| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Original | Revised | xii | | Glossary | Attributional | te | Weidema | This is not a definition. Use the one from the "feed supply chains" document, or the more authoritative one from UNEP/SETAC Shonan Database Guidelines: "System modelling approach in which inputs and outputs are attributed to the functional unit of a product system by linking and/or partitioning the unit processes of the system according to a normative rule." | Change to: "System modelling approach in which inputs and outputs are attributed to the functional unit of a product system by linking and/or partitioning the unit processes of the system according to a normative rule." or use the same definition as in the "feed supply chains" document: "process-based modelling intended to provide a static representation of average conditions, excluding market-mediated effects" | Yes | Adopt proposed change | | |
| 2 | Original | Revised | xii | | Glossary | Boundary | te | Weidema | The definition here is equal to that given for "System boundary" | Delete | Yes | Adopt proposed change | | |
| 3 | Original | Revised | xii | | Glossary | Carbon dioxide equivalent | te | Weidema | "impact" is too unspecific | Change "impact" to "accumulated radiative forcing over a specified time horizon" | Yes | Adopt proposed change | | |
| 4 | Original | Revised | xi | | Glossary | Carbon storage | te | Weidema | term is not used in the document | Delete | Yes | Adopt proposed change | | |
| 5 | Original | Revised | xiii | | Glossary | Consequential LCA | te | Weidema | The A in LCA stands for Assessment. Thus, LCA Assessment is a pleonasm. Also, the assessment is not necessarily on different choices, but can be on "a" choice. | Change to "Consequential LCA describes how relevant environmental flows will change in response to a decision." | Yes | Adopt proposed change; depending on whether consequential LCA is discussed - otherwise omit | | |
| 6 | Original | Revised | xiii | | Glossary | Containers and packaging | te | Weidema | Would it not be more reasonable to call this term "Retail packaging"? | Change the name of the term defined here to "Retail packaging" | Yes | Adopt proposed change | | |
| 7 | Original | Revised | xiii | | Glossary | Co-production | te | Weidema | This is not the normal usage of this term. Co-production is normally understood as encompassing both joint production (as defined here) and combined production, where the co-product outputs can be individually varied. Without good reasons, definitions should not deviate from normal usage. | Delete the second sentence. | Yes | Adopt proposed change | | |
| 8 | Original | Revised | xiii | | Glossary | Co-product | te | Weidema | It is probably not intended that wastes and emission outputs should be included in this definition (see definition of "Output"). Co-products are normally understood as product outputs, whether goods or services (see also the definition of "multi-functionality"). Without good reasons, definitions should not deviate from normal usage. | Change "Output" to "Product" and delete second sentence. | Yes | Accepted with modifications: Change first 11 words (before brackets) to: Multiple products from a single process. [this will retain consistency with the Poultry guidelines]<br><br>SECRETARIAT: ISO terms and definitions adopted | | |
| 9 | Original | Revised | xiv | | Glossary | Impact category indicator | te | Weidema | The indicator as such is unrelated to the product output. Use ISO 14040 definition: | Change to: "Quantifiable representation of an impact category endpoint" | Yes | Adopt proposed change | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **10** | Original | Revised | xiv | | Glossary | Joint production | te | Weidema | This is the definition of combined production. Joint production is when the products cannot be independently varied. | Change the name of the term defined here to “Combined production” | Yes | Adopt proposed change | | |
| **11** | Original | Revised | xv | | Glossary | Life cycle inventory | te | Weidema | If this is only for a unit process, rather than for a life cycle (product system), then the appropriate term would be “Unit process inventory” | Change the name of the term defined here to “Unit process inventory” | Yes | Adopt proposed change | | |
| **12** | Original | Revised | xv | | Glossary | Multifunctionality | te | Weidema | The second sentence provides one specific way to handle multifunctionality. A definition should not contain unnecessary prescriptive procedures. | Delete second sentence. | Yes | PEF definition adopted. | | |
| **13** | Original | Revised | xv | | Glossary | Normalization | te | Weidema | Text is unclear. | Change “unit” to “system”. Add “relative to the reference system” after “by the analyzed system”. Add “of each impact category separately” after “impact potential” | Yes | Definition modified per PEF | | |
| **14** | Original | Revised | xv | | Glossary | Primary packaging materials | te | Weidema | This definition is unclear and not in line with normal usage. Primary packaging is normally understood to be the packaging that is directly in contact with the product, as opposed to secondary packaging. Packaging, both primary and secondary, which reach the consumers is called “retail packaging” as opposed to “wholesale packaging”. | Bring definition in line with normal usage. | Yes | Change to: Packaging in direct contact with the product. See also Retail packaging (need to add with definition) | | |
| **15** | Original | Revised | xv | | Glossary | Process centre | te | Weidema | This term is not logical and not in general use. | Change the name of the term defined here to “Repackaging facility” | Yes | adopt proposed change | | |
| **16** | Original | Revised | xvi | | Glossary | Product parts | te | Weidema | This term is not precise and not in general use for this definition. | Change the name of the term defined here to “Retail cuts” | Yes | adopt proposed change | | |
| **17** | Original | Revised | xvi | | Glossary | Product(s) | te | Weidema | The purpose of the second sentence is unclear. | Delete or clarify | Yes | Clarified per ISO definition | | |
| **18** | Original | Revised | xvi | | Glossary | Proxy data | te | Weidema | Text is unclear | Change “in an LCA for a product produced” to “as input to a production process located” | Yes | These are existing LCI datasets that describe products which are assumed to have similar environmental impacts to the product of interest. For example, using a Chinese LCI dataset for electricity production as an input to a unit process located in Viet Nam.<br><br>SECRETARIAT: definition replaced with one from GHG Protocol | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **19** | Original | Revised | xvi | | Glossary | Reference flow | te | Weidema | Without good reasons, definitions should not deviate from normal usage. A reference flow can also be non-material. Use the ISO 14040 definition: | Change to: “Measure of the outputs from processes in a given product system required to fulfil the function expressed by the functional unit” | Yes | adopt proposed change | | |
| **20** | Original | Revised | xvi | | Glossary | Removal | te | Weidema | The term removal is also used in other meanings in this document. | Change the name of the term defined here to “GHG removal” | Yes | adopt proposed change<br><br>SECRETARIAT: ISO TS 14067:2013 definition adopted | | |
| **21** | Original | Revised | xvi | | Glossary | Secondary data | te | Weidema | The NOTE appears to suggest that secondary data are always of lower quality than primary data, which is not always the case. | Add “or of lower quality” after “not available” | Yes | adopt proposed change | | |
