaining 'sink' and 'stock'. Use of the term 'storage' will be checked.
14627	11	31	6			this section needs some work, it is disjointed and a little confusing	Noted, section revised.
14628	11	31	8			other types of what?	Accepted. Other types of carbon sinks. Text revised.
13968	11	31	8	31	10	this phrase confuses real mitigation, where gases are prevented from entering the atmosphere or are removed from the atmosphere, with market fixes. Buffer pools and insurance have nothing to do with mitigation. You can't take out insurance on reversals as a means to keep CO2 out of the atmosphere. with regard to the global GHG concentration increases, buffer pools are irrelevant. this sentence should be struck.	Accepted. Text revised.
4392	11	31		31		I find this section very small in regard to its importance, although some aspects of non-permanance appear in other sections. E.g. tree die back, pests, increased drought	Noted. Section has been augmented within limits of page allocation.
13967	11	31				Essential section, but the findings are not adequately incorporated into the analysis of technical and economic potential. If there are serious uncertainties with regard to both amount of carbon sequestered and permanence of carbon sequestered (particularly as temperatures increase), there is little likelihood that this carbon can be commodified in a market. Other references to be added include R.P. Philipps et al. 2012. Roots and fungi accelerate carbon and nitrogen cycling in forests exposed to elevated CO2. ecology letters doi: 10.1111/j.1461-0248.2012.01827.x; F.M. Hopkins et al. 2012. Warming accelerates decomposition of decades-old carbon in forest soils. PNAS doi:10.1073/pnas.1120603109; A. Knohl and E. Veldcamp. 2011. Indirect feedbacks to rising CO2, Nature 475: 177-178;K.J. vanGroenigen et al. 2011. Increased soil emissions of potent greenhouse gases under increased atmospheric CO2. Nature 475: 214-216.	Noted. Section (now 11.3.2) has been revised and two of the three references added.
14436	11	31				Relatively little discussion space is allotted to the important topic of mitigation effectiveness, relative to the page-length of the black carbon and biofuels section. Given the interest in policies that offer land managers payments for C sequestration, it is important for readers to understand the risk regarding C sequestration permanence.	Noted. Section has been augmented within limits of page allocation.
11206	11	32				The treatment here on 'competition for land' is overly truncated and could be expanded upon and this feeds back to my earlier comments about the need for specific actions to control unregulated land grabbing and strengthen communal tenure rights for customary land owners. At line 32: Why call these benefits 'cultural services'?	Accepted, Competition for land is discussed in an entire subsection (was 11.4.2); text regarding cultural services revised

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16221	11	32				figure is missing conservation as one of the competing uses of land (it has biofuels and food/fiber); it leaves out water/biodiversity	Accepted, Figure was deleted for reasons of scarce space, and following the suggestion by another reviewer. Land demand of conservation added in the text.
15971	11	32	1	41	43	Chapter is well written and clear, useful information is presented in a format which gives a nice overview. Displacement could be discussed more	Partially Accepted, Revised, but leakage is discussed elsewhere in more detail, cannot be duplicated here.
5067	11	32	1	32	29	I find this section redundant to coverage above and would delete it or move a little of it to earlier section on land use	Rejected, Most reviewers wish to see the section expanded
3858	11	32	11	32	18	It will be useful to provide figures at this point. What about quoting increase in agricultural area in the last 50 years, compared with population growth and society revenue (Global National Income)? I am surprised with the many references provided supporting the view of food versus fuel competition when agricultural land expansion has been many times lower than population and wealth growth. Be fairer by adding literature sources with different view.	Accepted, Two sentences with numbers and citations added
11298	11	32	14	32	16	Interesting indeed, but the 'points in space in time when this currently trajectories [sic] may be more easily influenced' already seem quite clear: cities. In particular, the fastest-growing cities in the developing world that are looking to expand and upgrade their infrastructure will have massive implications for resource use and efficiency; if their growth trajectories are directed appropriately they can have a great and positive impact on sustainability. However, neither the term 'cities' nor 'urban' appears even once in this entire chapter.	Accepted, Revised, text and references added
13326	11	32	16	32	16	Global resource, not .in global	Accepted, Revised
3859	11	32	16	32	17	Check wording	Accepted, Revised
5822	11	32	20			The information shown in this figure is already given in the text, so the figure can be deleted. Its presentation does not result in more information or better understanding.	Accepted, Figure deleted.
11205	11	32	3	32	18	The use of the term 'wild' here is inappropriate and outdated. Most scientific studies demonstrate that almost every corner of terrestrial ecosystems are used and occupied by peoples, the point is that in 'remote' areas the usage tends to be very low intensity and infrequent, yet nonetheless this land is under use, it just tends to be 'invisible' to western planners and decision-makers. This is especially case for indigenous gatherer hunter groups and shifting cultivators who combine hunting and gathering land use in very distant forest areas with swidden farming in forests closer to home. In some cases areas of 'remote' land are specifically set aside as no-go areas by indigenous peoples for spiritual *and* ecological reasons e.g. game breeding areas, water sources BUT they form part of an integrated customary system of land use and management. See, for example: Jane M. Read, Jose. V. Fragoso, Kirsten M. Silvius, Jeffrey Luzar, Han Overman, Anthony Cummings, Sean T. Giery, L. Flamarion de Oliveira (2010), Space, Place, and Hunting Patterns among Indigenous Peoples of the Guyanese Rupununi Region Journal of Latin American Geography Volume 9, Number 3, 2010 pp. 213-243.	Accepted, Revised, reference added.
11987	11	32	30		30	Need to add here that ecosystem services are underpinned by biodiversity, e.g. "ecosystem services, which are underpinned by biodiversity".	Partially Accepted, Agreed, but the text was considerably shortened so the proposed formulation did no longer fit in. Fits better in section 11.1
15185	11	32	33	32	33	cite MEA.	Accepted, Done

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11299	11	32	34	32	38	Agriculture (and indeed forestry) are increasingly important for urban livelihoods and employment too, though urban and peri-urban agriculture is never mentioned in this chapter. Urban and peri-urban agriculture can also help alleviate competition for scarce land resources by working within dense urban areas (and the innovative land use changes like green roofs, walls and redeveloped brownfields it often involves) and allowing larger green areas to remain intact.	Accepted, Urban and settlements are now better covered
5580	11	32	7	32	9	“Approximate ¼ of --- NPP is appropriated by humans either forgone due to land-use related loss in NPP or harvested for human purposes”. (H. Haberl et. Al 2007). The NPP for terrestrial plants is an estimated 53 GtC. One quarter of this is therefore 13 GtC. The annual gross rate of deforestation, according to FAO is 15.2 million ha/yr. The annual loss in NPP from this area is between 75 MtC and 115 MtC. However, according to FAO, there has been an annual planting of an estimated 8.8 million ha. This should sequester between 44 MtC and 66 MtC, thus the net NPP loss will be between 31 MtC and 49 MtC. The annual use of wood products is an estimated 1765 MtC, (but if this is not used it will decay etc. and finish up as atmospheric CO2 and the annual NPP for wood is over 9 GtC). Food consumption for 7 billion people at 2750 kcal day (page 8, line 24), consumption is about 790 MtC. Allowing for waste, residues and losses via animal consumption, the annual consumption of NPP may be of the order of 1.6 GtC. (However, some NPP, e.g. grass would rot if not eaten). Thus gross the ‘socioeconomic’ loss of NPP is an estimated 3.5GtC/yr. This is less than 7% of NPP not 25%! Also fish from the sea etc. should be excluded from terrestrial food consumption. Thus Haberl estimates are much too high.	Partially Accepted, Numbers were cross-checked but matched the numbers reported in the peer-reviewed literature; additional reference added. Note that, as explained in detail in the paper by Haberl et al., 2007, this hinges on the definition of HANPP applied; the formulations used here are based on definitions widely used in the scientific literature, see e.g. the special issue edited by Erb et al. (2009) in Ecological Economics, 69(2), 250-334; in particular the editorial gives an in-depth discussion of definitional issues related to HANPP.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15612	11	32	25	32	29	Feedbacks should also include animal welfare. People around the world care about the welfare of animals raised for food. World Society for the Protection of Animals (2007). WSPA International Farm Animal Survey (China & Brazil), Dec. 14; Zogby International (2003). Nationwide views on the treatment of farm animals. Poll for the Animal Welfare Trust; Lusk J.L., F. B. Norwood, and R.W. Prickett (2007). Consumer preferences for farm animal welfare: results of a nationwide telephone survey. Available at http://asp.okstate.edu/baileynorwood/AW2/InitialReporttoAFB.pdf; and Penn, Schoen & Berland Associates (2005). Poll for the Humane Society of the United States, Washington, DC. (Illustrating consumer concern for farm animal welfare in the United States of America.) Industrial systems now produce approximately two-thirds of the world's poultry meat and eggs, and more than half of all pork. Food and Agriculture Organization of the United Nations (2009). The state of food and agriculture: livestock in the balance (Rome, Italy: FAO, p. 27). Available at: http://www.fao.org/docrep/012/i0680e/i0680e.pdf. The breadth of scientific evidence demonstrating that intensively confined animals are frustrated, distressed, and suffering under modern production schemes is extensive, conclusively substantiating that battery cages for egg-laying hens and crates for pregnant sows and calves are simply not appropriate environments. Duncan I.J.H. (1970). Frustration in the fowl. In: Freeman B.M. and Gordon R.F. (eds.), Aspects of Poultry Behaviour (Edinburgh, Scotland: British Poultry Science Ltd., pp. 15-31). Špinka M. (2006). How important is natural behaviour in animal farming systems. Applied Animal Behaviour Science 100(1-2),117-28. Baxter M. (1994). The welfare problems of laying hens in battery cages. The Veterinary Record 134(24), 614-9. Dawkins M.S. (1990). From an animal's point of view: motivation, fitness, and animal welfare. Behavioral and Brain Sciences 13, 1-61. Vestergaard K. (1984). An evaluation of ethological criteria and methods in the assessment of well-being in sows. Annales de Recherches Vétérinaires (Annals of Veterinary Research) 15(2), 227-36. Broom D.M., Mendl M.T., and Zanella A.J. (1995). A comparison of the welfare of sows in different housing conditions. Animal Science 61, 369-85. European Commission, Scientific Veterinary Committee, Animal Welfare Section. 1995. Report on the welfare of calves. Adopted November 9. Available at: http://ec.europa.eu/food/fs/sc/oldcomm4/out35_en.pdf.	Partially Accepted, Revised - introduced a sentence in the subsection on demand-side measures. It fitted better than here due to length concerns.
15186	11	33	11	33	13	delete sentence	Accepted, Deleted
15187	11	33	11	33	24	is it trade offs that you want to minimize or negative effects? (tradeoffs can work, yes?)	Accepted, Revised
5823	11	33	18	33	19	"Leakage must be avoided" is only correct if the term "leakage" in used in the sense that emissions occur elsewhere and are therefore not considered in the assessment. This must be avoided. If emissions are assessed without regard to the location or timing of emission, than "leakage" is no problem.	Accepted, Revised
5581	11	33	20	33	22	Exploiting fully the NPP of the land should positively affect the livelihoods of the poor, especially if the are given control of say natural forests, paid for protecting them and provided with simple management techniques and opened up new markets for the products.	Rejected, Policy prescriptive and not sufficiently supported by peer-reviewed literature
13327	11	33	21	33	21	I believe it should say livlihoods of populations, not only poor populations. How do you define poor?	Accepted, Revised
8931	11	33	21			"poor" seems inappropriate better "rural population"	Accepted, Revised
5072	11	33	29	33	29	I have seen discussion of "Competition for land and water" before in this chapter	Accepted, Revised
11207	11	33	30	33	46	The section at 11.4.2 on 'competition for land and water' might be an ideal place to insert stronger and more robust text and references on the need to control unjust land acquisition and take measures to ensure forest tenure reforms to recognise the collective property rights of indigenous peoples and forest dependent communities.	Accepted, Noted - but not in a policy prescriptive way

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16576	11	33	30	33	38	This section is important. However its first paragraph is fairly general and reads more like an introduction to the whole chapter than to this section specifically. Some of the sentences could be moved to the start of the chapter.	Accepted, Revised
5582	11	33	35	33	37	“Competition for --- resources is expected to intensify”. This could be mitigated by increasing agricultural productivity, increasing the use of NPP, changing the diet and tempering population increase etc.	Rejected, Policy prescriptive
5507	11	33	39			Is there a potential to include in this list multi purpose use of lands? So for example earlier on in the chapter combination forest and production agriculture were mentioned- integrating coffee growing into forest lands is one case, another way to describe this would be to maximize ecological functions of land. This seems to be an important consideration- not clear where it would best fit into the discussion- just got up to pg 37 ln 43- thank you	Accepted, Revised, sentence and references included.
5071	11	33	39	33	39	the section about "Mitigation activities in the AFOLU sector can reduce climate forcing in different ways" has appeared twice before and does not fit under land and water	Accepted, Deleted
7197	11	33	39			Mitigation activities. Missing: reducing fire frequency, reducing peat oxidation. Maybe it’s also good to think a bit further: choice of land for agricultural expansion (e.g. no-go-areas. Avoiding high carbon, high biodiversity land).	Partially Accepted, Agreed, but this part was deleted due to required shortening, so the proposed text cannot be added here. Many of these options are discussed in section 11.3.
5069	11	33	4	33	28	I again think this was covered before and would eliminate some and rearrange	Accepted, Revised
5068	11	33	4	33	4	adaptaion also comoets plus future demands need to be considered	Rejected, Do not understand the comment
7192	11	33	4			o Successful implementation. This section illustrates the constraints and difficulties, and it describes ‘what is needed’, however, its very abstract and at the end I still do not know what the ‘key’ is to successful implementation. You could think of describe more concrete ‘what is known already’, including references, and takes parts from section 11.10. E.g important points regarding successful implementation:	Accepted, Revised
13328	11	33	43	33	46	This bullet could be taken to suggest that fertilization could lead to a net sequestration of carbon (removal of N,P deficiencies). This is not a statement that has a high degree of certainty and may in fact be false considering the energy required to produce fertilizer as well as N2O emissions.	Accepted, Revised (this part was deleted due to shortening)
2133	11	33	44	33	44	write "…to reduced till cropping" as it is not yet clear that no-till cropping, measured over the whole soil horizon does increase soil carbon (e.g. Ogle, S.M., A. Swan, and K. Paustian. 2012. No-till management impacts on crop productivity,carbon input and soil carbon sequestration. Agriculture, Ecosystems and Environment 149: 37-49	Accepted, Revised (this part was deleted due to shortening)
5583	11	33	46	33	46	Reducing deforestation is tied mainly to population increase and the increased demand for food and energy (increase in wealth), not from the use of forest product.	Accepted, Revised (this part was deleted due to shortening)
15613	11	33	10	33	10	The "social values (e.g. equity of participation)" should also include animal welfare. People around the world care about the welfare of animals raised for food. World Society for the Protection of Animals (2007). WSPA International Farm Animal Survey (China & Brazil), Dec. 14; Zogby International (2003). Nationwide views on the treatment of farm animals. Poll for the Animal Welfare Trust; Lusk J.L., F. B. Norwood, and R.W. Prickett (2007). Consumer preferences for farm animal welfare: results of a nationwide telephone survey. Available at http://asp.okstate.edu/baileynorwood/AW2/InitialReporttoAFB.pdf; and Penn, Schoen & Berland Associates (2005). Poll for the Humane Society of the United States, Washington, DC. (Illustrating consumer concern for farm animal welfare in the United States of America.)	Accepted, Revised - introduced a sentence in the subsection on demand-side measures. It fitted better than here due to length concerns.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5378	11	33	23	33	35	The last bullet in this paragraph seems like a platitude. Can the authours shed light on how this would be dealt with in practice as that would be very helpful. Otherwise this sentence seems to say this is a complex issue which is abundantly clear from all the material in Chapter 11. Luckow, P., et al., Large-scale utilization of biomass energy and carbon dioxide capture and storage in the transport and electricity sectors under stringent CO2 concentration limit scenarios. International Journal of Greenhouse Gas Control, 2010. 4(5): p. 865-877. Hamelinck, C.N., R.A.A. Suurs, and A.P.C. Faaij, International bioenergy transport costs and energy balance. Biomass and Bioenergy, 2005. 29(2): p. 114-134.	Accepted, Revised
5377	11	33	4	33	6	The first sentence of this paragraph seems like a platitude. Can the authours shed light on how this would be dealt with in practice as that would be very helpful. Otherwise this sentence seems to say this is a complex issue which is abundantly clear from all the material in Chapter 11.	Accepted, Revised
15188	11	33				interesting text, but it's NOT about land and water competition; it also repeats earlier sections.	Accepted, Revised
11815	11	33				I had the feeling that the titel of this section (competition…) does not fully reflect the content of this section (climate forcings of Mitigation etc…)	Accepted, Revised
10249	11	33	29	35	38	Change the title of this section "competition for land and water"…thus this section do not deal will water!	Accepted, Revised
5824	11	34				This figure does not add significant information, could be deleted.	Partially Accepted, Figure revised and improved
8932	11	34				The figure does not show that consumed materials from forestry are frequently used to process bio-energy (cascade use)	Accepted, Figure revised and improved
8933	11	34				Trade should stand between the pillars Livestock, Processing and Consumption not about	Partially Accepted, Figure revised and improved; proposed changes could not be entirely solved graphically. The current solution makes clear that product trade can occur at any of these processing stages
5712	11	34	1	34	3	Research to find possibility of increasing the capacity of soil to store more carbon also needs to be flagged here.	Partially Accepted, Added in knowledge gaps section instead
2134	11	34	1	34	3	may also mention the potential of certain agricultural practices to increase soil carbon, not only referring to forests i.e. add "…or through soil carbon increasing agricultural practices such as legume leys in crop rotations or use of organic fertilizers"	Accepted, Revised (this part was deleted due to shortening)
5584	11	34	1	34	6	One principal bullet that has been excluded is:	Noted, Not a comment
5585	11	34	1	34	6	· Using more fully the NPP in the existing biomass stock, especially wood.	Accepted, Revised (this part was deleted due to shortening)
15189	11	34	10	34	11	delete (and replace with lines 16-17)	Accepted, Revised
11301	11	34	12			Actually the term 'urban' does appear in this figure, but it is deliberately excluded from the landuse flows that this diagramme depicts. Urban and peri-urban agriculture calls this into question.	Accepted, Figure revised and improved
5073	11	34	13	34	13	don't like "Figure 11.6" very much it really does not stand alone and the discussion is just as effective as the figure	Accepted, Figure revised and improved
14731	11	34	16			Figure 11.6 demonstrates..." my suggestion is Figure 11.6 establishes…	Accepted, Figure revised and improved, wording changed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5586	11	34	19	34	20	Again the use of the existing NPP has been excluded.	Rejected, This claim is not correct. First, the chapter discusses increased use of "existing NPP", e.g. through increased use of wood in long-lived products. Second, the literature reviewed there also shows that "use of existing NPP" does not reduce GHG emissions under all circumstances, see Werner et al., 2010, Environmental Science & Policy 13, 72–85, Holtsmark 2011, Climatic Change, Schulze et al. 2012, GBC Bioenergy, several papers by Cherubini et al., Boettcher et al. 2012, GBC Bioenergy, and many other papers.
3860	11	34	21	34	21	I don't agree that organic agriculture, in general, involves adoption of less intensive cultivation technologies. Since the yield is lower than for traditional agriculture we need larger areas to fulfill food and feed demand. Larger areas are associated with higher GHG emissions from LUC and iLUC.	Accepted, Revised
13329	11	34	7	34	11	Her we are talking about production side vs. Consumption side activities, yet the terminology is not consistent with previous sections. Assure throughout chapter 11 that consisten terminology is used for consisten concepts.	Accepted, Revised
11300	11	34	7	34	8	AFOLU mitigation is not only about land management and technology, but also about planning and (sustainable) configuration (e.g. AFOLU configured to work with watersheds, avoid critical biodiversity hotspots and remain located close to markets).	Noted, We agree but there is not sufficient space to discuss this in detail. To some extent this issue is covered in the discussion of local food (diet change section) as well in the various parts that mention land-use policies and zoning.
11208	11	34	9			first mention of governance. This needs expansion here and throughout the text	Partially Accepted, Revised - governance is discussed in another subsection.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15614	11	34	16	35	5	The environmental, health, and animal welfare benefits of diet changes are vast, as listed in my comment 2. I suggest citing and discussing some of the following additional studies, as well as including animal welfare. Mekonnen M.M. and A.Y. Hoekstra (2012). A global assessment of the water footprint of farm animal products. Ecosystems 15, 401-15. Available at: http://doc.utwente.nl/80897/1/Mekonnen-Hoekstra-2012-WaterFootprintFarmAnimalProducts.pdf. Eshel G. and P. Martin (2009). Geophysics and nutritional science: toward a novel, unified paradigm. The American Journal of Clinical Nutrition 89(suppl), 1710S-16S. McMichael A.J., J.W. Powles, C.D. Butler, and R. Uauy (2007). Food, livestock production, energy, climate change, and health. The Lancet 370, 1253-63. Marlow H.J., W.K. Hayes, S. Soret, R.L. Carter, E.R. Schwab, and J. Sabaté (2009). Diet and the environment: does what you eat matter? The American Journal of Clinical Nutrition 89(suppl), 1699S-703S. Donner S.D. (2007). Surf or turf: a shift from feed to food cultivation could reduce nutrient flux to the Gulf of Mexico. Global Environmental Change 17, 105-13. Industrial systems now produce approximately two-thirds of the world's poultry meat and eggs, and more than half of all pork. Food and Agriculture Organization of the United Nations (2009). The state of food and agriculture: livestock in the balance (Rome, Italy: FAO, p. 27). Available at: http://www.fao.org/docrep/012/i0680e/i0680e.pdf. The breadth of scientific evidence demonstrating that intensively confined animals are frustrated, distressed, and suffering under modern production schemes is extensive, conclusively substantiating that battery cages for egg-laying hens and crates for pregnant sows and calves are simply not appropriate environments. Duncan I.J.H. (1970). Frustration in the fowl. In: Freeman B.M. and Gordon R.F. (eds.), Aspects of Poultry Behaviour (Edinburgh, Scotland: British Poultry Science Ltd., pp. 15-31). Špinka M. (2006). How important is natural behaviour in animal farming systems. Applied Animal Behaviour Science 100(1-2),117-28. Baxter M. (1994). The welfare problems of laying hens in battery cages. The Veterinary Record 134(24), 614-9. Dawkins M.S. (1990). From an animal's point of view: motivation, fitness, and animal welfare. Behavioral and Brain Sciences 13, 1-61. Vestergaard K. (1984). An evaluation of ethological criteria and methods in the assessment of well-being in sows. Annales de Recherches Vétérinaires (Annals of Veterinary Research) 15(2), 227-36. Broom D.M., Mendl M.T., and Zanella A.J. (1995). A comparison of the welfare of sows in different housing conditions. Animal Science 61, 369-85. European Commission, Scientific Veterinary Committee, Animal Welfare Section. 1995. Report on the welfare of calves. Adopted November 9. Available at: http://ec.europa.eu/food/fs/sc/oldcomm4/out35_en.pdf.	Accepted, Revised - introduced a sentence and a reference in the subsection on demand-side measures. It fitted better than here due to length concerns. However, not all those references could be incorporated due to length restrictions.
12414	11	35	1	35	1	The expression "healthier diets" used here and a number of other places in chapter 11 could be replaced with "diets with a lower share of animal products". This is more informative and neutral. In developed countries lower consume of animal products will be healthier for most people, but in developing countries, more protein also from animal products will for many people improve their health.	Accepted, Revised and clarified. Because demand-side issues were moved from section 11.3 to section 11.4, this part was integrated in the section on diet changes in 11.4.3.
5075	11	35	1	35	1	in the sentence "A critical factor is the 'displacement factor', i.e. the fraction of the 20 energy crop plantation area that is replaced by crop production somewhere else (RJ Plevin et al., 21 2010)." you introduce yet another term for leakage and indirect land use which i would not. also this was covered twice above why again?	Accepted, Deleted - refers to p 36, line 20

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5076	11	35	1	35	1	thare are some empirical papers on this these include Baker, J.S., B.A. McCarl, B.C. Murray, and R.B. Jackson, "Assessing Domestic Land Use Change under Simultaneous Bioenergy and Climate Mitigation Incentives", Presented at the World Congress on Resource Economics, Toronto, 2010. Mosnier, A., P. Havlk, H. Valin, J.S. Baker, B.C. Murray, S.J. Feng, M. Obersteiner, B.A. McCarl, S.K. Rose, and U.A. Schneider, "Alternative U.S. Biofuel Mandates and Global GHG emissions: The Role of Land Use Change, Crop Management and Yield Growth", Energy Economics, second review, 2012. Baker, J.S., B.A. McCarl, B.C. Murray, S.K. Rose, R.J. Alig, D.M. Adams, G.S. Latta, R.H. Beach, and A. Daigneault, "Net Farm Income and Land Use under a U.S. Greenhouse Gas Cap-and-Trade", AAEA Policy Issues, Issue 7: April 2010 (http://www. aaea. org/publications/policy-issues/PI7. pdf), 2010.	Partially Accepted, detail now in the bioenergy annex
5077	11	35	1	35	1	technology is a pretty big factor in mitigation Mosnier, A., P. Havlk, H. Valin, J.S. Baker, B.C. Murray, S.J. Feng, M. Obersteiner, B.A. McCarl, S.K. Rose, and U.A. Schneider, "Alternative U.S. Biofuel Mandates and Global GHG Baker, J.S., B.C. Murray, B.A. McCarl, S.J. Feng, and R. Johansson, "Implications of Alternative Agricultural Productivity Growth Assumptions on Land Management, Greenhouse Gas Emissions, and Mitigation Potential", American Journal of Agricultural Economics, forthcoming, 2012. Mosnier, A., P. Havlk, H. Valin, J.S. Baker, B.C. Murray, S.J. Feng, M. Obersteiner, B.A. McCarl, S.K. Rose, and U.A. Schneider, "Alternative U.S. Biofuel Mandates and Global GHG emissions: The Role of Land Use Change, Crop Management and Yield Growth", Energy Economics, second review, 2012.	Partially Accepted, detail now in the bioenergy annex
5074	11	35	1	35	38	lots of redundancy to above and another opportunity to shorten	Accepted, Revised
2628	11	35	1		5	The diet discussions have been interesting to read even though it doesn't show up again when much of the information is summarized. My only point on this is that it is an individual decision and behavioral change which will be more difficult to achieve so the benefits are less achievable. Other practices are government and organization controlled so there is an institutional change in behavior that is possible, i.e., more likely a broad impact and behavioral change. Is it worth including some discussion on this point?	Accepted, Yes - added for the SOD
2135	11	35	14	35	14	may also add the following reference that directly addressess this trade-off: Muller, A. (2009). Sustainable Agriculture and the Production of Biomass for Energy Use, Climatic Change 94(3-4): 319-331	Accepted, Reference added
16578	11	35	15	35	22	This paragraph assumes that land sparing will result from yield increases, but a later section (p. 69 lines 1-12) indicates, and cites evidence, to show that this assumption is questionable. The chapter needs to be consistent on this controversial question; the treatment on p. 69 is better since it takes into account at least some of the literature that questions land sparing (see also papers by Angelsen, Minang, Perfecto and Vandermeer).	Accepted, Revised
15237	11	35	15			"land sparing" might also have rebound effects at the farm level. As yields increase, economic benefit per piece of land increase, and there is higher pressure to expand farmlands. Ref: Matson, P. A. & Vitousek, P. M. 2006. Agricultural Intensification: Will Land Spared from Farming be Land Spared for Nature? Conservation Biology, 20: 709-710.	Accepted, Revised, reference added.
15190	11	35	2	35	3	repeats earlier sections	Accepted, Deleted here, integrated in demand-side section (11.4.3.)
14437	11	35	20	35	22	This is an important point, that observation suggests that yield improvements have not lead to land-sparing, rather to increase in consumption. As currently written this sentence does not integrate well into the other points made in this paragraph.	Accepted, Revised, reference added.
11988	11	35	21		21	"rebound effects" need to expand what these might be, e.g. increased deforestation for crop land.	Accepted, Revised, reference added.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7080	11	35	23	35	32	The benefits of higher forest productivity in increasing the potential for the land should also be mentioned. A good reference is Fox, T. E. (2004). The Evolution of Pine Plantation Silviculture in the Southern United States. In H. M. Rauscher, & K. e. Johnsen, Southern forest science: past, present, and future: Gen. Tech. Rep. SRS-75 (p. 394). U.S. Department of Agriculture, Forest Service, Southern Research Station.	Rejected, Not peer reviewed and pre-2007
3861	11	35	23	35	32	The amount of land required for biofuel production can be very modest as shown in Pacca and Moreira, 2011. Thus, it may be useful to reconsider the view that large scale biofuels production is a serious competitor for land use - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	Accepted, Revised; mostly moved to bioenergy annex
5589	11	35	33	35	35	If much more use is made of existing NPP, then the competing uses of biomass may be greatly reduced, especially if marginal land and waste land is taken into more productive use.	Partially Accepted, Use of marginal land for bioenergy has now been moved to bioenergy annex and is discussed there
13532	11	35	34	35	34	...may also (or may not)	Accepted, Revised
9454	11	35	36		38	True, but how? This chapter would benefit from discussion specific to AFOLU of how mitigation strategies can be implemented.	Partially Accepted, These issues are discussed in section 11.7 and 11.10
13533	11	35	38	35	38	(OPRE, MEM-ADC, 2001; EEP, MST-MEM, 1994)	Rejected, Not clear what is meant by this comment
15191	11	35	40	25	48	could cut whole paragraph (it's already been covered	Accepted, Whole paragraph has been excluded
3862	11	35	40	35	42	This is a point where the conclusion from Pacca and Moreira, 2011 can be commented. - Pacca, S. and J. R. Moreira, 2011. A Biorefinery for Mobility? Environ Sci Technol. 2011 Nov 15;45(22):9498-505.	Accepted, Whole paragraph has been excluded. But paper is now cited in the bioenergy annex
5591	11	35	40	35	48	. In my opinion, the upper limit for bioenergy crops of 9900 Mha is unrealistic. Much increased bioenergy could come from a much better use of existing NPP.	Rejected, Which would not then increase the area
10610	11	35	40			Update from 2004	Accepted, Update to 2010: HH: I only found numbers for 2007. I hope others have more up-do-date figures!
12415	11	35	41	35	43	The sentence states "In 2050, energy crops might occupy 1.3-9.9 Mkm2(9-65 % of current cropland which amounts to 15.2million km2) if ambitious bioenenergy strategies are pursued." 9-65 % is a very wide interval. Could it be explained which different assumptions are covered by "ambitious bioenergy strategies"?. To move from the existing 1 % (2004) to 65 % of crop area to bioenergy in 2050 is quite more ambitious than to 9%.	Accepted, Whole paragraph has been excluded; issues are now discussed (in revised form) in the bioenergy annex
10611	11	35	41			IEA, 2006 not listed in refs	Accepted, Zotero updated for SOD
5590	11	35	42	35	42	15.2 mio km2 should read 15.2 M km2 (1520 M ha.)	Accepted, Whole paragraph has been excluded.
14732	11	35	43			(Coelho et al., 2012), (H. Haberl et al., 2010)…should be changed to (Haberl et al., 2010; Coelho et al., 2012).	Accepted, Zotero updated for SOD
16579	11	35	45	35	45	Here, and in several other places, the phrase "avoided deforestation" is used as if it were comparable to afforestation, bioenergy or other new activities that reduce available land. It is not; deforestation is the land use change, and "avoided deforestation" is no change. Including it with these other activities effectively makes deforestation the default assumption; I doubt if the authors of the chapter wish to introduce such a bias in favor of one kind of land use change, but against others. (You certainly wouldn't refer to "avoided conversion of cattle pastures", for example!)	Accepted, Terminology has been improved.
14733	11	35	46			the same as above in chronological order, (Wackernagel et al., 1999; Murtaugh and Schlax, 2009 and Dietrich, et al., 2011).	Accepted, Zotero updated for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11168	11	35	6			In this secton, it is enphasized that options in the AFOLU sector often cause competition or trade-off. However, it is mainly happen in the energy crops and not common in forestry sector.	Rejected, This is in the AFOLU sector
5587	11	35	8	35	8	Again I stress that the fist bullet should be:	Rejected, Not a comment
5588	11	35	8	35	8	· Much more use of the existing NPP, especially from wood.	Noted, Increased use of wood is discussed in the demand-side section (11.4.3). The literature very clearly shows that increasing wood use does not always reduce GHG emissions (Werner et al., 2010, Environmental Science & Policy 13, 72–85). Increasing wood harvest in forests results in a C debt because trees are felled that would otherwise store C and would also continue to grow. Simple (e.g. various papers by Holtsmark and Cherubini) as well as complex models (e.g. Boettcher et al. 2012, GCB Bioenergy, vol 4(6), 773-783) show that this results in complex changes in flows and stocks of C in forests as well as socioeconomic systems that are by far not always C neutral. Therefore, "use of existing NPP" cannot be recommended in any case as being C neutral - in fact it is very important to focus on those measures that result in reduced GHG emissions and avoid those that do not succeed in doing so.
8837	11	35				I would appreciate a more elaborated explanation on iLUC, on the mechanism, the available estimation methods (models) and their assumptions. How is the displacement factor estimated and which land use type is targeted in this displacement and in which geographical region.	Accepted, No space to give detailed explanation in ILUC and LUC treatment in the models. Methodology can be accessed via references.
14438	11	35		37		This section repeats land-pressure issues discussed earlier (11.3.2, 11.4.2) such as water scarcity and the impact of a changing diet. There may be opportunities for reducing text length by editing these sections.	Accepted, Revised.
3863	11	36	10	36	11	First generation energy crops can build up carbon stocks while delivering bioenergy, as is the case of sugar cane in Brazil (EPA, 2010). Combining with CCS, the result is negative emission (see Pacca and Moreira, 2009). EPA, 2010 - EPA (Environmental Protection Agency). Renewable Fuel Standard Program (RFS2), Regulatory Impact Analysis. Assessment and Standards Division, Office of Transportation and Air Quality. EPA-420-R-10-006, February (2010). Pacca, S. and J. R. Moreira, 2009. Historical carbon budget of the brazilian ethanol program, Energy Policy, 2009, vol. 37, issue 11, pages 4863-4873	Accepted, Changed from 2nd generation to perennial crops (now includes sugarcane).

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2629	11	36	11			Lands that used to be for food crops and no longer are used for this purpose are typically less productive. Therefore growing energy crops will need considerable amount of fossil inputs as fertilizers, pesticides, etc.	Rejected, The logic is flawed. Some crops grow well on less fertile land.
10109	11	36	16	36	17	The price calculations I assume do not take into account the potential to reduce demans throug less waste and less meat (esp beef) dicussed above in theis chapter.	Noted, Correct - they do not
3864	11	36	18	36	20	Why not quote EPA, 2010 presents a much smaller figure? Why not quote Chapter 2 - Biomass from Special Report on Renewables that concludes that iLUC effects evaluation are decreasing as most fresh literature calculates with improving resolution soil uses? EPA, 2010. EPA (Environmental Protection Agency). Renewable Fuel Standard Program (RFS2), Regulatory Impact Analysis. Assessment and Standards Division, Office of Transportation and Air Quality. EPA-420-R-10-006, February (2010).	Accepted, Strongly revised and moved to bioenergy annex
5593	11	36	23	36	24	What is meant by 100g CO2 eq/MJ? 100 g CO2 contains 27 g C, which has an energy value of about 1 MJ. Why would LUC emissions increase under such crops? In fact the opposite may occur.	Accepted, This paragraph has been excluded due to length restrictions
2630	11	36	24		30	Not all bioenergy production needs to deforest. This only happens when converting forests to ag production, e.g., palm oil.	Accepted, Revised.
7081	11	36	27	36	30	It is more than just the avoidance of deforestation - it is also, as clearly noted in the Fourth Assessment Report, the need for sustainable forest management to maintain or increase carbon stocks while producing a continued output of product. (Forth Assessment Report, WGIII, Ch. 9, Executive summary)	Accepted, This paragraph has been excluded due to length restrictions
5594	11	36	28	36	29	As stated above, the avoidance of deforestation could occur through a more fully use of NPP, increasing agricultural productivity, changing diet and tempering population increase.	Accepted, This paragraph has been excluded due to length restrictions
16580	11	36	31	36	31	Another place where "avoided deforestation" is combined with land use changing activities, making deforestation the default.	Accepted, Terminology has been improved.
5078	11	36	31	36	31	the statement "However, restrictions of agricultural expansion resulting from avoided deforestation, expansion of 31 energy crop areas, afforestation and reforestation are expected to increase food and feed prices and 32 costs of agricultural production. Integrated assessments of land use based mitigation options 33 indicate that conserving natural" could be stronger. see the discussion in Abbott, Philip; Hurt, Christopher; and Tyner, Wallace E. What's Driving Food Prices? Farm Foundation Issue Report, July 2008. www.farmfoundation.org. there is a 2012 update	Noted, This paragraph has been excluded due to length restrictions
5595	11	36	31	36	41	This paragraph states that one outcome of LUC may be an increase in food prices. But this will most likely change food eating habits to more grain eating rather than meat consumption. This is what you have previously argued, so should it not be encouraged?	Rejected, This paragraph has been excluded due to length restrictions
16581	11	36	34	36	36	The Wise et al. paper on which these comparisons are based assumes a world-wide carbon tax on fossil fuels. This unlikely assumption is critical to its prediction of increased food prices. Thus I suggest you drop this first sentence.	Accepted, This paragraph has been excluded due to length restrictions
15192	11	36	4	36	30	repetitive of bioenergy ection	Accepted, This paragraph has been excluded due to length restrictions
5592	11	36	4	36	30	This whole paragraph assumes that the will be no increased use of NPP and that energy crops will be grown on converted forests and woodlands. This is highly unlikely. Even when natural forests are converted to eucalyptus plantations, the annual growth of eucalyptus is at least 50% more and with the use of the wood for charcoal production, which is then used for steel manufacture in place of fossil fuels gives a positive GHG balance after about 15 years and thereafter.	Accepted, This paragraph has been excluded due to length restrictions
13534	11	36	41	36	41+	Indeed, it's more relevant and useful develop trade agreements and finance controls that could reduce or avoid the artificial rise of food prices, which have doubled and tripled, well before the end of the century.	Accepted, Revised by including text on trade as an adaptation option..