| **22** | Original | Revised | xvi | | Glossary | Secondary packaging materials | te | Weidema | Without good reasons, definitions should not deviate from normal usage. What is defined here is normally called “wholesale packaging” as opposed to “retail packaging”. Secondary packaging is normally understood to be the packaging that is not directly in contact with the product, as opposed to primary packaging, irrespective of whether it reaches the consumer or not. | Change the name of the term defined here to “Wholesale packaging” | Yes | Change to: additional packaging, not contacting the product, which may be used to contain relatively large volumes of primary packaged products or transport the product safely to its retail or consumer destination. | | |
| **23** | Original | Revised | | | | | | | | | Yes | | | |
| **24** | Original | Revised | xvi | | Glossary | System boundary | te | Weidema | Without good reasons, definitions should not deviate from normal usage. The definition provided is a definition of the criteria for setting system boundaries, not the system boundaries themselves. | Change to “The boundary between the activities included in the system and the system environment” | Yes | adopt proposed change<br><br>SECRETARIAT: definition from ISO adopted | | |
| **25** | Original | Revised | xvii | | Glossary | Unit Process | te | Weidema | The last sentence represents only one possible LCI model (the attributional) and is not part of the definition of a unit process. | Delete the last sentence | As also noted for Poultry guidelines | SECRETARIAT: definition from ISO adopted | | |
| **26** | Original | Revised | xvii | | Glossary | Volatile Solids | te | Weidema | The second sentence is not fully correct. More precisely, the VS is the part of the sludge that is combusted at 550°C after 2 hours. | Delete second sentence or clarify. | Yes | Amend with: VS is measured as the fraction of sludge combusted at 550C after 2 hours. | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **27** | Original | Revised | 2-3 | 25 page 2 to 26 page 3 | Chapter 2 (Scope) | Paragraph 4 | ge | French Ministry of Ecology, Sustainable development and Energy | Guidance on the evaluation of additional impacts exists at French and European level, cf. Agribalyse project in France and PEF and Envifood Protocol in the EU. In France, LCI for small ruminant products at farm level exist for several impacts categories: GHG emissions, ecotoxicity, eutrophication, water consumption. Cf. Agribalyse project: www.ademe.fr/agribalyse-en. This work was carried on by the public operator ADEME with INRA, the main French public agricultural research institute, ART (Swiss research institute) and all the French technical institutes representing each product (including IDELE for ruminant production). Thus, the work is based on strong agricultural and LCA expertise and provides consensual LCI data and modeling method for French agriculture LCI. Methods used for ecotoxicity and eutrophication are in line with the European Commission PEF: science-based methods, consensual at European level at least, are available to quantify those impacts. Both these impacts categories are considered highly relevant for small ruminants by the TAG of the guidance. The ambition of World Food Data project (project from ADEME) has the ambition to develop LCI related to non-French products. This work can help to include additional impacts in the guidance. | Include additional impacts in the guidance, using French and European experiences. It can be done quickly for impact categories where an impact categorization model is available and consensual at the European level: ecotoxicity, eutrophication, eventually water scarcity (water consumption including stress factors). | Yes | Reject proposed change. It was stated that this Methodology is developing and will include more Impact Categories in future. It is considered inappropriate to refer to some studies here when methods may be different when future Guidelines for these Impact Categories are developed. BUT this needs discussion and consensus with Poultry Guidelines | | |
| **28** | Original | Revised | 3 | | 2 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Through the entire document, there are no reference at all to the PEF methodology and very little to the ILCD handbook and recommendations, while this methodology is currently tested by dozens of industrial sectors including the feed and livestock sector. It would have been extremely helpful that the LEAP guidance specify where they comply (and when not) to the PEF requirements. This would be a clear added value to members of the food pilots. | | Yes | Agree. PEF methodology should be referenced. One location it can be added is in the summary literature review on existing standards. | FAO to include extra wording | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **29** | Original | Revised | 3 | | 2 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Through the entire document, there are no reference at all to the PEF methodology and very little to the ILCD handbook and recommendations, while this methodology is currently tested by dozen of industrial sectors including the feed and livestock sector. It would have been extremely helpful that the LEAP guidance specify where they comply (and when not) to the PEF requirements. This would be a clear added value to members of the food pilots. | | Yes | same point as above | | |
| **30** | Original | Revised | 3 | | 2 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Clear references should be given to exclude impact categories, as some suggestions appear unjustified. For example, the exclusion of human health/toxicity and ionising radiation does not appear to be supported by study-based evidence. Considering only e.g. climate change may give a distorted environmental picture, particularly towards products that rely on specific energy mixes preferred by some countries and associated risks. | | Yes | Reject. The rationale for not including some impact categories was not based on the importance of that category in LCA, but rather on the pragmatic requirement of completing the guidance within the timeframe available. It has been stated that future revisions will be extended to include additional impact categories.<br>This point is noted and its limitations are clearly stated in the Application section | | |
| **31** | Original | Revised | 3 | | 2 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Exclusion of relevant impact categories such as water use and others appears to be unjustified and not in line with e.g. the EnviFood Protocol developed by key business representatives with support/input from EC, FAO, UNEP, and others. The same can be said for several other impact categories | | Yes | Reject. The rationale for not including some impact categories was not based on the importance of that category in LCA, but rather on the pragmatic requirement of completing the guidance within the timeframe available. It has been stated that future revisions will be extended to include additional impact categories. | | |
| **32** | Original | Revised | 3 | | 2 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural | • Some impact categories seem to be missing and of relevance, such as particulate matter. A cross-check with commonly considered/recommended indicators such as in the ILCD/PEF is recommended. The statement on “Agreement in the LCA community on the validity of the impact categorization model’ (scientific consensus)” page 2, line 5, does not seem justified. Please delete. Current LCA practice generally foresees a more holistic approach. Based on international practice and dialogue, | | Yes | Reject. The rationale for not including some impact categories was not based on the importance of that category in LCA, but rather on the pragmatic requirement of completing the guidance within the timeframe available. It has been stated that future revisions will be extended to include additional impact categories. | We could OMIT or revise the 2nd bullet point on page 3, as they suggest. | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| | | | | | | | | Resources Units | the International Reference Life Cycle Data System (ILCD) facilitated by the European Commission provides recommendations for most of the impact categories considered in current LCA practice. These are also adopted in e.g. the EC's PEF/OEF recommendations. These recommendations are operational and, as far as possible, reflect global average factors for generic assessments. We recommend cross-reference to such regional/international developments to help justify the selection of methods adopted. We recognize that several indicators require updating, where LEAP could refer to more recent developments, that indicators reflect different social/health/environment considerations, that they vary in terms of scope (pressures, risks, socio-economic, …), and that indicators considered in e.g. an agricultural context may not be readily available in LCA frameworks. A clearer distinction/justification of what would be mandatory vs what is recommendable would be beneficial with associated supporting justifications. The argument to separately report indirect/direct land-use change emissions based on the time when emissions occur is not in line with LCA practice. All emissions in an LCA inventory can occur at different times/locations. A distinction in terms of short-term vs long term emissions may be justified, but must then be conducted in a coherent manner. We recommend to delete this reason, while maintaining a position of caution in relation to consensus and separate reporting. | | | | Similarly, we could revise paragraph 3 (specifically line13 on page 3) to replace 'no consensual' with other wording such as '..there is variability in methods' OR maybe we should just acknowledge these as important but note that we only had enough time to include GHG and FED here and aim to add more Impact | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| | | | | | | | | | | | | | Categories in future | |
| **33** | Original | Revised | 3 | 11 | Chapter 2 (Scope) | Paragraph 3 | ge | French Ministry of Ecology, Sustainable development and Energy | The French Ministry of Ecology, Sustainable development and Energy also considers that biodiversity loss is a relevant impact for small ruminants. It welcomes very well the LEAP initiative to work on the assessment of biodiversity loss. It can share the study that had been led in 2013 on the development of an indicator on biodiversity loss based on landscape features: cf. http://www.developpement-durable.gouv.fr/Analyse-d-un-indicateur.html (in French language) | | No | We thank you for your reply and would be pleased to receive a copy of the document noted for work on biodiversity | Felix - you may already have this | |
| **34** | Original | Revised | 4 | 4 to 8 | Chapter 2 (Scope) | Paragraph 2 | ge | French Ministry of Ecology, Sustainable development and Energy | The French Ministry of Ecology, Sustainable development and Energy agrees that more environmental impact categories are needed to understand the wider environmental implications and to claim overall environmental superiority of some small ruminant production systems and products. Include other impact categories in the guidance would be a strong opportunity to have wider uses of the guidance. | Include additional impacts in the guidance using French and European experiences. It can be done quickly for impact categories where an impact categorization model is available and consensual at the European level: ecotoxicity, eutrophication, eventually water scarcity (water consumption including stress factors). | Yes | Reject. The rationale for not including some impact categories was not based on the importance of that category in LCA, but rather on the pragmatic requirement of completing the guidance within the timeframe available. It has been stated that future revisions will be extended to include additional impact categories. | | |
| **35** | Original | Revised | 4 | 1-3 | 2.2 | | ge | Weidema | The choice of an attributional approach is in conflict with the target audience and application areas provided on page 2, line 9-14, the statement that LCA can be used as a decision support tool (page 6, line 14; page 9, line 29, and page 10, line 3), as well as with the many references later in the document to ISO 14040/44 (which does not support an attributional approach). It is important to be aware that LCA is not the same as Environmental Performance Assessment (which is regulated in ISO 14031); see the Introduction to ISO 14040: “LCA is one of several environmental management techniques (e.g. risk assessment, environmental performance evaluation, etc…) and might not be the most appropriate technique to use in all situations.” The important difference is that Environmental Performance Assessment is made on an organization, i.e. a | Change to: “These guidelines are generally based on the consequential approach to life cycle modelling. The approach refers to process-based modelling, intended to provide a static representation of the consequences of the production and/or consumption of an additional amount of product.” | Yes | The Steering Committee has required that the guidelines be strictly attributional. This sets limitations to the use of the results for defining and estimating the impact of improvement options. There should be a disclaimer about this somewhere. If not, we have to strengthen the disclaimer. We respectfully disagree that the ISO 14044 does not support attributional approaches to LCA. | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| | | | | | | | | | multifunctional activity. As soon as we wish to isolate one specific product from a multifunctional production system, LCA is required, and here the handling of co-products becomes crucial. A true accounting approach, with mass balances etc., is only possible for a multifunctional (unallocated) system, and thus not for an allocated, attributional product system. An attributional approach cannot say anything about the environmental performance of a product, only about the environmental performance of that part of the product system that is included according to the chosen allocation rules for by-products. This is why ISO 14040/44/49 recommends the use of system expansion to avoid allocation, and generally describes a consequential approach to system modeling. The main reason for this is that ISO 14040/44/49 is intended for supporting improvements, which requires LCAs that provides information on the consequences of these improvements. The main problem of choosing an attributional approach is that the results cannot be used for decision support regarding improvements of the analysed systems, simply because the results do not reflect the environmental consequences of such improvements. The results will be misleading if they by mistake should anyway be used for decision-making. It does not seem wise for an international guideline to adopt a modeling approach that cannot be used for decision support. | | | | | |