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16582	11	36	42	36	45	This sentence understates the point. Forest conservation will tend to incentivize increase yields, by reducing the supply of cheap land for agricultural expansion. Limiting expansion on the extensive frontier will lead to more expansion on the intensive frontier. Thus forest conservation is not simply something that can be compensated by increased yields, but also will tend to stimulate them.	Accepted, This paragraph has been excluded due to length restrictions
5079	11	36	42	36	42	the study by Mosnier, A., P. Havlk, H. Valin, J.S. Baker, B.C. Murray, S.J. Feng, M. Obersteiner, B.A. McCarl, S.K. Rose, and U.A. Schneider, "Alternative U.S. Biofuel Mandates and Global GHG emissions: The Role of Land Use Change, Crop Management and Yield Growth", Energy Economics, second review, 2012. looks at global issues with bioenergy and yield growth	Noted, This paragraph has been excluded. Publication could also not be found.
2631	11	36	47		49	The list includes most of the factors that one would assume is soil degradation. Remove soil degradation from the list but introduce it.	Rejected, Unclear comment of the reviewer.
10110	11	36	48	36	48	This argumentation forgets that it means also increased income for farmers, we are taking about agricultural investments not costs, the investments can have high/or acceptable returns, often there is a time lag before the increased productivity will be realised, but since we are at the same time talking about economic development and poverty reduction, the investments are bot economically, socially and environmentally justified. Further it is assumed that it is not possible to increase productivety or intensify without negative environmental impacts, we have a lot of evidence of farming practices and especially systems where productivity (per land area) can be increased sustainably. the issue is very much about research politics and what kind of technical solutions are promoted.	Noted, This paragraph has been excluded due to length restrictions
11816	11	36	5			LUC is here introduced the first time as an abbreviation but has been used already earlier in the document.	Accepted, Revised
5379	11	36	11	36	16	Suggest adding a citation to Rooney et al (2012) as this speaks directly to the point being made in this passage Rooney, R.C., S.E. Bayley, and D.W. Schindler, Oil sands mining and reclamation cause massive loss of peatland and stored carbon. Proceedings of the National Academy of Sciences, 2012. 10.1073/pnas.1117693108	Accepted, This paragraph has been excluded.
14676	11	36	33	36	36	Production of bioenergy can keep energy prices down. If energy prices rise, food prices will rise. With biofuels in the mix the relationship between energy prices and food prices becomes more complicated.	Noted, Considered, but no peer-reviewed literature could be found to support the complex hypothesized feedbacks proposed by the reviewer

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15615	11	36	45	36	49	As listed in IAASTD, 2009 (section 7.3.2.4, pp. 471-72), animal welfare is important. The possible negative effects of intensification on animal welfare should be added. And, as mentioned above, the breadth of scientific evidence demonstrating that intensively confined animals are frustrated, distressed, and suffering under modern production schemes is extensive, conclusively substantiating that battery cages for egg-laying hens and crates for pregnant sows and calves are simply not appropriate environments. Duncan I.J.H. (1970). Frustration in the fowl. In: Freeman B.M. and Gordon R.F. (eds.), Aspects of Poultry Behaviour (Edinburgh, Scotland: British Poultry Science Ltd., pp. 15-31). Špinka M. (2006). How important is natural behaviour in animal farming systems. Applied Animal Behaviour Science 100(1-2),117-28. Baxter M. (1994). The welfare problems of laying hens in battery cages. The Veterinary Record 134(24), 614-9. Dawkins M.S. (1990). From an animal's point of view: motivation, fitness, and animal welfare. Behavioral and Brain Sciences 13, 1-61. Vestergaard K. (1984). An evaluation of ethological criteria and methods in the assessment of well-being in sows. Annales de Recherches Vétérinaires (Annals of Veterinary Research) 15(2), 227-36. Broom D.M., Mendl M.T., and Zanella A.J. (1995). A comparison of the welfare of sows in different housing conditions. Animal Science 61, 369-85. European Commission, Scientific Veterinary Committee, Animal Welfare Section. 1995. Report on the welfare of calves. Adopted November 9. Available at: http://ec.europa.eu/food/fs/sc/oldcomm4/out35_en.pdf.	Accepted, Revised as suggested.
5596	11	37	1	37	50	This page is a mainly negative take on bioenergy production, except line 43 which talks about the multifunctional use of land	Rejected, Statement - not a comment.
16583	11	37	10	37	10	Clarify whether by "freshwater use" you mean withdrawal or consumption.	Accepted, Revised
5825	11	37	12	37	15	Please correct sentence, it is not understandable.	Accepted, Revised
10111	11	37	13	37	14	It has to be remembered that reforestation of watershed aread can actually be an important way to improve the water availablility for agriculture downstream	Rejected, Statement - not a comment
13330	11	37	18	37	21	This sentence is not clear. The term shadow prices requires some explanation as well.	Accepted, Revised
13535	11	37	26	37	26+	It would be useful, look into the links between prices, shadow prices, real costs, so as different water management practical water management solutions applied by local communities, based on needs, use value, and the importance of supposed "externalities" (Kumar, A., Huici C.,J.,1996; Postel, S., 1989; Rogers, P., et al., 2001).	Rejected, Unclear comment of the reviewer, reference could not be found.
5826	11	37	27	37	34	Please re-order paragraph, can be shortened by 2 - 3 lines.	Accepted, Revised
15351	11	37	27	37	28	http://www.maweb.org/en/index.aspx	Rejected, Unclear comment of the reviewer.
15352	11	37	28	37	31	Sajwaj, T et al (2008) The Eliasch Review: Forest management impacts on ecosystem services, AEA http://www.ibcperu.org/doc/isis/11528.pdf	Rejected, Unclear comment of the reviewer.
5080	11	37	32	37	32	I think the statement "Biodiversity conservation is therefore a necessity," is an unsubstantited conclusion and should be toned down, perhaps use highly desirable. This is not your subject	Accepted, Revised
10250	11	37	35	37	42	Already said p.30	Accepted, Revised
5082	11	37	35	37	35	food demand yet again. Somne serious reorganization is needed. (Yes I know it was glued together although this is the fod not the zod and it has a lot of redundancies)	Accepted, Revised
16584	11	37	36	37	38	Same point as numbers 47, 49 and 50 -- need to distinguish beef from other animal products, for which the land requirements are much less.	Accepted, This paragraph has been excluded due to length restrictions
13536	11	37	40	37	40	if to be concerned only about GHG emissions, also show	Rejected, Unclear comment of the reviewer.
5508	11	37	43			A diagram to illustrate multi purpose land use and associated benefits would be helpful	Accepted, See completely newly written section 11.1., including a figure making exactly that point

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10112	11	37	43	37	50	This is a central insight and the basis for landscape level land management, should not be bureid at a bottom of the bioenergyargumentation only	Accepted, Revised; bioenergy issues have mostly been moved to the Bioenergy Annex
2136	11	37	6	37	6	Add the waste-aspect as a third point to land use and yields, e.g. by adding the following "Hereby, the 30-40% of global food wastage (*add a cross reference*) should not be neglected, as reducing this wastage would also lower pressure to increase yields and further intensify production in the context of fewer land availability for crop production."	Partially Accepted, This paragraph had to be excluded due to length restrictions.
15193	11	37	7	37	26	THIS is the land/water tension	Accepted, Revised; most material was moved to the Bioenergy Annex
3867	11	37	7	37	14	It is worthwhile noting that sugar cane in Brazil usually doesn't require artificial irrigation. How much land will be used in order to achieve 70% increase in water price in Latin America?	Partially Accepted, This paragraph had to be excluded due to length restrictions (parts of the material are now in the bioenergy annex).
3866	11	37	7	37	8	Why not comment AR4, Chapter 2 - Bioenergy main conclusion here. Bioenergy production can be performed in the right and in the wrong way. When using the right way there are significant benefits.	Partially Accepted, This paragraph had to be excluded due to length restrictions (parts of the material are now in the bioenergy annex).
14677	11	37	21	37	22	C4 plants generally have a higher water use efficiency than C3 plants. If a C4 plant replaces C3 plants transpiration may go down.	Partially Accepted, This paragraph had to be excluded due to length restrictions (parts of the material are now in the bioenergy annex).
5380	11	37	27	37	34	What is said here is certainly true. However this seems a little too black and white. If we do not reduce GHG emissions that will certainly have a negative impact on biodiversity. Biodiversity and GHG mitigation will have to be balanced. The text here reads as if it is obvious that protection of biodiversity is the more worthy goal. The point that climate change is bad for biodiversity is made a few pages down in Chapter 11. Perhaps a pointer could be provided here to this later text so the reader understands the authors of chapter 11 see this as a nuanced balancing of goals.	Accepted, Revised; mostly moved to bioenergy annex
11209	11	38				Table 11.6: The section on "Institutional arrangements" should make mention of free, prior and informed consent (FPIC) and could make specific reference to legal recognition of communal tenure regimes of indigenous peoples	Partially Accepted, The content of this table has been moved. Consideration to FCIP as one option has been included. Land tenure and use rights for indigenous people and local communities has been stated in various sections
15972	11	38				good figure, readability should be improved and discussed.	Accepted, Design improved
5827	11	38				Where do you subsume e. g. trade relations and the question of production for subsistence economy or cash crops?	Accepted, Trade and subsistence economy (also informal sector) included in economic factors
5829	11	38				Conditions can also be prohibitive, not only enabling. The figure could also be deleted because it offers no additional information then contained in the text.	Rejected, There are other comments highlighting the usefulness of the graphic. The term "enabling conditions" is well known as such. Of course in absence of such conditions the planning, implementation and monitoring will be more difficult - if possible.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11169	11	38				The intention of this figure is not clear. This figure must be improved.	Partially Accepted, We got positive and negative comments about this graph. We improved the design for the SOD
5597	11	38	12	38	13	I entirely agree with Herold (2009)	Noted,
5828	11	38	12	38	13	This example is not clear. Besides, deforestation monitoring does not require national or even local capacities: it can be done by remote sensing.	Rejected, Detailed monitoring can not be done only with remote sensing, as the quality and readability of the imagines is not always as high as required. This is especially the case in tropical countries. Additionally, local capacities are also needed for using remote sensing in developing countries. Herold et al 2009 discuss it in detail. Further, the FCPF programs also address this issue in their countries, as one relevant element, especially for REDD+
5598	11	38	15	38	15	"--- for example promoting agroforestry plantations". I would use the word systems rather than plantations. In Asia they have the taungya system to grow teak with farmers growing crops for 2 to 3 years, while weeding under the trees and in East Africa they have the shamba system with a similar outcome, but most agro-forestry systems are based on short-rotation trees scattered in the fields or in lines, mainly to improve the soil fertility or to enhance soil fertility while providing brows. Some 'trees' may be on a 1-year rotation, but generally 3-5 years. The trees are not replanted as they coppice.	Accepted, Term improved in the SOD
10168	11	38	15	38	16	I lack a specific explanation on how agroforestry improves food security	Accepted, Many agroforestry systems mix wood species with crops and/or with trees producing food. These systems sequester C from the atmosphere and also produce food. A good example are the agroforestry gardens used by farmers in Africa, Asia and Latin America. References are cited in the text. Further references can be found under the publications of ICRAF, including its annual report 2007 - 2008 or Pye-Smith C. 2008. Farming Trees, Banishing Hunger. How an agroforestry programme is helping smallholders in Malawi to grow more food and improve their livelihoods. Nairobi: World Agroforestry Centre.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14439	11	38	17	38	20	Text can more strongly state that development must consider the benefits of mitigation strategies with respect to food security. Focusing on mitigation at the expense of creating viable cropping systems which promote local access to nutritious food should not be a possible outcome. We should not endanger nutrition in developing countries to offset the high energy use of developed countries.	Accepted, We agree with the comment. It has been noted repeatedly in the chapter.
11302	11	38	21			This figure may not be necessary. The graphic effects obscure the message which the text alone may explain better anyhow.	Partially Accepted, We got positive and negative comments about this graph. We improved the design for the SOD
5083	11	38	3	38	3	the statement "as well as in chapter 4 of the AR5" is odd. Ar5 is not out yet what are you referring to?	Rejected, It is a cross reference within the AR5.
7616	11	38	5	38	5	"sustanable future" is incomprehensible term for citizen. This trem would be improved.	Partially Accepted, Sentence improved
15616	11	38	8	38	10	The social and human framework in Table 11.6 should include animal welfare. See, e.g. studies including animal welfare in sustainability analyses: Stern S., U. Sonesson, S. Gunnarsson, I. Öborn, K.-I. Kumm, and T. Nybrant (2005). Sustainable development of food production: a case study on scenarios for pig production. Ambio 34(4), 402-407. Mollenhorst H., P.B.M. Berentsen, and I.J.M. De Boer (2006). On-farm quantification of sustainability indicators: an application to egg production systems. British Poultry Science 47(4), 405-417. Additionally, people around the world care about the welfare of animals raised for food. World Society for the Protection of Animals (2007). WSPA International Farm Animal Survey (China & Brazil), Dec. 14; Zogby International (2003). Nationwide views on the treatment of farm animals. Poll for the Animal Welfare Trust; Lusk J.L., F. B. Norwood, and R.W. Prickett (2007). Consumer preferences for farm animal welfare: results of a nationwide telephone survey. Available at http://asp.okstate.edu/baileynorwood/AW2/InitialReporttoAFB.pdf; and Penn, Schoen & Berland Associates (2005). Poll for the Humane Society of the United States, Washington, DC. (Illustrating consumer concern for farm animal welfare in the United States of America.)	Noted, Thanks for the references. Animal welfare can be included in social issues. Why? Because the definition of animal welfare is based on cultural values
10251	11	38	1	41	49	This section can be improved with recent papesr that showed/illustrated possibilities of synergy between development and mitigation in AFOLU (e.g. Branca et al. 2013. (available on line) Capturing synergies between rural development and agricultural mitigation in Brazil. Land Use Policy, 30,1 507-518. Also International agencies involved in development activities in the AFOLU sector (FAO, World Bank, GEF, IFAD,...) started to incorporate the "mitigation" (and also "adaptation") aspect, by developing indicators or tools to maximise synergies (see for instance the UNEP Year Book, 2012; The GEF Carbon Benefits project; the Ex-ante carbon balance Tool developed by FAO: http://www.fao.org/tc/exact).	Accepted, Thanks for the references. Were considered when drafting the SOD
7617	11	39				Replace "Sustainable manegement of plantations" with "Sustainable manegement of planted forest" as "Plantation" meams short rotation forestry.	Accepted, Term changed
5599	11	39				P39 Table 11.7 Natural assets - Forestry. The statement GHG emissions from forests for rural energy (firewood) are highly relevant in developing countries is wrong. Firewood and wood for charcoal accounts for an estimated 2036 MT dry wood out of a total wood consumption of 2422 Mt dry wood. The annual growth of accessible wood is an estimated 10328 Mt dry wood, (K, Openshaw 2011 –ref above). When burnt, the wood gives off CO2 and some products of incomplete combustion, but if not burnt it will rot giving of CO2 etc. or be eaten by termites etc, which also give off CO2 and CH4 etc. – the carbon cycle. You use it or you lose it!	Partially Accepted, GHG emissions from forest for rural energy are relevant not only because of the carbon balance but because of its importance for the livelihood. Mitigation activities related to firewood will therefore have an impact not only on GHG balance but also on the whole livelihood

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5600	11	39				Natural assets – Bioenergy. Under natural assets, the stated points are mainly negative. First and foremost the use of NPP should be emphasized. While monoculture has its negative aspects, the most successful natural forests are mainly monoculture –northern temperate forests. The statement about potential increases in GHG emissions should be qualified. Again under livestock, silvopatoral activities have a positive impact when replacing degraded grasslands	Accepted, The whole table has been moved to 11.7 and redrafted
13970	11	39				under livestock and manure, a differentiated treatment of manure issues in different management systems is required. The GHG contributions of intensive feedlot manure lagoons are different than the contributions of manure from dispersed pastoralism.	Accepted, The whole table has been moved to 11.7 and redrafted
13971	11	39				under cropland management, the claim that increasing productivity has an impact on areas required for food security cannot be made uncritically. Food security is complex, and the effects of increased productivity on who eats is not straightforward, let alone, as mentioned earlier, the impacts that may or may not have on other land uses.	Accepted, The whole table has been moved to 11.7 and redrafted. We agree with the reviewer on the challenges for attributing co-benefits and risks, especially in a global report. For that reason we refer to "potential" effects
13972	11	39				under cropland managements, add the word negative in the sentence on large scale monocultures	Accepted, The whole table has been moved to 11.7 and redrafted
13973	11	39				under livestock and manure, add the word positive in the sentence on silvopastoral activities	Accepted, The whole table has been moved to 11.7 and redrafted
14440	11	39		40		Tabulating concepts is a very helpful format for concisely presenting the complex interactions discussed. The table should be reviewed for formatting and can be made more concise to improve readability.	Accepted, The whole table has been moved to 11.7 and redrafted
12416	11	39	1			Comment on column on forestry and/or bioenergy, and the row on natural assets: Cutting of boreal forest (and other slow growing forests) may give higher short term emissions of GHG compared to not cutting. The time lag lasts for several decades before the released amount of CO2 is on the same level as if the forest continued growing. Repeated cutting magnifies this time lag. This aspect is important for policy makers to be aware of.	Rejected, Time frame in the context of AFOLU mitigation options is discussed in p. 41 line 25 ff
9455	11	39	1		1	This table is valuable, but seems mischaracterized. It should be labeled "Factors Affecting Mitigation Activities and Mitigation Outcomes."	Accepted, The whole table has been moved to 11.7 and redrafted
11303	11	39	1			There is too much text in this table for it to be useful as a graphic. It would be much easier to read as listed bullets.	Accepted, The whole table has been moved to 11.7 and redrafted

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15617	11	39	1	40	2	Table 11.7 should build on the AR4 WGIII Chapter 8, Table 8.8, which at least included qualitative analysis of the effects (+, -, or ?), and explanation in the notes. Table 11.7 here should be made more clear for whether impacts are positive, negative, or unknown. Additionally, the section on "Livestock and manure" (for the "Social and human Framework" and "Natural Assets") should include animal welfare to the extent that AFOLU mitigation options may include intensification that leads to more intensive confinement or other welfare-depriving practices. The breadth of scientific evidence demonstrating that intensively confined animals are frustrated, distressed, and suffering under modern production schemes is extensive, conclusively substantiating that battery cages for egg-laying hens and crates for pregnant sows and calves are simply not appropriate environments. Duncan I.J.H. (1970). Frustration in the fowl. In: Freeman B.M. and Gordon R.F. (eds.), Aspects of Poultry Behaviour (Edinburgh, Scotland: British Poultry Science Ltd., pp. 15-31). Špinka M. (2006). How important is natural behaviour in animal farming systems. Applied Animal Behaviour Science 100(1-2),117-28. Baxter M. (1994). The welfare problems of laying hens in battery cages. The Veterinary Record 134(24), 614-9. Dawkins M.S. (1990). From an animal's point of view: motivation, fitness, and animal welfare. Behavioral and Brain Sciences 13, 1-61. Vestergaard K. (1984). An evaluation of ethological criteria and methods in the assessment of well-being in sows. Annales de Recherches Vétérinaires (Annals of Veterinary Research) 15(2), 227-36. Broom D.M., Mendl M.T., and Zanella A.J. (1995). A comparison of the welfare of sows in different housing conditions. Animal Science 61, 369-85. European Commission, Scientific Veterinary Committee, Animal Welfare Section. 1995. Report on the welfare of calves. Adopted November 9. Available at: http://ec.europa.eu/food/fs/sc/oldcomm4/out35_en.pdf. Additionally, the Table 11.7 section on "Economic Factors" under "Livestock and manure" could include negative impacts on small-holders, to the extent that AFOLU mitigation options indicate industrial farm animal production (IFAP) practices. Mirle C. (2012). The industrialization of animal agriculture: implications for small farmers, rural communities, the environment, and animals in the developing world. The 10th European International Farming Systems Association Symposium in Aarhus, Denmark, July 1-4. Workshop 1.3: Understanding agricultural structural changes and their impacts, to support inclusive policy dialogue and formulation. Available at: http://www.ifsa2012.dk/downloads/WS1_3/ChetanaMirle.pdf.	Accepted, We checked the references. Many of them are either too old for this assessment report (which focuses in new scientific outputs after the AR4) or non-scientific literature. We then looked for recent references that consider the issues highlighted by the reviewer.
7337	11	39				under box Natural Assets/Forestry: 'Vulnerability of forest ecosystem to climate change needs to be better understood." Of course it needs to be better understood (doesn't everything in this report?), but we do know quite a bit about this, and as expected, there is a wide variation on vulnerability, depending on species and location. My group has been working on this topic for 17 years, so I include a couple of citations. I would rather see you put something like "Certain forest ecosystems are highly vulnerable to climate change, others not so much". Citations: 1) Iverson L., Matthews S., Prasad A., Peters M. and Yohe G. 2012. Development of risk matrices for evaluating climatic change responses of forested habitats. Climatic Change 114: 231-243. 2) Iverson L.R., Prasad A.M., Matthews S.N. and Peters M. 2008. Estimating potential habitat for 134 eastern US tree species under six climate scenarios. Forest Ecology and Management 254: 390-406. 3) Swanston C., Janowiak M., Iverson L., Parker L., Mladenoff D., Brandt L., Butler P., St. Pierre M., Prasad A.M., Matthews S., Peters M. and Higgins D. 2011. Ecosystem vulnerability assessment and synthesis: a report from the Climate Change Response Framework Project in northern Wisconsin. U.S. Department of Agriculture, Forest Service, Northern Research Station, Newtown Square, PA. p. 142.	Accepted, The whole table has been moved to 11.7 and redrafted. Further, the discussion on vulnerability and adaptation is located in section 11.5. References checked. Some were too local, we were looking for meta-analysis for validating results
15974	11	4	1	5	26	The executive summary can be improved to better summarize the remainder of the chapter	Accepted, Revised for SOD
14551	11	4	1	5	26	Exec summary general comment: obviously it is hard to write this until all the numbers are in. I would like to see sub headings for difference AFOLU sectiors (e.g. REDD, Aff/ref, agric, livestock,bioenergy. Numbers in each sector.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2591	11	4	1	5	26	The text focuses a lot on the multi-functionality and underestimate the role of the creation of intergrated agricultural activities, which gives priority to food and fibre production. But, at the same time, it does exploit the opportunities to produce bioenergy. There a lot to do in terms of R&D to find adequate solutions in terms of finding species and varieties that adapt to arid zone.	Rejected, Statement - not a comment
9183	11	4	1	5	26	You can cut emissions drastically by shrinking agriculture and changing food consumption pattern from meat to vegitable - isn't it an issue in this chapter?	Noted, Sure - all of 11.4 deals with this
14410	11	4	10			Inconsistent. 1.1-1.3 GtC per year is far less than 1/3 of emissions. (Total emissions of CO2 in 2007 were 8 GtC.) Please clarify whether the absolute figure or the 1/3 share is correct.	Accepted, Checked numbers and revised for SOD
14554	11	4	10			this is not the range of ucnertainty, see comments on that section later	Accepted, Gave uncertainty range where published
14420	11	4	10			What does 11.2 refer to? A section? Table?	Accepted, Revised for SOD
16523	11	4	11	4	13	The recent reductions in estimates of emissions from deforestation, as well as increases in fossil fuel emissions, make the "about one-third" estimate out of date. And in fact it is misleading to use the words "is responsible for" to describe calculations based on estimates for the 1980s and 1990s. For a report coming out in 2013, those decades clearly should be described with "was", not "is". I urge you to calculate the proportion based on the most recent estimates, for the decades of the 2000s, and for all GHGs (not just CO2) in both numerator and denominator, so as to give a reasonable estimate of the role of AFOLU in the overall climate change problem.	Accepted, Updated for 2010
12359	11	4	11	4	12	Please consider to include "fire" in this sentence, since it is one of the main contributors from AFOLU according to Figure 11.1 a)	Accepted, Revised for SOD
6820	11	4	11			It would be helpful to recognise that in terms of the atmosphere forestry is a sink or reservoir and agriculture is a source, with the conversion of forest to agriculture (accounted as) a source. Deforestation causes a rapid carbon stock loss, but the emission (UNFCCC source) may occur at another time/place due to processes such as combustion (eg bioenergy) and decay (eg landfill of wood products). The key point to make is what is the optimal outcome for land use in relation to GHG, before other factors are taken into account. for example this would include high on-site stocks of carbon, regenerative site management (mantaining/enhancing soil carbon, fertility etc), low external inputs (fertilisers, pesticides etc), low fossil fuel energy inputs, and sustainable harvest levels. the quantified GHG impacts are highly dependent on the accounting system adopted ie boundaries (as shown for forestry in AR4) and baselines.	Accepted, Revised for SOD
12866	11	4	11	4	11	Change this to read "for one-fourth of anthorpogenic greenhouse pas emissions" because WGIII, Chapter 5, page 4 says 23%.	Partially Accepted, Updated for 2010
11290	11	4	11	4	13	An important point -- and excellent justification for the integrated nature of this chapter -- which is clearly explained in Muller 2010 (Muller, Adrian, Julia Jawtusch and Andreas Gattinger 2011: 'Mitigating Greenhouse Gases in Agriculture'. Stuttgart: Diakonisches Werk der EKD. Original source Bellarby, J et al 2008: 'Cool Farming: Climate impacts of agriculture and mitigation potential'. Amsterdam: Greenpeace International.). The authors may wish to reference these articles in this chapter.	Accepted, Added reference to Bellarby et al. and Mueller et al.
5026	11	4	12	4	12	is rice "soil and nutrient" I might stick in the word rice	Accepted, Revised for SOD
16524	11	4	13	4	13	The phrase "biomass burning….also" implies that emissions from fires are separable from, and additional to, emissions from deforestation and forest degradation. If the authors have in fact separated out a biomass burning component of emissions it should be explained further on in the chapter; if not, this phrase should be deleted.	Accepted, Revised by Jo House

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14555	11	4	13	4	14	biomass burning often little net emission as carbon taken up during growth (apart from land clearing fires and peatland fires).land clearing firest in forets already covered by deforestation. Need to be careful about different types of fire in the main text, see comments there. But if you are going to have smaller additional contributions then there are others. E.g could add in land use change other than deforestation here such as expansion of agricultural land into grasslands and peatlands...	Accepted, Revised by Jo House
10578	11	4	13			Add …agricultural "residue" burning	Accepted, Revised for SOD
13950	11	4	13			While I recognize that production of fertilizers is accounted for in another IPCC category, the emissions from production are inextricably linked to their use in agriculture and should be mentioned/referenced here.	Accepted, Revised for SOD
14421	11	4	15			What does 11.3 refer to? A section? Table?	Accepted, Revised for SOD
14556	11	4	16	4	19	I find the separation by demand and supply side measures a bit odd and prefer just to see sectorial. E.g. some of reducing losses of waste in food seems to be production rather than demand. It is not clear where bioenergy and Aff/ref fit as they are produced in response to a demand for mitigation. REDD is reducing demand and relocationg production. i would prefer just to see by option without this separation. howevr ican see a lot of work has gone into this thinking so also happy to live with it as long as it is better explained , eg, mention here that REDD aff/def and nioenergy are considered as production side options.	Partially Accepted, Terminonology changed (supply side and demand side) but discussed together
7531	11	4	16	4	17	Dividing mitigation options into production-side and demand-side is not good idea. Even AR4 deals with both side options in Chapter 9. All options are linked tightly each other. All options should be summerized in a table. Categorization by sectors and common options (i.e. Agricilture, Forestry, other land uses , land use change and bioenergy) is enough.	Rejected, See other comments giving the opposite view. In AR4 the agriculture chapter did not consider demand side options at all, so this is a very useful addition
9438	11	4	17		17	Normalizng across land units presumes that land units are fungible. They are not fungible economically or biophysically. Land area is poor normalization technique for AFOLU interventions.	Rejected, I don't think it assumes fungibility
5534	11	4	18	4	18	As stated above, wood consumption could be increased considerably without affecting the growing stock of wood.	Rejected, Do not know of evidence to support the reviewers statement
13951	11	4	18			changes in diet, including with regard to consumption of animal products -- should be specifically mentioned here.	Accepted, Revised for SOD
6821	11	4	19			Displacement of fossil fuels with bioenergy is important under the current accounting system, but this does not reflect the atmospheric impact. Burning carbohydrate emits more C per unit of energy than burning hydrocarbon.	Rejected, Bioenergy can substitute for fossil fuel, thereby reducing emissions in the energy sector
7532	11	4	19	4	19	Replace "displacement " with "substitution" which is used in AR4.	Accepted, Reworded throughout
7533	11	4	19	4	19	Not only bioenergy. " ... the substitution of fossil fuels through bioenergy and use of wood products .." is better.	Accepted, Revised for SOD
7052	11	4	19	4	19	The mitigation benefits of forest-based products go far beyond "bioenergy" and include the indirect displacement of fossil fuels via production and use of biomass based products that can substitute for more GHG-instnsive products", especially when done in a "cascading" framework, as described in Dornburg, V. and A. Faaij, "COst and CO2-emissions reduction of biomass cascading: methodological aspects and case study of SRF poplar", in Climatic Change (2005) ,71: 373–408.	Accepted, Revised for SOD
5390	11	4	2	5	26	The Executive Summary need to be shorten to one page or less	Rejected, This is not the guidance we have so far received
6819	11	4	2		8	The unique feature of AFOLU related to GHG is its ability to perform as a sink, source or reservoir. Furthermore it has perhaps the greatest potential for both mitigation and adaptation impacts.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2260	11	4	2	93	26	This entire Chapetr fails to understand that the entire agricultural and forestry industry has as its prime objective the removal of carbon dioxide from the atmosphere. Any increase in either agriculture or forestry should therefore have the benefit of mitigation credits. At present, only forestry is considered to qualify for such benefits. This is completely unfair to the agricultural industry which finds itself penalised for its relatively minor emissions of methane, whch have no effect on the climate, since the atmospheric concentrations are not rising, but gets no credit for its much greater contribution to sequestering carbon dioxide.	Rejected, The statement is untrue. Many activities in the AFOLU sector emit more GHG to the atmosphere than is gained in C sinks. The statement about CH4 having no climate impact is also incorrect. An ill informed comment.
7530	11	4	2	4	3	The first sentence "since it has a central role in providing food security, water and livelihoods, and supporting sustainable development" is not appropriate as the first message for AFORU. It is good only for Agriculture. AFOLU is unique because it contributes mitigation by both emission reduction and removal from the sight of climate change mitigations. And it should be stressed that land use change / deforestation is one of key issues at the beginning.	Accepted, Revised for SOD
11111	11	4	2			"Agriculture" has several definitions. Of all definitions, one is related to the LULUCF context where agriculture is limited to animals, and specific aspects of land use, whereas LULUCF includes the rest. In this respect, I suggest that the definition of AFOLU is repeated here (or there is a link to the IPCC 2006 Guidelines). This is important to link all emission and removal data to the correct definition of agriculture. See e.g. Figure 1.3 (Chapter 1) where "Animal husbandry" and "Agriculture" are treated separately - what is then "Agriculture"?	Accepted, Figure 1 in Chapter 1 needs to be revised. Agriculture includes animal husbandry, if the latter means raising livestock for food
2608	11	4	2	5	26	The Executive summary does not reflect the key points made in the chapter. The distinction between forest and agriculture land use, especially as related to bioenergy, needs to be clarified. The inclusion of fertilizers is not applied to forests except on industrial lands and that is a small percent of our forests.	Partially Accepted, Revised for SOD
5027	11	4	20	4	20	you say "changes in diet can have a significant impact" but getting that implemented may be very hard and I would qualify that some	Accepted, Qualified the statement to recognize it is hard
14557	11	4	21	4	22	sentence doesn't tell us much unless more information given. Also this is just true for the different options regardless of semand or suplly side. "May" is a weak term, trade offs are inevitable, synergies exist and will be ciritcal to exploit	Accepted, Revised for SOD
13952	11	4	23			"the nature of the sector" is too vague to be useful in an executive summary	Accepted, Revised for SOD
5704	11	4	25			Replace 'sounding' with word "surrounding".	Accepted, Revised for SOD
15142	11	4	26	4	26	replace "between" with 'among"	Accepted, Revised for SOD
5028	11	4	26	4	26	limited available resources are also an item forcing tradeoffs (investment capital, land, wate, human capitalr)	Accepted, Revised for SOD
14558	11	4	28	4	30	does this sentence need a confidence qualification.	Accepted, Yes
14266	11	4	3	4	4	Reption of Reference "Godfray et. al 2010" may be corrected	Accepted, Deleted
15141	11	4	3	4	4	duplicated reference	Accepted, Deleted
14552	11	4	3	4	4	I don't think you make the right case for it being a unique case, after all energy has a central role in providing energy security. It is rather that use of land for cliamte mitigation cometes with other uses or priorities of land such as food production and natural capital	Accepted, Reworded
5024	11	4	3	4	3	agriculture is also taking on an increasing role in energy	Accepted, Revised for SOD
5025	11	4	3	4	3	you might isert fiber or building materials or forest products to encompass forest	Accepted, Revised for SOD
5023	11	4	3	4	4	agriculture has a central role in providing … water? Really? Words must be missing	Accepted, Revised for SOD
11974	11	4	30		31	"Sustainable management of agriculture, forests...". Excellent statement. Completely agree.	Noted, Thank you
11801	11	4	30	4	31	This sentence as formulated here is so general and unspecific that it does not convey much information.	Accepted, Removed in edit
13953	11	4	30	4	31	I would add here the need for increased research and diffusion of research.	Rejected, Do scientists not always say that?

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7053	11	4	31	4	31	To accurately reflect the literature and give adequate attention to the critical role of sustainable forest management, the following conclusion (originally in the fourth assessment report) should be repeated here. i.e. "In the long term, sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual yield of timber, fibre, or energy from the forest, will generate the largest sustained mitigation benefit". (Fourth Assessment Report, WGIII, Chapter 9, Executive Summary) This finding remains true in spite of the recent fondness for focusing on "carbon debt". The carbon debt research does not contradict the important finding in the Fourth Assessment Report. Instead, it highlights the fact that various systems where forest carbon stocks are reduced to produce biomass require differing times to reach the point where the long-term benefits of using the biomass are realized. The fact remains, however, that "In the long term, sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual yield of timber, fibre, or energy from the forest, will generate the largest sustained mitigation benefit".	Accepted, Has been reflected here - with similar wording
9439	11	4	32		32	Will the terms top-down and bottom up be defined elsewhere in WG3? If not, I think that they should be defined here	Accepted, Replaced with more explicitly descriptive terms
13954	11	4	35	4	36	moreover an overriding concern for food security will require careful evaluation of mitigation options in context-specific manner	Accepted, Revised for SOD
5698	11	4	36	4	40	Cost of mitigation per tCO2eq is mentioned for agriculture sector. However, for forestry mitigation potential, the same is not mentioned. It will be advisable to add this figure.	Accepted, Revised for SOD
15955	11	4	37	4	37	A range should be given for agriculture, with a lower limit, as is done for forestry	Accepted, Revised for SOD
15143	11	4	37	4	39	with falling carbon price, should take care in what kind of estimates and price are highlighted	Noted, Revisit what basis on which to quote economic potentials
11058	11	4	37	4	39	Should CO2 eq. also be used in the numerator of the unit as well as the denominator?	Rejected, No - the form of the carbon price units is correct
5535	11	4	38	4	39	There is a surplus of annual growth of an estimated 9 Gt C or 34 Gt CO2 equivalent. This is not taken into account when considering forest mitigation options (1.3 to 4.2 GtCO2/yr). Thus, the potential for 'forest' mitigation is much larger.	Rejected, Please provide a reference for this. What does surplus annual growth mean?
9324	11	4	4			Please delete '(Godfray et al., 2010)'; it appears twice.	Accepted, Deleted
8597	11	4	4	4	4	There is only one work of Godfray et al. (2010) in the References section. Thus, it should be cited once in this line.	Accepted, Deleted
11059	11	4	40	4	44	Mitigation potential for the agricultural sector will vary at much smaller scales than considered in these sentences see comment below regarding Section 11.8.3.	Rejected, Cannot see what the reviewer is referring to
14559	11	4	41	4	42	suggest delete as unecesary: "for instance, between….rdeveloping regions"	Accepted, Deleted
5029	11	4	42	4	42	sentence "In developing countries, agriculture is often central to the livelihoods of many social groups and a significant share of the GDP." is fairly irrelevant and could be dropped	Rejected, Retained, but qualified as suggested in comment on row 1109
14560	11	4	43	4	44	true but link to rest of text e.g by saying at end "COMPARED TO DEVELOPED REGIONS"	Accepted, Revised for SOD
14561	11	4	45			"..is difficult TO ESTIAMTE...""	Rejected, Removed as below comment on row 1111
11060	11	4	45	4	45	Awkward wording, suggest edit "…difficult to estimate accurately.."	Accepted, Revised for SOD
13955	11	4	48			and the overriding food security priorities/demands at national and subnational levels	Accepted, Revised for SOD
12361	11	4	49	4	49	Please consider to add "soils" so the sentence states; "climate change impacts on carbon stocks in forests, soils and future land use…..". Significant C-stocks are found in peat lands and other soils and these are also vulnerable to climate change.	Accepted, Revised for SOD
14562	11	4	49			suggest: "…cliamte change impacts on LAND COVER, carbon stocks in PLANT BIOMASS AND SOILS, and future HUMAN land use.." because climate change could lead to e.g. forest dieback or expansion, as well as loss of soil carbon, etc in natural vegetation as well as deliberate activity changing land use in the future	Rejected, Adopted wording suggested in comment on row 1113

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14553	11	4	7			suggest add: as well as the OTHER COMPETING ecosystem services	Rejected, They do not all compete
12360	11	4	9	4	10	Please consider to rephrase, as this sentence is difficult to understand	Accepted, Revised for SOD
9437	11	4	9		9	Why report global C and not GWP?	Accepted, I think you mean total GHG impact (not the same as GWP) - but we have replaced C with total GHG
13304	11	4	9	10	4	The link between the introductory sentence is not clear. This paragraph could be reorganised. Is the objective of the paragraphs is to clearly state that there is a great deal of uncertainty in AFOLU estimate methodology? If not it should be clearly stated.	Accepted, Revised for SOD
7051	11	4	9	4	10	Cited range does not include atmospheric removals of carbon attributible to forest growth and expansion as documented by Pan, Y., Birdsey, R., Fang, J., Houghton, R., Kauppi, P., Kurz, W., et al. (2011). A Large and Persistent Carbon Sink in the World's Forests. Science Vol. 333 , 988-993. While part of this removal of carbon from the atmosphere may be due to anthropogenic nitrogen fertilization and elevated termperature, Pan et. al. indicate that much of it is clearly attributable to expansion of forestland, regrowth of forest land, and forest management. It is simply wrong to ignore this important flux.	Accepted, Revised for SOD
15602	11	4	11	4	13	As mentioned later, the farm animal production sector deserves particular consideration. Steinfeld H., P. Gerber, T. Wassenaar, V. Castel, M. Rosales, and C. de Haan (2006). Livestock's long shadow: environmental issues and options. Food and Agriculture Organization of the United Nations. Available at: ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e.pdf. Pelletier N. and P. Tyedmers (2010). Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Sciences of the United States of America 107(43), 18371-74. Available at: http://www.pnas.org/content/early/2010/09/27/1004659107.full.pdf+html.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15603	11	4	19	4	21	As mentioned later, dietary changes can also positively impact health, non-climate environmental indicators, as well as animal welfare. Mekonnen M.M. and A.Y. Hoekstra (2012). A global assessment of the water footprint of farm animal products. Ecosystems 15, 401-15. Available at: http://doc.utwente.nl/80897/1/Mekonnen-Hoekstra-2012-WaterFootprintFarmAnimalProducts.pdf. Stehfest E., L. Bouwman, D.P. van Vuuren, M.G.J. den Elzen, B. Eickhout, and P. Kabat (2009). Climate benefits of changing diet. Climatic Change 95, 83-102. Eshel G. and P. Martin (2009). Geophysics and nutritional science: toward a novel, unified paradigm. The American Journal of Clinical Nutrition 89(suppl), 1710S-16S. McMichael A.J., J.W. Powles, C.D. Butler, and R. Uauy (2007). Food, livestock production, energy, climate change, and health. The Lancet 370, 1253-63. Marlow H.J., W.K. Hayes, S. Soret, R.L. Carter, E.R. Schwab, and J. Sabaté (2009). Diet and the environment: does what you eat matter? The American Journal of Clinical Nutrition 89(suppl), 1699S-703S. Donner S.D. (2007). Surf or turf: a shift from feed to food cultivation could reduce nutrient flux to the Gulf of Mexico. Global Environmental Change 17, 105-13. Regarding animal welfare, less animals consumed would likely result in less animals being raised and therefore improve animal welfare. Additionally, industrial systems now produce approximately two-thirds of the world's poultry meat and eggs, and more than half of all pork. Food and Agriculture Organization of the United Nations (2009). The state of food and agriculture: livestock in the balance (Rome, Italy: FAO, p. 27). Available at: http://www.fao.org/docrep/012/i0680e/i0680e.pdf. The breadth of scientific evidence demonstrating that intensively confined animals are frustrated, distressed, and suffering under modern production schemes is extensive, conclusively substantiating that battery cages for egg-laying hens and crates for pregnant sows and calves are simply not appropriate environments. Duncan I.J.H. (1970). Frustration in the fowl. In: Freeman B.M. and Gordon R.F. (eds.), Aspects of Poultry Behaviour (Edinburgh, Scotland: British Poultry Science Ltd., pp. 15-31). Špinka M. (2006). How important is natural behaviour in animal farming systems. Applied Animal Behaviour Science 100(1-2),117-28. Baxter M. (1994). The welfare problems of laying hens in battery cages. The Veterinary Record 134(24), 614-9. Dawkins M.S. (1990). From an animal's point of view: motivation, fitness, and animal welfare. Behavioral and Brain Sciences 13, 1-61. Vestergaard K. (1984). An evaluation of ethological criteria and methods in the assessment of well-being in sows. Annales de Recherches Vétérinaires (Annals of Veterinary Research) 15(2), 227-36. Broom D.M., Mendl M.T., and Zanella A.J. (1995). A comparison of the welfare of sows in different housing conditions. Animal Science 61, 369-85. European Commission, Scientific Veterinary Committee, Animal Welfare Section. 1995. Report on the welfare of calves. Adopted November 9. Available at: http://ec.europa.eu/food/fs/sc/oldcomm4/out35_en.pdf.	Rejected, This is dealt with later - does not belong here in such detail
14671	11	4	4	4	4	Unless this is done elsewhere in the document it might be useful to indicate what exactly is meant by sustainable development. This is a word that has been appropriated by many over the last few decades and its meaning has been stretched in a wide range of directions.	Rejected, Hopefully done in another chapter - should not be defined here
11210	11	40				Table 11.7: Again -- would be useful to include explicit language here on the need to take measures to recognise and secure the land rights of indigenous peoples in left hand column on 'forestry'	Accepted, explicit language to land rights of indigenous peoples can be included under institutional agreements
11211	11	40				Table 11.7: On left column at 'state of infrastructure...'; there is indirect mention of prior agreement: why not insert FPIC here?	Rejected, Because it doesn't belong to infrastructure, but to institutional agreements
11212	11	40				Table 11.7: On left column at 'Institutional arrangements' - you could insert here the word 'and recognition' after 'clarification'	Accepted, The whole table has been moved to 11.7 and redrafted

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3868	11	40				1st. Row, 3rd. Column. Are you sure that bioenergy production in countries with insufficient political stability can reduce or prevent investment? Look the example of oil and NG investments in some very political unstable countries.	Rejected, 1st Row 3rd column in page 40 discusses availability of infrastructure in cropland management.
5601	11	40				Under Forestry –economic factors. I would add --- or with better land management and fuller use of NPP.	Partially Accepted, The whole table has been moved to 11.7 and redrafted
11817	11	40				The references should be linked to the content of the table, otherwise they are not so useful	Accepted, The whole table has been moved to 11.7 and redrafted
5830	11	40				Notes: There is only one note, so "-s" and "a)" can be deleted. The last sentence is highly speculative and should be deleted. One could also assume that these options are supposedly little researched.	Partially Accepted, The whole table has been moved to 11.7 and redrafted
13974	11	40				under the caption. Many developing countries have little to no mitigation burden to bear. Their per capita emissions are below 1 ton and many LDCs have a per capita emission below .1 ton. Equity and responsibility issues also have a very significant bearing on the adoption of agricultural mitigation strategies in countries where actually they might need to increase emissions from agriculture for food production and food security reasons. following on the comment earlier on about who bears the cost of migitation, vs. who is responsible for emissions and thereby derives most of the benefits, excessive costs for assuming someone else's mitigaiton burden might actually go a long way to explaining why there is little experience with agricultural mitigation in developing countries. the lens of the carbon market is really not appropriate for these countries. see for example P. Tschakert. 2004. Carbon for farmers: assessing the potential for soil carbon sequestration in the old peanut basin of senegal. climatic change 67: 273-290.	Rejected, The chapter discusses the opportunities of AFOLU mitigation options, but not the responsibility issue. This is mainly discussed within the UNFCCC, which is a more proper place for this discussion
13975	11	40				some differentiated analysis of where responsibilities and mitigtion potential lie, particularly with regard to ch4 and n2o is absolutely essential, as is a breakout of per capita emissions among countries.	Rejected, ibid
11785	11	40				Deleate or transfer to WG2 to save the voulme.Climate change impact should be described in WG2.	Accepted, The whole table has been moved to 11.7 and redrafted
5602	11	41	1	41	39	This page needs a good edit.	Accepted, Section re -drafted
11304	11	41	13	41	16	As both a social and scalar phenomenon, 'city' is missing from the social scale-line. As it is, the sudden jump from 'village' to 'province' makes little sense, and in any case agriculture most likely originated as a result of cities (see Soja, Edward 2000: 'Postmetropolis: Critical Studies of Cities and Regions'. Oxford: Blackwell: 20-27.)	Partially Accepted, City was included in tthe SOD.
14441	11	41	16	41	17	Unclear sentence. The topic of this paragraph - mitigation scenarios having potentially negative impacts on regional socio-ecological systems is an important point to emphasize.	Accepted, The whole table has been moved to 11.7 and redrafted
5603	11	41	18	41	21	Bio-fuel plantations can also have positive impacts for villagers. The could provide work, sell fuelwood, charcoal and poles etc.	Accepted, Section re -drafted
13331	11	41	27	41	29	This sentence is not clear.	Accepted, Section re -drafted
5604	11	41	31	41	31	Population growth is a key input and should be mentioned sooner.	Accepted, Section re -drafted

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17146	11	41	32			Suggest a more indepth inclusion of Indigenous Peoples and Sustainable Development specifically as it relates to behaviour	Rejected, "indigenous peoples" is indicated in the text as the first example. Indigenous peoples are not the only social group potentially affected; colonos (settlers) or farmers need also to be considered. The awareness of different social groups is key for getting the potential of AFOLU realized as well as for promoting SD. Looking at only one social group can become discriminatory to the others
3869	11	41	40	41	41	Sustainable management of bioenergy crops is also possible (see AR4, Chapter 2 - Bioenergy),. You should add this to make the text a little less biased against bioenergy.	Accepted, Section re -drafted
5605	11	41	40	41	49	. I am in full agreement with this paragraph, as I am with the first paragraph on page 42.	Noted, thanks
11170	11	41	40			The description "Sustainable management of agriculture, forests, and other land uses –either natural or man-made, such as plantations- is essential to achieving sustainable development." is not clear. Any land management, including agriculture, forestry and other land uses are human-induced activities even if there are some difference of intensity. This sentence should be changed into "Sustainable land management is essential to achieving sustainable development."	Accepted, Section re -drafted
13976	11	41	42			a blanket statement that synergies need to be maximized, including maximization of the mitigation efect, cannot be made. It depends on what country you are in and what your food security demands/needs are.	Partially Accepted, Section re -drafted
3870	11	41	43	41	44	Should read "Adequately implemented forestry and agriculture, including bioenergy, mitigation options provide".	Partially Accepted, Section re -drafted
7200	11	41	43	41	43	What is adequately implemented? Ideas? Systems? Global? National? See earlier comments.	Partially Accepted, This paragraph has been redrafted.
13977	11	41	43	41	47	it is inappropriate to use the 2007 forestry chapter and its conclusions and then conclude that they are also appropriate for the agriculture sector, particularly a claim that mitigation options are an effective means to reduce poverty. There is no empirical evidence for this claim and it should be eliminated.	Accepted, Some of the management options included for AFOLU measures in agriculture have been used in developing countries (although without being used as mitigation options). This experience provides some empirical evidence
2137	11	41	47	41	47	may add a reference to the potential of "systemic" approaches to agricultural production, e.g. between "...(Nabuurs et al., 2007)." and "Additional costs…": e.g. the following. "Thereby, it should be accounted for the potential of systemic approaches to agricultural prouction, such as pursued in agro-ecology or organic agriculture (e.g. (El-Hage Scialabba, N., Müller-Lindenlauf, M., 2010. Organic agriculture and climate change. Renewable Agriculture and Food Systems 25, 11.))."	Accepted, Reference assessed
14735	11	41	47			The phase: “Additional costs and human…” is confusing, needs rewriting.	Accepted, Section re -drafted
11818	11	41	9	41	49	this text part could be shortened	Partially Accepted, Section re -drafted
5606	11	42	12	42	12	What is meant by natural resource space?	Accepted, Text modified

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12873	11	42	19	42	19	It would be good here to add a key example of the connection between adaptation and mitigation with forest management and forest carbon: "Field trials in western U.S. forests indicate that prescribed burning, mechanical thinning, and retention of large trees can help forest ecosystems adapt to climate change (Stephens et al. 2009) and mitigate greenhouse gas emissions because long-term storage of carbon in large trees outweighs short-term emissions from prescribed burning (Hurteau and Brooks 2011)." Stephens, S.L., J.J. Moghaddas, C. Edminster, C.E. Fiedler, S. Haase, M. Harrington, J.E. Keeley, E.E. Knapp, J.D. McIver, K. Metlen, C.N. Skinner, and A. Youngblood. 2009. Fire treatment effects on vegetation structure, fuels, and potential fire severity in western U.S. forests. Ecological Applications 19: 305-320. Hurteau, M.D. and M.L. Brooks. 2011. Short- and long-term effects of fire on carbon in US dry temperate forest systems. BioScience 61: 139-146.	Accepted, Text Modified
11819	11	42	21	42	48	This text part could be cross-referenced to WG2 and then shortened	Accepted, Section restructured, referring to WGII
2632	11	42	21		38	It would be worth clarifying the material a bit. There is a CO2 fertilizer effect if the plant is able to adjust its water use efficiency and nutrient use efficiency. It is unable to adjust its physiological activities, there will be no fertilizer effect. Part of the CO2 fertilizer effect is the increased efficiency of water uptake which could be valuable if the environment becomes more dry.	Accepted, Section restructured, referring to WGII
10113	11	42	24	42	24	Scale works also the other way, integrated food-energy systems at farm/communitylevel can mitigate while brininging substantial development benefits (energyavailability, cost savings, additional income source,energy for agricultural production i.e. irrigation pumps, reduced forest degradation etc.)	Accepted, Section restructured, referring to WGII
7338	11	42	25	42	34	need citations for the CO2 fertilization effect, and the report that carbon storage would decline with warming. Alsc the Wamelink study needs more info, including the modeled time frame. And the Metsaranta study -4.5 to +4.5! - needs some indicator as to what key variables matter the most and what business as usual might look like.	Accepted, Section restructured and shortened due to page limitation
5084	11	42	25	42	25	I believe brent sohngen has some results that are very different from the those inculded in this paragraph.	Accepted, Section restructured
5085	11	42	25	42	25	you might also talk about the face experiements as they seem to show that forest growth may be somewhat lowe than what people project.	Accepted, Section restructured
5086	11	42	25	42	25	this first section is somewhat unbalanced. One should also discuss croplands and grasslands.	Accepted, Section restructured
15194	11	42	3	42	19	doesn't add much	Accepted, Section restructured and shortened due to page limitation
4277	11	42	30	42	32	As worded leaves impression Metsaranta et al worked on European Forest; their work was in British Columbia. Also, listing of growth rates, decay rates, and area burned by wildfire leaves out insect and disease disturbances which are a very large component of forst disturbance in British Columbia and boreal forests more generally.	Accepted, Text modified
5831	11	42	30	42	38	Please rephrase this paragraph. Do not put the weight on persons but on the findings. It is also not very polite to refer to G.B. Bonan as "it" as your wording in lines 34 - 36 does.	Accepted, Text modified
13978	11	42	30	42	36	how does this data then translate into carbon storage in fields, and what is the relation between increase in T and altered precipitation regimes and carbon storage in fields?	Rejected, These are trees- they are not grown in fields. Misplaced comment?
12417	11	42	34	42	38	The lines state that "... carbon cycle feedbacks are projected to increase atmospheric CO2 at the end of the 21. century by 4-44 % equivalent to 20-224 ppm". Could it be clearified, compared to which model scenario this increase will take place? And whether the big interval is caused by uncertainty or by different emission scenarios.	Accepted, Text modified
13332	11	42	36			Remove extra "to"	Accepted, Text modified
7339	11	42	41	42	43	Reader needs to know how deforestation in mid-high latitudes may cool the Earth, and by altering what biophysical processes. This is potentially a really important statement in that, if true and taken at face value, why would I not want to go out and harvest the entire boreal forest???	Accepted, Text based on reference

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2633	11	42	41		46	Shift to deciduous will be more challenging. Deciduous species need higher nutrient contents and even growing season rainfall. If these do not exist, they will not begin to dominate. Most coniferous sites are nutrient poor and have low rainfall during the summer growing season.	Rejected, Projections are for an increase
5832	11	42	43	42	48	Please rephrase in a more concise way. I suggest: "Several studies show that there will be an expansion of deciduous woodlands (Edwards et al., 2005; Peros et al., 2008). This can have a positive feedback on regional climate change by creating a positive feedback through albedo and transpiration, and produce a strong warming if they act in combination with sea-ice processes (Swann et al., 2010)."	Noted, Text based on references and is already concise
12418	11	42	47	42	48	It would have been useful if it could be clearified whether the combination of positive feedback through albedo and transpiration and sea-ice processes will produce a "strong warming" proportional with the sum of these phenomena or if these will reinforce each other even more and in that case why.	Partially Accepted, We only cover the albedo here
2140	11	42	6	42	6	add reference to Smith P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, and others (2008). Greenhouse gas mitigation in agriculture. Philosophical Transactions of the Royal Society B: Biological Sciences 363, 789–813. Available at: http://rstb.royalsocietypublishing.org/content/363/1492/789.short.	Accepted, Text deleted
2141	11	42	9	42	9	Locatelli et al: add further references emphasizing the potential of systemic approaches, e.g. El-Hage Scialabba, N., Müller-Lindenlauf, M., 2010. Organic agriculture and climate change. Renewable Agriculture and Food Systems 25, 11 or Muller, A., Olesen, J., Smith, L., Davis, J., Dytrtova, K., Gattinger, A., Lampkin, N. and Niggli, U., 2012, Reducing Global Warming: The Potential of Organic Agriculture, Scandinavian Working Papers in Economics 526 / FiBL Working Paper or Muller, A. and Aubert, C., forthcoming, The potential of organic agriculture to mitigate the impact of agriculture on global warming - a review, in: Penvern, S., Bellon, S. and Savini, I. (eds), Organic Farming, prototype for sustainable agricultures? Springer	Accepted, Issue adequately addressed
11125	11	42				If mitigation=emission reduction + sink increase + feedbacks, it would be nice to develop one table where all effects could be combined, at least by AFOLU categories, to highlight the complexity of the entire system and the limits of our knowledge.	Noted, I think this would require multiple scenarios - will do in systemic perspectives chapter
8011	11	42	20			Some descriptions are required for climate feed-backs of not only forests but also agricultural land and other land use.	Accepted, Referred to WGI and a generic sentence added from WGI
6931	11	42	20			Please coordinate and ensure consistency with WGI, Chapter 6 on the land use change - climate feedbacks. Suggest to refer to WGI AR5 Chapter 6 here whenever appropriate. Many parts of this section stray into the WGI area of expertise and will overlap with the assessment provided by Chapter 6. This should be avoided to avoid duplication and/or inconsistencies.	Accepted, Consistency with WGI ensured
12874	11	43	10	43	10	Because biome shifts comprise a major climate change impact that also alters greenhouse gas emissions and removals, add here: "Field measurements from boreal, temperate, and tropical ecosystems around the world have detected numerous latitudinal and elevational biome shifts (Gonzalez et al. 2010) that alter ecosystem function and greenhouse gas emissions and removals." Gonzalez, P., R.P. Neilson, J.M. Lenihan, and R.J. Drapek. 2010. Global patterns in the vulnerability of ecosystems to vegetation shifts due to climate change. Global Ecology and Biogeography 19: 755-768.	Accepted, Section restructured and shortened
7340	11	43	12			it seems 'fires in tropical forest ecosystems' should be 'fires in all forest ecosystems'. Why restrict to tropical?	Accepted, Section restructured and shortened
5607	11	43	13	43	13	Give examples of invasive species.	Accepted, Section restructured and shortened
9333	11	43	14			The word 'are' is suggested to be replaced with 'is'.	Accepted, Section restructured and shortened
11821	11	43	15			Are you refering to natural adaptation of anthropogenic adaptation measures?	Accepted, Section restructured and shortened

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7341	11	43	16			Zhu et al 2011 paper not cited	Accepted, Zotero updated for SOD
7342	11	43	16			suggest adding at end of sentence "nor is the pace of migration likely to keep up with the pace of climate change (Iverson et al. 2004). " Citation: Iverson L.R., Schwartz M.W. and Prasad A. 2004. How fast and far might tree species migrate under climate change in the eastern United States? Global Ecology and Biogeography 13: 209-219.	Rejected, Need to find more up-to-date reference
13333	11	43	17	43	27	Opportunity in this section to treat the question of active N in the biosphere. The impact on NH3 deposition from fertilizer application and impacts on natural ecosystems.	Accepted, Section restructured and shortened
5087	11	43	2	43	2	I sure think the statement below is totally obviou abd hardly in need of stating or referenceing what els could the sensitivity be "In general, how forests, agriculture or other land-use systems will respond to climate change 2 depends on the exposure to climatic changes as well as the sensitivity of the ecosystem to these 3 changes"	Accepted, Section restructured and shortened
5088	11	43	2	43	2	to me this whole section is a very partial treatment and would be best eliminated and cross referenced to wgii past and present materials. So many issues are ignored that the coverage is misleading at best.	Accepted, Section restructured and shortened
10114	11	43	2	43	16	Corresponding discussion on vulnerabilites in agricultural production systems is missing, also should be mentioned, that optimal adaptation of agricultural production systems is a prerequisite to maximize mitigation co-benefits, through maximised system productivity	Accepted, Section restructured and shortened
9135	11	43	22			Add an important literature in the citation "Matyssek R. et al 2010" after "Allen et al., 2010". Matyssek R., G. Wieser, R. Ceulemans, H. Rennenberg, H. Pretzsch, K Haberer, M. Löw, A.J. Nunn, H. Werner, P. Wipfler, W. Oßwald, P. Nikolova, D.E. Hanke, H. Kraigher, M. Tausz, G. Bahnweg, M. Kitao, J. Dieler, H. Sandermann, K. Herbinger, T. Grebenc, M. Blumenröther, G. Deckmyn, T.E.E. Grams, C. Heerdt, M. Leuchner, P. Fabian, K.-H. Häberle (2010). Enhanced ozone strongly reduces carbon sink strength of adult beech (Fagus sylvatica)– Resume from the free-air fumigation study at Kranzberg Forest. Environmental Pollution 158, 2527-2532.	Accepted, Section restructured and shortened
9136	11	43	26			"Strassburger 2008, Leadley et al 2010" are not cited.	Accepted, Zotero updated for SOD
6779	11	43	28	43	47	Ecological thresholds about climate change or other global change drivers is uncertains,some ecosystems carbon sink may increase,for example grass ecosystems change into shurb or forest ecosystems following climate change.	Rejected, Statement - not a comment
9334	11	43	30			The word 'been' is suggested to be added between 'has' and 'exposed'.	Accepted, Section restructured and shortened
5089	11	43	32	43	32	I wonder why you are devoting pages to this as it is covered in wgii and is not so well done here	Accepted, Section restructured and shortened
11989	11	43	36		37	Please add something to the effect of: For the Amazon at least, Intact forest is more resilient to climate change than fragmented forest. Malhi, Y., Aragão, L.E.O.C., Galbraith, D., Huntingford, C., Fisher, R., Zelazowski, P., Sitch, S., McSweeney, C. & Meir, P. 2009. Exploring the likelihood and mechanism of a climate-change-induced dieback of the Amazon rainforest. Proceedings of the National Academy of Sciences 106: 20610-20615.	Accepted, Section restructured and shortened

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11990	11	43	36		37	Please add something to the effect of: Fragmentation increases susceptibility to drought-induced forest fire, leading to a descructive positive feedback loop between fragmentation, forest fire and drought. Nepstad, D.C., Stickler, C.M.,Soares, B.& Merry, F. 2008. Interactions among Amazon land use, forests and climate: Prospects for a near-term forest tipping point. Philosophical Transactions of the Royal Society B 363:1737–1746. Ray, D.; Nepstad, D. C. & Mourinho, P. 2005. Micrometeorological and canopy controls of fire susceptibility in mature and disturbed forests of an east-central Amazon landscape. Ecological Applications 15: 1664-1678. Laurance, W.F. 2004. Forest-climate interactions in fragmented tropical landscapes. Philosphical Transactions of the Royal Society. 359: 345-352	Accepted, Section restructured and shortened
16589	11	43	45	43	47	There are a number of recent papers on Amazon dieback (and a World Bank review of the literature) with different conclusions; you shouldn't consider only one of them.	Accepted, Section restructured and shortened
14736	11	43	6			(Allen et al., 2010) suggest…should be Allen et al. (2010) suggest…	Accepted, Zotero updated for SOD
15195	11	43				FACE sites contribute here?	Accepted, Section restructured and shortened
11820	11	43				I miss here adaptive capacity as an important element of vulnerability	Accepted, Section restructured and shortened
6932	11	43	28			Suggest to refer here to the WGI and WGII AR5 reports in relation to climate change and ecological tipping points. Make sure this assessment is consistent with the other two AR5 WG reports.	Accepted, Section restructured and shortened
4278	11	44	11	44	13	FRA 2010 (page 75: Table 4.7) notes 0.7 % of forests burned each year, not 1.0%. The difference is significant: it reflects a difference between a 100 yr fire cycle (not credible) and a 143 yr fire cyle (much more plausible). Comparing Table 4.7 in FRA 2010 with Table 4.3 shows that insects and disease disturb nearly twice as much forest area each year as fire.	Accepted, Value Modified
5090	11	44	14	44	14	in this section I might talk carbon and fires and carbon and pests like mountain pine beetle	Accepted, Text modified
9137	11	44	26			“mainly due to CO2 fertilization effects" is not understandable.	Noted, Text based on reference
9138	11	44	28			“primarily due to CO2 fertilization" is not understandable.	Noted, Text based on reference
5609	11	44	31	44	31	--- ‘tree die-back’ not ‘die off’ is the common phrase.	Accepted, Corrected
5610	11	44	34	44	34	Change ‘sampling’ to ‘sample’	Accepted, Corrected
15196	11	44	37	44	40	anentire range of outcomes is in the figure; doesn't make sense to highlight "some"; neither text nor figure really contribute much	Accepted, Text restructured and shortened
16590	11	44	38	44	40	Need to say how many of the 11 models predict this. Although it's not clear from Figure 11.8, it appears that it is only a few of them, not the majority.	Accepted, Figure deleted
5608	11	44	5	44	8	There are 12 references. Cut some out. Chang OL Phillips et al to Phillips et al.	Accepted, Text modified
11822	11	44				also here cross-references to WG2 would be good	Accepted, Referred to WGI and many references from WGII added

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10633	11	44	1	44	10	As for implication of climate change on forest carbon sink, climate influences on GHG fluxes in forest soils. The following sentence would be appropriate in this section. Hashimoto et. al. (2011) showed climate-driven changes in soil GHG fluxes (CO2 emission, CH4 uptake, and N2O emission) in Japanese forests from 1980 to 2009, which were estimated using a regional soil GHG model that is data-oriented. It revealed that the soil GHG fluxes in Japanese forests have been increasing over the past 30 years. Shoji Hashimoto, Tomoaki Morishita, Tadashi Sakata and Shigehiro Ishizuka Increasing trends of soil greenhouse gas fluxes in Japanese forests from 1980 to 2009 Scientific Report 2011; 1: 116. Published online 2011 October 13. doi: 10.1038/srep00116	Accepted, New sentence added quoting Sitch et al, 2008 and Bowman et al., 2009 which covers forest biomass and soil carbon
6933	11	44	1			Please coordinate and ensure consistency with WGI, Chapter 6 on climate change and forest carbon. Suggest to refer to WGI AR5 Chapter 6 here whenever appropriate. Please avoid duplication of assessment.	Accepted, Cross reference to WGI, Ch6 is provided
4274	11	44	37		40	Because some models showed different trends (Fig. 11.8,) should be good to know some of the key assumptions of Heimann and Reichstein, 2008 to allow better undertansding of those modeled results	Accepted, Figure 8 deleted
6935	11	44	39	44	40	Better: Components of "the terrestrial carbon cycle become a substantial source of atmospheric CO2 [...]".	Accepted, Text modified and shortened
6934	11	44	4	44	9	Suggest to refer here to the WGI and WGII AR5 reports in relation to climate change and forest carbon. Make sure this assessment is consistent with the other two AR5 WG reports.	Accepted, Cross reference better to WGI, Ch6 provided in the paragraph
12927	11	44	1	46	11	Section 5.2 and 5.3 should be combined. Pragraph in Line37-40 in Page may good for the introduction in this section. Implication of climate change on forest C sinks and soil C in three land use should be discussed in different sub-sections, I think.	Rejected, Section 11.5.3 retained to provide focus for peatlands, grasslands and rangelands
7618	11	45				Need explanatory notes in this figure.	Accepted, Figure deleted
5833	11	45				The figure has no legend. Besides, it has little informational value beyond the text and can be deleted. If you want to retain it please add information to the text: under what circumstances can the terrestrial C cycle become a source?	Accepted, Figure deleted
11171	11	45				A legend or some explanations for the lines are needed to understand the figure.	Accepted, Figure deleted
14442	11	45	1			Is there a legend?	Accepted, Figure deleted
9085	11	45	18	45	29	Besides CO2, CH4 and N2O are also important GHG and are emitted from peatland, easpecially after disturbances.	Accepted, Text added
15197	11	45	24	45	25	delete sentence	Accepted, Text modified
12420	11	45	30	46	2	Could an estimate for the carbon stock in the soil of Grasslands, Pastures and Rangelands be given as it is done for forest soils and peatlands?	Noted, Carbon stock values provided for peatlands due to the magnitude involved. Due to lack of space, C-stock data for others not given since given in WGI
12875	11	45	30	45	31	The 2006 IPCC National Greenhouse Gas Inventory Guidelines have superceded the older good practice guidance. So, say instead "...used in the IPCC National Greenhouse Gas Inventory Guidelines (IPCC 2006)..." Intergovernmental Panel on Climate Change. 2006. Agriculture, Forestry, and Other Land Use. National Greenhouse Gas Inventory Guidelines. Institute for Global Environmental Strategies, Hayama, Japan.)	Accepted, Text deleted
12419	11	45	4	45	5	In connection to chapter 11.5.3, it would be useful to include a table which illustrate the total estimated content of carbon in different types of soil, adding up to 100%.	Rejected, No - too detailed

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5611	11	45	4	45	4	11.5.3 Soil carbon. Insert soil carbon estimates by land use types as given in general comments on page 2 above. This could be in place of or addition to Figure 11.8.	Rejected, What would the purpose be?
16222	11	45	8		18	Inconsistency here: FAO has 363 GT C for forest soil carbon; then below, for peatlands only, estimate is 350-550 GTC (the entire amount) and they say: 'this is 20-25% of the soils stocks globablly'--they must mean non-forest as well? And nevermind that it seems to represent 100% of the above referenced soil carbon?	Rejected, Not all forests are on peatlands- no inconsistency here
5612	11	45	8	45	8	The figure of 363 GtC for forests seems low.	Accepted, Values deleted since available in FAO reports and WGI and lack of space
4393	11	45		45		indication of emission scenarios used would be useful	Rejected, Where?
10612	11	45				Could merge with section 11.2 and delete from here - much overlap	Accepted, Substantial text deleted from 11.5.3
12189	11	45	18	45	19	Firstly the estimated carbon in peatlands seems too high and if it consists 20-25% carbon of the world's soil organic carbon, the estimated value of the world's soil carbon should be mentioned.	Rejected, No - this is consistent with global soil C estimates
4279	11	45	4			There is good literature on peatland carbon (CO2 and CH4) emissions, but this section does not seem to clearly summarize it. Peatlands are extremely sensitive to climate, and store vast amounts of carbon (see Yu, Z, Vitt, D.H., Campbell, I.D>, & Apps, M.J. 2003. Understanding Holocene peat accumulation pattern of continental fens in western Canada. Can. J. Bot. 81: 267-282; Yu, Z., Campbell, I.D., Campbell, C., Vitt, D.H., Bond, G.C. and Apps, M.J. 2003. Carbon sequestration in western Canadian peat highly sensitive to Holocene wet-dry climate cycles at millenial timescales. The Holocene 13: 801-808)- that point is made - but there is a need to further discuss CH4 and CO2 separately, along with net carbon fluxes.	Accepted, Text modified and shortened and since WGI covers these issues, not addressed here
6936	11	45	4			Please coordinate and ensure consistency with WGI, Chapter 6 on climate change and soil carbon. Suggest to refer to WGI AR5 Chapter 6 here whenever appropriate. Please avoid duplication of assessment.	Accepted, Cross reference to WGI, Ch6 provided
10172	11	45	6	45	29	Structure could be improved for increased understanding, e.g. 1. peatlands globally, 2. regionally, i.e. permafrost	Accepted, Section modified; due to limited space available, detailed coverage of regional peatlands may not be feasible
12188	11	45	8	45	8	As per FRA 2010 of FAO the Carbon in soil is 292 billion tonnes or 44 % of the total carbon in the forest ecosystem then where from 363 Gt C has come?	Accepted, Text modified
18233	11	46		46		• In section 11.5.4 (Potential adaptation measures to minimize the impact of climate change on 12 carbon stocks in forests); page 46. This section shows in a positive way and in perspective, the need to assume different adaptation strategies related with forests; aspects considered relevant in the forest policy of the country, by the fact that adaptation measures will allow to take the future risks of the climate change, risks that would produce a number of environmental, economic, and human costs, among others. In Venezuela are initiating the application of adaptation measures by implementing a new model for forests management.	Rejected, Interesting - but this is a statement, not a comment. What can we do with it?
6777	11	46		47		add the "potential adaptation measures to minimize the impact of climate change on carbon stocks in grasslands or other lands ",because climate change will influence the carbon stocks or non-CO2 emission,some potential adaptation measures will minimize the impact of climate change on carbon stocks or non-CO2 emission in grasslands or other lands type.	Accepted, Section includes forest and agriculture land only. Grassland and other land categories not included due to lack of references. Have been explored for the SOD.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8603	11	46	1	46	11	Please, consider contributions on tropical savannas such as Grace, J., San José, J., Meir, P., Miranda, H. & Montes, R. 2006. Productivity and carbon fluxes of tropical savannas. J. Biogeogr. 33:387-400 and San José, J. & Montes, R. 2007. Resource apportionment and net primary production outcome across the Orinoco savanna-woodland continuum. Acta Oecol. 32:243-253.	Rejected, Ideally, we should use post-2007 reviews and meta-analyse and not older single studies
12421	11	46	12	46	43	The measures in this paragraph seem not to comprise forest soils, even though forest soils represent huge stocks of C as mentioned on p 45 line 8. Does that mean that such measures don't exist?	Accepted, Forest soils not included due to lack of references. If found, will be added in the final draft
16592	11	46	26	46	34	These are important points. I suggest that they be made into a Box to highlight them.	These are important points. I suggest that they be made into a Box to highlight them.
15198	11	46	3	46	11	section is supposedly about SOC, but all effects on grassland mentioned here	Accepted, Section title modified; Mitigation aspects of peatland SOC adequately addressed
5091	11	46	3	46	3	the statement "The potential impacts of climate change on pastures would be declines in pasture/grass productivity, 3 reduced forage quality, livestock heat stress, greater problems with some pests and weeds, more 4 frequent droughts and intense rainfall events, and greater risks of soil erosion (Hennessy et al. 5 2007). " is a lttle too harsh as i think there are grasslands in northern areas that will have increased productivity.	Accepted, Text modified and sentence deleted
5092	11	46	3	46	3	also again you are doing things that overlap with wgii	Accepted, Text modified and sentence deleted
5613	11	46	33	46	33	Energy efficient cooking devices will improve the health of the cook and family if used indoors. They may not reduce the pressure on forests etc. if there is a surplus of wood.	Noted, Energy efficient cookstoves will reduce fuelwood use and there is a shortage of fuelwood in large parts of tropical world
13335	11	46	37	46	42	There is mounting evidence that C loss due to tillage only occurs in dry agricultural production areas (see Angers, D.A., Bolinder, M.A., Carter, M.R., Gregorich, E.G., Drury, C.F., Liang, B.C., Voroney, R.P., Simard, R.R., Donald, R.G., Beyaert, R.P., Martel, J., 1997. Impact of tillage practices on organic carbon and nitrogen storage in cool, humid soils of eastern Canada. Soil & Tillage Res. 41, 191-201.). The authors should be more specific and qualify this statement.	Accepted, Qualified statement
10115	11	46	37	46	37	Other for mitigiaotn important adaptation measures are more efficient water management and use, which will allove for maximum biomass produciton with availble water, and reduction of production risks through diversification securing for example feed prodcution for animals, and thus more efficient livestock production	Accepted, Drastically reduced here and cross referenced to WGII
13334	11	46	38			NPP has already been defined for net primary production, use NPP.	Accepted, Revised for SOD
10252	11	46	40	46	42	The sentence "The main cause of SOC…is due to disturbance of soils with tillage" is only supported by a non peer-reviewed scientific reference which concerns pasture! Moreover, tillage level is not the only neither the main cause of SOC loss (as it is clearly stated in the sentence before: quantity and quality of inputs might be more important. The authors should avoid this kind of sentence	Accepted, Qualified statement