| **36** | Original | Revised | 7 | 17 | 4.2 | | te | Weidema | It may be typical to limit the assessment to natural resources, but the purpose of these guidelines should not be to perpetuate such a limited understanding. | Delete “natural” | No | Point is accepted. 'Natural resources" is changed to "Resource availability" to more closely align to ILCD. Line 17 on page 7 will also have the word 'natural' removed<br><br>SECRETARIAT: Natural resources" is changed to "Resources" | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **37** | Original | Revised | 8 | 8 to 20 | Chapter 4.2 | Paragraph 2 | ge | French Ministry of Ecology, Sustainable development and Energy | European Commission PEF methodologies to assess water consumption, resource depletion of non-renewable resources and eutrophication are not quoted in the relevant methodologies. These methodologies are (or will be for water consumption) used in France to assess the environmental footprint of products. The French Ministry of Ecology, Sustainable development and energy believes that these methods are relevant. | Include European Commission PEF methodologies to assess water consumption, resource depletion of non-renewable resources and eutrophication in the quoted relevant methodologies. | Yes | Reject proposed change. It was stated that this Methodology is developing and will include more Impact Categories in future. It is considered inappropriate to refer to some studies here when methods may be different when future Guidelines for these Impact Categories are developed. BUT this needs discussion and consensus with Poultry Guidelines | I agree we should have comment somewhere about PEF and be consistent across the various Guidelines | |
| **38** | Original | Revised | 8 to 10 | 22 page 8 to 3 page 10 | Chapter 4.3 | | ge | French Ministry of Ecology, Sustainable development and Energy | The French document BPX-30-323 and its declinations in the food sector (food products in general, dairy products, coffee), established by the multistakeholders platform ADEME-AFNOR, is also a normative document that may ease assessing environmental footprint of small ruminants products. It is in line with ISO standards. | Add French document BPX-30-323 and its declinations in the food sector, to the normative documents listed. See them in attached file. | Yes | Reject proposed change. It was stated that this Methodology is developing and will include more Impact Categories in future. It is considered inappropriate to refer to some studies here when methods may be different when future Guidelines for these Impact Categories are developed. BUT this needs discussion and consensus with Poultry Guidelines | It seems reasonable to add reference to this in Appendix 1. BUT I do not have access to it - this comment implies that they sent it. I am happy to suggest an addition if you (FAO staff) send that to me | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **39** | Original | Revised | 11 | 24-30 | 5 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | This chapter should makes reference to PEF guidelines since it is obvious when reading this chapter that LEAP and PEF share the same aims. | | Yes | PEF guide cited in Glossary and chapter 4 | same point as that in row 38 above | |
| **40** | Original | Revised | 13 | 29 to 32 | Chapter 5.2 | | ge | French Ministry of Ecology, Sustainable development and Energy | Agribalyse project contains full LCI studies on sheep and goat milk and lamb. | Add Agribalyse and its LCI studies on sheep and goat milk and lamb in appendix 1. | No | Accept. On page 92, line 2 - to add: The French AGRIBALYSE® database provides life cycle inventory and LCIA data about sheep meat and milk, and goat milk (for Methodology report, see Kochand Salou, 2014; www.ademe.fr/agribalyse-en). Add the following reference to reference list at end of this Appendix - Koch P, Salou T (2014) AGRIBALYSE®: METHODOLOGY, Version 1.1, March 2014. Ed ADEME. Angers. France. pp 384. Available at: www.ademe.fr/agribalyse-en | | |
| **41** | Original | Revised | 19 | 27-28 | 6.4 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Suggest to add after Tabaski : Aid El Kebir, and to specify this is for all Muslims, not only those of west and central Africa. | | No | Accepted with modification. Revised to - "Among these is the Muslim celebration of the festival of "Eidul Adha", which requires the ritual sacrifice of animals." | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **42** | Original | Revised | 19 | | 6.4 | | | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | The landscape management and manure are important functions of the system not to be forgot (in the functional unit) and to be considered in 7.1 | | No | Agree. RE landscape management, the general benefits are noted in section 6.4. An additional sentence will be added - "While the benefits of wealth management and landscape management (including multiple ecosystem services) are recognised, they have not specifically been accounted for in these guidelines. Methodology to account for these was considered as developing and too immature to include in as guidance. However, they should be reviewed in future." Manure is recognised in section 6.4 and methodology to account for it is covered in section 9.3. | | |
| **43** | Original | Revised | 19 | 31-33 | 6.4 | | GE | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | The positive impact of small ruminants is obvious, but it should be clarified here if this is taken into account in the final assessment. To my knowledge it is not. | | No | See reply to previous comment | | |
| **44** | Original | Revised | 20 | 6-7 | 6.5 | | te | Weidema | Such a degree of precision in the figures is not credible. | Replace the bracket with “at around 23 kg CO2-eq/kg meat” | No | Agree. Adopt proposed change. | | |
| **45** | Original | Revised | 20 | 14-15 | 6.5 | | te | Weidema | The brackets and the word “especially” are unwarranted. | Remove the brackets and the word “especially” | No | Agree. Adopt proposed change. | | |
| **46** | Original | Revised | 22 | | 7.2 | | | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Feed production: What about the grazing from (more or less managed) natural landscape? Is this included, and if so, how? | | No | Agree. Page 22, line 23 was changed to recognise this point and now reads "….pastures, shrubs, trees and native vegetation (see the…" | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **47** | Original | Revised | 22 | 8-15 | | | | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Why only meat, fibre and milk products are included in the guidelines, but skin and hides and other co-products are excluded? | | Also to Poultry | It was considered that these co-products can go through a wide range of secondary processing into other products and that it was outside the scope. Some PCRs relating to such co-products were referenced in the guidelines.<br><br>SECRETARIAT: All goods and services having economic values are considered as products. | To discuss with Greg Thoma | |
| **48** | Original | Revised | 22 | 4 | 7 | | ge | Weidema | It does not seem wise for an international guideline to adopt a modeling approach that cannot be used for decision support. The choice of an attributional approach is also in conflict with the target audience and application areas provided on page 2, line 9-14, the statement that LCA can be used as a decision support tool (page 6, line 14; page 9, line 29, and page 10, line 3), as well as with the many references in the document to ISO 14040/44. | Change the word “attributional” to “consequential” | Yes | Reject. The Steering Committee requested that the Guidelines remain as "attributional". | To be discussed! | The role of system expansion using a consequential approach is recognised within the guidelines for sensitivity analyses and for evaluating alternative systems or mitigations. However, the main function of these guidelines was identified as benchmarking and hence an attributional approach was identified as appropriate |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **49** | Original | Revised | 24 | 22-25 | 8.3 | | te | Weidema | The “shall”’s are too restrictive here, since this can only determined by investigating the specific market conditions. The text appears to confuse the functional unit with the reference flow. The functional unit should reflect all the obligatory properties of the product on its market so that comparable products can be compared, and cannot be reduced to weight alone. It may also be useful to provide a more detailed description of how to define the functional unit, see proposed change for p. 25, line 7-9. | Remove the “shalls” and move this text to a new section on how to determine the reference flow, with adequate examples, showing the relation to the functional unit. | Yes | Wording has been changed to clarify reference flow and functional unit | To review across all Guidelines. Option 1 is to reword as in Poultry guidelines where 'shall' is not used. However, should it be called a reference flow and not a FU? | |
| **50** | Original | Revised | 24 | | 8.3 | | | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | The definition of functional unit is too close to the definition of the reference flow. Better to describe both. | | Yes | Wording will be changed to clarify between reference flow and functional unit | To review across all Guidelines | |
| **51** | Original | Revised | 25 | 7-9 | 8.3 | | te | Weidema | It would be incorrect not to distinguish between different cuts of meat, including edible offal, when these are sold on different markets and at different prices, since their degree of substitutability varies, which shall be expressed in the functional unit. | Replace by a more detailed text on the procedure for defining the functional unit, e.g. based on B P Weidema, H Wenzel, C Petersen, K Hansen (2004): The product, functional unit and reference flows in LCA. København: Miljøstyrelsen. (Environmental News 70), with sufficient real life examples of ruminant products. | Yes | Reject recommendation: The pragmatic approach taken is considered relevant for an attributional approach and it aligns with the process outlined in the Decision Tree. This comment is more relevant for use of a consequential approach and could be seen as subjective in its application | To be agreed with the Poultry TAG | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **52** | Original | Revised | 25 | 11-12 | 8.3 | | | Weidema | The text appears to confuse the functional unit with the reference flow. The functional unit should reflect all the obligatory properties of the product on its market so that comparable products can be compared, and cannot be reduced to weight alone. The “shall” is too prescriptive here, since this can only determined by investigating the specific market conditions. | Remove the “shall” and move this text to a new section on how to determine the reference flow, with adequate examples, showing the relation to the functional unit. | No | Modified to read - "…the reference flow is greasy weight (as shorn off the animals) at the farm gate, while the functional unit is clean weight at the point of leaving the scouring plant." | Links to point 50 above re FU versus Reference flow. To be agreed across TAGs | |
| **53** | Original | Revised | 25 | 28 | 8.3 | | | Weidema | Again, the text confuses the functional unit with the reference flow. Interestingly, ECM is a functional unit expressed in a mass unit, while the reference flow is the actual corresponding amount of milk! This can be used as an illustration of the difference between functional unit and reference flow. | Replace “the weight of “ to “determined for”. Use the difference between the ECM and the actual mass flow to illustrate the difference between the functional unit and the reference flow. | No | Accepted with modification. Changed to "…type, the functional unit is one kg of energy-corrected milk, i.e. corrected for the fat, protein and lactose content." | Links to point 50 above re FU versus Reference flow. To be agreed across TAGs | |
| **54** | Original | Revised | 27 | 11-12 | Chapter 8.4 | | ge | French Ministry of Ecology, Sustainable development and Energy | French declination of BPX-30-323 for dairy products include milk products from small ruminants: it is considered in this document that environmental impacts of dairy products processes don’t depend on the kind of milk ; the origin of the milk (cow, sheep, goat) is taken into account in the environmental impact of milk production. | Precise that there are PCRs that cover all kind of dairy products, including from small ruminants, such as the French ones. | No | Accept. Line 9 is reworded to '….are currently no published PCRs…<br>The French PCR for milk products BP X30-323-20 should have been published in 09/2014 but is not yet available on AFNOR web site (http://affichage-environnemental.afnor.org/referentiels-sectoriels-pcr/liste-des-referentiels-sectoriels). | | |
| **55** | Original | Revised | 28 | 12 | 8 | 8.4.1 | Te. | ENEA | It is not clear why the system boundaries begin with the great grandparent generation | This point should be better explained, especially for practitioners who do not have a previous knowledge of poultry systems | Poultry only | Not applicable - this refers to the Poultry guidelines | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **56** | Original | Revised | 29 | 12-15 | 8.4.2 | | te | Weidema | The text here deals with allocation ("impacts are divided evenly by mass over all such products"), which really belongs to another chapter. It is incorrect not to distinguish between different edible parts, when these are sold on different markets and at different prices, since their degree of substitutability varies, as expressed by the functional unit. That there are no significant biophysical and nutritional differences between the products does not mean that there cannot be other significant differences that make them different in a comparison or substitution context. | Delete | No | Accepted. Sentence is removed | | |
| **57** | Original | Revised | 29 | 31-35 | 8.4.3 | | te | Weidema | If something is included with an estimate, it is not excluded. When everything is included with estimates from the scoping analysis, it is inconsistent and confusing to require only 95% to be accounted for. | Change the last part of the paragraph after the word "system" in line 31 to: "can be included with an estimate from a scoping analysis (Section 8.2). An exception to this is in cases where significant environmental impact is associated with a small mass input (e.g. some material may be present in small quantities, yet still have a relatively large environmental impact)." | Yes | Accept to revise as suggested - in agreement with Poultry TAG revision | Wording is identical in Poultry. | |