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2143	11	46	42	46	42	May add the following: "There are also indications from many cases that the use of synthetic N fertilizers decreases soil organic carbon stocks (Mulvaney, R., Khan, S. and Ellsworth, T., 2009. Synthetic Nitrogen Fertilizers Deplete Soil Nitrogen: A Global Dilemma for Sustainable Cereal Production. Journal of Environmental Quality 38: 2295–2314; Khan, S., Mulvaney, R., Ellsworth, T. and Boast, C., 2007. The Myth of Nitrogen Fertilization for Soil Carbon Sequestra-tion. Journal of Environmental Quality 36: 1821–1832): Generalisation of these findings are however discussed controversially (Ladha, J., Reddy, C. K., Padre, A. and van Kessel, C., 2011. Role of Nitrogen Fertilization in Sustaining Organic Matter in Cultivated Soils. Journal of Environmental Quality 40: 1756-1766).	Accepted, Added debate to feedback and uncertainty section
15199	11	46	43	46	47	delete	Accepted, Deleted
5614	11	46	43	46	43	What were P Smith's findings? Are they given in Figure 11.9? If so it should be stated in the text.	Noted, Big table - not shown here - they were in AR4
11823	11	46	46			"migration" should be "mitigation"	Accepted, Text modified
11066	11	46	46	46	46	Is "climate migration" the wording that is intended here? Also "future" is misspelled.	Accepted, Text modified
6937	11	46	3	46	6	Please revise and avoid generalized statements about drought/rainfall changes since they are regionally dependent and connected to high uncertainties (especially regarding rainfall).	Accepted, Text modified and shortened due to page limitation
14678	11	46	9	46	9	If C4 plants replace C3 plants this will generally diminsh forage quality as C4 plants generally have less leaf protein.	Noted, This section is about mitigation and not about forage quality
6938	11	46	9	46	11	Please make sure to use the latest available literature on that topic, i.e., post AR4. Suggest to add References to AR5 (Chapter 12) and/or SREX Chapters 3/4.	Accepted, Text modified
8012	11	46	35			Before discussing the potential adaptation measures to minimize the impacts of climate change on carbon stocks in agricultural soils, an overview for the impacts is necessary.	Noted, Due to page limitation, not included here. Further WGII covers impacts
14679	11	46	43	46	47	This paragraph needs to indicate the important findings of the two studies it mentions.	Accepted, Text shortened and modified. Smith and Olesen quoted.
10634	11	46	46	46	47	fufutre climate change' may be 'future climate change' ?	Accepted, Modified
10253	11	46	35	46	47	In its present state, this section do not really concerns ADAPTATION….rather only mitigation. Please be more precise on the practices, and why they can help to adapt to climate change (e.g. irrigation which reduce vulnerability to water availability...)	Noted, Text shortened and modified
12928	11	46	12	47	21	Same as previous comments, these two chapter may be better to be combined.	Accepted, Sections combined
6778	11	47				Suggest add the effects of Nitrogen deposition or other air pollution on the carbon stocks or non-CO2 emission	Noted, This section is about Mitigation-adaptation synergy and not about the effects of nitrogen deposition.
16593	11	47	16	47	21	Another set of important recommendations that should be highlighted. They can be part of the same Box recommended in my point 75, or a separate one.	Rejected, Cannot locate this comment
13336	11	47	17	47	17	Why are reduce fertilizer and increase crop diversification included as one soil management practice.	Accepted, Text modified
13337	11	47	17	47	21	There should be a qualifying statement that these practices should be undertaken in such a way as to not affect crop yields.	Accepted, Text modified
11824	11	47	2	47	3	the mitigation potential of a land use systems itself…' is more clear	Accepted, Text deleted to avoid generic statements
5834	11	47	2	47	16	Please make sure you do not consider C stocks only. SFM with high annual increment, high annual harvest and a high share of timber flow to HWP with a high replacement factor (substitution factor) can contribute much better to mitigation than forest reserves or simply raising C stocks.	Noted, Text provides only illustrative examples; all potential examples cannot be covered due to page limitation.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13979	11	47	2			add the phrase "may at times be" prior to the word "complementary." these measures may not necessarily be undertaken by the same person at the same time.	Accepted, Sentence deleted
5093	11	47	3	47	3	this was all said earlier in the document	Accepted, Text deleted
13338	11	47	31	47	35	Sentence is confusing, rephrase.	Accepted, Revised for SOD
13981	11	47	31	47	34	this section must include discussion of the fact that there is no functioning carbon market for AFOLU and that the current CDM market is crashing. To discuss market potential in the absence of a functioning market is highly misleading.	Noted, The section deals with economic potentials and not market potentials. The market potentials are mentioned as a concept and only to distinguish these from economic potentials.
13980	11	47	35	47	36	does technical mitigation potential completely incorporate the biogeophysical uncertainties about carbon sequestration potentials under changing climates?	Accepted, No - it is the unconstrained maximum - see figure 11.9
5615	11	47	38	47	38	Mt of GHG mitigation --- MtC or MtCO2?	Accepted, CO2-eq.
5094	11	47	41	47	41	I think the section puts all the gaps at the foot of barriers but I think incentives are a huge part as are resource competiton. mccarl and schneider shows big gaps depending on resources and altered shares depending on prices McCarl, B.A., and U.A. Schneider, "Greenhouse Gas Mitigation in US Agriculture and Forestry", Science, Volume 294 (21 Dec), 2481-2482, 2001.	Accepted, Revised in SOD (can be more specific pending the outcome of the costs and potentials cross-cut)
5095	11	47	41	47	41	not sure what leakage means in the sentence "Providing consolidated estimates of economic potentials for GHG mitigation within the AFOLU sector 19 as a whole is further complicated because of potential 'leakages' stemming from competing 20 demands on land for various agricultural and forestry activities as well as for the provision of many 21 ecosystem services" but i think it is being used wrong	Accepted, Revised in SOD (can be more specific pending the outcome of the costs and potentials cross-cut)
11825	11	47				there are no trade-offs mentionned here, such as decreasing rotation length to adapt to pest and storm risks in forestry	Accepted, Added for SOD if appropriate
13063	11	47	22	54	6	On the Costs & Potentials issues it is difficult for the reader to access the bigger picture of the cost & potential information. Each sector has its own approach to costs and potentials, which is appropriate as each sector has its own unique qualities and considerations. Nonetheless, the information that will be most relevant to take-away for policy-makers is overarching cost information that brings these different pieces together. To help policy-makers access this information, it should be important to highlighting market realization, but also the policy aspects of cost (by policy it is meant institutional frameworks and/or market frameworks and/or capacity building arrangements, etc...). In both developing and developed countries policy can have a strong impact on cost. Simply looking across the costs & potentials sections of the sector chapters, the reader could miss this message, although the information on policies and measures is there in the chapter. Therefore it could be important to make sure that these informations are put in perspective appropriately.	Accepted, (Peter, my understanding is that these issues will be picked up in the synthesis report)
10254	11	47	23	54	6	I am not an econimist, but I think this section need to include somewhere the economic dimension of the REDD debate.	Accepted, Addressed in SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5509	11	47	16	11	47	Use of organic soil amendments as a source of fertility as well as soil conditioners should be mentioned here. Depending on how one considers carbon storage accouting- multiple studies have shown persistant soil carbon increases following the use of organic soil amendments. These amendments also increase soil nitrogen reserves, decrease bulk density and improve soil water holding capacity, and can increase NPP- all important factors for mitigation and resiliance See Khaleel, R.; Reddy, K. R.; Overcash., M. R. Changes in soil physical properties due to organic waste applications: A review. J. Environ. Qual. 1981, 10, 133–141., Albaladejo, J.; Lobez, J.; Boix-Fayos, C.; Barbera, G. G.; Martinez-Mena, M. Long-term effect of a single application of organic refuse on carbon sequestration and soil physical properties. J. Environ. Qual. 2008, 37, 2093–2099. Spargo, J. T.; Alley, M. M.; Follett, R. F.; Wallace, J. V. Soil carbon sequestration with continuous no-till management of grain cropping systems in the Virginia coastal plain. Soil Tillage Res. 2008,100, 133–140. Tian, G.; Granato, T. C.; Cox, A. E.; Pietz, R. I.; Carlson, C. R., Jr.; Abedin, Z. Soil carbon sequestration resulting from long-term application of biosolids for land reclamation. J. Environ. Qual. 2009,38:61-74, Life Cycle Inventory and Life Cycle Assessment for Windrow Composting Systems; Recycled Organics Unit, The Univ. of New South Wales: Sydney, Australia, 2006; www.recycledorganics.com/publications/ reports/lca/lca.htm., Brown, S., K. Kurtz, A. Bary, and C. Cogger. 2011. Long-term effects of organic amendments on soil carbon storage and physical properties. Environ. Sci. & Tech. dx.doi.org/10.1021/es2010418	Accepted, Added in revision
10624	11	48				Please consider Lubowski et al. (2006) and in general the papers that use econometric estimations of reveled preferences of the landowner to estimate reforestation economic potentials and costs. Reference: Lubowski, R.N A.J. Plantinga, and R.N. Stavins (2006), 'Land-use change and carbon sinks: econometric estimation of the carbon sequestration supply function', Journal of Environmental Economics and Management 51: 135–152.	Rejected, Prefer more up to date literature (post-2007)
5616	11	48	15	48	15	Change acreage to hectarage or area?	Accepted, In SOD used 'area'
5617	11	48	19	48	19	The word sectoral is used here and subsequently. I think the correct word is sector.	Accepted, Revised in SOD: sector-specific
9456	11	48	21		21	Is a mitigation "response" the same as a mitigation "option?'	Accepted, Clarified in SOD (can be more specific pending the outcome of the costs and potentials cross-cut)
16594	11	48	32	49	13	This point seems too subtle (and only conceptual) to be appropriate in this chapter.	Accepted, Revised to contextualize the 'sectoral implications of transformation pathways' in section 11.9.
15976	11	48	34	48	34	the concept of carbon prices could be briefly explained or refered to	Accepted, Carbon prices explained elsewhere in SOD.
10173	11	48	3	49	32	Especially p. 48, l. 32 - p. 49, l. 13 : could be illustrated with theoretical graphs for easier understanding	Accepted, Revised to contextualize the 'sectoral implications of transformation pathways' in section 11.9.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
18235	11	49				"…deforestation is the most important source of greenhouse gas emissions, with a net loss of forest area estimated in 5.2 million hectares each year, between 2000 and 2010 (FAO 2012)" From this sentence is relevant for countries reaffirm the common but differentiated responsibilities, and deepen binding measures of countries, annex 1; preserved forests will be insufficient as carbon sinks to mitigate the capture of CO2 gases. On the other hand, countries with large forest areas and those adopting REDD measures, will have to account effectiveness of the sink in a carbon markets context.	Rejected, This is a statement - not a comment
18234	11	49		53		• In section 11.6.2 (Forestry), pages 49-53, comment extensively on the economic potential of carbon mitigation, mainly by the forest sector, including reducing deforestation, forestation and agroforestry, which differ largely by activity and by regions, therefore, said options are assessed. At short-term, is expected that economic potentials for carbon mitigation by reduction of deforestation, be higher than economic potentials for forestation (forests management: forestry, forests management, others). This is probably since deforestation is the greatest source of greenhouse gas emissions.	Rejected, This is a statement - not a comment
9457	11	49	1		13	Important point, but should be re-written for clarity.	Accepted, Revised to contextualize the 'sectoral implications of transformation pathways' in section 11.9.
16595	11	49	22	49	22	It's quite strange to be citing a 2013 reference, and it's not clear from the literature cited whether it even has been submitted. Given the danger of criticism for citing unpublished work, this should be dropped.	Accepted, it will be in press before SOD
13340	11	49	25	51	5	Confusing and repetitive, rephrase.	Accepted, Revised in SOD (can be more specific pending the outcome of the costs and potentials cross-cut)
5618	11	49	37	49	37	Reduced deforestation depends on increased agricultural productivity (and tempering population increase) not on cutting down on wood consumption. This could be increased substantially up to the point of NPP of wood!	Rejected, Point made many times elsewhere - does not fit here
7204	11	49	38		39	That is because deforestation is the single most important source for GHG emission….'. Within the 'forestry' yes, within AFOLU no. Over a 100 years time period, conserving or restoring a peat will produce >50% more carbon credits than the conservation or restoration of a forest on the same area of land. Suggestion: show somewhere in the document a figure on economic potentials of all mitigation measures within AFOLU: 'Forest', 'Croplands', 'grasslands' and 'wetlands'. Fig. 11.12 illustrates this partly, but it's all about management (excludes avoided degradation of forest and peat) and excludes forest.	Accepted, Revised in SOD (can be more specific pending the outcome of the costs and potentials cross-cut)
12423	11	49	40	49	43	Could you please clarify if the emissions from biomass-burning are included in the estimated mitigation potential?	Accepted, Clarified in SOD
5619	11	49	40	49	40	. Biomass from trees not forestry can contribute up to 340 EJ from NPP alone of which up to 300 EJ are potentially available for energy. The figure of 12-74 EJ is much too low. The current IEA consumption figure for biomass energy is 74 EJ/yr. Likewise the mitigation potential of 0.4 to 4.4 GtCO2/yr (0.11 to 1.2 Gt C) is much too low for power plants. There can be many more wood-fired 'local' plants with conventional boilers and larger wood gasified plants.	Rejected, These numbers seem very optimistic
7669	11	49	41	49	43	The above mentioned literature shows that you cannot talk about annual mitigation potentials of bioenergy from forests as a fixed number. Generally increased harvest will lead to increased accumulation of co2 in the atmosphere for a long period (from decades to centuries) before one could hope for a mitigation.	Rejected, Surely not - if that wood is used to substitute fossil fuels, less fossil C will end up in the atmosphere and forest regrowth will take up the C released from wood in combustion

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3760	11	49	44	51	17	Three relevant references on economic potential for carbon mitigation from forestry are: 1) Coren, Streck, Myers-Madeira. Estimating supply of RED credits 2011-2035. Climate Policy doi:10.3763/cpoi.2010.0181; 2) Busch, J., Lubowski, R., Godoy, F., Steininger, M., Yusuf, A., Austin, K., Hewson, J., Juhn, D., Farid, M., Boltz, F. (2012). "Structuring economic incentives to reduce emissions from deforestation within Indonesia." Proceedings of the National Academy of Sciences of the United States of America 109(4):1062-1067.; and 3) Merger, Held, Tennigkeit, Blomley. A bottom-up approach to estimating cost elements of REDD+ pilot projects in Tanzania, Carbon Balance and Management 2012, 7:9 doi:10.1186/1750-0680-7-9	Accepted, Added these references in SOD
12424	11	49	47	49	47	Does economically viable mitigation potential mean that effects on biodiversity is not included? If no, what would the mitigation potential be if biodiversity constraints were taken into account?	Rejected, No - and don't know the answer. We can only review what is known and has been published
12422	11	49	34			This section could be improved to make it more undestandable.Texts should be placed more in connection with the figure they explain. Table 11.9 is hard to understand. Why is the difference between global integrated assesment models and Global forest sector models so much - 700 respectively 13 755 Mt CO2.	Accepted, Revised in SOD (can be more specific pending the outcome of the costs and potentials cross-cut)
13957	11	5				some reference to competition of residues for bioenergy with residues needed for fertility (composts) and sequestration. This is a major potential conflict that must be put in the foreground	Accepted, Agreed - has been noted
14563	11	5	1			should this be ADAPTIVE CAPACITY	Accepted, Revised for SOD
2609	11	5	11	5	12	bioenergy expansion 'of agricultural plantations into forests' can ….TOO MANY THOUGHTS ARE INCLUDED IN THIS PARAGRAPH WITHOUT HAVING A TRANSITION BETWEEN SENTENCES - MAKES IT DIFFICULT TO FOLLOW	Accepted, Revised for SOD
14565	11	5	13	5	14	"will likely increase" increase from what? I would say its more than likely. Use of land for bioenergy and sequestration does comepte with other land uses. Of course the parger the scale the greater the competition. (this is aprtly also covered in paragraph above. Could say this stronger and earlier.	Accepted, Revised for SOD
7535	11	5	13	5	18	Forest management and sustainable forest management is important options in this discussion.	Accepted, Revised for SOD
2610	11	5	13	5	18	Is the large scale bioenergy from agriculture or is this referring to forests since afforestation and reforestation is mentioned in the same sentence? The comment on harvesting residues does not factor in that most residues have someone that is already using it, e.g., mill owners or small industries colocated with a facility. Therefore residues are a competitive resource. Linking food security with forest energy becomes confusing. Bioenergy from forests or plantations is minor compared to land conversion to agricultural or oil crops.	Accepted, Both
12363	11	5	17	5	18	"Multifunctional systems" is at term which is very general an may not be too meaningful for the reader. May be the authors could give a short definition of what is meant by a "multifunctional system" in the body of the text?	Accepted, There is one in the glossary, but we have now explained it on first use
5033	11	5	17	5	17	"consider competition for land" I might add and water	Accepted, Revised for SOD
8920	11	5	17	5	18	multifunctional system in practice are not yet developed to the point that they could substantially contribute to a considerable decrease of the food-energy competition; a more cautious formulation is recommended	Accepted, Revised for SOD
2126	11	5	18	5	18	harnessing agricultural residues for bioenergy may also cause conflicts, due to the utilization of this biomass as fertilizer in a range of sustainable agricultural production systems (e.g. organic; cf. e.g. Muller, A. (2009). Sustainable Agriculture and the Production of Biomass for Energy Use, Climatic Change 94(3-4): 319-331). Another issue is the role of organic fertilizers for soil carbon sequestration which may conflict with using this biomass for energy use.	Accepted, Revised for SOD
2611	11	5	19		23	Comment - forest conservation is not the only issue that needs to be addressed since half of the world is still dependent on forests for food (wildlife), energy and water. They don't use the forest materials efficiently and mainly burn woodfuel. They also do not convert forests to energy crops.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
2612	11	5	2			Comment - how is this a social benefit if the lands are conserved and forest dependent communities are not provided any alternatives?	Accepted, Revised for SOD
14566	11	5	20	5	23	REDD should have its own paragraph. The sentence above is general to all mitigation and not specific to REDD	Accepted, Revised for SOD
5034	11	5	20	5	20	the redd statement is a little strong. How we implement this is a major issue. You can spend a lot of money on redd projects that would never have been defforested (additionality isse) plus you can just move development elsewhere (leakage problem)	Accepted, Revised for SOD
13958	11	5	20	5	22	the evidence base for a revenue stream forthcoming for substantial numbers of REDD projects is severely lacking. A much more critical, nuanced, and contingent analysis of mitigtion financing options in the AFOLU sector is required given the serious lack of potential currently for finance, from markets or otherwise.	Accepted, Revised for SOD
5699	11	5	21			Words 'REDD mechanisms' may be replaced by "comprehensive REDD mechanism known as REDD-plus mechanism".	Accepted, Revised for SOD
7536	11	5	21	5	22	"One of the most striking aspect of policies for the AFOLU sector is the implementation of REDD mechanisms and its variations that can represent a very cost-effective option for mitigation" is based on the Stern report. However, we realize tha REDD requires large costs of system development and transaction throgh experiments of negotiation and development for REDD.	Accepted, Some limitations for REDD+ implementation and related programs were included in section 11.10
10580	11	5	21			Put REDD in full first time used. Also could explain it in a footnote and also for REDD+ (first quoted on page 10)	Accepted, Revised for SOD
11061	11	5	21	5	21	Does the acronym "REDD" need to be defined ahead of this?	Accepted, Revised for SOD
8921	11	5	21			the term REDD should be explained	Accepted, The term was explained - section 11.10
15144	11	5	24	5	25	vagues sentence; reader may not be familiar with transformation pathways at this point	Accepted, These have been defined in Ch6
5035	11	5	24	5	24	when you say "AFOLU forms a critical component of transformation pathways," I am unsure what you are talking about. I would also think you might say currently implementable and also mention the concept of limikted capacity plus bridge to the future	Accepted, These have been defined in Ch6
9441	11	5	28		40	Indeed progress. Although I suspect that the present format limits discussion of the land-energy nexus and the synergies and tradeoffs between urban and rural regions	Noted, Statement - not a comment
5036	11	5	31	5	31	I might fence off "other land use" from urban use by inserting the word rural	Accepted, Revised for SOD
5037	11	5	35	5	35	I think bioenergy will still be probalematic and you should acknowledge it is split to another chapter (I assume). That did not work so well in ar4 and probably will plague ar5	Accepted, Now in ioenergy annex
2127	11	5	37	5	37	add the following between "...Meyfroidt, 2011)" and "and water…": ", biomass (Muller, A. (2009). Sustainable Agriculture and the Production of Biomass for Energy Use, Climatic Change 94(3-4): 319-331)"	Accepted, Revised for SOD
12364	11	5	38	5	40	It is important to remember that even though the new IPCC guidelines on national GHG inventories merge the sectors agriculture and LULUCF (AFOLU), it is decided under the UNFCCC that the sectors will continue to be reported as two separate sectors. Please consider to include this information in a sentence.	Rejected, Is that relevant for mitigation - surely an accounting issue
7610	11	5	4	5	6	Bioenrgy expansion is not main driver for land use change. Land use chenge would not occur under sustainable use of timber for bioenergy. Need more anlysis of another cause such as agriculture and expansion urban area.	Accepted, Revised for SOD
7534	11	5	4	5	6	Bioenergy is not a main driver for land use change. Before this paragraph, discussion on emission from land use change is required.	Accepted, Revised for SOD
5030	11	5	4	5	4	when you say "Land use and land use change associated with bioenergy expansion" I would also add affrestation, adaptation, grassland conversion	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12365	11	5	41	5	42	Since it is rather obvious that climate mitigation is not the primary use of land, the senescence could be simplified by stating; "In this chapter we consider the conflicting uses of land for food and fiber provision, for energy production and for conservation of biodiversity and ecosystem services and natural resources"	Accepted, Revised for SOD
13959	11	5	42			livelihoods are essential to add to any list that addresses uses of land. Lands provide livelihoods to billions, not merely food and fiber. Food security encompasses more than just the production of food. The rural nature of billions requires attention to food production as one element of livelihood strategies for this immense proportion of the global population.	Accepted, Revised for SOD
13960	11	5	45	5	46	explicitly include livestock/meat as element considered in the demand-side measures	Accepted, Revised for SOD
9440	11	5	7		7	Here, I assume that availability means something like cost-competitive. The reserve of productive land remains effectively ample, the problem is often cost-competiitiveness.	Accepted, Revised for SOD
14564	11	5	7			DUE TO limited availability of productive land, INCREASING demand for both food and bioenegy may induce…..	Accepted, Revised for SOD
5031	11	5	7	5	7	I would add fiber and fodder to "due to growing food and bioenergy"	Accepted, Revised for SOD
12362	11	5	8	5	8	End of sentence could be simplified since the main consequence of extended use of fertilizer is higher N2O-emissions. Suggested rewriting: "...which imply more energy use for irrigation and higher N2O emissions from the increased use of fertilizer."	Accepted, Revised for SOD
5032	11	5	9	5	9	add land degredation?	Accepted, Revised for SOD
10579	11	5	9			"energy use" is for more than just irrigation	Accepted, Revised for SOD
18022	11	5	13	5	14	The term "will likely" is too strong. It attributes causality to the impacts of bioenergy and afforestation and reforestation on competition for land and other natural resources, on an ex-ante basis. Naturally, there are also ways of doing that in manners that avoid or minimize such competition. Thus, the suggestio is to use "may" instead of "will likely". The suggestion is also consistent with the term "may" already used in Section 11.4.3, page 35, lines 43 to 44.	Accepted, Revised for SOD
11902	11	5	27	6	26	Consider add a figure or table to summarize the changes in treatment "AFOLU" from IPCC SAR to AR4, and what are new in AR5.	Accepted, section revised - new figure added
8314	11	5	28	5	40	Also rural societies affect simultaneously land use of agriculture and forest. This point is enhanced as a reason to discuss agriculture and forest sectors together.	Accepted, Revised for SOD
3532	11	5	41		43	It is hard to understand this sentence, please reformulate and make it clearer.	Accepted, Revised for SOD
18236	11	50				Page 50: table 11.8 (Potential of mitigation measures of global forestry activities. Global model results indicate annual amount sequestered or emissions avoided, above business as usual, in 2030 for carbon prices 100 US$/Tco2 and less), shows mitigation potentialities economically viable, by key region and mitigation options, calculated using global models which indicate annual amount of CO2 sequestered or avoided emissions by 2030 with carbon prices between 1 and 20 $, 20 – 50 $ and 100 $. In this case is evident that potential mitigation measures by forest activities, globally, are more obvious for Central and South America, followed by Asia countries and USA. Based on these prices, strategies will be focused to reduce deforestation, aforestation (the establishment of forests where there never has been forests) and forest management, being more striking, commercially at a price of 100 $, highlighting that no option represent negatives results, namely, loss. However, they recommend the elimination of uncertainty in the models showed because the lack of baselines does not allow definitive estimates of forest´s mitigation potential. Thus, is expected that combined effects of deforestation and degradation reduction, implementation of forest management, agroforestry and bioenergy will increase from now to 2030 and beyond, depending always of carbon sequestering prices.	Accepted, The issue has been recognized as part of the assessment.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
8217	11	50				VALUES UNDER FOREST MANAGEMENT COLUMN 3, 12, AND 30 ARE NOT CLEAR, ALSO UNDER REDUCED DEFORESTATION COLUMN 21 AND 30 THE VALUES ARE NOT CLEAR	Accepted, Reduced deforestation and forest management are defined/explained in SOD
5713	11	50		52		The global forestry mitigation potential up to 2030 based on 3 different cost classes should also add one or two paragraphs on various possibilities and conditionalities that would be essential for mobilizing resources for the purpose. For example, enhanced mitigation commitments by developed nations could be the main trigger for the purpose. Similarly, a minimum support price may be helpful in ensuring realization of mitigation potential in forestry sector across the world.	Noted, (Peter, my understanding is that issues like this will be picked up in the synthesis report and/or in section 11.9 on transformation pathways)
5620	11	50				. I had difficulty in following this table. I think there should be another column for each region giving the fraction for class 50-100. Thus the USA afforestation activity, the three columns should read 0.3; 0.3; 0.4. The cost columns should values to the nearest 1000. E.g. for forest management in the USA, the value should by 1,590 not 1,59.	Accepted, Table has been reformatted
5835	11	50				The description needs some re-phrasing and re-working. It does not become clear what is meant by "Two right columns …". If you want to show fractions, why are values given in total units and not per cent? Please amend "1)" and "2)" accordingly. The potential is not equal over C costs up to a certain point - the 100 US$ - so your description under "3)" is wrong. Do you mean "maximum potential under C costs up to 100 US$"? If you want to have one column with a max. / total potential and two columns with fractions of this total that could be realized at the cost ranges specified in the column header it would be better - in my opinion - to place the "total" column at the left, not the right. Reading direction in English texts is left to right, so you have the important value (total) first and the fractions following. Pay attention to cell formats, too: is "USA / FM / 100" 1,590 or 1.59? You can also save space by using REDD as abbreviation instead of "reduced deforstation".	Accepted, Table has been reformatted
11172	11	50				Definition of the activities such as afforestation, Reduced deforestation and forest management are not clear. Some explanations are needed to avoid missleading.	Accepted, Defined the terms in SOD
12425	11	50	1	50		There seem to be some errors with the use of "," and "." in the numbers.	Accepted, Errors corrected in SOD
9086	11	50	1			Some typo errors ocurred in the Table.	Accepted, Errors corrected in SOD
14443	11	50	1			Check numbers. Decimal value appears to follow U.S. convention. Check value for USA (forest management), Total (deforestation, forest management).	Accepted, Errors corrected in SOD
5621	11	50	10	50	10	Removal of annual growth could be at a negative cost. I don't think this table takes into consideration using the NPP of trees.	Rejected, Correct - it does not
4394	11	50		50		units of sequestered C ?	Rejected, Stated in footnote 3
10625	11	51				Please consider Strengers et al. (2008) for the costs of carbon plantations. Reference: Strengers, B.J., van Minnen, J.G., Eickhout, B., 2008. The role of carbon plantations in mitigating climate change: potentials and costs. Climatic Change 88, 343–366.	Accepted, Reference considered
10626	11	51				Please consider Tavoni et al. (2008) for the costs of forests alternatives. Tavoni, M., Sohngen, B., Bosetti, V., 2007. Forestry and the carbon market response to stabilize climate. Energy Policy 35 (11), 5346–5353.	Accepted, Reference considered
5622	11	51				Global forestry mitigation potential in 2030. The diamond spots on the graph are not explained. Again, I don't think this figure takes into consideration NPP of trees.	Accepted, Figure reformatted/revised in SOD
5836	11	51				Please amend legend: the panel shows also diamonds in at least two colours, but no source is given for this. And please check author names (Sohngen / Songhen).	Accepted, Figure reformatted/revised in SOD
14737	11	51	13			…" One important reason that bottom-up…" This phrase is confusing needs to be clearer than it is now.	Accepted, Revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5623	11	51	21	51	22	“Forestry mitigation options --- to contribute between 1.27 and 4.23 GtCO2/yr for economical viable abatement in 2030”. This is extremely low. The current un-used accessible NPP from trees is an estimated 14.82 Gt wood, equivalent to an abatement potential of over 27 GtCO2/yr. This is more than 6 times the 4.32 GtCO2 figure and this is without other abatement measures considered in the text. The same applies to Figure 11.11 on page 52.	Noted, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
12426	11	51	3	51	5	Could you please clarify if the albedo is included in the calculations, e.g. for afforestation?	Accepted, Clarified; no, not included
18237	11	52				Page 52: Graph 11.11 (Annual economic mitigation potential in the forestry sector by world region and cost class in 2030), highlights the annual economic mitigation potential in the forest sector by region and cost by 2030. Again are Central and South America which have more mitigation potential for the forest sector, with similar values for sequestration to both lower costs of 20 $ and prices between 20 $ and 100 $, emphasizing that in a PNUMA report, it is suggested that forestry offers a mitigation potential of 1,3-4.2 Gt 1 CO2 / per year and stabilization of climate in 2ºC. These aspects are very important for Venezuela because of the potential represented by its forests and areas under management, estimated in 16.231.389 hectares (162.313,89 Km2).	Noted, Statement - not a comment
5624	11	52				The regional bottom up maximum estimate of 4230 MtCO2 is very low and even the global forest sector models of 13,775 MtCO2 is low compared to the NPP from trees of OVER 33,600 MtCO2. Excluding current use of woody biomass, the net NPP is over 27,000 MtCO2. At present about 55% of woody NPP is in the tropics and according to Melillo et all (1993) 66% of NPP is in the tropic (see my article). Thus, the potential for expanding wood consumption, including energy is much greater than stated and much could be achieved quickly with the help of rural people and with proper incentives for them.	Noted, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5625	11	52				This is extremely low. The current un-used accessible NPP from trees is an estimated 14.82 Gt wood, equivalent to an abatement potential of over 27 GtCO2/yr. This is more than 6 times the 4.32 GtCO2 figure and this is without other abatement measures considered in the text.	Noted, We are dealing with economic, not total biophysical potentials. Biophysical potentials of not the focus of modern assessments
5837	11	52				Please clarify text: You do not need to state "excluding bio-energy" two times. Concerning footnote "a": is it related to the column "regional, bottom-up, mean" only? However, if bio-energy is excluded in general, it does not have to be given here again. Numbers can be compared more easily if they are set right-bound.	Accepted, The table (should be referred to as Table 11.9) was reformatted and double statement removed in SOD.
5838	11	52				Please either expand figure or table. Both show parts of the same information, so please delete one and show the information in one place.	Accepted, The table and the figure were reformatted in SOD
13342	11	52	10			occuring	Rejected, Do not understand the comment

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9458	11	52	15		16	Where would avoiding emissions from U.S. biofuels production go on this chart? North America or scattered everywhere where LUC is avoided? If the Searchinger et al. (2008) paradigm is to be adopted, it is inconsistent with this sort of framework.	Accepted, Explicitly recognized in SOD that net emissions outcome or emission abatement potentials from LUC is not considered in this section?????? (Peter, you are better placed to judge but my understanding is that this issue relates to an LCA but will be addressed somewhat in Chs. 7 and 8 on 'energy systems' and 'transport', respectively. These chapters, through the measurement of leveled costs of energy generation and leveled cost of conserved energy, will look into what feedstocks be used in bio-energy production as well as what fuels be replaced by bio-energy. Some IAMs will be able to account for the LUC related abatement/net emissions, and hence in Ch 6 may oick up the issue.)
13341	11	52	5			Economic_mitigation	Rejected, Do not understand the comment
18238	11	53				"… A recent PNUMA report suggests that forestry can offer a mitigation potential of 1,3-4.2 Gt 1 CO2 / per year in the achievement of stabilization of climate at +2ºC". This is a reckless asseveration: confer forests the responsibility of stabilize the temperature increase of global climate; there should be a balance with the diminution of GHGs by the developed countries / Annex 1. On the other hand, an increase of +2ºC is worrying for the life on the planet; this trend implies the design of simulation climate models immediately. In the best-case scenario, sure there will be adverse consequences for humanity and the environment, in particular in those areas identified as of high climate vulnerability. Finally, we encourage the IPCC to review this figure and the party countries to boost a mass dissemination of environmental education for all the population to promote environmental awareness globally.	Rejected, The purpose of IPCC AR5 is not to review non-peer-reviewed reports for governments, but to assess the best available science and provide a synthesis of it
2365	11	53				As this is not in cost curve format, be explicit if there is doublecounting between the measures	Accepted, Further assessed and caveats used as and when applicable.
13343	11	53				Why use up to. What was the number that the scenario was tested at. Use this number.	Rejected, It was "up to" - these were the thresholds used in the FASOM model
5626	11	53	1	53	2	Again the UNEP figure seems very low for the mitigation potential.	Rejected, Looks very reasonable to me - and consistent with many other studies
12429	11	53	10			Manure management has been shown to represent a relatively low reduction potential compared to other measures. It should be indicated in the legend that this does not include the substitution effect for biogas in other sectors used in district heating or as fuel for buses and trucks.	Accepted, Explicitly mentioned in SOD that only CH4 emission reduction potential considered here

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11069	11	53	13	53	13	Is more than one figure being referred to here as suggested because I can see only one that applies.	Accepted, Changed 'figures' to 'estimates'
11070	11	53	13	53	17	Fig. 11.12 does not break down mitigation potential by category (e.g. carbon sequestration) as indicated buy the text, or should a different figure or table be referred to here?	Accepted, Better explained the mitigation options/categories in SOD
13344	11	53	14			CO2e	Rejected, Do not understand the comment
9335	11	53	15			The word 'is' is suggested to be deleted.	Accepted, Revised in SOD
13345	11	53	15			which may (remove is)	Accepted, Revised in SOD
16600	11	53	18	53	25	McKinsey et al. 2009 - is another apparently non-peer-reviewed publication; furthermore, it is a company that gets some of its income from studies of climate change mitigation, and its data is proprietary. Unless you can cite a journal article giving these results, don't court danger by including this paragraph.	Noted, Included for SOD as publically available
5628	11	53	21	53	21	What is MACC? Spell out.	Noted, spelt out in its first use.
18288	11	53	24			"a mitigation potential of 1.1-4.3 Gt CO2 / yr" should it be CO2-equ.?	Accepted, Corrected
18289	11	53	24			It would be helpful to have the mitigation potential also expressed as % of total agricultural CO2-equ. Emissions; so far, total emissions are only given as Gt C (not Co2-eq.)	Rejected, Not a good idea, as there are C sinks which act very differently from non-CO2 emissions
13983	11	53	24			isn't this just circularly referential? Isn't UNEP just using IPCC AR4 data?	Accepted, I don't think so - I reviewed the UNEP report - needs to be checked
5627	11	53	3	53	3	11.6.3 Agriculture. Nitrogen-fixing trees (and shelterbelts) could play an important role in all the potential mitigation measures for agriculture. So the potential may be much greater than indicated.	Rejected, This will be tiny in the global picture
12427	11	53	4	53	12	Summarizing the ecomic potential for each practice(measure) for resp 20, 50 and 100 USD in figure 11.12 results in resp about 1 000, 2 400 and 3 300 Mt CO2-eq/yr. These are lower than the figures in the text line 6 resp 1 600 2 700 and 4 300 Mt CO2-eq/yr. Is there an explanation for the differences?	Rejected, No - the numbers in the figure add up exactly to the numbers in the text. Must be reading the axis incorrectly.
13982	11	53	5	53	7	the question of demand must be integrated into this economic analysis. As carbon prices increase, the proported potentials increase significantly. But multiply here -- 4.3 billion tonnes at $100/ tonne is almost a half a trillion dollars. Do you really propose that at some point there will be half a trillion dollars available just for soil carbon sequestration? are you serious? and how are the significant caveats of pp. 31 and 35 factored into this "economic" potential?	Rejected, Very complex -and we can only review work that has already been done. Nobody is proposing how much money will or will not be available- simply estimating the potential that would be realized if these carbon prices were paid. Please read AR4 which describes how the assessment was done.
11067	11	53	5	53	5	It is not accurate to state that Fig. 11.12 presents "various …..stabilization scenario pathways", it only presents one as indicated in the figure caption.	Accepted, Revised in SOD
11068	11	53	7	53	8	The final sentence of this paragraph appears redundant to what was stated in the first sentence, as both sentences are referring to the same figure.	Accepted, Revised in SOD
12428	11	53	8	53	12	For clarification a short description of the difference between "Restore cultivated organic soils" vs. "Cropland/Grazing land management" should be given. Does restoring of cultivated soil mean that the soil is converted to natural soil or is it soil that is e.g. drained to produce more crop?	Rejected, The difference is between peatlands (organic soils) and non-peatlands (mineral soils)

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15618	11	53	3			This section on economic mitigation potentials in agriculture does not mention any analysis of demand-side measures. I don't know whether such analysis exists to parallel the other IPCC analysis, but Wirsenius S. and others (2010), seems worth discussing as a start. Wirsenius S., F. Hedenhaus, and K. Mohlin (2011). Greenhouse gas taxes on animal food products: rationale, tax scheme and climate mitigation effects. Climatic Change 108(1-2), 159-84.	Accepted, Very few studies - these are all discussed in the systemic perspective section
13346	11	54				Be more specific for what the actual actions are that are mitigating GHGs under the heading "Option"	Rejected, The individual measures are presented in table 11.2 in section 11.3
5629	11	54				Trees could play an important role in all the options and thus increase the CO2 equivalent for the different prices of CO2. For the subsistence sector, cheap inputs could increase fertility. They include wood ash (high in K), manure (N), compost (N P K), Lime (CaCO3: this increases the pH and facilitated the release of P), soot (C), bone meal (Ca,) dried blood (N) and no-till etc.	Rejected, This was not in the published studies
5839	11	54				Please explain what is given in brackets: min - max., standard deviation, …?	Accepted, Explained in SOD: Standard deviations
13984	11	54				are the assumptions underlying these numbers still valid? I would suggest a reassessment -- that's the point of having an assessment called AR5 -- it should evaluate and update AR4, not merely copy the data.	Partially Accepted, Agreed - we have included all new studies in figures 11.10 and 11.13.
12431	11	54	1			The figure needs some more explanation, eg the big differences in mitigation potential in this figure, compared with table 11.10.	Accepted, Revised in SOD
13985	11	54	1			where is the analysis of other financing mechanisms? In the absence of a global carbon price, significant issues of non-permanence and a functioning market, it clearly begs the question of how to mobilize resources for mitigation in agriculture that are not linked to "the carbon market."	Noted, The issue has been dealt with elsewhere in the report. (Peter, I suspect Ch 16 will deal with this issue.)
11071	11	54	4			A recent analysis (In press) by Delgrosso and Cavigelli entitled “Climate stabilization wedges revisited: can agricultural production and greenhouse gas reduction goals be accomplished?” (Frontiers in Ecology and the Environment, In press) could be included in this summary and/or elsewhere in the chapter or the analysis. They conclude that “agriculture could provide wedges of 1350 to 3900 Tg C under realization of technological and human behavior mitigation potentials”. I have sent the article via email to comments@ipcc-wg3.de.	Accepted, Included in SOD
12430	11	54	5			This table should be placed together with the text at page 53 line 26 to p 54 line1.	Accepted, Revised in SOD
11072	11	54	5			What is the value of republishing the information that was already included in Fig. 8.9 of AR4? Did you consider an updated analysis that incorporates the previous as well as more recent information instead of presenting them separately?	Accepted, Agreed - we have included all new studies in figures 11.10 and 11.13
14268	11	55		58		sections 11.7.1, 11.7.2 & 11.7.3 are unnecessarily prolonged. These can be minimized to have the desired number of pages allocated for this chapter	Accepted, Section re -drafted
5714	11	55	10	55	17	In respect of forests, co-benefits or incentivization of ecosystem services other than carbon is being discussed globally. What is the possibility of financing these services alongwith financing of mitigation in the forestry sector? One or two paragraphs on this aspect will also be useful. For example, even mentioning that mixing up of the forestry mitigation and other forest ecosystem services in terms of financing may not be a feasible approach for the present, or that more research would be required to go into the determination of modalities for valuation of other ecosystem services before considering their financing, would be a useful suggestion.	Partially Accepted, We checked references on success/failure of A/R CDM and the voluntary carbon markets in promoting mitigation and other ecosystem services.
11175	11	55	10	61		I co-benefits, Risks and uncertainties, Barriers and opportunitiesの 3 つに区分して記述している。他の章との横並びなのかもしれないが、記述の多くが重複しており、冗長な印象。11.7.3 spilloversはコンセプトが不明。不要では？	Rejected, Sorry, we could not read the comment.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11176	11	55	10	61		From 11.7.1 Co-benefits to 11.8 Barriers and opportunities, there are some dupricates of discriptions in these sections. The concept of these setions must be distinguished clearly.	Accepted, Section re -drafted
11178	11	55	10	61		The impact of international market prices for crops and timbers should be mentioned as risks or barriers of mitigation options.	Accepted, Considered for the SOD in 11.7 (could also have been in 11.8)
11305	11	55	12	55	15	Urban and peri-urban agriculture is a perfect example of AFOLU's land management co-benefit potential, especially on vulnerable sites like steep hillsides and/or floodplains where permanent human settlement is ill-advised. UPAF in this areas may also turn geographic liabilities into livelihoods and increase food security close to where it is needed most acutely.	Partially Accepted, Considered to include positive examples --> checked references
11173	11	55	12	55	15	In addition to these example of co-benefits, prevention of landslides and coastal erosion must be included.	Partially Accepted, Included partially in co-benefits and also in 11.5
5630	11	55	13	55	14	I think the sentence should read --- rising salination, lowering ground water levels ---	Accepted, Improved
10116	11	55	19	55	19	There are may other important activities with socioeconomic cobenefits like improved livestock healf and improved feedproduciton/regeneration of degraded pastures will increase the income, also improve the nutrition of the household and create a capital assest which improfvew livelihoodsecurity. Another excample is integrated food-energysystems discussed earlier. Agrocofersty will create an income source, improve nutrition etc.	Section has been reviewed including more co-benefits and potential adverse effects from livestock
5631	11	55	20	55	48	Change timber production to wood production.	Rejected, Both terms are widely accepted
2634	11	55	21			Mostly not ag to forests but forests to ag.	Partially Accepted, Sentence improved
13347	11	55	25			Are the authors promoting the commercialization of water.	Noted, No, we are only mentioning options
16602	11	55	38	55	38	The phrase "land tenure" is better than "property rights" here -- more inclusive of traditional tenure systems.	Partially Accepted, Tenure rights included (both elements are important, tenure is often not enough, property needs to be clarified too)
5096	11	55	46	55	46	consideration of cobenefits is somewhat more complex than stated for example under a hypthetical cap and trade elbakdize and mccarl compare co benfits from sequestration with those from reducing power plant emissions and show that the cobenefits offset and reccomend ignoring them since you have to not do selective evaluation but look at tfor all strategies, this is also coverd in the nas report on limiting emissions Fri, R., M. Brown, D. Arent, A. Carlson, M. Carter, L. Clarke, F. de la Chesnaye, G. Eads, G. Giuliano, A. Hoffman, R.O. Keohane, L. Lutzenhiser, B.A. McCarl, M.C. McFarland, M.D. Nichols, E.S. Rubin, T. Tietenberg, J. Trainham, L. Geller, A. Crane, T. Menzies, and S. Freeland, "America's Climate Choices Limiting the Magnitude of Future Climate Change", National Academy Report, The National Academies Press, Washington, D. C, 2010. Elbakidze, L., and B.A. McCarl, "Sequestration Offsets versus Direct Emission Reductions: Consideration of Environmental Co-effects", Ecological Economics, Volume 60, 564-571, 2007.	Partially Accepted, References checked. We agree that attribution of co-benefits and negative effects is difficult and therefore we discuss "potential" effects in the AR5.
13348	11	55	47			net (not nett)	Accepted, Done
11174	11	55	49			Something is missing after the last sentence. Period or additional explanations.	Accepted, Section re -drafted

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13350	11	55				This section should have a discussion that reduction of emissions from agriculture reduces inefficiencies and improves agricultural profitability.	Partially Accepted, Although the point is interesting, it can not be generalized as for all GHG emissions in the agricultural sector. We considered the issue in the SOD, though.
15619	11	55	18			The socio-economic co-benefits does not mention those from demand-side consumption measures, which can improve animal welfare. E.g., industrial systems now produce approximately two-thirds of the world's poultry meat and eggs, and more than half of all pork. Food and Agriculture Organization of the United Nations (2009). The state of food and agriculture: livestock in the balance (Rome, Italy: FAO, p. 27). Available at: http://www.fao.org/docrep/012/i0680e/i0680e.pdf. The breadth of scientific evidence demonstrating that intensively confined animals are frustrated, distressed, and suffering under modern production schemes is extensive, conclusively substantiating that battery cages for egg-laying hens and crates for pregnant sows and calves are simply not appropriate environments. Duncan I.J.H. (1970). Frustration in the fowl. In: Freeman B.M. and Gordon R.F. (eds.), Aspects of Poultry Behaviour (Edinburgh, Scotland: British Poultry Science Ltd., pp. 15-31). Špinka M. (2006). How important is natural behaviour in animal farming systems. Applied Animal Behaviour Science 100(1-2),117-28. Baxter M. (1994). The welfare problems of laying hens in battery cages. The Veterinary Record 134(24), 614-9. Dawkins M.S. (1990). From an animal's point of view: motivation, fitness, and animal welfare. Behavioral and Brain Sciences 13, 1-61. Vestergaard K. (1984). An evaluation of ethological criteria and methods in the assessment of well-being in sows. Annales de Recherches Vétérinaires (Annals of Veterinary Research) 15(2), 227-36. Broom D.M., Mendl M.T., and Zanella A.J. (1995). A comparison of the welfare of sows in different housing conditions. Animal Science 61, 369-85. European Commission, Scientific Veterinary Committee, Animal Welfare Section. 1995. Report on the welfare of calves. Adopted November 9. Available at: http://ec.europa.eu/food/fs/sc/oldcomm4/out35_en.pdf.	Accepted, Animal welfare has been included at the social side. Why? Because the understanding of welfare is based on cultural values. References were checked. Special consideration was given to scientific papers
17989	11	55	21	55	37	From where does this "increase in the overall capital" come from? In what way would that be a co-benefit, given that the capital would not be available elsewhere in the economy? While the mentioned payment schemes might obviously lead to additional income for land-holders, these seem to be policy instruments to realize mitigation options rather than mitigation options themselves and should be discussed in the policy section.	Rejected, Make your analysis. If you Considered K a finite element or not. Furthermore there are sectors in the economy that are over-capitalized causing a stagnation. This is more a Discussion on economic theory than something else
17990	11	55	24	55	27	While increased (or decreased) downstream water availability might well be a co-benefit (or co-cost) of mitigation options such as revegetation or reforestation, why would additional timber be a co-benefit when it should clearly be part of the economic asssessment of the mitigation option?	Rejected, It is a co-benefit of the mitigation. That means that besides the mitigation benefit you get other benefits. Further, getting additional wood doesn't necessary have a direct economic benefit as it can be used by the producer (e.g. firewood, building) When this activities are part of the informal economy (as in many developing countries) there is no direct economic benefit (no monetization)

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
17991	11	55	42	55	22	Since these improvements on institutional agreements are hard to quantify, I would frame these as opportunities rather than co-benefits and thus move the discussion to section 11.8.1.	Rejected, Co-benefits are not only quantifiable things. The existing institutional framework can be an opportunity or a barrier . But changes in the institutional framework can be also a consequence of an AFOLU measure (look at the REDD+ activities financed by the FCPF), and thus should be listed as co-benefits, too
10117	11	56	1	56	1	Healt would fit better to socioeconomic benefits, nutrition benefits must be better articulated	Accepted, Done
16603	11	56	15	56	22	This paragraph, as with that mentioned in my point 61, is contradicted in the discussion of land sparing on p 69, lines 1-12. The land sparing issue should be discussed in one place so that you have a consistent set of opinions on it. P. 69 is better at including the evidence on both sides, although as mentioned earlier it leaves out several important works.	Accepted, re-drafted
9459	11	56	15		22	Key point, but poorly articulated and misplaced.	Accepted, re-drafted
13986	11	56	15	56	22	this assertion needs to be significantly qualified to reflect the substantial disagreement in the scientific community about these conclusions.	Accepted, re-drafted
12432	11	56	2	56	2	Reduced deforestation will have at least the same benefits as reforestation. Please consider to add "reduced forestation" before reforestation.	Rejected, Environmental and health effects from reducing deforestation and reforestation are not necessarily the same. Impacts on watersheds is a good example of it. What is meant by "reduced forestation"?
15200	11	56	2	56	14	what's the point here?	Noted,
3871	11	56	20	56	22	Bioenergy crops are being exploited with high yields since this is a compulsory market for them in some countries (e.g. USA, Brazil, EU). Thus, the statement for Austria does apply for bienergy crops. This isn't mentioned in Section XY where mainly negative impacts of bioenergy are presented. Please, be fairer in your evaluation. See Pacca and Moreira, 2009. - Pacca, S. and J. R. Moreira, 2009. Historical carbon budget of the brazilian ethanol program, Energy Policy, 2009, vol. 37, issue 11, pages 4863-4873	Partially Accepted, Reference checked. The discussion on bioenergy co-benefits and potential negative effects has been moved to the annex on biodiversity, where a more balanced view has been included.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3872	11	56	28	56	31	This point must be made clearer. Several papers complain that bioenergy crops require too much water. The amount of water required includes rainfall. Here you claim that surface cover can increase water availability. Please, explain the contradiction pointed out.	Partially Accepted, The impacts discussed here are the impacts from activities aimed at restoring watersheds (i.e. watershed restoration), which is rarely done through bio-fuel plantations. What is often done is a combination of biofuel crops and other (trees and crop) species. Biofuels monocultures on the other side can require much water, but there won't be any reason for making watershed restoration with this type of system. However, we recognize that the use of the term restore in line 36 can be misleading. The term has been improved.
2635	11	56	33		37	There are many examples of agricultural yields increasing but as many examples for the need for a new green revolution since yields are down.	Noted,
12433	11	56	38	56	38	Please consider to add a few words so the sentence read; "Measures to reduce GHG-emissions from agriculture and forestry may also improve air, soil and water quality"	Accepted, Good suggestion! It increases readability. The whole section has been redrafted.
10118	11	56	42	56	42	This section is vague, mainly refers to other sections, maybe should focus on innovative new technologies , including breeding, pest management, wasteproductuse, …or then skipped if no more content developed	Partially Accepted, Section has been re-drafted
5097	11	56	43	56	43	this section does not fit well under its subheading	Accepted, Section reviewed for the SOD
13351	11	56	44			agricultural, not agricclutual	Accepted, checked
10179	11	56	7	56	14	In some cases it is unclear whether the studies referred to are theoretical or empirical	Accepted, Section redrafted considering the comment
13349	11	56				This section should have a discussion of ammonia volatilization and impacts to air quality as well as ecosystem impacts.	Accepted, Air quality considered in the SOD
14444	11	56				This section appears a bit scattered due to the broad topics covered.	Accepted, Section has been re-drafted
14680	11	56	2	56	3	Persistant reductions in light levels will tend to reduce the productivity of crop and forest systems.	Accepted, Considered for the SOD, however, few clear references
4266	11	56	40	56	41	This section omits important health co-benefits from reduction of ischaemic heart disease as a result of reduction in animal source saturated fat consumption and reduction in large bowle cancer from reduced red and processed meat consumption. There are also benefits from increased fruit and vegetable consumption. Friel S, Dangour AD, Garnett T, Lock K, Chalabi Z, Roberts I, Butler A, Butler CD, Waage J, McMichael AJ, Haines A. Public health benefits of strategies to reduce greenhouse-gas emissions: food and agriculture. Lancet 2009; 374:2016-25	Partially Accepted, Section re-drafted considering impacts on human health

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15620	11	56	40	56	41	There are numerous additional studies discussing environmental and health benefits of reduced consumption. I suggest citing and/or discussing some of those briefly here. Mekonnen M.M. and A.Y. Hoekstra (2012). A global assessment of the water footprint of farm animal products. Ecosystems 15, 401-15. Available at: http://doc.utwente.nl/80897/1/Mekonnen-Hoekstra-2012-WaterFootprintFarmAnimalProducts.pdf. Eshel G. and P. Martin (2009). Geophysics and nutritional science: toward a novel, unified paradigm. The American Journal of Clinical Nutrition 89(suppl), 1710S-16S. McMichael A.J., J.W. Powles, C.D. Butler, and R. Uauy (2007). Food, livestock production, energy, climate change, and health. The Lancet 370, 1253-63. Marlow H.J., W.K. Hayes, S. Soret, R.L. Carter, E.R. Schwab, and J. Sabaté (2009). Diet and the environment: does what you eat matter? The American Journal of Clinical Nutrition 89(suppl), 1699S-703S. Donner S.D. (2007). Surf or turf: a shift from feed to food cultivation could reduce nutrient flux to the Gulf of Mexico. Global Environmental Change 17, 105-13	Partially Accepted, References were checked. The relationship between diet and gHG emissions is addressed in sections 11.4 and 11.7 as well as dietary change
10255	11	56	1	56	41	This section is too weak and must be refocused on the human health aspect! There is really much to be considered: - avoided burning of residues that have positive impact in reducing respiratory problems (e.g. Cançado ED, Saldiva PHN, Pereira LAA, Lara LBLS, Artaxo P, Martinelli LA, Arbex MA, Zanobetti, Braga ALF (2006) The impact of sugar cane–burning emissions on the respiratory system of children and the elderly. Env. Health Persp. 114: 725-729.); - Debate on some substancies proned to reduce methane emission by liter of milk produced such as the Bovine somatotrophine; - The no-tillage and muching option that is also synonymous of a shift in herbicide consumption; - The bioenergy debate arround Jatropha and the presence of tumor promoters and phytotoxin (curcin) in its seed oil (e.g. Horiuchi T, H Fujiki, M Hirota, M Suttajit, M Suganuma, A Yoshioka, V Wongchai, E Hecker, T Sugimura. (Mar 1987) resence of tumor promoters in the seed oil of Jatropha curcas L. from Thailand. Japanese Journal of Cancer Research, 78(3):223-236; - The possible presence of polycyclic aromatic hydrocarbons (PAHs) is Biochars (e;g. Hilber et al. 2012. Quantitative Determination of PAHs in Biochar: A Prerequisite To Ensure Its Quality and Safe Application, J. Agric. Food Chem., 2012, 60 (12), pp 3042–3050	Partially Accepted, Section re-drafted considering impacts on human health
10256	11	56	42	57	2	This section is too short in its present form to be informative.	Accepted, Length of the sections is given. We have redrafted the section and hope that even if short it will be really informative.
15621	11	56	42	57	2	One additional technological consideration may be cultured meat production. Tuomisto H.L. and M.J.T. de Mattos (2010). Life cycle assessment of cultured meat production. 7th International Conference on Life Cycle Assessment in the Agri-Food Sector in Bari, Italy, September 22-24. Available at: http://oxford.academia.edu/HannaTuomisto/Papers/358909/Life_cycle_assessment_of_cultured_meat_productio	Accepted, Livestock sections improved throughout
17992	11	56	2	56	6	The climate benefits are no additional benefits to mitigation and should not be discussed under the framework of co-benefits.	Accepted, done
10627	11	57			8	Please consider the Caparrós et al. (2010). This paper analyzes reforestations in Spain including, in addition to commercial values, social preferences. The paper also studies the impact of different carbon accounting methods on the speciees selected. Reference: Caparrós, A, Cerdá, E., Ovando, P. and Campos, P , 2010. Carbon Sequestration with reforestations and biodiversity-scenic values. Environmental and Resource Economics 45: 49-72.	Accepted, References checked

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10120	11	57	10	57	1	The argumentation here assumes that mitigaiton is connected to carbon markets, but mitigation and possible financing mechanisms are two different things. Reduction of net emissions is mitigaiton. How this is achieved is another issue, carbon markets is one options, not very probably in my view in small holder/pastoralist context in developing countires (major land users). Since agricultural investments (including farmers as the maininvestors) are about 1500 billion/year. directing thesefor climate smart agricultural investments (with mitigation as a co-benefit0 will I think be the major means of financing for mitigaiton in agriculture. Some kind of mitigation top up (to cover MRV if countries want to demonstrate downward deviation from ther baseline in their national reporting), investment suport for specially atractive mitigation practices with long lead limes ets. seem much more realistic alternative for agriculture that carbon markets. Through NAMAs Annex 1 countries could also offset theri emissions if they cannot do it in theri own agsectro (countries like New Zealand). LUC is another issue and has to be linked to red where a landscape approach looking at all ecosystem services is needed	Rejected, Without proper financing measures it is unlikely to get the AFOLU potential used. This is special critical in developing countries. The carbon markets (including all, Kyoto, the voluntary markets and the semi-regulated markets) are a main instrument promoting AFOLU activities. Carbon markets and agriculture are not necessarily two different things. Here it seems to be a confusion by the reviewer. The VCS for example includes methods for agriculture in its voluntary scheme (e.g. Agricultural Land Management - ALM). Further the comment on NAMAs seems rather speculative as there is not yet regulation on the NAMAs by the UNFCCC
11213	11	57	11	57	25	Section 11.7.2.1 on socioeconomic risks and uncertainties could expand the analysis of risks of mitigation measures on indigenous peoples and local communities to include low carbon developments like dams and carbon sequestration (tree plantations) that risks marginalising community land and resource rights and causing environmental damage etc	Partially Accepted, The risk mentioned here is not only for indigenous peoples but for many rural communities. The issue has been included in the SOD under perceptions as well as under socio-economic co-benefits and risks
5098	11	57	11	57	11	I would not call the following risks they are tradeoffs "Some mitigation measures may result in a decrease in the amount of land available for food 11 production (e.g. reforestation of farmland to sequester carbon or produce bioenergy), decrease 12 yields (e.g. competition between trees and crops, reduced yields with reduced fertilizer inputs), or 13 directly compete for food materials as a bioenergy feedstock (e.g. conversion of sugar or maize to 14 ethanol)."	Rejected, It is a trade-off in the sense of land availability . However it is a high risk from the livelihood perspective
3873	11	57	11	57	11	Here it is stated that multiuse of land decreases yield and has negative impacts on GHG mitigation. Early in this paper multiuse of land is recommended as a mitigation source. How can we live with such contradiction?	Rejected, It is written that "some mitigation measures MAY result..." We didn't mention any specific and we didn't say that it happens always.
5099	11	57	15	57	15	what is the risk in "Mitigation projects may have rules that require the mitigation activity to be in place for 70-16 100 years; this can reduce future flexibility in land-use." this is a barrier	Rejected, Defining use for such a long period can be an important risk for livelihoods in developing countries as these are locking any future use that could have better / more development impacts

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5510	11	57	16	57	17	The reviewer strongly agrees with the issue of the required 70-100 year time frame as counterproductive to many mitigation strategies. Commercial tree plantations for example can have a 40 year rotation period- and not qualify as mitigation- however these types of plantations provide sustainable forests, multiple benefits as well as carbon storage. The required time frame also puts constraints on crediting for soil carbon and an emphasis on increasing inert C in soil systems, again counterproductive. As the potential benefits of rapid action within this sector are large and cost productive- this is a key hurdle to be overcome	Noted, Thanks. This comment is completely opposed to the previous comment.
5840	11	57	17	57	18	Not clear: why should land holders want to repurchase C credits? The projects are tailored to generate credits. Buying credits can only be necessary if the project failed the expectations?	Partially Accepted, That can make sense e.g. in developed countries through JI projects. Consider rewording in order to increase readability. Text improved.
16604	11	57	18	57	19	This assumes both a broad carbon market including land use credits, and landholders who participate in it actively. Neither is the case currently and as mentioned in my point 4, the trends are no longer moving in that direction. Delete.	Rejected, It only assumes that this is possible. If the possibility exists then land-holders need to consider this carefully
12436	11	57	18	57	20	Please consider to explain the meaning of "beyond 2015". The meaning of this sentence is hard to understand.	Partially Accepted, Page is incorrect. The sentence is in page 58. It is expected that a new agreement under the UNFCCC will be achieved at the latest by 2015. This is one of the outcomes of the last COP in Durban. However, as there is not yet clarity about the architecture of such an agreement (including financing systems or eligible activities), it is difficult to make decisions now that will go beyond 2015.
5100	11	57	25	57	25	personally I think there there are risks that you omit likel that with distribution of future carbon prices, amount of sequestration, monitoring reliability or emissions reduction, disturbances like fires, future value of resource and opportunity costs. Also indirect land use is a risk as we dont often know what it is	Partially Accepted, Issues were considered and some included in the SOD
5101	11	57	25	57	25	I don't find "The impacts of greenhouse gas mitigation in the AFOLU sector on other climate drivers (such as 27 albedo and water balance) are discussed in detail in section 11.5 so are not discussed further here." to be a risk it is a known consequence and a tradeoff	Accepted, Discuss with Ravi and Frank
12437	11	57	26	57	26	Please specify which section "The section on systemic perspectives" refers to.	Accepted, Redrafted
3874	11	57	29	57	32	Here you are presenting negative aspects of land use intensification. Earlier in this paper, high yields were described as a good approach to reduce GHG emissions. I understand that what is important is the amount of fertilizers used in relation to the volume of useful crop harvested.	Partially Accepted, High yields are not considered as negative impacts in the SOD
11214	11	57	3	57	8	As well as the observation in the text that mitigation might have positive impacts on tenure, land use rights and governance, there is an equal risks that these measures might have negative impacts if human rights standards, FPIC and rule of law are not adhered to...	Noted, We agree, and this has been mentioned in other subsections of the chapter (e.g. 11.4.4)
5632	11	57	3	57	8	Fully agree with this paragraph. Line 7 change greated to greeted.	Accepted, Thanks. Term corrected.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10119	11	57	3	57	3	This is weak, much more needs to be said about mitigation, since it is a very contentuos issue. Mitigation in agriculture in existing land area can be framed as a co-benefit of adoting climate smart practies i.e. increasing productivity sustainably on existing land area, building the resilience and adopting long term adaptation strategis, and then having mitigaiton as a co-benefit. The contentuous issue is really land use change and the role of agriculture and bioenergy there, this has been well discussed earlier, probably taking a lnad scape approach securing multiple objectives trhoug inclusive participatory processes is the way forward here.	Partially Accepted, Page 57 line 3 deals with public perception. We have considered "smart agriculture" in the SOD: However the term is not really defined, neither there is a definitive agreement on it. Thus we include the positive impacts only.
5103	11	57	31	57	31	there may be risks in environmental quality from increased n use and runoff, pesticides can also be a problem	Accepted, Discussed in the SOD in environmental co-benefits and risks
5104	11	57	31	57	31	there is a major risk of practice reversal particularly if programs are voluntary	Rejected, The comment is highly speculative. There is not much to prove that voluntary programs are likely to reverse
5105	11	57	31	57	31	there is also a major risk of non performance. I have been working with steve rose and he has estimates from a trader on delivery risk due to international contraacts, political instability, individual performance ets that shows some high riskes (20-50% non performance)	Accepted, Discussed in section 11.5
5106	11	57	31	57	31	wher you say (R.B. Jackson et al., 2005) documented several effects of afforestation/ 35 reforestation on the environment" I think this is wrong (I am a coauthor) they really looked at water not the total environment, you should use the word water in the sentence	Accepted, Redrafted
5102	11	57	32	57	32	leakage is a known concept in mitigation and I would avoid use of the word	Accepted, Redrafted
3875	11	57	35	57	48	Here the statement is against land cover increase. Just a few paragraphs before land cover was presented as a potential benefit for water. We need a final conclusion on that.	Accepted, Redrafted
12435	11	57	39	57	40	Do plantations have increased nutrient demand compared with cropland, as stated in the sentence ?	Accepted, Redrafted
12434	11	57	4	57	4	Please consider to add "can" before have, to make the statement more nuanced and more consistant with p.57 line 11-14.	Accepted, Redrafted
13353	11	57	40			Space between words: increase_nutrient: changes soil chemistry (s on change)	Accepted, Redrafted
5633	11	57	43	57	48	Some litter decomposition can raise the pH, especially from broadleaf trees. Agroforestry crops --- have been used. Used for what? VOC emitted --- by most of the species commonly used. What common species?	Accepted, Redrafted
10192	11	57	48	58	3	What about reduced land run-off of precipitation due to increased uptake by biomass and soil after reforestation/afforestation, as well as dew harvesting by the forest? See e.g. Meuser (1990) Agricultural and forest meteorology, 50: 125-138; del Campo et al. (2006) Forest Ecology and Management, 235: 107-115	Accepted, One of the references is too old, the other one is only 2006. We searched for more recent references on the topic
13352	11	57	7			greeted not greated	Accepted, Redrafted
10257	11	57	3	57	8	There will be difference between countries (developping, developped,…), and also rather similar to section 11.8.4	Accepted, We tried to include the regional differences in the SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5381	11	57	4	57	5	The first sentence of this paragraph is really a sweeping statement. What evidence has been offered that mitigating terrestrial carbon emissions are going to throw farmers off their land. How do we know that this is the cause and not other drivers, e.g., there have been a number of reports of China and oil-rich states buying up large tracts of land in Africa to grow food which is then imported into the country that bought the land. Certainly that is displacing small farmers. How do we know that mitigation will be negative. What evidence has been presented in Chapter 11 for such a sweeping statement? See for example Collier, P. and S. Dercon, AFRICAN AGRICULTURE IN 50 YEARS: SMALLHOLDERS IN A RAPIDLY CHANGING WORLD?, in Expert Meeting on How to Feed the World in 2050, Food and Agriculture Organization of the United Nations, Economic and Social Development Department, FAO, Editor 2009, Food and Agriculture Organization of the United Nations: Rome, Italy.http://www.fao.org/docrep/012/ak542e/ak542e00.htm ftp://ftp.fao.org/docrep/fao/012/ak542e/ak542e18.pdf	Partially Accepted, Section has been re-drafted. New references are included, more were checked
14445	11	57				This is a very important risk with mitigation strategies. Good to see it receives attention in this chapter. Does this topic receive more attention in other chapters?	Noted, Thanks
15622	11	57	10	57	25	To the extent that mitigation measures encourage industrial farm animal production practices, there are numerous socio-economic risks for consideration, including to small farmers and animal welfare. Mirle C. (2012). The industrialization of animal agriculture: implications for small farmers, rural communities, the environment, and animals in the developing world. The 10th European International Farming Systems Association Symposium in Aarhus, Denmark, July 1-4. Workshop 1.3: Understanding agricultural structural changes and their impacts, to support inclusive policy dialogue and formulation. Available at: http://www.ifsa2012.dk/downloads/WS1_3/ChetanaMirle.pdf.	Partially Accepted, Livestock sections improved throughout
17995	11	57	27	57	34	The negative impact of mitigation options in terms of other climate drivers are no additional costs to mitigation and should not be discussed under the framework of co-costs.	Partially Accepted, Added to table
15623	11	57	33	57	34	Agricultural intensification in animal agriculture could also lead to increased grey water footprints. Mekonnen M.M. and A.Y. Hoekstra (2012). A global assessment of the water footprint of farm animal products. Ecosystems 15, 401-15. Available at: http://doc.utwente.nl/80897/1/Mekonnen-Hoekstra-2012-WaterFootprintFarmAnimalProducts.pdf.	Accepted, Unfortunately it is not a scientific reference. However we considered the issue.
10180	11	58	12	58	13	Expand on this topic: i.e. which technologies and which areas, and what are the reasons for banning?	Accepted, technology sub-section redrafted for the SOD
5107	11	58	13	58	13	we are facing a tech risk in united states. Namely cellulosic ethanol is not advancing at the assumed rate	Noted, Statement - not a comment
5108	11	58	13	58	13	there is also a tech risk in ag technological progress namely if the technology advances at a rate slower that population growth we have a real problem with production diverting mitigation. This is covered in Mosnier, A., P. Havlk, H. Valin, J.S. Baker, B.C. Murray, S.J. Feng, M. Obersteiner, B.A. McCarl, S.K. Rose, and U.A. Schneider, "Alternative U.S. Biofuel Mandates and Global GHG emissions: The Role of Land Use Change, Crop Management and Yield Growth", Energy Economics, second review, 2012	Accepted, We checked more scientific references on the topic and by the authors. Although, before having this as an important risk, other technological challenges were included in the SOD. For other sectors this might be more important than for AFOLU, where the major challenge is probably not an advance in technology, but land tenure, financing, and local capacity issues

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5635	11	58	14	58	24	The general public perception is that the cutting of trees is deforestation, when in most cases it is harvesting. An effort to correct this should be vigorously pursued!	Rejected, The statement that "the general perception is" something is vague. The text clarifies in some places that deforestation implies a land use change.
10178	11	58	14	58	24	Based on the scientific knowledge of today, what measures would be most effective at the global scale and at the regional scale, respectively?	Partially Accepted, This is a valuation. What is most effective depends on the context.
11306	11	58	20	58	22	Re: the use of the term 'perceived' in this context, is this to say that there is no evidence of the risks in biotechnology or animal feed additives? Again, in the current political climate this could be misconstrued by corporate interests as a dismissal of any risks. Would it be better to change to 'real or perceived health and/or environmental risks'?	Rejected, The text refers to the effects caused by the uncertainties regarding international agreement(s) within the UNFCCC.
16606	11	58	22	58	24	This final sentence is needlessly provocative, implying that the scientists know better than the public. Delete.	Accepted, deleted
10181	11	58	23	58	24	Therefore the need to be specific in this report	Accepted, redrafted
5842	11	58	24	58	46	Please give an explanation what you mean by "spill-over" in this here context, e.g. in the glossary, because this is synonymous with side-effects and can thus mean anything from "co-benefit" to "risk of desaster". I do not see any reason to mention scale effects and environmental markets so broadly here, this is redundant. The text could be shortened to "they exist". As everything written here is already mentioned elsewhere in the text the text of the section could be deleted and only the table be retained.	Accepted, We considered spill overs as co-benefits that go beyond the original system of the AFOLU measure. There is still discussion going on how exactly to deal with spillovers in the AR5.
11826	11	58	26			insert the section number so that it is clear which section is meant	Accepted, Redrafted
5636	11	58	37	58	37	Change timber yield to wood yield.	Rejected, Timber is a widely accepted term.
5109	11	58	53	58	53	I would think mention of indirect land use and leakage might appear in "Where this displaces other 42 commodities, there are likely to be impacts on markets."	Noted, There is a cross-cutting group on leakages. In the drafting group, we agreed that we don't include international leakages at the moment. The issue is mainly argumentative, and attribution of international leakages in AFOLU, especially in forestry, is extremely challenging.
5634	11	58	6	58	13	Technological considerations. Technical consideration are: whether to end the rotation at the point when mean annual increment (MAI) is maximum, that is when current annual increment (CAI) dissects the MAI curve from above; to fell when economic returns are maximum (usually before maximum MAI); or to let the crop grow to maturity. In the latter case the C sequestration will be maximum, but in the two former cases, the thinning and felling yields will give the greatest returns. For a mixed-aged plantation the C stock and thinnigs/felling, will be greater than the C stock in the mature trees.	Accepted, Technological issues were re-drafted for the SOD
5841	11	58	6	58	13	Mitigation projects without consideration of the potential use of biomass grown on the land or other management issues are wasted. Please bear in mind that sequestration means "removal from the atmosphere", not "fixing C in this place and leaving it here".	Rejected, Use of biomass as well as waste management and various management issues (options) are discussed in section 11.3
10121	11	58	6	58	6	Needs strengthening, again not much content	Accepted, Redrafted
16605	11	58	7	58	8	Again, it is asserted that "a large proportion" of the AFOLU sector is in soil and vegetation sequestration, without an estimate of what that proportion is nor a citation. Both are needed.	Partially Accepted, Link to the corresponding section in the chapter