| **58** | Original | Revised | 30 | 13-17 | 8.4.5 | | te | Weidema | It appears an unnecessary complication to have different recommendations/requirements for applications that involve alternate systems. Often a study that was first intended as stand-alone is later used in a comparison. | Consider simplifying by making it a general requirement to include capital goods, i.e. deleting the section except the last 6 words. | Yes | Accepted with modification. Revise section 8.4.5 to read - The production of capital goods (building and machinery) with a lifetime greater than one year shall be included in the life cycle inventory, unless it falls below the 1% cut off threshold noted in section 8.4.3. In practice, most small ruminant farm systems will fall below this threshold, except perhaps some intensively housed animal systems. | To decide across TAGs re inclusion of Capital. Within the SR TAG there was a preference to exclude it, but we see this as a compromise option if there is a preferenc | |

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| | | | | | | | | | | | | | e to include Capital | |
| **59** | Original | Revised | 30 | 12-17 | 8.4.5 | | Te | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | In PEF guidelines capital good shall be included, whereas in the Small Ruminant guidelines the capital goods are excluded. | | Yes | Covered in point above | | |
| **60** | Original | Revised | 31 | | 8.3 | | | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Generally, it is good to have a decision tree, however, the result would probably be a mix of different allocation approaches. There will be no consistently applied procedure. | | Yes | We disagree that there should be the same allocation approach used throughout. No change was made | | |
| **61** | Original | Revised | 31 | 12 | 8.5 | | te | Weidema | For a general impact category as “Fossil energy demand” it is not relevant to use Lower Heating Value of the raw materials, since this depends on the specific combustion conditions (extent to which the reaction products are condensated and the heat used). The higher heating value is therefore less situation-dependent and more useful in a generic resource assessment. See also Frischknecht R, Heijungs R, Hofstetter P. (1998). Einstein's lessons for energy accounting in LCA. Int. J. LCA 3(5):266 – 272, which could be used as a reference here. | Change “Lower” to “Higher” | Yes | Agree. Accept change, and change reference to Frischknecht et al. 1998). | To agree across TAGs. | GT: I think they have definitions reversed. HHV is achieved when combustion products are condensed; LHV when they remain hot gas. |

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| **62** | Original | Revised | 32 | 8 | 9.1 | | te | IDELE | It could be useful to give definition of what is a function, or some examples. | | Yes | | For Theun's team? This is generic across Guidelines | |
| **63** | Original | Revised | 32 | 17-22 | 9.1 | | te | Weidema | ISO14044:2006 does not have a section 9. And in the section on allocation (Clause 4.3.4) there is no mentioning of “bio-physical causality” or “physical properties such as mass, or protein or energy content” as “other relationships”. On the contrary, the Original standard text (ISO 14041) contains this clarification: “The resulting allocation will not necessarily be in proportion to any simple measurement such as the mass or molar flows of coproducts”. The only specific causal relationship mentioned is economic value, as already quoted in the extensive ISO step 1-3 quote on page 33-34. | Delete | Yes | Accepted with modification. Some change is marked accordingly. "section 9" is omitted. | Technically he is correct for ISO14044. So this does need revising. An option is to delete reference to ISO14044 .While "bio-" is not included it is reasonable to extrapolate from physical to bio-physical. In ISO, physical properties e.g. mass is after economic. | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **64** | Original | Revised | 32 | 24 | 9.1 | | te | Weidema | The product displaced in a system expansion shall be the same as when the similar product is used as an input (ISO 14044 clause 4.3.4.2: “Allocation procedures shall be uniformly applied to similar inputs and outputs of the system under consideration). Thus, displacing the average product is not consistent when the similar product used as an input is modeled as the marginal. The procedure for determining the input is described in ISO 14049 clause 6.4 as a marginal input, not an average: “The supplementary processes to be added to the systems must be those that would actually be involved when switching between the analysed systems. To identify this, it is necessary to know: - whether the production volume of the studied product systems fluctuate in time (in which case different submarkets with their technologies may be relevant), or the production volume is constant (in which case the base-load marginal is applicable), - ( . . . ) whether ( . . . ) the inputs are delivered through an open market, in which case it is also necessary to know: - whether any of the processes or technologies supplying the market are constrained (in which case they are not applicable, since their output will not change in spite of changes in demand), - which of the unconstrained suppliers/technologies has the highest or lowest production costs and consequently is the marginal supplier/technology when the demand for the supplementary product is generally decreasing or increasing, respectively.” Besides that, when the by-product is part of the average, the resulting system cannot be solved mathematically. | Delete | Yes | Accept. Delete lines 23-27 | A cross-TAG decision | |
| **65** | Original | Revised | 32 | 25 | 9.1 | | te | Weidema | To be more precise, change “co-product” to “by-product” here, since system expansion can be applied to non-determining co-products (by-products) only. | Change “co-product” to “by-product” | Yes | no mention of co-product here, so cannot see where this is referring to SECRETARIAT Reject. The Steering Committee requested that the Guidelines remain as "attributional". | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **66** | Original | Revised | 32 | 26-27 | 9.1 | | te | Weidema | "Sharing the credit" of an avoided burden is not a meaningful concept, since the avoided burden is exactly the share of burden that is assigned exclusively to the determining product. The difference in procedure when dealing with a determining product and a non-determining product (by-product) flow could use some additional treatment here. | Change to: "Differentiating whether one is dealing with a determining product flow or a non-determining (by-)product flow. The determining product receives the full avoided burden from the systems displaced by the by-products and carries the full burden of the co-producing system and any other treatment activities required until the marginal output of the by-product reach the point where it can substitute (displace) a determining product from another activity. As a dependent co-product, the non-determining by-product does not receive any burden from the co-producing system, but since it is constrained by the demand for the determining product, it cannot provide a marginal supply to the market. An additional demand for the by-product must therefore be provided by the system that is otherwise displaced by additional outputs of the by-product. However, if the by-product is not fully utilized, i.e. if the marginal output of by-product is undergoing waste treatment, there is no displaced system on the margin, and an additional demand for the by-product is provided by a reduction in the waste treatment, and not by any other displaced system." | Yes | Accepted with modification. Lines 23-27 will be deleted | A cross-TAG decision | |
| **67** | Original | Revised | 32 | 31 | 9.2 | | te | Weidema | To avoid confusion, the term "step" in this context should only be used about the ISO procedure. | Delete: "his involves a three-step approach and t" | Yes | | | |
| **68** | Original | Revised | 33 | 1 | 9.2 | | te | Weidema | To avoid confusion, the term "step" in this context should only be used about the ISO procedure. The subdivision in 3 groups is an unnecessary complication. | Change to: "Avoid allocation by sub-division" | Yes | | | |
| **69** | Original | Revised | 34 | | | Figure 7 | Ge | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | After arrow 1b there is a green box with text "Draw up inventory table Attribute all inputs and outputs to the single production units". From that box there are two arrows of which one is labelled "single product" and the other one "no". It is unclear what "no" indicates. Maybe it would be better to include a question in the box. | | Yes | | Valid point. A change/addition would be worthwhile | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **70** | Original | Revised | 34 | | | Figure 7 | Ge | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Would be good to explain what “Cut-off (and attribute post splitting steps if needed)” means. | | Yes | | | |
| **71** | Original | Revised | 34 | 18 | | | Ge. | ENEA | What is a determining product flow? Maybe is it a product flow of the main product? | This point should be better explained, maybe with an example too. | | Bullet list deleted; no longer relevant | | |
| **72** | Original | Revised | 33 and 35 | line 6-18 on p. 33 and line 1-9 on p. 35 | 9.2 | | te | Weidema | It is not all processes and activities that should be divided, but only those that leads to the reduction in the number of co-products for which system expansion is needed. The difference between flow 1.b. and flow 1 c is unclear. The division at this point gives an unnecessarily complicated description and leads to a duplication of identical decision boxes in step 2 and 3 in the current Figure 7. By including here all forms of subdivision, also those currently described under Step 2 (page 35), the description becomes more clear and straightforward. Note that Step 2 describes combined production (variable output proportions), not joint production (fixed output proportions) Note that layer operations have not been included here since the outputs of layer operations are not individually variable when the operations are optimized for egg output. | Change to: “In the first step “ISO step 1a subdivision”, subdivision of the farm/processing facility into production units should be done when this implies that co-products can be assigned specifically to one production unit, for example: - packaging or post-processing storage that can be assigned to one specific product only; - inputs of feed, pesticides, operations, climate control, internal transport or drinking water for a specific animal type in a multi-species operation. - When feed is provided to multiple animal species, the animal growth requirements may be used to apportion the shared feed between the species. - Some general inputs, such as internal transport, capital goods and office overheads, which cannot be directly attributed to specific production units, but are nevertheless necessary for the operation of all production units, can normally be assigned to each production unit in proportion to the causal relationship that determines increased need for each input, such as weight, volume, or area (transport, roads, buildings) or revenue (office and accounting).” | Yes | The description has been modified to include the proposed change. And combined/joint terminology corrected. Text matches Poultry Guidelines. Comment regarding layers and eggs not relevant to this guideline. | A cross-TAG decision | |
| **73** | Original | Revised | 34 | | 9.2 | Figure 7 | te | IDELE | | 1a: add “YES” on the arrow If NO, I propose to rewrite “Is it possible to assign most [instead of “all”] inputs/emissions to a single production unit?” (otherwise it could be understood as too exclusive) In the Part 3, in the box in the middle, can the text can clarify what does mean “Can the remaining co-products be divided…” | Yes | | A cross-TAG decision | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **74** | Original | Revised | 35 | 23 | 9.2 | | te | IDELE | Another condition could be that their goals or markets can be reflected by common properties (ex: some physical properties can reflect interest of coproducts in different markets) It could be useful to define what is a “function” (is human an animal consumption the same or different functions?) | | Yes | | A cross-TAG decision | |
| **75** | Original | Revised | 35 | 10-14 | 9.2 | | te | Weidema | The text here suggests that there are situations where avoided production cannot be unambiguously identified. However, since the input to a market is identified by the same procedure whether the market output is decreasing (avoided inputs) or increasing (normal inputs), the avoided production can be determined with the same degree of (un)ambiguity as any other market input to the product system. If the procedure that is generally accepted for identifying upstream market inputs is discarded just because the sign of the flow has been inversed, this places into question the entire procedure by which we link our product systems, and can therefore not be used as an argument for not applying the procedure specifically for avoided production. Thus, system expansion should be accepted as adequate in all cases where the subdivision by physical causality has not been possible. Since the procedure for identifying suppliers to a market is not widely known, due to its convoluted placement in ISO 14049, it may be helpful to quote this ISO text, in parallel to the quote on p. 36 of the allocation section in ISO 14044. | Change to “System expansion (ISO step 1b) should be applied whenever possible. It is always possible to determine the avoided production with the same degree of unambiguity as any other market input to the product system, by using the same procedures for identifying the avoided production as those used for determining the other inputs to the product system, cf. ISO 14049 clause 6.4: “The supplementary processes to be added to the systems must be those that would actually be involved when switching between the analysed systems. To identify this, it is necessary to know: - whether the production volume of the studied product systems fluctuate in time (in which case different submarkets with their technologies may be relevant), or the production volume is constant (in which case the base-load marginal is applicable), - ( . . . ) whether ( . . . ) the inputs are delivered through an open market, in which case it is also necessary to know: - whether any of the processes or technologies supplying the market are constrained (in which case they are not applicable, since their output will not change in spite of changes in demand), - which of the unconstrained suppliers/technologies has the highest or lowest production costs and consequently is the marginal supplier/technology when the demand for the supplementary product is generally decreasing or increasing, respectively.” In practice, the avoided production is included in the product system by changing the non-determining co-products to inputs with a negative sign, whereby they directly cause a reduction in the contribution from the suppliers determined by the above procedure.” | Yes | **Decline.