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10182	11	58	4	58	5	Reforestation/afforestation on previous agrocultural land, such as grazing areas, may reduce biodiversity since species specific to these agrocultural habitats will disappear while forest species may be limited in their dispersal or have problems establishing populations due to habitat specifics. See e.g. Cocca et al. (2012) Land Use Policy, 29: 878-886; Bruun et al. (2010) PRESLIA, 82: 345-346; Brunet et al. (2012) Scandinavian Journal of Forest Research, 27: 245-254; Amici et al. (2012) Ecological Complexity, 9: 55-62; Stenert et al. (2012) Marine and Freshwater Research, 63: 283-292; Otero et al. (2011) Land Use Policy, 28: 207-218;	Partially Accepted, References checked. Impacts on biodiversity are included.
4267	11	59				There is no mention of any health co-benefits in this table	Partially Accepted, Health co-benefits and risks included in the SOD
3876	11	59				Row Technological risks, 4th. Column. Promotion of innovation is a positive input of bioenergy as stated here and in the IPCC-SRREN. At Section XY only negative aspects of bioenergy are mentioned and even this one positive aspect is absent there. Make Section XY fairer.	Partially Accepted, Technological issues redrafted
5843	11	59				Do you want to give the sources with the table, or why do you show numbers in brackets?	Rejected, Brackets were used during drafting and for guidance among the writing team. The numbers in brackets should have been deleted. However, we considered the possibility of making references more specific.
11073	11	59				what do the numbers in parentheses refer to within Table 11.11 and some other tables?	Rejected, Brackets were used during drafting and for guidance among the writing team. The numbers in brackets should have been deleted. However, we considered the possibility of making references more specific.
2636	11	59				This table is mostly agriculture and should state that. It has been difficult throughout the chapter to balance the agricultural information with forests data. Since they are really different - one perennial and the other annual - they are difficult to summarize together.	Partially Accepted, Ensure balance between the sectors
10445	11	59	0	59	0	Potential negatice impact of ill defined land tenure rights in the poor communities is multifold. The poorly defined property rights will result in biased compensation for the most vulnerable	Accepted, Land tenure is discussed in 11.7 and 11.7 and included also in 11.4.5 of the SOD
5110	11	59	1	59	1	there are a numner of risks in here not in the text might point to this in text on risk.	Accepted, redrafted
5111	11	59	1	59	1	also what do the numbers in parentheses mean?	Rejected, Brackets were used during drafting and for guidance among the writing team. The numbers in brackets should have been deleted. However, we considered the possibility of making references more specific.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15624	11	59	1	59	1	The summary Table 11.11 should include risks to small farmers and animal welfare under "Socio-economic effects." Mirle C. (2012). The industrialization of animal agriculture: implications for small farmers, rural communities, the environment, and animals in the developing world. The 10th European International Farming Systems Association Symposium in Aarhus, Denmark, July 1-4. Workshop 1.3: Understanding agricultural structural changes and their impacts, to support inclusive policy dialogue and formulation. Available at: http://www.ifsa2012.dk/downloads/WS1_3/ChetanaMirle.pdf.	Noted, Unfortunately it is not a scientific reference. However, we considered the issue.
11201	11	6	1	6	10	This section treats land management by 'sector' without recognising land management functions and customary land tenure systems of indigenous peoples and local communities (these are not 'sectors'). There is a need to insert text here on "communal tenure regimes" and/or traditional and/or customary land owners and managers.	Accepted, Added later in the chapter
3533	11	6	1			What are these issues common to all land uses? Please give some examples.	Accepted, e.g. all have soils and vegetation GHG fluxes; has been considered
2614	11	6	11		16	This is one sentence - too long and too many ideas embedded in it.	Accepted, Edited for SOD
18912	11	6	13	6	14	consider replacing "scenarios also being considered by IPCC WG I and WG II (i.e. the RCPs)" with "same assumptions (i.e. the Representative Concentration Pathways [RCPs]) that many scenarios that are assessed in the three IPCC Working Groups are based on." Reasoning: RCPs are not scenarios but part of the framework scenarios are based on and they are also used in WG III. In case you are also making use of SSP (Shared Socio-economic Pathways) then also reference these (https://www.isp.ucar.edu/sites/default/files/Scenario_FrameworkPaper_15aug11_0.pdf)	Accepted, Edited for SOD
14569	11	6	17	6	19	I would liketo see a slightly improved definition of what is meant by "bottom up " and top down". often bottom up studies are not necessarily small scale, they could be large scale but based in just one sector. May be something like…scale up from site to regional scale sector or resource specific studies" (ie start with land availability and regional tree productivity, or corp productivity. The top down studies: the riginal RCPs actually started with different bottom up policy driven assessments eg. agressive mitigation in lots of sectors including AFOLU in the 4 IAMs that originally developed the mitigation pathways. I think one of the differences here is bottom up studies often dont consider cross sectoral competiation for demand. Whereas the IAM studies are looking at demand on land use in an integrated way.	Accepted, Replaced terms with more descriptive ones
15145	11	6	18	6	18	replace "the" with "then"	Accepted, Edited for SOD
18913	11	6	19			consider adding a reference to the discussion about bottom-up and top-down to this section as background information	Accepted, Replaced terms with more descriptive ones
15954	11	6	20	6	23	The sentence provides three different figures for agriculture, from the text it is not directly clear to what these 3 ranges refer to. In the introductory section a range is given.	Accepted, Revised for SOD
5536	11	6	21	6	21	There is a surplus of annual growth of an estimated 9 Gt C or 34 Gt CO2 equivalent. This is not taken into account when considering forest mitigation options (1.3 to 4.2 GtCO2/yr). Thus, the potential for 'forest' mitigation is much larger.	Discuss further at LAM3, We are not condsidering total biophysical potentials here so total extractable NPP is not relevant here
14570	11	6	22			rangeD	Accepted, Edited for SOD
10583	11	6	23			Is this range quoted at $100/tCO2eq?	Accepted, Clairfied for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16526	11	6	24	6	25	As discussed above (points 4 and 5) the expression of mitigation potentials in terms of responses to a global carbon price reduces their utility considerably, even if they are "refined estimates" as described here. I understand the advantage of modelling and estimating them this way in terms of analytic simplicity (using marginal abatement curves), but that doesn't justify using an anachronistic approach that doesn't correspond to the world of the second decade of the 21st century.	Noted, We can only report what is in the literature so have to report potentials at the costs calculated
10584	11	6	24			Add "(LULUCF)	Accepted, Edited for SOD
4989	11	6	28	6	29	Sentence: The section describes …… in drivers. No need for this sentence	Accepted, Deleted
13519	11	6	28	6	29	Sentence: The section describes …… in drivers. No need for this sentence	Accepted, Deleted (duplicate comment)
15146	11	6	28	6	28	insert "them" after "compares"	Accepted, Edited for SOD
14571	11	6	28	29		could delete first sentence as title says it.	Accepted, Edited for SOD
5800	11	6	28	6	37	Combine lines 28 - 29 and 34 - 37. This paragraph could thus be reduced to half ist length.	Accepted, Edited for SOD
16527	11	6	32	6	32	Clarify here and in Figure 11.1 whether these figures are for gross or net emissions.	Accepted, Clarified gross and net throughout
9442	11	6	4		6	The distinctions presented here are too broad and do not contribute much to the piece.	Rejected, Improve distinction instead
14567	11	6	4	6	8	these two sentances could be combined	Accepted, Edited for SOD
5038	11	6	4	6	4	where you say "The land managers are also very different" I might add "and time frames of concern" after managers	Accepted, Edited for SOD
8832	11	6	5	6	5	Can the land use 'agriculture' be considered short term? The rotation are of shorter term than in forestry, but generally the land occupation in an agricultural practice (even fallow) can be long term	Accepted, Edited for SOD
10581	11	6	5			….short-term "returns" by farmers whereas forests are managed for longer-term returns.	Accepted, Edited for SOD
10095	11	6	5	6	5	apart from farmers and foresters large land areas, grasslands, are managed by pastoralists who have a long term view	Accepted, Edited for SOD
2613	11	6	5	6	7	Why highlight the difference between farmers and forest managers? Farmers being small private landholders doesn't work for the industrialized world.	Accepted, Edited for SOD
10238	11	6	6	6	7	" the different land managers have perceptions of themselves as one otr the other of these"…I do not understand	Accepted, Edited for SOD
16525	11	6	7	6	8	Delete "small" from the phrase "small private landholders". Many of the most important landholders for AFOLU (e.g. deforestation in Latin America due to soy and beef expansions) are very large, owning thousands or even tens of thousands of hectares.	Accepted, Edited for SOD
7054	11	6	7	6	8	The statement "agriculture tends to be managed by small private landowners; forestry by Government and corporate entities" is an over-generalization and not true for many parts of the world.	Accepted, Edited for SOD
5799	11	6	7	6	8	Concerning forestry, please be careful with your interpretation of FAO FRA page 121. ff. The world's regions differ in the share of ownership types (what can have significant impacts on mitigation policy implementation), and ownership and management must not necessarily be in the same hand.	Accepted, Edited for SOD
10096	11	6	7	6	7	there are wast land areas with communal tenure systems, notable partures and grasslands, where one can also trough introduction of trees "cross over"sectors	Accepted, Edited for SOD
8922	11	6	7	6	8	On a global perspective White and Martin estimates that 77% of the global forest estate are administered by governments, 4 % belong to communities and indigenous groups, 19% are private ownership based on traditional or entitled rights; in some important forest countries up to 80% of the state own forest are managed by private firms under long-term lease/concessions [White, Andy; Martin, Alejandra 2002: Who owns the World's forests, Center for Environmental Law, Washington, DC]	Accepted, Added reference and details later in the chapter
14568	11	6	8			suggest to delete "also"	Accepted, Edited for SOD
11802	11	6	8			What about private and community forest owners/managers?	Accepted, Edited for SOD
10582	11	6	8			Forests owned mainly by private landowners in NZ and Sweden I think - not always corporates/governments.	Accepted, Edited for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13305	11	6	11	6	19	Long confusing sentence, rephrase for clarity	Accepted, Edited for SOD
3534	11	6	1		10	Agriculture' and 'Forestry' are different sectors, but in order to better deal with common issues between both sectors (for e.g. forest converted to agricultural land, afforestation, reforestation, mitigation options), it is good practice to treate them in a single sector. Therefore, saying that there are significant differences between the sectors (policies, governed by different ministries, etc) is a fact, is abvious, it cannot be otherwise. I would suggest to reformulate the paragraph and include some ideas like "since both sectors are governed by different policies, ministries, etc., there is a need, when it comes to mitigation, to consider agriculture and forestry as a single sector to avoid to dissipate and jeopardize mitigation efforts"	Rejected, Acknowledging that there are differences is important
6928	11	6	11	6	16	Please provide a more specific reference to WGI/WGII AR5.	Accepted, Added for SOD
5366	11	6	3	6	4	It seems needlessly perjorative and factually incorrect to assert that farmers manage their lands focused only on the "short term." I don't see how that can possibly be true for all farmers across the world. If there is an important point that needs to be made here, it needs to be restated. Otherwise delete.	Accepted, Edited for SOD
3169	11	6	27			Much of section 11.2 is also covered in WG1. Sections 11.2 and 11.3: streamline the tables and the prose; much of the prose in the main text repeats the tabular points.	Accepted, Section was largely revised for SOD, and became shorter. Some sectoral detail does not appear in WGI
3536	11	6	28		37	I would suggest to reformulate the first sentence as follows: "This section describes new trends in GHG emissions and major drivers since the publication of the AR4". Please indicate also in the paragraph, as sources of GHG emissions, non-CO2 emissions (CO, NOx) from, for e.g., biomass burning (forest fires, savannah burning, etc.). Saying that "Global trends in total emissions from AFOLU activities between 1971 and 2010 and contributions of single sources are shown in figure 11.1a" is in contradiction with what is shown in Figure 11.1a, please harmonize.	Accepted, Edited for SOD
7056	11	6	32	7	19	This part of the intro to 11.2, including figures 11.1a and b, should be removed because this formulation of the information is unnecessary, easily misinterpreted and far less transparent than the more detailed discussion of the issue that follows. It would also help to reduce the length of this section - a stated goal of the review.	Accepted, Agreed - edit
6929	11	6	34	6	34	Relevant for WGI AR5, encourage to ensure consistency between WGI (Chapter 6 for sure) and WGIII on the issue of land use, land use change.	Accepted, Has been cross-referenced to WGI
14672	11	6	6	6	6	If it is true, as some paper suggest, that the Hadley pressure cells have broadened, moving to higher latitudes north and south. As things become drier, particularly in the high latitude subtropics, there will be more fires.	Accepted, Figure has been removed; fire dealt with later

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
9916	11	60	1			An analysis of 104 empirical studies of innovation to change showed the following barriers, that could refine and structure the discussion of barriers: Issues of resourcing (76%), for instance, “not enough resources” (Post and Altman 1994), “lack of adequate resources such as time and staff” (Adams and McNicholas 2007), limited or no budgeting (e.g. Harris 2000 and Anumba et al. 2006), access to capital and lack of time (Rohdin and Thollander 2006). Issues of capabilities (75%), for instance, “low technology literacy” (Stewart, Mohamed and Marosszeky 2004), “ill equipped in terms of training and expertise” (Whitaker 1987), “employees are not trained” (Tamimi and Sebastianelli 1998), “lack of understanding” (Waldron 2005), “lack of technical skills” (Rohdin and Thollander 2006), “lack of skill, knowledge and expertise” (Kirkland and Thompson 1999), etc. Issues of communication (64%), for instance, “communication barriers” (Heide, Grønhaug and Johannessen 2002), “communication overload and distortion” (Allen 2002), “lack of communication within the team” (Attaran and Nguyen 1999), “lack of communication among those sharing responsibility for different aspects” (Kunda and Brooks 2000), “poor communication practices that damaged employee commitment to projects” (Jacobs et al. 2006), “tension among departments arising from the incompatibility of actual or desired responses” (Aggarwal 2003), etc. Issues of organizational structure (62%), for instance, bureaucracy (e.g. Molinsky 1999; Borins 2000; Abdul-Hadi, Al-Sudairi and Alqahtani 2005), “salary structure” (Al-Qirim 2007), “complexity, centralization, and formalization”(e.g. Allen 2002), “rigid organizational boundaries” (Butler 2006), “departmental fortresses” (Cicmil 1999), and organizational structure (e.g. Scarbrough and Lannon 1988; McGaughey and Snyde 1994; Yauch and Steudel 2002). Abdul-Hadi, N., Al-Sudairi, A. und Alqahtani, S. (2005): Prioritizing barriers to successful business process re-engineering (BPR) efforts in Saudi Arabian construction industry, In: Construction Management \& Economics, Vol. 23, Nr. 3, S. 305-315. Adams, C.A. und McNicholas, P. (2007): Making a difference: Sustainability reporting, accountability and organisational change, In: Accounting, Auditing and Accountability Journal, Vol. 20, Nr. 3, S. 382-402. Aggarwal, N. (2003): Organizational Barriers to Market Orientation, In: Journal of Management Research, Vol. 3, Nr. 2, S. 87-97. Allen, R.Y.W. (2002): Assessing the impediments to organizational change: A view of community policing, In: Journal of Criminal Justic, Vol. 30, Nr. 6, S. 511-517. Al-Qirim, N. (2007): The adoption and diffusion of E-commerce in developing countries: The case of an NGO in Jordan, In: Information Technology for Development, Vol. 13, Nr. 2, S. 107-131. Anumba, C.E.H., et al. (2006): Understanding structural and cultural impediments to ICT system integration: A GIS-based case study, In: Engineering Construction & Architectural Management, Vol. 13, Nr. 6, S. 616-633. Attaran, M. und Nguyen, T.T. (1999): Design and implementation of self-directed process teams, In: Management Decision, Vol. 37, Nr. 7, S. 553-561. Borins, S. (2000): What Border? Public Management Innovation in the United States and Canada, In: Journal of Policy Analysis and Management, Vol. 19, Nr. 1, S. 46-74. Butler, J.C. (2006): Ten Lessons Learned: Data Warehouse Development Project, California Department of Fish and Game, In: CrossTalk: The Journal of Defense Software Engineering, Vol. 19, Nr. 10, S. 16-20	Consider, The references provided were mostly for other sectors. The drafting team looked at the importance of the following issues as barriers for AFOLU: lack of resources, communication barriers, and organizational barriers as the main three categories mentioned by the reviewer.
5112	11	60	1	60	1	I think transactions costs are a major barrier. In particular the us avg numbers for tillage yield of carbon were one 1/4 ton per acre and to sell a 10,000 ton contract takes 40,000 acres which is at 600 acres per farm (avg farm size was 643 acres a couple of years ago(is about 700 farmers transactions costs would be high crop insurance is about 25%. larger costs would occur in developing countries with small farm sizes amounting to sat 70000 farms is average farm size is 2 ha. i think this was discussed in Post, W.M., J.E. Amonette, R. Birdsey, C.T. Garten Jr., R.C. Izaurralde, P.M. Jardine, J. Jastrow, R. Lal, G. Marland, B.A. McCarl, A.M. Thomson, T.O. West, S.D. Wullschleger, and F.B. Metting, "Terrestrial Biological Carbon Sequestration: Science for Enhancement and Implementation", Science and Technology of Carbon Sequestration, Editors B. McPherson and E. Sundquist, American Geophysical Union, Geophysical Monograph Series, Volume 183, 350 pp, 2009.	Accepted, The issue of transaction costs is included in 11.8. Newer references were included.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11827	11	60	1			Wouln't be "Barriers and oportunities to AFOLU mitigation" or so be a more complete title for this section?	Rejected, Titles are given
5114	11	60	11	60	11	why single out unfccc as a source of incentives many others could do so	Accepted, Good point. Voluntary markets are included in the text
5115	11	60	13	60	13	what about education level and acess to information	Accepted, Good point. Skill and education levels are included
2637	11	60	19		21	There are many other uses of forests that do not always require deforestation.	Noted, We fully agree
5113	11	60	22	60	22	land ownership and property rights is also an issue	Partially Accepted, Land tenure has been already addressed in other sections. We didn't want to put the same issues in all sections. On the other side, non-clear tenure or difficult tenure agreements are certainly a barrier.
2638	11	60	22		33	This is a difficult case to make since the countries with clear land tenure (most of Europe, USA) are also the countries conserving their forests and not using forests as working forests. While countries with low land tenure are the suppliers of forest products to the countries with clear land tenure. So this is not very simple.	Rejected, These are not the only countries conserving forest. There are interesting experiences in developing countries (e.g. Brazil, Costa Rica, Bhutan). The issue is certainly not simple and we have highlighted that along the section.
10122	11	60	3	60	3	See my previous comment in agriculture in existing areas mitigation is a cobenefit, it does not make sense to discuss mitigaiton actions separately. LUC and REDD is another issue. I think this framing is WRONG and leads precisely the type of misconceptions about ag mitigation maintained by many developing countries and NGOs. I urge you to think carefully about the framing of mitigation in agriculture.Also looking further the text, mitigaitoon has to be framed in development context, so the question of people being too poor to mitigate is again to me a comletely false framing.	Rejected, I don't see how this comment is linked to the text in page 60, line 3. Further co-benefits are discussed in section 11.7
5637	11	60	30	60	30	--- improve C storage and use, is usually a better financial option, especially for local people.	Partially Accepted, Considered while redrafting the SOD
15203	11	60	31	60	33	delete sentence	Accepted, Changed
6781	11	60	34	61	3	add " some mitigation technologies may bring negtive effects for conservation biodiversity,some may benefit for conservation biodiversity".	Accepted, Checked for references and considered when drafting the SOD
16607	11	60	35	60	35	Citation needed for these estimates (nearly 1/3 to 1/2).	Accepted, Included references
15204	11	60	35	60	35	differs from earlier statistics quoted. Should be consistent.	Accepted, Harmonised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5638	11	60	35	60	35	This statement is wrong. The NPP for land plants is an estimated 53 GtC. One third of this is 17.5 GtC and one half is 26 GtC. Also page 32, line 6 gives a figure of 25% - 13 GtC! In the text on page 6 above, I have calculated that the maximum loss of NPP from land use change, use of wood products and food production is of the order of 3.5 GtC/yr or 7% of NPP. Also, the only real loss of NPP is through 'deforestation' which is a net NPP of 31-49 MtC/yr: this is less than 0.1%. The use of wood products and food does not cause a loss of NPP, for if annual NPP is not used it reverts back to the atmosphere, mainly in the form of CO2. Lines 35-42 need rewriting.	Rejected, The estimates of maximum theoretical potential for biomass growth and exploitation are noted, but we do not consider maximum theoretical potential for any technology in WGIII AR5 - instead we consider the economic potential, as constrained by economics, and note that the market potential is likely to be still lower due to the many barriers (discussed later in the chapter) which prevent implementation even to the economic potential.
14446	11	60	37	60	38	This is a very important risk with mitigation strategies. Good to see it receives attention in this chapter. Does this topic receive more attention in other chapters?	Noted, Thanks
3877	11	60	45	60	47	The examples provided are due to climate change and not due to AFOLU mitigation options. Please, reconsider your statement.	Rejected, We are discussing barriers. Specific soil conditions and water availability as well as natural variability and resilience to the specific systems will determine the size of the potential by each AFOLU mitigation. If climate change affects these conditions negatively, the potential will be less.
13987	11	60	1			the state of the carbon market should be evaluated in this section. Also to be included in this section should be the question of who is responsible for emissions vs. where the mitigation potential lies. The overarching principle of common but differentiated responsibilities that underpins global political agreement on mitigation action is essential to understand why action may or may not be taken.	Accepted, We consider constraints of financing mechanisms (including market mechanisms).
18001	11	60	18			There should be a cross-reference to Chapter 4 that are supposed to provide the framework for all SD discussions in the WGIII AR5.	Accepted, Checked cross-references
14681	11	60	35	60	35	I think 25 to 40% was stated above in the text.	Partially Accepted, Checked in the text
15625	11	60	37	60	37	The animal agriculture sector alone is likely to add significant pressure to several sustainability thresholds, including reactive nitrogen mobilization and biomass appropriation. Pelletier N. and P. Tyedmers (2010). Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Sciences of the United States of America 107(43), 18371-74. Available at: http://www.pnas.org/content/early/2010/09/27/1004659107.full.pdf+html.	Partially Accepted, The reference of Pelletier and Tyedmers is more relevant for 11.7. The issue of land limitations/land as finite element is included in 11.8
5511	11	61				This table is not essential	Accepted, Table deleted
11828	11	61				It is unclear why "available land" is an opportunity (or how this is meant)	Accepted, Text improved
5844	11	61				Opportunities: What opportunities come from "increasing desertification"?	Accepted, Text improved
2640	11	61				Same comment on land tenure and whether it will help or create opportunities. Governments mostly own the forests and generate much of their economic return from this so they will not release rights easily to communities living in or around the forests.	Partially Accepted, Clear land tenure can create opportunities for AFOLU mitigation options. This has been included.
4990	11	61	11	61	11	Sentence: These issues are discussed in full in section 11.7. Delete this sentence or correct	Accepted, Text improved

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13520	11	61	11	61	11	Sentence: These issues are discussed in full in section 11.7. Delete this sentence or correct	Accepted, Text improved
5117	11	61	13	61	13	in the U.S. unwillingness to accept that climate change is occuring and we need to do something about it is a major barrier	Rejected, Political issue.
5639	11	61	20	61	29	I am in full agreement with this paragraph.	Noted, Thanks
9460	11	61	23		23	optimization of what?	Partially Accepted, Text improved
10184	11	61	26	61	29	Do you have references on this statemenet, i.e. has this been shown empirically?	Accepted, Text improved and more references included.
12877	11	61	32			Add to the technological line - Barrier: Accurate forest carbon monitoring for REDD; Opportunities: Standard scientific methods from IPCC National Greenhouse Gas Inventory Guidelines, remote sensing data, Monte Carlo quantification of uncertainty	Accepted, Lack of monitoring capacity can become a major barrier for REDD+ (Herlod, 2009)
5116	11	61	5	61	5	this is rather an overstatement. There is often a need to improve existing items to say in front of pests and other suceptabilities. I would think r and d investment rates might be a barrier plus a need to continue to invest to adpat existing mitigation to the effects of climate change	Partially Accepted, Scale of funding resources included in the SOD
11307	11	61	5	61	11	Again, this suggests (to the present reader anyhow) that amongst the barriers to dietary additives and crop trait manipulation, their risks are not valid. It would be more credible if the possible risks of additives and manipulation were considered fairly.	Rejected, What is meant by fairly?
2639	11	61				All of the technology discussion is for agriculture and forests are really not included in any of the technology discussions.	Accepted, Updated text in the SOD
12876	11	61	4	61	11	This section omits the major issue of forest monitoring for REDD. Add something like "Although monitoring forest carbon in forests with high spatial variation of tree density and species composition poses a technical barrier for the implementation of REDD (Baker et al. 2010), the IPCC National Greenhouse Gas Inventory Guidelines (Aalde et al. 2006) provide one opportunity because they offer standard scientific methods that countries already use to report AFOLU emissions and removals under the UNFCCC. Also, field research in high-biomass forests (Gonzalez et al. 2010) show that remote sensing data and Monte Carlo quantification of uncertainty offer a technical opportunity for implementing REDD." Aalde, H., P. Gonzalez, M. Gytarsky, T. Krug, W.A. Kurz, S. Ogle, J. Raison, D. Schoene, N.H. Ravindranath, N.G. Elhassan, L.S. Heath, N. Higuchi, S. Kainja, M. Matsumoto, M.J.S. Sánchez, and Z. Somogyi. 2006. Forest Land. In Intergovernmental Panel on Climate Change. National Greenhouse Gas Inventory Guidelines. Institute for Global Environmental Strategies, Hayama, Japan. Baker, D.J., G. Richards, A. Grainger, P. Gonzalez, S. Brown, R. DeFries, A. Held, J. Kellndorfer, P. Ndunda, D. Ojima, P.E. Skrovseth, C. Souza, and F. Stolle. 2010. Achieving forest carbon information with higher certainty: A five-part plan. Environmental Science and Policy 13: 249-260. Gonzalez, P., G.P. Asner, J.J. Battles, M.A. Lefsky, K.M. Waring, and M. Palace. 2010. Forest carbon densities and uncertainties from Lidar, QuickBird, and field measurements in California. Remote Sensing of Environment 114: 1561–1575.	Accepted, Barriers and opportunities regarding MRV included in the SOD.
15626	11	61	4	61	11	Perhaps worth mentioning cultured meat production in section on technological barriers and opportunities. Tuomisto H.L. and M.J.T. de Mattos (2010). Life cycle assessment of cultured meat production. 7th International Conference on Life Cycle Assessment in the Agri-Food Sector in Bari, Italy, September 22-24. Available at: http://oxford.academia.edu/HannaTuomisto/Papers/358909/Life_cycle_assessment_of_cultured_meat_production.	Partially Accepted, The issue has been considered. We searched for scientific references.

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11074	11	61	4			The section on "Technological barriars.." could be expanded considerably. In particular, mitigation potential in the agricultural sector can be highly site-specific even within specific regions or cropping systems. For example, within different areas of the midwest US the potential for no-till agriculture to generate soil carbon storage is limited due to climatic and soil factors. See Chatterjee and Lal, 2009. Soil and Tillage Research 104(2):270-277 and Venterea et al. 2006. Soil Sci. Soc. Am. J. 70: 1752-1762. The same issues apply with regard to N2O emission reduction potential: For example, some studies have found that controlled-release or stabilized nitrogen fertilizers reduced N2O emissions by up to 70% compared with conventional fertilizers in irrigated systems in a semi-arid climate (e.g., Shoji et al. 2001. Commun Soil Sci Plant Anal 32:1051-1070; Halvorson et al. 2011. J Environ Qual 40:1775-86), while studies in more humid, rain-fed locations found no significant benefit (e.g., Venterea et al. 2011. J Environ Qual 40: 1521–31; Sistani et al. 2011. J Environ Qual 40:1797-1805). A recent (in press) article (sent via email to comments@ipcc-wg3.de) addresses this issue with regard to N2O in some detail: Venterea et al. Technical challenges and opportunities for mitigating nitrous oxide emissions from fertilized cropping systems. Frontiers in Ecology and the Environment.	Accepted, Barriers and opportunities related to the natural assets (soil, water, etc) were included as environmental barriers. References were checked, some included.
15627	11	61	5	61	6	It is not necessarily the case that there are no technological barriers for already-applied mitigation technologies. Lokey E. (2009) shows the significant challenges of biodigester operation. Lokey E. (2009). The status and future of methane destruction projects in Mexico. Renewable Energy 34, 556-69.	Partially Accepted, The section on technological barriers and opportunities has been updated for the SOD.
4395	11	61		61		not sure how to interpret “available land” as an opportunity for environment and health effects	Accepted, Text has been improved to be clearer in the SOD.
5641	11	62	13	62	13	Bioenergy --- reaching as high as 100EJ by 2030. This is = to 5.35 Gt wood equivalent, - 2.66 GtC, or 5% of NPP.	Rejected, The estimates of maximum theoretical potential for biomass growth and exploitation are noted, but we do not consider maximum theoretical potential for any technology in WGIII AR5 - instead we consider the economic potential, as constrained by economics, and note that the market potential is likely to be still lower due to the many barriers (discussed later in the chapter) which prevent implementation even to the economic potential.
12439	11	62	14	62	15	Does the sentence mean that bioenergy will require the use of 15-16 % up to 50 % of all land on earth? Please consider to clarify.	Accepted, Clarify that these are IAM scenario outputs - not projections of actual land use
14738	11	62	18			Line 18-20: “An exception is (Steven K. Rose et al., 2012) who reported agriculture, forest carbon, and bioenergy abatement levels for various climate stabilization policies´. This is not clear. In any case the reference citation should be: An exception is Rose et al. (2012) who reported…	Accepted, Zotero updated for SOD
5845	11	62	18	62	23	What has been assessed as "forest carbon" in this study? A considerable share of forest carbon (all which is included in aboveground biomass) can also be used in bio-energy generation and HWP. If the study did not include substitution effects and HWP under "forest biomass" please either delete the lines or use terminology that indicates that not forestry but C stock increases in the forest only were part of the study.	Accepted, Clarify with Steve Rose and amend for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
12440	11	62	20	62	22	Do all the percentages in this entence relate to the all-over global abatement of the emissions of GHGs?	Accepted, add word "global"
10186	11	62	20	62	23	Using past tense when discussing scenarios for the future is not intuitive	Accepted, Change wording
13988	11	62	20	62	22	no agricultural carbon is included? This should be pointed out.	Accepted, Not included in the model - state this
11786	11	62	24	63	17	All sentences including figure 11.14 should be deleted to avoid misunderstand of readers that carbon tax is the best way to achieve the 450ppm target. There is a possibility in (B) scinario to bring higer elecricity fee to pepole instead of the significant incresing of food praice, because (B) would be thought to need more ristrict measuers like introducing CCS, too much other renewable energies compared with (C).	Accepted, This figure will be replaced for the SOD
5642	11	62	24	62	32	Bioenergy 'leakages'. Biomass can be used directly as a feedstock for charcoal production and electricity generation. This paragraph assumes that wood waste and switch grass etc. will be converted to ethanol. It may be more cost effective and more environmentally sustainable to dry distill the 'non-oil' plant biomass, rather than trying to break down the cellulose to simple sugars and then distill the mash into ethanol.	Rejected, it does not assume this - checked with Chapter 6
5744	11	62	31	62	32	This aspect is investigated in more detail in "Biofuels and the underlying causes of high food prices" (GBEP/FAO) (http://www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/BIOENERGY_INFO/0810_Flammini_-_Biofuels_and_the_underlying_causes_of_high_food_prices_GBEP-FAO.pdf)	Rejected, Statement - not a comment. Select peer reviewed literature in preference
16608	11	62	4	62	15	As mentioned previously, the Wise et al results assume a global carbon tax on all fossil fuels -- this explains why they give such divergent estimates from other studies (e.g. 50% of land in bioenergy), and should be mentioned.	Accepted, This figure will be replaced for the SOD
5640	11	62	4	62	36	This hardly takes into consideration, the existing use of NPP.	Rejected, The estimates of maximum theoretical potential for biomass growth and exploitation are noted, but we do not consider maximum theoretical potential for any technology in WGIII AR5 - instead we consider the economic potential, as constrained by economics, and note that the market potential is likely to be still lower due to the many barriers (discussed later in the chapter) which prevent implementation even to the economic potential.
12438	11	62	9	62	12	Does this sentence mean that the global landscape will contribute to reduction of global CO2-emissions in 2030 with 0-3 Gt CO2/yr, possibly up to 10 Gt CO2/yr? Please consider to clearify.	Accepted, Yes - clarify
13355	11	62	9	62	12	Sentence is confusing, rephrase.	Accepted, Edit for SOD
15628	11	62	1			Note relevance of discussion of Davidson E.A. (2012) to this section. Davidson E.A. (2012). Representative concentration pathways and mitigation scenarios for nitrous oxide. Environmental Research Letters 7, 024005. Available at: http://iopscience.iop.org/1748-9326/7/2/024005/pdf/1748-9326_7_2_024005.pdf.	Accepted, Add new reference
7543	11	62		62		Extreame senarios may give misleadings. Discussion on Land use should be focused on deforestation, not bioenergy crops. More fisible senarios and discussion are required.	Accepted, This figure will be replaced for the SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5512	11	63				The caption here should be edited to make the point more succinctly- it might be easier to do this by eliminated (B) and just noting that no significant changes in land distribution would be seen with limits on fossil fuel, …. Main point of this is that a focus on bioenergy would eat up land area	Accepted, This figure will be replaced for the SOD
7343	11	63				Figure legend has a lot of redundancy - reword.	Accepted, This figure will be replaced for the SOD
18655	11	63				(Interesting figure on page 63 comparing global land use under different scenarios. Source: M. Wise et al., 2009 Implications of limiting CO2 concentrations for land use and energy, Science 324, 1183 -1186)	Rejected, Statement - not a comment.
5643	11	63				I don't think this takes into consideration the use of NPP.	Rejected, The estimates of maximum theoretical potential for biomass growth and exploitation are noted, but we do not consider maximum theoretical potential for any technology in WGIII AR5 - instead we consider the economic potential, as constrained by economics, and note that the market potential is likely to be still lower due to the many barriers (discussed later in the chapter) which prevent implementation even to the economic potential.
11308	11	63	1			Excellent graphics that manage to layer several dimensions of quantitative data in a spatial format. This chapter would benefit from more figures like these.	Accepted, This figure is pasted in from a paper. It will be replaced, but we will endeavour to provide useful figures for the SOD
12441	11	63	10	63	11	Please consider to add "energy" and "for bioenergy" so the sentence states: "As a result, the relative increase in land required for biomass and other energy crops exceeds the relative increase in demand for bioenergy." This will make it easier to understand.	Accepted, Edit for SOD
5846	11	63	11	63	16	The text "Illustrative figure … impact on all land use," is redundant.Please delete and include statement concerning unmanaged forests and pastures in the text above. The information given about the scenarios is not sufficient, too. For example, what does UCT stand for? Besides, given the wide array of drivers, I would certainly question any scenario that leads to an increase in UNmanaged lands, be it pasture or forests, in the future. This would violate any findings from land-use history (except: if "unmanaged lands" includes "devastated, deforested and degraded beyond usability") .	Accepted, This figure will be replaced for the SOD
8013	11	63	2			The illustrated result, energy crops will cover about 30 % of the global land area in 2050 and about 50% in 2100, seems to be unrealistically large. Does this have a consistency with the biomass supply potential from cropping systems described in Page 24 and Table 11.3 ?	Accepted, This figure will be replaced for the SOD
11829	11	63	3			has this abbreviation (UCT) been introduced?	Accepted, This figure will be replaced for the SOD
5644	11	63	5	63	5	What is FFICT?	Accepted, This figure will be replaced for the SOD
11830	11	63	5			has this abbreviation (UCT) been introduced?	Accepted, This figure will be replaced for the SOD
5645	11	64	1	64	11	I assume SD is sustainable development, but what is SOD?	Noted, Second Order Draft

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10190	11	64	12	64	18	Consequences for biodiverstiy migth merit its own section, and should at least explicitly be added somewhere	Partially Accepted, Add more information - but not in this section
5119	11	64	16	64	16	when you say "The rapid increase of biofuels production worldwide" and say subsidies I am not totally in agreement. The big driver has been energy prices, mandates and in place technologies (due to earlier subsidies)	Accepted, Discuss and add reference to support (not incorrect page number - should be page 70)
2641	11	64	20		29	This is an interesting policy discussion. The first paragraph is not supported or reinforced by the earlier discussions. This note about Europe would be good to briefly explain since it will have policy implications beyond European borders.	Accepted, Expanded
10188	11	64	25	64	29	more of this, and for all regions!	Accepted, Expanded
5646	11	64	27	64	29	Only carbon sequestration is mentioned, not sequestration and use.	Rejected, The estimates of maximum theoretical potential for biomass growth and exploitation are noted, but we do not consider maximum theoretical potential for any technology in WGIII AR5 - instead we consider the economic potential, as constrained by economics, and note that the market potential is likely to be still lower due to the many barriers (discussed later in the chapter) which prevent implementation even to the economic potential.
12442	11	64	28	64	28	It makes sense that afforestation and bioenergy can compete with other land use, but please consider to explain how "crop land management" could compete with "other land use".	Accepted, Expanded
12443	11	64	30	64	30	Maybe the meaning is better expressed by"Nationa and international agricultural, forest and climate policies have the potential ……"	Accepted, Edited for SOD
5118	11	64	37	64	37	this is more on potential than policy	Accepted, Edited for SOD
5647	11	64	37	64	38	Rather than Forests provide --- I would say Trees on all land-use types provide. They also provide goods and services to about half the world's population, (>3 billion people), not half a billion users.	Accepted, Trees can occur on land that is not forestry - good point
7211	11	64	37		42	About carbon sequestration 1) forest C stocks can be increased by increasing biomass on existing forest acreage 2) forest C stocks can be increased by expanding forest land; missing: 3) protection of existing natural forests (not perse by improved management, but by saving it from being converted).	Accepted, Edited for SOD
5648	11	64	39	64	39	Change 'forest acreage' to 'forest area'.	Accepted, Edited for SOD
10123	11	64	39	64	40	Forest degradation due to charcoal produciton is a major issue which whoudl be mentioned here	Accepted, Edited for SOD
12444	11	64	41	64	44	Please consider to specify "alternative sinks" and explain whether "forests can continue to act as sinks…" comprises only tropical forest, but also temperate and boreal forests.	Accepted, Has been clarified for SOD
16610	11	64	45	64	46	The Brazilian reduction in emissions from deforestation has been large and rapid, and deserves to be explained in more detail. I'd suggest several sentences or a Box. Also, the peer-reviewed studies relevant to it (e.g. Cederberg, Macedo, Rudorff) should be cited rather than the PRODES web site.	Accepted, Edited for SOD
10259	11	64		71		need to be update with recent debate on green economy, Rio+20 outcomes, Green climate funds,… Policies have also started to adress the intersectorial aspect (Agriculture versus Forest, as annonced at the beggining of chaper 11!) and exemple should be given. perhaps in this sence, a focus should be dedicated to ex-ante tools available for policy makers, and tools beeing developed to implement policies (e.g. Climagri in France to help territories and cities over 50000 inhabitnats to comply with the law (see Climate-Energy Territorial Plan).	Accepted, Edited for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7544	11	64		66		This subsection includes many kind of options and it is difficult to undersand. It is devided into sub-subsections.	Accepted, Edited for SOD
15629	11	64	19			For section on sectoral policies, the importance of the animal agriculture sector deserves discussion, as well as potential co-benefits and risks (e.g. animal welfare, health, and non-climate environmental implications). Pelletier N. and P. Tyedmers (2010). Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Sciences of the United States of America 107(43), 18371-74. Available at: http://www.pnas.org/content/early/2010/09/27/1004659107.full.pdf+html. Unger N., T.C. Bond, J.S. Wang, D.M. Koch, S. Menon, D.T. Shindell, and S. Bauer (2010). Attribution of climate forcing to economic sectors. Proceedings of the National Academy of Sciences of the United States of America 107(8), 3382-87. Steinfeld H., P. Gerber, T. Wassenaar, V. Castel, M. Rosales, and C. de Haan (2006). Livestock's long shadow: environmental issues and options. Food and Agriculture Organization of the United Nations. Available at: ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e.pdf. McMichael A.J., J.W. Powles, C.D. Butler, and R. Uauy (2007). Food, livestock production, energy, climate change, and health. The Lancet 370, 1253-63. Mirle C. (2012). The industrialization of animal agriculture: implications for small farmers, rural communities, the environment, and animals in the developing world. The 10th European International Farming Systems Association Symposium in Aarhus, Denmark, July 1-4. Workshop 1.3: Understanding agricultural structural changes and their impacts, to support inclusive policy dialogue and formulation. Available at: http://www.ifsa2012.dk/downloads/WS1_3/ChetanaMirle.pdf. The breadth of scientific evidence demonstrating that intensively confined animals are frustrated, distressed, and suffering under modern production schemes is extensive, conclusively substantiating that battery cages for egg-laying hens and crates for pregnant sows and calves are simply not appropriate environments. Duncan I.J.H. (1970). Frustration in the fowl. In: Freeman B.M. and Gordon R.F. (eds.), Aspects of Poultry Behaviour (Edinburgh, Scotland: British Poultry Science Ltd., pp. 15-31). Špinka M. (2006). How important is natural behaviour in animal farming systems. Applied Animal Behaviour Science 100(1-2),117-28. Baxter M. (1994). The welfare problems of laying hens in battery cages. The Veterinary Record 134(24), 614-9. Dawkins M.S. (1990). From an animal's point of view: motivation, fitness, and animal welfare. Behavioral and Brain Sciences 13, 1-61. Vestergaard K. (1984). An evaluation of ethological criteria and methods in the assessment of well-being in sows. Annales de Recherches Vétérinaires (Annals of Veterinary Research) 15(2), 227-36. Broom D.M., Mendl M.T., and Zanella A.J. (1995). A comparison of the welfare of sows in different housing conditions. Animal Science 61, 369-85. European Commission, Scientific Veterinary Committee, Animal Welfare Section. 1995. Report on the welfare of calves. Adopted November 9. Available at: http://ec.europa.eu/food/fs/sc/oldcomm4/out35_en.pdf.	Accepted, Added more detail on livestock here
16611	11	65	1	65	1	"The mechanism" presumably refers to REDD+ but this should be said explicitly (the previous sentence had it in the plural).	Accepted, Edited for SOD
7212	11	65	1		7	o Somewhere here I would add some text on PRC projects (peatland rewetting and conservation) as a new activity, at least in the voluntary market (e.g. Winrock, VCS). This could be a very promising and cost effective tool for emission reduction.	Accepted, Added for SOD
11179	11	65	1	65	3	Explanations for REDD-plus is not consistent with the international agreement. Detailed modarity for establishment of national reference level(s) have not yet agreed.	Accepted, Harmonized and revised throughout the chapter
2642	11	65	1		15	Comment - the policy discussions is not balanced with the earlier materials, e.g., changing diet etc. They need to be better blended together so there is a consistent voice for the chapter. Most of the policies appear to be for forests while the drivers of increased emissions appears to be agriculture - especially during the last decade.	Accepted, Strengthened agricultural policy parts for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10124	11	65	10	65	10	Does this really address agriculture as a driver of deforestation , the prices of agricultural products are increasing, the demand for more food feed and fibre is growing, , is this taken into account in the calculations.	Accepted, Edited for SOD
13699	11	65	13	65	13	Add after "...Kyoto Protocol": "Therefore, in the political discussion regarding the integration of REDD+ into the market mechanisms under international climate policy, there has been a marked reluctance due to the fear that emission credits from REDD+ might crowd out credits from other project types (Michaelowa and Dutschke 2009). " Reference: Michaelowa, A.; Dutschke, M. (2009): Will credits from avoided deforestation jeopardize the balance of the carbon market?, in: Palmer, C.; Engel, S. (eds.): Avoided deforestation. Prospects for mitigating climate change, Routledge, Abingdon, p. 130-148	Accepted, Harmonized throughout the chapter
5514	11	65	16	66	35	This discussion on nuts and bolts of implementation is too detailed for this type of section. A box with a portion of this information would be more helpful- integrating some of this into an additional column for Table 11.13 is another option	Accepted, Summarized, edited, and shortened for SOD
14447	11	65	16	65	49	Good to see these social concerns outlined in this chapter.	Noted, Thank you
16612	11	65	18	65	20	The 86% figure may have gone down in recent years; check FRA 2010 instead of 2005.	Accepted, Checked numbers and edited for SOD
5847	11	65	20	65	22	Please add a reference - why do you put the emphasis on temperate forests when most of the LUC and Deforestation-related emissions come from tropical forests?	Accepted, Edited and added reference
9182	11	65	20	65	36	It has been reported for long that there are large potential at low costs - but nothing happened in last decades. There mush have been lack of human capacity , coordination and so forth - that has to be assessed. I guess the situation is similar to so-called "energy efficiency gap".	Noted, Statement - not a comment
12445	11	65	27	65	35	These lines seem hard to understand and also contain som contradictions, please consider to rephrase.	Accepted, Edited for SOD
7545	11	65	3	65	5	"The REDD-plus approach would finance not only forest conservation, but also sustainable forest management and nhancement of carbon stocks restoration / afforestation / reforestation)" is not correct. It should be revised into "The REDD-plus approach would finance not only deforestation and forest degradation, but also forest conservation, sustainable forest management and enhancement of carbon stocks". In the decision, restoration / afforestation / reforestation are not described.	Accepted, Harmonized and revised throughout the chapter
5649	11	65	3	65	3	The REDD+ approach must be tied to increasing agricultural productivity, especially in the subsistence sector.	Accepted, Harmonized and revised throughout the chapter
17147	11	65	33			Important to mention more clearly the impact of REDD on Idnigenous Peoples as cited in the literature. See fo rInstance: Anderson, N (2009) REDDy or not? The Effects on Idngienous Peoples in Brazil of a global mechanism for Reducing Emissions from Deforestation and Degradation. In Journal of Sustainable Development 2 (3). Also see Ghasoul, J., Butler, R., Mateo-Vega, J, Pin Koh, L. (2010) REDD: A reckoning of environment and development implications. In Trends in Ecology and Evolution 25 (7) 396-402. And Ribot, J., and Anne Larson (2012) Reducing REDD risks: affirmative policy on an uneven playing field. In International Journal of the Commons 6 (2)	Accepted, Comment was included in section 11.10. Deeper discussion was prevented by space limitation
7213	11	65	33		35	See earlier comments: discussion on the failure of REDD (+) programs,. Why do they fail? What can be improved to make REDD more successful? Obstacles for implementation of REDD(+)? Etc.	Accepted, Comment was included in section 11.10. Deeper discussion was prevented by space limitation
7547	11	65	36	66	35	Explanation of REDD+ and the present situation of it is not matured having many small errors. For example, the most important decision on REDD+ under UNFCCC is Cancun accords, but it is not referred. Mechanisms of REDD+ should be explained. Safeguards including biodiversity, local people and human rights also should be referred here.	Accepted, Comment was included in section 11.10. Deeper discussion was prevented by space limitation

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
3763	11	65	41	65	41	"Although the threat of leakage would remain." This threat can be addressed through broad participation of many forest countries in the REDD+ mechanism, including those with high forest cover and low deforestation rates (da Fonseca, 2007). For example, "the most effective reference level designs balance incentives to reduce historically high deforestation emissions with incentives to maintain historically low deforestation emissions." (Busch et al, 2009). da Fonseca, G.A.B., Rodriguez, C.M., Midgley, G., Busch, J., Hannah, L. and Mittermeier, R.A. (2007). "No forest left behind." PLoS Biology 5(8):1645-1646. Busch, J., Strassburg, B., Cattaneo, A., Lubowski, R., Bruner, A., Rice, R., Creed, A., Ashton, R. & Boltz, F. (2009). Comparing climate and cost impacts of reference levels for reducing emissions from deforestation. Environmental Research Letters, 4:044006.	Accepted, Harmonized throughout the chapter
5651	11	65	46	65	47	For proper MRV, good inventories and maps are needed. Remote sensing can help with mapping and changes of land use over time.	Accepted, Comment on MRV technologies and costs was included in section 11.10
5513	11	65	8	65	15	It would be helpful to have a map where the most significant mitigation options for a region along with associated cost and sequestration potential are identified. This comment goes back to the mention of costs of mitigation options in Europe on pg 64 ln25	Accepted, Regional breakdown now given - but will be improved for FD
7546	11	65	8	65	9	I cannot agreed with "REDD can be very cost effective" that is a message from the Stern report. It was a kind of economics analysis. Now we realize that REDD requires large costs of system development and transaction throgh experiments of negotiation and development for REDD.	Accepted, Harmonized and revised throughout the chapter
5650	11	65	8	65	8	REDD+ will only be accepted fully if the local participants agree to it and get properly rewarded. At present, some of REDD+ money goes to Outside contractors and to governments, with little left for local people.	Accepted, Harmonized and revised throughout the chapter
9181	11	65	8	65	15	But these low cost options are limited. Compensation for oppportunity costs will get more expensive soon.	Noted, Discussion included in broad terms but space limited
16613	11	66	1	66	18	This paragraph explains the Bali Action plan and the NAMAs discussion in the following years, but not the REDD+ discussion. It, and its decisions (particularly those in Cancun and Durban) are more relevant to REDD+ in the next few years than the NAMAs questions, which are much broader in terms of sectors covered.	Accepted, Text was revised
10125	11	66	12	66	14	at the moment there are 18 agricultural Namas and 29 forestry submitted, the text covers only forestry, text needed on agriculture	Accepted, Strengthened agricultural policy parts for SOD. Comment on NAMAs for agriculture was included
16614	11	66	19	66	35	This paragraph discusses the carbon market relating to REDD+, which is mostly voluntary and very small, but leaves out the non-market approaches. These, particularly the Norway-Brazil arrangement related to the Amazon Fund, have been much larger both in monetary terms and in terms of the emissions reductions already accomplished (several hundred million tons). They deserve at least as much space. This could usefully be put in a Box.	Accepted, Box was included
10126	11	66	19	66	35	Note that NAMAs can be financined form any sources, probably agricultural NAMAs where mitigaiton is a co-benefit would be most sensibly financed by normal agricultural investments which are geared to support climate smart production systems. The economuc incentive for farmers comes from increased productivity and reduced risk, the extra cost for mitigation is really MRV if countries want to include the mitigaiton impacts in tehri national reporting	Accepted, Comment on MRV technologies and costs was included in section 11.10
7548	11	67		68		This table is not enough for REDD+. REDD+ partnership, UN-REDD, Norway-Indonesia REDD+ Partnership and Indonesia-Australia Forest Carbon Partnership should be listed in this table.	Accepted, Information was included
5652	11	67				There is no programme for mapping and inventory. This is essential to monitor land use changes and to assess biomass stock and yield on all land use types. Without such information many initiatives may be misguided.	Accepted, Added to data gaps

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
16616	11	69	1	69	12	This is the land sparing paragraph that should be combined with the earlier ones and expanded to include other relevant references (e.g. Angelsen, Minang, Perfecto and Vandermeer). It should be placed early in the chapter rather than left to this final section.	Accepted, This has been put in earlier section where this is first discussed
10127	11	69	1	69	12	Reducing global cultivated area seems highly unlikely given the increasing demand from population and income growt. Keeping the present area only is ambitious enough goal (but might be realistic though) and would meand much improved productivity from areas with productivity gap, much more use of sustainable farming practices reducing N2O emissions and manuremanagement to reduce CH$ emissions and produce eousehold and farm energy and reduction of waste from all food systems.	Noted, Statement - not a comment
11831	11	69	10	69	12	Is there a reference for this statement?	Accepted, Added reference
5516	11	69	13		21	Very important point	Noted, Thank you
13991	11	69	15			salient? Needs a citation. I would not agree with this claim.	Noted, Revised for SOD
5653	11	69	17	69	17	What is PES?	Accepted, Spelled out on first use
10191	11	69	17	69	17	What PES stands for is not given in the text, a list of acronyms and abbreviations would be useful	Accepted, Spelled out on first use
15206	11	69	18	69	21	hard to read; tighten	Accepted , Revised for SOD
10128	11	69	22	69	22	This depends on commodity price developments and the amount of investments to improved prodcutivity in agriculture	Accepted , Revised for SOD
5848	11	69	24	69	40	Information in text is redundant, can be deleted.	Accepted , Revised for SOD
11309	11	69	26	69	28	This may place too much emphasis on the ability of technology alone to increase land use efficiency (for one, there is the rebound effect). Secondly, 'agricultural chemicals, to eliminate poverty and malnutrition'? Consider rewording at the very least. The phrase conjures up the Green Revolution and the more recent Rio+20 debate in which the G77 argued that an equitable green economy cannot require expensive technological imports.	Accepted , Revised for SOD
12446	11	69	36	69	36	To enhance understandability, please consider to rephrase the sentence to "…..responsible to 3% of global GHG emissions…"	Accepted , Revised for SOD
12447	11	69	39	69	40	Could it be explained how nutrient management can help reduce methane missions from rice and please give a reference?	Accepted , Revised for SOD
15630	11	69	1	69	21	In the discussion of land-using sector policies and intensification, the significant challenges to cattle ranching intensification projects may deserve mention. Cohn A., M. Bowman, D. Zilberman, and K. O'Neill (2011). The Viability of Cattle Ranching Intensification in Brazil as a Strategy to Spare Land and Mitigate Greenhouse Gas Emissions. CCAFS Working Paper no. 11. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark. Available online at: www.ccafs.cgiar.org. Bowman M.S., B.S. Soares-Filho, F.D. Merry, D.C. Nepstad, H. Rodrigues, and O.T. Almeida (2012). Persistance of cattle ranching in the Brazilian Amazon: a spatial analysis of the rationale for beef production. Land Use Policy 29, 558-68.	Accepted , Revised for SOD
14682	11	69	1	69	3	Food prices are rising making land sparing unlikely.	Accepted , Revised for SOD
6822	11	7				Very helpful graphic - perhaps CO2e more useful scale than C?	Accepted , Harmonize units throughout - Revise for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14572	11	7				I have a major problem with this figure regarding the LUC and deforestation data. LUC is mostly driven be deforestation yet we see in panel b LUC results show a decline in emission since the 1980s and in panel a deforestation emissions increase substantially abetween the 1980s and later decades. You cannot compare ramankutty and Piao with Pan like this, it is mixing apples and oranges. Among other things, Pan treats temeprate and tropical forests differently, their temeprate forest numbers are (LUC + sinks due to claimte and CO2) from inventory data, their tropical data separates these out using a model . Also it means in panel a you are only dealing woth conversions to and from forests, and not other land use conversion (e.g. pastures and crolands into grasslands.) I would show CO2 from LUC (including deforesation) in panel a. There are also some refs where you could split def only in the tropics e.g. those you give an others. I would give these nummbers int eh text and total LUC here. I can help you with this	Accepted, figure to be redrawn using WGI model data on LUC emissions
14573	11	7				re. fires. In panel a. Can you be clear what type fo fires, and whether these are gross or net emissions ie. . The GFEd database includes emissions from deforestation fires which would double count with deforestation emissions. It includes natural fires in forests and grasslands which have annual gross emissions but small net emissions due to regrwoth of vegetation. peatland fires will have large net emissions which are not otherwise cvered under deforestation or LUC.	Accepted, New databases considerd
14574	11	7				panel b: the SD between the model results hown does nto represent the uncertainty. This is also not the full range of reults. For WG1 we asked modelling groups to do runs up to and including 2009 to get decadal averages that are comparable acorss decades going up to the 2000s. It would be good to use these numbers for consistency. Ican check with hte WG1 LAs and the model contributers that they ae happy for this to be done. Alternatively, use the synthesis results in Houghton 2012, on which I am co-authro, againa and can help with numbers.	Accepted, figure to be redrawn using WGI model data
11903	11	7				The data sourses are confused. Please check.	Accepted, agree, figure to be redrawn
11803	11	7				Please Explain why the standard deviation of the periods 1980-1989 and 1990-1999 are so large while for the later periods they are comparably small	Accepted, they are smaller in the later period as fewer models covered this period, however this figure will be redrawn to be consistent with new runs in WGI that cover the entire period
7176	11	7		7		Page 7, figure 11.1. It would be good to include all main sources that fall under AFOLU: CO2 and CH4 from fires, N2O from agricultural soils, CH4 and N2O from manure, CH4 from rice cultivation, CH4 from enteric fermentation, CO2 from deforestation, CO2 from drained peat soils	Accepted, Now done
7177	11	7		7		Page 7, figure 11.1. Drained peat soils are large sources of CO2 and have a high potential for conservation and restoration (they store more than twice the carbon in all terrestrial biomass). In this fig. drainage of peat would be together with fires and deforestation one of the major sources.	Accepted, agree, but not likely to get numbers on this for different decades, could say something about it in text
7178	11	7		7		Page 7, figure 11.1. Are the fire numbers averaged over dry AND wet years? Or are numbers taken from el nino years in which fire existed more frequently? The figure suggests that this is the case.	Accepted, I imagine they are averaged over the decade, may need to check
7179	11	7		7		Page 7, figure 11.1. Are global numbers used, of is the figure for certain sources biased towards a certain climatic region (e.g. tropics, or temperate zones)? E.g. Ramankutty reports on tropical forests, Pan et al on temperate forests etc	Accepted, suggesting re-draw figure should take care of this, just use global modelled net CO2 from LULUCF numbers

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10585	11	7				Can't see how range bars are so small in 2000-2009 and 1990-2007 if there is high uncertainty in first 20 years. Footnote a) could maybe be shortened - just be listing references.	Accepted, see above, fewer models, but will redraw using WGI data
10097	11	7				The emmissions from agricultural soils do not include CO2 emissions from organic soils, drained peatlands, which are in agricultural use and this is an important source of emissions in some areas. Also degraded pastures on organic soils are an important source of emissions of CO2. I also wonder are the cumulative CO2 emissions from drained organic soils under forestry (which continue until all the peat has oxidized) represented here	Accepted, agre peatlands underrepresented, probably not enough data on previous decased to include in figure but shoudlspecifically mention in text.
8598	11	7				In this figure, it is important to discriminate fires associated to deforestation processes and other LUC from those that occur in natural fire-adapted systems (ie. Tropical savannas)	Accepted, agree need more clarity,
8923	11	7				it seems unlikely that the valueshave remained the same for enteric fermentation from 1980 to 2010 , despite a significant increase in animal production	Accepted, Check numbers and revise accordingly
12366	11	7	1			Comment to Figure 11.1 b); For enhanced transparency the "net C emissions per year" should be converted to CO2-equivalents to make the figure direct comparable to Figure 11.1 a). If the conversion factor is given this can be done even if the referred publications gives the emissions in Gt C/year.	Accepted, suggesting merging these two figures anyway and only showing net LULUCF modelled emissions from WGI
12367	11	7	1			Two questions arises from the stacked bars of figure 11.1 a); 1) Does the CO2 emissions from deforestation include emissions also from forest soils? 2)Is carbon loss from agriculture soils and human activity on peatlands neglected in the figure? If these sources are not included it should be indicated clearly in the caption.	Accepted, yes the numbers include forest sils, no they do not typically include peatland emissions, will add comemnt to text/caption
14411	11	7	1			Figure 11.1 seems to say that by far, deforestation and fires are the main source of AFOLU emissions (about 3/4ths). But neither one is really “agriculture.” (Could usefully clarify whether fires refers to forest fires caused by campers – presumably forest fires caused by lightening are not anthropogenic – or fires set in agricultural practices to clear fields.) Looks like there is far more scope for emissions reduction through ending deforestation than, for example, through reducing animal share of diet or changing crop practices. Maybe there was a good reason why agriculture was separated from deforestation in earlier IPCC reports. Surely the main message remains the importance of curbing deforestation, and the opportunity presented by afforestation.	Accepted, Agree. Actally much deforestation is by fire and for agriculture. Need to clarify the fire part here.
12867	11	7	1	7	19	For carbon emissions from land use change, the 95% confidence interval is the standard measure of uncertainty (see Intergovernmental Panel on Climate Change. 2006. National Greenhouse Gas Inventory Guidelines. Institute for Global Environmental Strategies, Hayama, Japan.) So, convert the uncertainty in these graphs to 95% CI. That would also allow for comparison with other published forest emissions results.	Accepted, I assume these graphs are showing 1 SD which = 68%, so would need to go to 2 SD. But anyway should merge these graphs and not show LUC separately.
14718	11	7	1			Global trends in CO2….change to CO2	Accepted, OK
13961	11	7	1			it's not at all clear how b relates to a, given values for co2 emissions included in a and changes in units co2eq vs c.	Accepted, agree, will merge using WG1 data

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
13527	11	7	15	7	15	It seems obvious that the main efforts are directed to progressively solve the complex interplay of factors linking the farm and agroforestry with LUC, deforestation and fires, while advancing to detect reliable correlations of these processes with GHG emissions, because with current methods such as remote sensing, can measure the magnitude of deforestation in a much more easy, coherent and reliable manner than the measurement of the produced emissions. Until then, me must use the available data, even if they are not very consistent, because they respond broadly to the relationship between GHG emissions, its causes, and proportions. Deforestation and fires (A) are largely the main contributors to CO2 emissions, and clearly much more than agricultural soils, manure management, rice cultivation and enteric fermentation, ie, essential activities for food production (B); namely, A/B= 40/11 (1980-1989), 53/13 (1990-1999), 46/14 (2000/2009), 49/13 (1990-2010). It also appears that CO2 emissions from fires fell from 27 (1980-1989) to 23.33 in average (23+18+20/3=41/3=20,33) in the last 30 years. Fires are sometimes related to deforestation, and both have to do with the uncontrolled “expansion of the agricultural frontier”, but we must recognize that while its management is a complex multifactorial process, a progressive decrease of its magnitude could markedly reduce CO2 emissions, without conflicting with food production on well-organized bases and social science and technology methodologies. A different problem is posed by the N2O and CH4 emissions, but that is a fertile field for practical scientific and technological progress in the understanding of natural phenomena.	Rejected, Statement - not a comment
2595	11	7	16	7	16	"RA Houghton, 2003, 2010" should be "Houghton, 2003, 2010;"	Accepted, agree
2596	11	7	16	7	17	"S. Piao et al., 2009;" should be "Piao et al., 2009;"	Accepted, agree
2597	11	7	19	7	19	"(RA Houghton et al., 2012)." should be "(Houghton et al., 2012)."	Accepted, agree
10166	11	7	20	8	6	This text appear a bit unstructured, a suggestion for improvement is 1. change in land use: i) global pattern, ii) regional scale, 2. change in productivity and its reasons, 3. change in livestock	Accepted, Agree
16529	11	7	21	7	28	The relation between the pasture numbers in the first sentence ("In 2009 total agricultural land…) and the 4th ("In accordance to the wider definition…") is not clear. Is "about 25% of the global land surface" calculated using the figure of 3356 Mha, or some other number? If so, what is this other number?	Accepted, Numbers were checked and text revised largely for the SOD.
14575	11	7	21	7	22	the share has remained stable but what has the land area done?	Accepted, Numbers were checked and text revised largely for the SOD.
2615	11	7	21			Immediate question came up how agricultural land has changed from 2009 to an earlier date. Saw that it was covered in the next paragraph. Would be good to present how the amount of ag land has changed in first paragraph. This would make sense then to discuss the components of the ag land.	Accepted, Numbers were checked and text revised largely for the SOD.
12868	11	7	23	7	24	Say instead "Agricultural lands, including croplands and rangelands, occupy 40–50% of the ice-free land surface of the Earth (Bartholomé and Belward 2005, Ellis et al. 2010)." Bartholomé, E. and A.S. Belward. 2005. GLC2000: A new approach to global land cover mapping from Earth observation data. International Journal of Remote Sensing 26: 1959-1977. Ellis, E.C., K.K. Goldewijk, S. Siebert, D. Lightman, and N. Ramankutty. 2010. Anthropogenic transformation of the biomes, 1700 to 2000. Global Ecology and Biogeography 19: 589-606.	Accepted, Text revised largely for the SOD, included post 2007 references
3537	11	7	23		24	Please include a reference to this statement.	Accepted, Text revised largely for the SOD, included post 2007 references
14576	11	7	23	7	24	better as introductory sentence to paragraph??	Accepted, Text revised for SOD
11904	11	7	23			(see AR4): please indicate the section or page of AR4.	Accepted, Text revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11112	11	7	23			"croplands and pastures are one of the largest terrestrial biomes on the planet" - this statement is not precise, and may lead to incorrect concepts. Regarding what are they "one of the largest" biomes? Area? That is OK, but when we are talking about emission, removals and mitigation, and the share of natural and human-induced processes, then a more detailed and precise picture is necessary.	Accepted, Text revised largely for the SOD, included post 2007 references
11905	11	7	25	7	33	This section is about "prodution and consumption trends", not about the area of pasture or grazing land. Consider to delete or move to a suitable place (The definition of grassland also mentioned in page 45, line 30).	Accepted, Numbers were checked and text revised largely for the SOD.
14577	11	7	26	7	28	so agric is 15% of the 40% mentioned above?are these numbers from same data source?. Bit confusing	Accepted, Numbers were checked and text revised largely for the SOD.
12869	11	7	27	7	27	The 2006 IPCC National Greenhouse Gas Inventory Guidelines have superceded the older good practice guidance. So, say instead "...used in the IPCC National Greenhouse Gas Inventory Guidelines (IPCC 2006)..." Intergovernmental Panel on Climate Change. 2006. Agriculture, Forestry, and Other Land Use. National Greenhouse Gas Inventory Guidelines. Institute for Global Environmental Strategies, Hayama, Japan.)	Accepted, Text revised for SOD, reduced in pages
5801	11	7	3	7	19	The text is too long. Please consider just giving the sources and a statement about differences in regional coverage and other sources of incomparability.	Accepted, Figure replaced / removed for SOD
5042	11	7	31	7	31	this is the last time I will say this but when you say "Overgrazing 31 often happens on drylands as a result of pressure from food demand" I would have said food, fiber and energy demand	Accepted, text largely revised for SOD
14578	11	7	33			add comma after "poor regions,…."	Accepted, text largely revised for SOD
4565	11	7	34	7	35	The statement " The amount of arable and pasture land per-capita has increased in deveoping countries by 5% and 10% respectively between 20002 and 1970s, despite a continued decreasing trend in developed countries (FAOSTAT, 2011)" is not clear and it is somehow confusing. Probably more clarity is needed.	Accepted, Numbers were checked and text revised for SOD
12368	11	7	34	7	35	substitute "despite" with "opposite to" to make the sentence logical	Accepted, text largely revised for SOD
15148	11	7	34	8	6	do stats in this paragraph line up (or contradict?)	Accepted, Numbers were checked and text revised for SOD
14579	11	7	34	7	36	sentence could be worded better and sswap 200s and 1970s. Would be good to know absolute numbers in terms of land area as well as % increase per capita as gives sense of what is to do with pper capita increase and hwat to do with population. But also note that a lot of the land for agriculture in developing countries isfor the export market to develpoped countries, so increase in per captial land does not imply people have more food. may be owrth making this point	Accepted, Numbers were checked and text revised for SOD
5040	11	7	34	7	34	I don't look at the data but I really doubt that the statement :The amount of arable and pasture land per-capita has increased in developing countries by 5% and 34 10% respectively between 2000s and 1970s" as population has grown. The only explanation I could think of is this is due to deforestation or poor wording where arable should be replaced with cropland and the word used should be inserted. i dont think the stock of potential arable and pasture land can change other than through deforestation. simpley put land is generally not being created.	Accepted, Numbers were checked and text revised for SOD
2129	11	7	34	7	42	is this consistent? - land area increase and decrease in the lines 34 resp. 42? - It should be made clearer which type of land use changed by which amount over which period.	Accepted, Numbers were checked and text revised for SOD
2616	11	7	34		35	respectively between 2000s and 1970s is confusing. Is this a decadal comparison or from 1970 to 2000?	Accepted, Numbers were checked and text revised for SOD
18915	11	7	34	7	35	5%, 10%, 2000s, 1970s: There is one range but two values, order of the years should be switched. Please correct/clarify.	Accepted, Numbers were checked and text revised for SOD
16530	11	7	35	7	35	2000s and 1970s are reversed.	Accepted, Numbers were checked and text revised for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15147	11	7	35	7	35	switch order of 1970s and 2000s	Accepted, Numbers were checked and text revised for SOD
7333	11	7	35	7	35	2000s and 1970s --- should be 1970s to 2000s	Accepted, Numbers were checked and text revised for SOD
5041	11	7	36	7	36	when you say "Changing land-use practices have enabled world grain harvests to double" I would add technological progress and maybe crop management as ferilizer and varietal improvement have been important as have changes in crop mix	Accepted, text revised for SOD
10586	11	7	39			Is the 311 Mha increase as a result of deforestation? Could clarify	Rejected, A better question is "did deforestation result from the land clearance for agriculture?" - the answer would depend on where the expansion has occurred and the natural system displaced
14719	11	7	4			(Y. Pan et al., 2011) should be changed to (Pan et al., 2011)	Accepted, Zotero updated for SOD
2594	11	7	4	7	5	Y. Pan et al., 2011 should be Pan et al., 2011	Accepted, Zotero updated for SOD
9443	11	7	40		40	WG3 refers to developed, OECD, and Annex One countries. The latter two categories are much more meaningfu than "developed."	Accepted, Regions harmonised
18916	11	7	41			7%, 75Mha: It is unclear whether this is about developed countries only. If so, it would be good to give the developing country values that partially make up for the developed country trend. For consistency please have a " " before numbers throughout the chapter and make sure that this is the case for % values AND absolute values. It should e.g. be "-3.1% or -31.6 Mha)" etc.	Accepted, Numbers have been checked and text revised accordingly
5039	11	7	5	7	5	you refer to pan with "1990-2010" in one place and "1990-2007" which is it?	Accepted, Check numbers and revise accordingly
14720	11	7	7			(GR van der Werf et al., 2010) change to (van der Werf et al., 2010)	Accepted, Zotero to be updated for SOD
8315	11	7	6	7	6	Authors should note that the amount of carbon emission is varied according to a land use type.	Accepted, Revise for SOD
3535	11	7				It is very hard to understand that Figure 11.1 (a) include all land use categories (LUC) in AFOLU. For e.g. does 'fires (CO_2)' covers all LUC (forest, cropland, grassaland, etc.)? Also, it is not clear whether this figure 11.1 (a) include emissions from all carbon pools (living biomass, dead organic matter, soils), please clarify. Please indicate what are the LULUCF activities indicated for Figure 11.1(b). How settlement as LULUCF category is treated? Are all C pools included in Figure 11.1(b)? Please include as much information as possible to demonstrate the completeness of your assessment (i.e. justify that the entire AFOLU sector is covered in the assessment), otherwise indicate what is missing in the current literature. This is very important for future scientific and IPCC work. Also, please increase consistency between both figures 11.1(a) and 11.1(b): 11.1(a) shows data for 1980-2010 while 11.1(b) shows data for 1980-2007. Explain clearly what is AFOLU and LULUCF in this chapter (indicate the different categories).	Accepted, Figure to be replaced / removed for SOD

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7057	11	7	16	7	19	We fear that the primary source for Figure 11.2 (Houghton et. al. 2012) does not accuractely reflect recent information. In particular, Houghton 2012 asserts that the forest sink is due to fertilizatoin and climate effects whereas the information in Pan et al 2011 clearly shows that forest regrowth, expansion and management are key contributors to growing forest stocks and the global forest sink. (See Pan, Y., Birdsey, R., Fang, J., Houghton, R., Kauppi, P., Kurz, W., et al. (2011). A Large and Persistent Carbon Sink in the World's Forests. Science Vol. 333 , 988-993.) Net emissions due to land use, land use change and forestry are best calculated from Pan et al. This publication, by leading international authorities and built on actual national inventory data, shows different picture than implied by Figure 11.1b, and explains the unexplained sink described in AR4	Accepted, Comment actually refers to Figure 11.1. Figure to be replaced / removed. The commentator is confused between land use change net emissions due to direct activity of land use and land cover change, and the response of ecosystems to the indirect effects of environmental change in the two different papers. this is not surprising as the current chapter text and indeed the Pan et al. paper are not clear on this. Human activity on the land (land use land-use change and forestry LULUCF) is a net source of CO2 emissions, primarily due to tropical deforestation. The Pan paper uses the Houghton model to calculate the NET LULUCF flux in the tropics, but also splits the model results up into the GROSS flux from forests loss, and the GROSS sink from regrowing vegetation (e.g. much of the tropics undergoes shifting cultivation as well as net forest area loss). Then the other thing the Pan paper does is collate inventory data in tropics to show that extant forests not undergoing human management are currently net sinks for carbon, this is due to indirect effects of environmental change (CO2 fertilization, climate). This is consistent with Houghton 2012. In fact Houghton was an author on both papers. Houghton 2012 shows the net LULUCF flux (in the tropics this is a source of CO2 to the atmosphere) but says we know from atmospheric measurements the land as a whole is a net sink, and that this sink is due to climate and CO2. The Pan paper further confuses the issue by
12183	11	7	3	7	7	First sentence of the paragraph lines 3/4/5 are not clear. In one source it is mentioned as 1990-2007 where as in the next line as 1990-2010. Why the data of 1980s (perhaps 1980-1989) is not comparable with 1990-2010. FAO is the best source of data on deforestation but that has not mentioned here. Similarly the sentence starting C emissions from fires from 1980-1989 and ---for 1980 only is not clear. It is also not clear how the data of CO2 emissions has been harmonized and presented in the figure 11.1.	Accepted, Revise for SOD
5493	11	7				Section 11.2.1- would it be possible to include some information on trends re import and export of primary production in this section?	Noted, Could not find space

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
11291	11	7	20			Quantitative data in this section would be much more comprehensible if shown graphically (i.e. on a map or chart).	Accepted, Tabulated or inserted figures
12925	11	7	20	10	14	Topics in this section should be discussed following three categories of "Cropland", "Grassland", "Wetland". Trend of C flux was discussed in such categories in 11.2.2, so readers can easily compare the discussion in Production and Consumption trend with in the trend of C flux.	Accepted, Revised for SOD
10129	11	70	13	70	13	A discussion on mitigaiton in livestock produciton is completely missing and it is the biggest emitter, animal healt and feeding practices (more production of protein per animal, sick animals hyngry animals do not produce but they do emit), how the feed is produced (deforestation consequences, but could also be a carbon sink) , manuremanagement and produciton of biogass (FAO has done a lot of work on this).	Accepted, Livestock sections have been strengthened
10130	11	70	13	70	13	Also energy in agricultural context is much larger issue that only biofuel production , energy is needed in the households (forest degradation) and in farming (irrigation pumps, machinery, transport, processing) this can be produced as apart of farming system with clear mitigaiton benefits but maybe this is addressed in the energychapter	Noted, Energy chapter issue
2643	11	70	14		28	The discussion seems to suggest that only agricultural crops can be used to produce biofuels. This is not correct and forest materials are also used to produce liquid fuels.	Accepted, Clarified for SOD
5517	11	70	21			Biofuels are mentioned frequently in this chapter but I have not seen any type of assessment of relative benefits:costs of different types of biofuel or detailed discussion on the relative energy to costs for different types of biofuels. Tools for appropriate assessment of different biofuels would also be helpful.	Rejected, This occurs in the energy chapter and the bioenergy cross cut chapter
7214	11	70	21			‘ coherent biofuel policies need to be promoted’. This only counts if the existing biofuel policies are sound, reliable and promote the production of ‘true’ sustainable biofuel. And this is not the case yet. Discussion needed on e.g. Roundtables such as RSPO, RSS, RSB. RSPO for example does not even have GHG criteria yet in their policy. This needs to be discussed	Accepted, Revised for SOD
12448	11	70	32	70	32	Is the emission reduction of 104 Mt CO2-eq per year or accumulated over ten years? Please consider to clarify.	Accepted, Checked numbers and revised accordingly
10613	11	70	38			Australia didn't have the "world's first" scheme. NZ emissions trading scheme started in 2008 and the forestry sector was included from 1 January with forest C credits being traded since then. http://www.mfe.govt.nz/publications/climate/emissions-factsheets/factsheet-17.html	Accepted, Removed claim that Australia was the first - unimportant and should not single out countries except as examples
12449	11	70	41	70	44	Line 42 "reducing fertilizer use" indicates that N2O emissions are included in the scheme. The expression "Carbon Farming Initiative in line 43/44 and "Australia's carbon emissions" however suggests that only C-related emissions are included. Please clearify.	Accepted, Revised for SOD
12450	11	70	44	70	44	Clearify if the figure 460 million tonnes is C, or CO2-eq and if it is per year.	Accepted, Checked numbers and revised accordingly
5654	11	70	44	70	44	“--- cut Australia’s carbon emission by 460 million tonnes by 2050”. Units tC or tCO2 equivalent?	Accepted, Checked numbers and revised accordingly
5849	11	70	45	70	46	Please give the complete name of the certification initiative: "Forest Stewartship Council".	Accepted, Revised for SOD
15207	11	70	6	70	7	extensive citation for simple sentence	Accepted, Revised for SOD
14448	11	70				Good summary of research areas that should be supported. I recommend leaving this section intact.	Accepted, Retained this section, but added to it and developed it further
17148	11	71	10			A Case Study on the important role that traditional/indigenous agriculture makes in climate change mitigation might be a valuable includsion in this chapter.	Noted, Very limited space

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5850	11	71	10	72	5	There are two topics missing from your list (at least): 1.) Better understanding of the indirect effects of land-use, especially of the use of biomass grown on the land in HWP and / or bio-energy, with an emphasis on cascading use and recycling. 2.) Better understanding of the optimization of biomass production in agriculture or forestry with regard to the climate change impacts and trade-offs (in both cases: positive and negative). Linking 1.) and 2.) is a matter of course.	Accepted, Added to gaps list
6782	11	71	10	72	5	date about the effects of Nitrogen deposition or other air pollution on the carbon stocks or non-CO2 emission.soi inorganic carbon changing following land use change.the trade-off about adaptation and mitigation in AFOLU sector.	Accepted, Added to gaps list
5655	11	71	11	71	42	First and foremost:	Noted, Not a full comment
5656	11	71	11	71	42	An inventory of biomass, especially trees on all land use types. Where important, inventories of residues both plants and animals. Data required on stock and annual growth.	Accepted, Added to gaps list
5657	11	71	11	71	42	Good land use maps and monitoring for land use changes over time.	Accepted, Added to gaps list
5658	11	71	11	71	42	Regarding point 10. Better data on forest degradation. This sentence assumes that selective logging, collection of fuelwood/poles and NTFP, charcoal production etc. is a principal cause of forest degradation. In most cases the removal of these products is harvesting. Dead wood is the first choice of fuelwood collectors. They are doing a service in decreasing the risk of forest fires. Also trees outside the forest (TOF) are a significant source of fuelwood and poles. Such trees have been neglected in this First Order Draft. TOF could supply much of the firewood (and poles) in developing countries.	Accepted, Added to gaps list
5659	11	71	11	71	42	Point 11. What are DGVMs?	Accepted, Spelled out DGVMs
5660	11	71	11	71	42	Point 14. The dry distillation of biomass for liquids energy should not be neglected.	Accepted, Added to gaps list
4352	11	71	11	72	5	Indication of these gaps are useful to understand uncertainty of future projection in AFOLU and study targets. I can add some, e.g. migration and survival of native forest species, responces of vegetation and soil for extreme climates, linkage after several potions in AFOLU	Accepted, Considered and added those considered important
18290	11	71	13			"A global, high resolution data base of typical land management practices": the same applies for typical animal housing systems and manure management practices, please add this as a gapof knowledge	Accepted, Added to gaps list
18291	11	71	16	71	18	the same applies for livestock management practices,please add this as a gap of knwoledge	Accepted, Added to gaps list
11075	11	71	16	71	18	Suggest changing this item to "Better data on how agricultural management practices including crop rotations, variety selection, fertilization practices (amount, type and timing) and tillage practices affect GHG gas emissions including N2O and CH4 emissions and soil C storage, and how these effects vary at different locations across the globe."	Accepted, Revised for SOD
18292	11	71	18			Please add the following gap of knowledge:"better data on emission level and mitigation options of new technologies e.g. in animal housing, manure management, feeding practices, etc." as we also need data on the newly developed technologies	Accepted, Added to gaps list
2644	11	71	19		21	Studies need productivity (NPP) data and not just C stocks to calculate C sequestration potentials.	Accepted, Added to gaps list
13671	11	71	19	71	21	This data and knowledge gap should be saparated as follows: - More accurate data on C stocks in biomass for grasslands, croplands and wetlands, and C stocks in pools of dead organic matter for different types of ecosystems around the world, including forests - More accurate long-term monitoring data on C stocks in soils for different types of ecosystems and different management around the world, including forests	Accepted, Considered and reorganized
2645	11	71	26		28	Most of the burning of forests and fires in Indonesia is for planting palm oil plantations and not shifting agriculture	Partially Accepted, Expanded bullet point
2646	11	71	29		30	There is a need for a better word than degradation. Degradation can be a heavily human laden word or value. A change may be negative for humans because it decreases the delivery of an ecosystem service but the ecosystem itself may be shifting within its range of change without it being negative.	Accepted, Defined degradation

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7215	11	71	3			the length and complexity of the biofuel supply chains make the sustainability issue very challenging'. That is true, however, it is of major importance to study the total chains, since otherwise very wrong, highly impacting decisions on e.g. biofuel policies could be made, because simply the knowledge is not there. E.g. the promotion of palm oil produced on any kind of land (including peatland) as a biofuel. While afterwards it turns out that biofuels that contain palm oil produced on peat has very negative impacts in terms of GHG emissions compared to fossil fuels	Accepted, Nuance Discussion and refer back to bioenergy section
2647	11	71	31		33	Llarge global data bases already exist (FAO) so one would question the need for more data collection. It would be better to mine the large existing data bases instead of just collecting more data.	Accepted, Reworded bullet point
2648	11	71	38		39	This needs to include soils	Accepted, Reworded bullet point
2649	11	71	41		42	Bioenergy is not one type of energy but a broad group of different types of energy - gas, liquids, etc.	Accepted, Nuanced discussion and referred back to bioenergy section
10260	11	71		72		A major gap to be added: an effective initiative is necessary to build an on-line dedicated tier2 database for the AFOLU activities	Accepted, Added to gaps list
13356	11	71				There is a poor understanding of the relationship between animal nutrition and enteric fermentation. Current global manure management estimates are extremely crude and poor. There is a poor understanding of the impact of draining of wet areas (potholes) on carbon balance on agricultural soils. There is a poor understanding of forested wetlands/peatlands and the impacts of forestry on forested wetlands/peatlands. In general the gaps in knowledge here are focussed mainly on land use and are just touch on knowledge gaps in AFOLU.	Accepted, Added to gaps list
11181	11	71				Knowledge of practical technology for sustainable forest management in diversed natural and social conditions are important to reducing emissions from deforestation and forest degradations in developing countries in the long term. But it is still insufficient.	Accepted, Added to gaps list
4280	11	71	10			Fire is identified as a data gap; fire statistics are probably better and more readily avaialble thatn insect and disease data, which may be as important or even more important, but is not identified as a data gap. A gap in the data gaps list :)	Accepted, Added to gaps list
11180	11	71	19			More accurate data on C stocks in forest biomass are also needed especially for the natural forest in developing countries. Correcting forest biomass data is more difficult than in the cropland/grassland and diversity is much larger.	Accepted, Added to gaps list
15208	11	72				it's not just ag and l-u change. It's all kinds of land uses and land-use change	Accepted, Edit for SOD
13992	11	72				add in change in diets. Mention the problems with 4.3 Gt estimate.	Accepted, Edit for SOD
13993	11	72				some barriers such as non-permanence cnanot be resolved.	Rejected, Statement - not a comment
13994	11	72				increased incorporation of manures and composts will increase soil fertility, soil health, water infiltration and water holding capacity, etc.	Rejected, Statement - not a comment
2650	11	72	1		2	We need productivity of the total ecosystems (above and belowground) to better understand the carbon budget	Rejected, Statement - not a comment
18293	11	72	17	72	28	The question on "main mitigation options" is not being answered	Accepted, state explicitly
9461	11	72	17		28	This chapter does plenty to demonstrate the mitigation potential of mitigation options, but does little to nothing to demonstrate that these are actionable strategies.	Accepted, Write more in policy section to suggest what is already happening
18294	11	72	30			I suggest to add a question liek "How can consumers influence GHG mitigation by their choice of diet and agricultural products?"	Partially Accepted, Will add something on diets under mitigation options - see comment on line 1780
5851	11	72	38	73	4	What you refer to here is the direct mitigation potential through C sequestration and storage in situ or by e. g. avoided degradation / deforestation. You neglect indirect effects of biomass use, what can lead to erroneous conclusions.	Rejected, Accounted for in the energy chapter
5661	11	72	9	72	16	Annual flux from land use and land-use changes account for 12-20% --- 1.1 +/- 0.9 GtC. This is a very large figure for +/-!	Noted, Yes - it is a very complex system and the uncertainty is large

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15631	11	72	3	72	4	In terms of knowledge and data gaps, the effects of mitigation options on the social and economic conditions of poor people are not the only gaps to be considered. More should be done to improved knowledge and data on a wide range of social and economic impacts, as well as non-climate environmental impacts. This includes, for example, animal welfare, which to my knowledge has been rarely considered in this context.	Rejected, Animal welfare considered already in earlier comments; will be included in the main chapter
5382	11	72	8	73	9	This reviewer feels that there really needs to be a bullet here in the FAQs that says doing noting about climate change represents a real and already present danger for AFLOU and therefore the baseline needs to be framed in terms of deviating from this bad outcome trajectory and not on restoring the earth to some idyllic natural state.	Accepted, Revise for SOD
7084	11	73				The answer to the FAQ needs to be expanded to included the mitigation benefits associated with forest products. In this context, it should be noted here that in the fourth assessment report, it was found (and is still true) that as regards mitigation benefits of forests, the maximum long-term benefits are attained via sustainable forest management to maintain or increase forest carbon stocks while producing a continuing output of forest-based products. (Fourth Assessment Report, WGIII, Chapter 9, Executive Summary)	Accepted, Revise for SOD
10193	11	73	10	73	12	However, reforestation of burnt areas will lead to CO2 sequestration again, which is not the case if the area originally was left deforested	Noted, Statement - not a comment
11833	11	73	17			FAQ 11.6: Shouldn't there be a a FAQ about trade-offs as well?	Rejected, We are working to the IPCC WG3 FAQ outline
2150	11	73	18	73	26	add the role of improved soil quality, fertility etc. from increased soil organic carbon levels (water retention, absorption, etc.) - given the big mitigation potential of SOC sequestration, co-benefits thereof have to be communicated clearly as well.	Accepted, Revise for SOD
10194	11	73	20	73	20	For clarity change to "reforestation, afforestation and reduced deforestation" since it is a reduction in the last but an increase in the first two that results in mitigation. Alternatively write out "increased" before reforestation and afforestation.	Accepted, Revise for SOD
13537	11	73	28	73	28	explained, integrated, or used for feedback for profound changes in concept, approach and scope?	Rejected, We are working to the IPCC WG3 FAQ outline
11832	11	73	6	73	8	In which sense does the feedback from thawing permafrost to the climate relate to AFOLU? Just by ist overall effect on warming?	Noted, Yes - via feedback to increase future warming
6940	11	73	27	73	28	Models to do what? We suggest to revise the title to be more explicit in order to better capture the content.	Accepted, To estimate mitigation potential in the AFOLU sector - clarify
6939	11	73	5			We are concerned about the current focus of the FAQ. Most of this FAQ deals with physical science and climate change feedbacks. We suggest to either delete the FAQ or to move the focus on the emissions side to avoid unnecessary overlap and duplication with the WGI AR5 assessment, Chapter 6 WGI AR5.	Accepted, This FAQ removed
16621	11	74		103		I have emphasized the importance for the credibility of the chapter, given possible attacks as with AR4, of avoiding citations to reports that are not either peer-reviewed or citations of official government or intergovernmental publications. The following are those which may fall into this category. (I hope not, but it's important to check!): Berndes Goran 2012, Calder 2005, CATF 2009, CBD and Giz 2011 Chan et al 2010, Eliasch 2008, Herold 2009, Jackson 2009, Joosten 2010, Mayrand and Paquin 2004, McKinsey and Company 2009, Peters-Stanley et al 2011, Shiraishi et al. 2006, Strassburg et al. 2007 (I believe this is the "white-paper" equivalent of Strassburg et al. 2009), WBGU 2009, and WBGU 2011.	Accepted, Okay - thanks - we havel taken advice

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7670	11	74	29	74	36	The two papers by P. Asante et al mentioned here contain both a fundamental error. This will be shown in the following paper, which conclude very differently with regard to the importance of dead organic matter: Holtsmark, B., M. Hoel, K. Holtsmark (2012) Optimal harvest age considering multiple carbon pools - a comment. Journal of Forest Economics (in press)	Accepted, Removed reference, or have shown the counter-case
15209	11	76	1	76	5	repeated reference	Accepted, Zotero updated for SOD
16531	11	8	10	8	10	".. Expected to double" with respect to its value in what year?	Accepted, Text largely revised for SOD, included reference years
10587	11	8	10			FAO projection of 70% more food will be needed by 2050 than 2005/2007 production could be quoted: FAO 2009, How to feed the world in 2050, Food and Agriculture Organization of the United Nations, Rome. 35 pages. www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf	Accepted, Text revised for SOD
11976	11	8	11		11	"M head" maybe better as million head first time as people may get confused	Accepted, Agreed - revised
18917	11	8	11	8	12	For better readability change the million values to billion.	Rejected, Billion means different amounts in different parts of the world
5802	11	8	15	8	22	Please explain "EIT" and bear in mind that cattle, buffalo, sheep and goats are all ruminants, too. So you could simply delete the term from line 20.	Accepted, The guidance at LAM3 on regional breakdown is agreed, and those have been used for SOD. Regions are explained. Text largely revised.
9444	11	8	21		21	The term drivers is pervasive in the scientific literature, but its meaning varies widely. Here, it should be defined or excised	Accepted, Text largely revised for SOD. Term 'drivers' used in accordance to agreed outline of the Chapter.
14583	11	8	22			would be good to make the point somewhere in this para or the one below that amount of land and agric cops needed to sustain livestock production, ie. not just a matter of increasing pasture land, but of feed production.	Accepted, Text largely revised for SOD
4566	11	8	24	8	26	The use of the term developing regions is not very common and may be difficult to understand. I suggest that the term developing countries in Asia be used instead.	Accepted, The guidance at LAM3 on regional breakdown is agreed, and those have been used for SOD. Regions are explained. Text largely revised.
18918	11	8	24			"for the world": add a time span	Accepted, Text revised for SOD
13307	11	8	25	8	25	remove "for" before "Asia"	Accepted, Revised for SOD
10100	11	8	25	8	25	The per capita food availability in Africa has to my knowledge decreased	Accepted, Numbers have been checked, text revised for SOD
9445	11	8	26		28	Since when has the share of livestock products in developed nations begun to decline? The 1970's also?	Accepted, Text largely revised for SOD, included reference years
2130	11	8	26	8	26	may write "almost doubled" instead of "up 92%" - to avoid that an inattentive reader may think that meat constitutes for 92% of the diet.	Accepted, Text largely revised for SOD, included actual numbers
13306	11	8	3	8	6	With the increase in N fertilizer, there has been an increase in the amount of reactive N in the biosphere, and as a consequence a corresponding increase in N2O and see Galloway et al. The N cascade (	Partially Accepted, This is dealt with later in the chapter dealing with changes in emissions in the AFOLU sector

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
10098	11	8	3	8	4	There has been a significan increase in fossile fuel use due to mechanisation, production of fertilizers, the irrigation pumps use significant amount of fuels and also emit harmful substancies (I try to dig a reference if I have time)	Partially Accepted, This is accounted for in the energy sector
6823	11	8	34		36	Is increasing use of artifical fertilisers possible in these developing countries given rising oil prices and land degradation etc? FAO (Save and Grow, 2011) promotes "sustainable crop production intensification (SCPI), which produces more from the same area of land while conserving resources, reducing negative impacts on the environment and enhancing natural capital and the flow of ecosystem services."	Accepted, Text largely revised and shortened for SOD
9325	11	8	34	8	36	The likelihood that increased crop and livestock production will be met through expanded use of synthetic fertilizer does not seem to be a good proposition. The synthetic fertilizers, which were the moving force behind the green revolution of 1960s and 70s, are blamed for atmospheric pollution, i.e. nitrate contamination of groundwater through leaching from agricultural fields and emission of nitrous oxide (a greenhouse gas) through the process of denitrification. This is supported by a statement on page 15, line 11 of this Chapter (Chapter 11) that 'In total, 76% of greenhouse gas emissions on croplands come from the application of fertilizer'.	Rejected, Of course - we are not advocating it - we are reporting the trends
5700	11	8	34	8	36	Please add that enhanced use of chemical fertilizers and expanded livestock production will, however, increase GHG emissions.	Accepted, We have added that - but we are not advocating it - we are reporting the trends
8924	11	8	34	8	36	"and by the substantial conversions from forest to arable / grazing land"	Rejected, Provide reference
10101	11	8	35	8	35	Expanded livestock production capacity? Improved, increased?	Accepted, Changed to "increased"
14584	11	8	36			see point above, again it would be useful in the context of this para to have data on crop yeild/ha in the past, currently and potential for increase.	Accepted, Text revised for SOD
10099	11	8	4	8	5	There has been a very significant intensification in China, which at the moment uses most N fertilizers per ha but also South Korea, Vietnam, Indonesia	Accepted, Regional breakdown removed
15229	11	8	4		6	Missing parallel comparison to food yields. 700% increase in chemical fertilizer use and 70% increase in irrigation (ok). But this resulted in non-proportional increases in food production. For example, grain yields increase by 1.5-fold from 1961 to 2006 (FAO stats). Suggest adding this comparison inputs vs. yields increases (to highlight innefficiencies and impacts of GR technologies).	Accepted, Have shown yields per capita increasing, and yield per unit input going down
14721	11	8	5			(J. A. Foley et al., 2005), needs to be changed to (Floey et al., 2005). In this matter several authors throughout the text are cited in different ways. In my opinion this should be standardized.	Accepted, Zotero to be updated for SOD
14722	11	8	5			…" agricultural intensification has mainly occurred in the Southern Asia (e.g. Bangladesh and Sri Lanka) (Royal Society, 2009)." Agricultural intensification in the Savanas areas of Brazil (Central part of the country) has also been intensified since the 70's. Significant areas were de forested and soybeans crop and grazing lands were planted.	Accepted, Removed regional statements
2598	11	8	5	8	5	"(J. A. Foley et al., 2005);" should be "(Foley et al., 2005);"	Accepted, Zotero to be updated for SOD
14580	11	8	6			it would also be good to have information on yield/ha in different regions over time to see past icnrease and potential for further yield icnreases.	Accepted, Have shown yields per capita increasing, and yield per unit input going down
14581	11	8	6			delete : in THE Southern Asia	Accepted, Removed regional statements
16532	11	8	7	8	22	This paragraph does not mention pigs, whose numbers have changed rapidly in recent years, particularly in China. There should be a sentence or two mentioning their trend.	Accepted, Non-ruminants and poultry have also been considered. Text largely revised for SOD
2592	11	8	7	8	9	It would be more opportune to state where the increase happens: in Europe, milk productions exceds the demand	Rejected, These are global trends - not the place for regional details

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5043	11	8	7	8	7	I note this paragraph does not have hogs or aquaculture and that might be a good addition	Accepted, Non-ruminants and poultry have also been considered. Text largely revised for SOD
2617	11	8	7		22	The organization of information delivery is hard to follow, the word sequence difficult to follow and one sentence is 5 lines long.	Accepted, Text revised for SOD
2599	11	8	7	8	7	"the last 50 years" would be given by specific time, for example, during 1961- 2011	Accepted, Time periods are more specific in SOD
2323	11	8	8		17	This paragraph could be deleted as other report will deal with impact and adaptation to Climate Change.	Rejected, Trends data needed - not dealt with elsewhere - not about adaptation - misplaced comment?
14582	11	8	9			would be good to make the point htat this is linked to both increasing population,a nd increasing meat onsumption per capita in developing nations. There is mor eon this in the next para though so may not be necessary	Rejected, Dealt with in next paragraph
2322	11	8	9		10	Please, provide references.	Rejected, Each statement is fully referenced
15604	11	8	10	8	12	Why exclude poultry (including egg-laying hens) from these production numbers, especially given the shift to monogastric production. Food and Agriculture Organization of the United Nations (2009). The state of food and agriculture: livestock in the balance (Rome, Italy: FAO, p. 13). Available at: http://www.fao.org/docrep/012/i0680e/i0680e.pdf.	Accepted, Non-ruminants and poultry have also been considered. Text largely revised for SOD
15606	11	8	21	8	22	Consider mentioning the importance of emissions trends based on economic sectors, specifically animal agriculture; and adding figures on this such as those in Unger N. et al (2010) and Pelletier and Tyedmers (2010). Unger N., T.C. Bond, J.S. Wang, D.M. Koch, S. Menon, D.T. Shindell, and S. Bauer (2010). Attribution of climate forcing to economic sectors. Proceedings of the National Academy of Sciences of the United States of America 107(8), 3382-87. Steinfeld H., P. Gerber, T. Wassenaar, V. Castel, M. Rosales, and C. de Haan (2006). Livestock's long shadow: environmental issues and options. Food and Agriculture Organization of the United Nations. Available at: ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e.pdf. Pelletier N. and P. Tyedmers (2010). Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Sciences of the United States of America 107(43), 18371-74. Available at: http://www.pnas.org/content/early/2010/09/27/1004659107.full.pdf+html.	Accepted, Emissions have been presented by subsectors; section largely revised for SOD
5367	11	8	23	8	25	This point about food avialiabilty per capita increasing even in the face of growing world population seems to be a profoundly important point that should perhaps be mentioned in the executive summary and the FAQs at the end of the chapter. This finding seems to have important ramifications for going forward in terms of addressing climate change as well as feeding the world.	Accepted, Have shown yields per capita increasing, and yield per unit input going down
12184	11	8	25	8	26	The share of animal product in the diet ? Perhaps it should be per capita consumption to make it more clear	Accepted, Changed wording

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
15605	11	8	7	8	22	Consider more clearly highlighting the animal agriculture sector. Steinfeld H., P. Gerber, T. Wassenaar, V. Castel, M. Rosales, and C. de Haan (2006). Livestock's long shadow: environmental issues and options. Food and Agriculture Organization of the United Nations. Available at: ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e.pdf. Pelletier N. and P. Tyedmers (2010). Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Sciences of the United States of America 107(43), 18371-74. Available at: http://www.pnas.org/content/early/2010/09/27/1004659107.full.pdf+html. Also consider highlighting the amount of crop production going to animal feed. Over 97% of global soymeal production is fed to animals used in agriculture, and during the last four decades of the 20th century, over 60% of the corn and barley crop were also fed to these animals. Steinfeld H., P. Gerber, T. Wassenaar, V. Castel, M. Rosales, and C. de Haan (2006). Livestock's long shadow: environmental issues and options. Food and Agriculture Organization of the United Nations, pp. 38-39, 43. Available at: ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e.pdf.	Accepted, Non-ruminants and poultry have also been considered. Text largely revised for SOD
14673	11	8	7	8	9	It seems very likely that as feed prices rise, due to climate change related reductions in yield and increasing population pressure on food of all sorts, meat prices will rise resulting in decreased per capita, and possibly absolute, meat consumption.	Rejected, Possibly but we have no reference to base this on
13538	11	80	9	80	9+	OPRE - Operational Plan for Renewable Energy, New Energy Division, Ministry of Energy and Mines-MEM & Andean Development Corporation-ADC, Caracas, 1998-2001.	Accepted, Zotero updated for SOD
15210	11	81	27	81	38	foley reference in here 3 times; twice as 2009 and once as 2005.	Accepted, Zotero updated for SOD
8599	11	81	27	38		Check if Foley et al (2009a), Foley et al (2009b) and Foley et al (2005) are not the same	Accepted, Zotero updated for SOD
13539	11	83	31	83	31+	González, F.G., Energy and mechanization in agriculture, Central University of Venezuela, Caracas, 1995 (404 pp.).	Accepted, Zotero updated for SOD
13540	11	86	43	86	43+	Huici C., J., Integrated Rural Development Project, Community Huanacu, Energy & Development, PROPER-GTZ, N°9, 1996.	Accepted, Zotero updated for SOD
13541	11	88	29	88	29+	Kumar, A., Optimizing Small Water Resources of India, Energy & Development, PROPER-GTZ, N°9, 1996.	Accepted, Zotero updated for SOD
8316	11	9		9		Absolute figures are more important than percentages to estimate GHG emission through land use fluctuation.	Accepted, Checked numbers and revised for SOD
14585	11	9				I have a slight preference for absolute numbers rather than % change. I understand this allows you to plot all on one figure but I think it is interesting to see relatively how much land is in crops and forests etc. Anyway, I see the rational of doing it both ways.	Accepted, Checked numbers and revised for SOD
7334	11	9				It ssems the countries should be better identified on this figure, especially OECD90 and EIT countries. At least give a clue on how to find out what countries are included. Also, I don't like how figure #1 is compressed to make room for the legend. They should all be on the same x scale, and note should be made that the Y axis are different.	Rejected, Regional breakdown is required - but not individual countries
5537	11	9				The combined increase in agriculture and pasture should equal the decrease in forest area. It does not seem to be the case!	Rejected, Not true - these can come from natural grasslands
5803	11	9				Please rework this figure. The years should be given below all curves to facilitate reading, panels should be of equal size, and it would benefit readers if regions were indicated in the panels, not in the text. The legend can be drawn across both columns of panels what might also allow for a larger size of the font used.	Accepted, Reformatted for SOD
7181	11	9				For SE Asia recent numbers of deforestation have been published by Miettinen et al., 2011: 46% of the forest cover is lost between 2000 and 2012 (see also table below). It is interesting to see how the total net gain of forest in total Asia is more than 2.2 M ha yr-1 in the period 2000-2012. Are these numbers in table 11.1 reliable? Please check.	Accepted, Deleted table and used figure

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
7182	11	9		9		In the study by Miettinen et al (2011), deforestation rates in insular Southeast Asia were determined by comparing satellite imagery between 2000 and 2010 using a spatial resolution of 250 m and land cover maps with regional methodologies and classification schemes. They calculate a net deforestation rate for Indonesia and Malaysia of 1110 ha-1 yr-1.	Accepted, Deleted table and used figure
13663	11	9				It is strange that the data for N fertilizer and forest land are shown to start from 2001 and 1990, respectively. They should be started from 1971 so that the trends can be compare to other data.	Rejected, Data not available for different regions
11292	11	9	1			The significance of the data in these six graphs would be much clearer if the scales of their y-axes were standardized.	Accepted, Reformatted for SOD
14422	11	9	1			Formatting of graphs is not uniform. When y-axis has negative values, the x-axis labels are embedded in the graph. Could streamline by using a master x-axis label on the lower graphs (5&6).	Accepted, Reformatted for SOD
14423	11	9	1			The graphs are not aligned evenly. Make all graphs the same size, place the legend outside the graph frame.	Accepted, Reformatted for SOD
16535	11	9	10	9	12	These two sentences are misleading, since the changes in wheat production and in rice and soy yields are not due solely to climate change (and in fact probably reflect relative demand and prices more than climate change.) Delete them.	Accepted, Removed, work of WGII
14587	11	9	10			Is it just warming (ie heat stress) or also reduced ppt (drought). May be better to be specific (ie rising heat stress) or to say "due to climate change"	Accepted, Removed, work of WGII
2600	11	9	11	9	11	"D.B. Lobell,2011" should be "Lobell, 2011"	Accepted, Zotero to be updated for SOD
18920	11	9	11			"respectively": add time frame (range) here during which the increase in yield has taken place	Accepted, Text revised for SOD
14588	11	9	12			add some text at beginning of sentence to clarify but also to make it make sense e.g. "MODELLED ESTIMATES OF future changes…." and to clarify, is this in the US?	Accepted, Removed, work of WGII
14589	11	9	13	9	14	I would prefer to see the range after the best estiamte in a racket, use "to, be careful of commas versus decimal points, and put the crop type with the number rather than list them all and say respectively as this way it is easier to follow e.g.wheat +1.6% (-4.1 to +6.7); maize -14.1% (-28.0 to +4.3).....etc	Accepted, Removed, work of WGII
18921	11	9	13			"A1B scenario": Please add reference to the SRES	Accepted, Removed, work of WGII
2601	11	9	14	9	14	"Tebaldi and D.B. Lobell, 2008" should be "Tebaldi and Lobell, 2008"	Accepted, Zotero to be updated for SOD
14590	11	9	15			surely everywhere not just temerate regions, especially since the next number is a global one.	Accepted, Removed, work of WGII
13962	11	9	15	9	17	adaptation is much more complex than just adapting planting dates and cultivar choices, even in rather well understood temperate growing systems, as the drought in the US this summer has demonstrated all too well. See for example recent editorial by lobell at http://globalfoodforthought.typepad.com/global-food-for-thought/2012/09/commentary-series-climate-change-adaptation-lessons-from-2012.html and writings by jarvis of CIAT/CCAFS.	Accepted, Text revised for SOD
16536	11	9	18	10	3	In giving data on area losses it is important to point out that, due to differences in carbon density (dry forests and savannas vs. wet forests) the resulting emissions are much larger in relative terms in Latin America and tropical Asia than in Africa. Otherwise the reader may get the impression that Africa is responsible for a substantial proportion of climate change, which it is not.	Accepted, Agree could give density data or even CO2 emissions, could ask houghton to separate out numbers?? FAO should have forest biomass numbers as well as area - Francesco??
12369	11	9	18	10	14	The section only describes the trends in forest cover. Production and consumption is more than forest cover. We miss a description on trends in forest management (harvest/ standing biomass).	Accepted, agree, could do this, FAO should have numbers - Francesco??
12370	11	9	18	9	19	Would it be possible to specify if the net loss of forests is in a specific year or average over the period?	Accepted, agree should do this, probably average over period
6824	11	9	18		22	It will be good to note the primary causes/drivers of deforestation as well as the exacerbating factors.	Accepted, OK , again FAO -Francesco

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
14591	11	9	18			I would prefer to start by giving global numbers then breaking down regionally. But I think there also needs to be some explanation where the data comes from ie. FAO FRA reporting happens every 5 years, relies on country reporting, many uncertainties (grainger paper),. Increasing use of setellite data is improving estiamtes, FAO now including this.Has led to substantial reduction of FAOs past estimates of deforestation rates between FAO FRA 2010 and FAO FRA 2005. Satellite data now increasing being used. Also note that FAO FRA 2010 found a decline in deforestation brates between 200 and 2005, but FAO/JRC report based entirely on satellite data found an increase. In addition to satellite area change data (Hansen et al) there are now satellite estimates of biomass (e.g. Baccini et al, harris et al).	Accepted, agree jo/Francesco rto rework this section
11804	11	9	18	10	3	This subsection needs a reference, probably the numbers come from the FRA, which is cited later but it should be cited here as well	Accepted, agree
7180	11	9	18	9	24	For deforestation rates it might be useful to give references. Are these numbers based on peer reviewed literature? Are they from national ministries?	Accepted, agree
10588	11	9	18	9	24	This para just repeats info in Table 11.1 so delete.	Accepted, agree this section should talk more about drivers of the data se see on the table rather thanr epreat nubers
8833	11	9	21	9	21	Are (all) forests lost due to fire, lost as land with forest as land use?	Accepted, most forest loss is due to land clearing firs for agriculture. Need ref on this!!
17149	11	9	21			A possible case study to include on the role of IK and Fire Management/Abatement is the case of WALFA in Australia. See Russell-Smith, J., Whithead, P., Cooke, P., (2009) Culture, Ecology and Economy of Fire Managemnet in North Australian Savannas: Rekindling the Wurrk Tradition	Rejected, Seems a bit specific. Do we have a general reference on cause for fire loss on Australia?
5044	11	9	23	9	23	today north america is losing a lot of forest to disturbances like fires and pine bark beetles	Rejected, Statement - not a comment
2324	11	9	24	10	2	Please, reformulate this sentence	Accepted, Revise for SOD
5748	11	9	26	9	26	Please include also FAO Save&Grow guide as a reference (http://www.fao.org/ag/save-and-grow/en/1/index.html)	Rejected, Location cannot be located (no line 26 on page 9)
9447	11	9	8		10	Clarify whether this refers to yields or total output	Accepted, Removed, work of WGII
11784	11	9	8	9	17	Deleate or transfer to WG2 to save the voulme.Climate change impact should be described in WG2.	Accepted, Removed, work of WGII
15149	11	9	8	9	17	paragraph is somewhat difficult to follow/read	Accepted, Revised for SOD
14586	11	9	8			Need an introductory sentence here explaining why claimte affects agric production.	Accepted, Removed, work of WGII
13308	11	9	8	9	12	Changes in US grain production could be as much due to market influences as climate influences. Suggest removing this speculation.	Accepted, Removed, work of WGII
5804	11	9	8	9	17	Yield per country is a weak indicator as it is a combination of yield per unit of area and area allocated to this crop in the country. Here, do you refer to yields per unit of area within e.g. the USA, or do you refer to yield in the USA, without breakdown in yield effect and area effect?	Accepted, Removed, work of WGII
16534	11	9	9	9	10	Sentence on global maize production needs a separate citation.	Accepted, Removed, work of WGII
14412	11	9	9			Maize production 3.8 percent lower because of warming to date – this is extremely important and should be highlighted; maybe it already is, in WGII.	Accepted, Removed, work of WGII
8925	11	9	9	9	10	there may be other reasons that the maizeproduction has decreased by 3.8%	Accepted, Removed, work of WGII
4272	11	9	22		23	The text says "The area of forest in North and Central America was estimated to be almost the same in 2010 22 as in 2000." What was the reason to take this assumption?	Rejected, Not assumed - reported from FAO GRA (2010)
12185	11	9	18	9	22	It is essential to give here FAO 2010 as a source to avoid confusion.	Accepted, Move reference citation up

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
5368	11	9	8	9	10	It is not clear at all why one would attribute anthroprogenic climate change to dececrease in US wheat production over the period 1980-2008. It seems there could be many possible market drivers that could also explain this trend. If this is indeed driven by climate change, this is a very important point and the text here needs to more fully develop the point and substantiate it with references to a broader literature and by explaining the drivers. As currently written this seems more like an assertion than a robust technical point.	Accepted, Removed, work of WGII
5852	11	91	36	91	37	This (local) address will not work for retrieving this source.	Accepted, Zotero updated for SOD
13542	11	92	22	92	22+	OPRE - Operational Plan for Renewable Energy, New Energy Division, Ministry of Energy and Mines-MEM & Andean Development Corporation-ADC, Caracas, 1998-2001.	Accepted, Zotero updated for SOD
13543	11	93	45	93	45+	Postel, S., Water for Agriculture: Facing the Limits, Worldwatch Paper 93, December 1989 (54 pp).	Accepted, Zotero updated for SOD
13544	11	95	4	95	4+	Rogers, P., et al., Water as a Social and Economic Good: How to put the Principles into Practice; Global Water Partnership, Stockholm, 1998; Sp. ed., Chili, 2001 (41 pp.)	Accepted, Zotero updated for SOD
15472	11	953	8	953	8	Need to define LUC for the chapter	Accepted, Glossary issue, but define in Ch11 too for SOD
15473	11	955	1			Some grammar issues plus removing internal notes from text description of figure	Accepted, Revise for SOD
15474	11	957	1			Different scales on each figure disorts the % changes between graphs. Suggest selecting one or two y axis values and use for all figures. For graph 1, there is no need to show the entire -ve y-axis for just sheep and goats. The trend is evident. Use a break in the y-axis make this half of the graph smaller.	Accepted, Reformatted for SOD
7654	11	96	35	96	44	Searchinger et al. (2008) is listed twice in References.	Accepted, Zotero updated for SOD
15475	11	990	20			The section is essentially correct about the CO2 "fertilisation" effect, however I believe it is worth an expansion (say several more sentences and refs) since there is some confusion on interpreting the results of enhanced CO2 experiments - and contridictions in the literature. How this effect is used in CC modelling can have a large impact on the results - as highlighted with Mensaranta et al. A sentence should be added to reinforce this point. I also believe that any discussion about this subject is not complete unless the seminal paper Karnosky (2003) is not mention. It goes through all the factors that can/might mitigate photosynthesis upregulation - and its conclusions are still relevant. Ref: Karnosky, D.F. (2003). Impacts of elevated atmospheric CO2 on forest trees and forest ecosystems: knowledge gaps. Environment International 29, 161-169	Rejected, Cannot locate the comment - wrong page number. Paper too old anyway (prefer post 2007 papers)
15476	11	999	18	1000	4	I would recommend adding the impact of the Finanical Crisis on carbon prices. The collapse of the value of carbon prices have made mitigation with carbon trading for existing or new forests uneconomic. A perfect example is New Zealand's Emission's Trading Scheme (currently <NZ$5 / tonne CO2). With current very low carbon prices that are unlikely to improve anytime soon, Figure 11.11 is misleading (that shows mitigation potential of carbon prices of less than <US$20/ tonne CO2)	Rejected, Not in this chapter