** This consequential approach is not chosen and thus system expansion is not adopted. | A cross-TAG decision | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **76** | Original | Revised | 35 | 14-17 | 9.2 | | te | Weidema | It is a misunderstanding that it should be a condition for system expansion that the avoided product shall be fully equivalent. It is adequate that the by-product and the avoided product have the same functional unit, so that the substitution will occur in practice. If a difference between the by-product and the avoided product cause differences in the downstream lifecycle of the by-product compared to the avoided product, these differences are assigned to the determining product, just like any other downstream treatment activity that is caused by the additional amount of by-product. | Change to: "The avoided product shall have the same functional unit as the by-product, so that the substitution will occur in practice. However, the by-product may have other properties compared to the avoided product, not included in the functional unit, which may cause differences in the downstream lifecycle of the by-product. Such differences shall be assigned to the determining product of the co-producing activity that gives rise to the by-product." | Yes | **Decline.** This consequential approach is not chosen and thus system expansion is not adopted. | A cross-TAG decision | |
| **77** | Original | Revised | 35 | 18-19 | 9.2 | | te | Weidema | This text is confusing and unnecessary. | Delete "; however, at the inventory level there is no corresponding reduction in the emissions or exchanges with the environment" | Yes | | A cross-TAG decision | |
| **78** | Original | Revised | 35 | 20-34 | 9.2 | | | Weidema | The allocation according to physical causalities is equivalent to the subdivision already described, and should be moved up before the system expansion. The relevant parts of the text have already been included in the proposed changed text for line 6-18 on p. 33 and line 1-9 on p. 35 | Delete, when proposed change is accepted for line 6-18 on p. 33 and line 1-9 on p. 35. | Yes | Decline. Not all of the language proposed above was incorporated. | A cross-TAG decision | |
| **79** | Original | Revised | 34 | | 9.2 | Figure 7 | te | Weidema | The division into 3 steps is unnecessarily complicated and leads to a duplication of identical decision boxes in step 2 and 3 in Figure 7. Essentially, only two steps can be identified from the description: 1) A division of the farm/factory into separate production units; 2) A procedure for the co-products from each production unit. The description in Box 3 is unnecessarily complicated and includes unnecessary procedures. The Box to the right of box 3 is unclear as to what exactly is to be done. | Change Figure 7 to have only two main boxes: One box replacing box 1, to be named "When possible, subdivide the farm/factory further into separate production units" with the decision box: "Is it possible to subdivide the farm/factory further into separate production units?" YES leads to the small box "Draw up…" which is now given the number 2, and the existing box 2 is deleted. NO leads directly into box 3 without passing through box 2. One box 3 (existing), to be named "Convert production units with more than one product into single-product units" in which the decision boxes are changed, so that the first one is "Does the production unit have more than one product?" NO leads to a new box outside box 3: "No allocation needed. Draw up the inventory.", which replaces the existing box to the right of box 3. YES leads to a decision box "Can the output of the co-product be individually varied?" YES leads to "Subdivide the combined production by applying the physical causality between each input and each additional unit of output" and then to the above mentioned box outside of box 3. NO leads to "Identify the determining products and change all other co- | Yes | In fact, the reviewer is correct. But there is nothing wrong in duplicating the decision boxes in step 2 and 3. We can add a sentence, indicating that this is a duplication, but that we do this to separate the different production units. | A cross-TAG decision | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| | | | | | | | | | | products to inputs with a negative sign. Identify the markets for these co-products, and describe the functional unit and name of each co-product accordingly." and then leading on to the above mentioned box outside of box 3. | | | | |
| **80** | Original | Revised | 36 | 1 | 9.2 | | te | Weidema | To avoid confusion, the term "step" in this context should only be used about the ISO procedure. The unnecessary overlap between step 2 and 3 can be avoided by deleting the heading here. | Delete | Yes | **Change to** 'stage' when referring to the guidelines and keep 'step' with respect to the ISO procedure. | A cross-TAG decision | |
| **81** | Original | Revised | 36 | 2-10 | 9.2 | | te | Weidema | This text repeats what is already covered above. | Delete | Yes | Decline. It helps overall clarity to explain with different wording. | A cross-TAG decision | |
| **82** | Original | Revised | 36 | 10-13 | 9.2 | | te | Weidema | This is based on a misunderstanding of these standards. PAS 2050:2011 clause 8.5 reads: "Where energy production from CHP is exported to a larger system (e.g. export of electricity to a national electricity network), the avoided GHG emissions arising from the exported energy shall be allocated in accordance with 8.1.1" Clause 8.1.1 describes the standard steps 1a and 1b of ISO 14044. | Delete | Yes | Accept deletion | A cross-TAG decision | |
| **83** | Original | Revised | 36 | 13-14 | 9.2 | | te | Weidema | This sentence is unclear. | Replace by: "The "footprint" of the avoided product is identical to that which would be used – with a positive sign - in another LCA for a downstream demand of the by-product or avoided product (which have identical functional units)." | Yes | Reference to 'footprint' removed and description changed | A cross-TAG decision | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **84** | Original | Revised | 36 | 14-19 | 9.2 | | te | Weidema | The danger for improper interpretation when several LCAs are combined is particularly high these apply different system models and/or allocation methods are combined. This should be reflected in the text. | Replace by: "When several LCAs are combined to obtain an aggregated view of the larger system, it is essential that the system models of the LCAs are the same, so that all burdens caused by the aggregated demand are covered and no burdens are double-counted. For example, when a food crop use the manure from an animal system, and the two systems are combined to view the consequences of the aggregate demand, the consequences of the manure management must be included once and only once, and the fertilizer use must be the full fertilizer requirement of the food crop minus the amount of fertilizer displaced by the manure. This can only be ensured if all inputs are modeled as marginal, and the system expansions are not mixed with other allocation procedures. This guidance strongly encourages no to include aggregated data that applies other methods for allocation, except when necessary when using proxy data for inputs with low significance." | Yes | This discussion has been removed. | A cross-TAG decision | |
| **85** | Original | Revised | 36 | 20-29 | 9.2 | | te | Weidema | This description ("total value of the flow less than 1 percent") is not consistent with the definition of residual (page xiv: "Materials with economic value are not considered residual"). Based on the description here, it is not obvious what is the purpose for isolating "residues" from other co-products. The mere fact that the revenue from these outputs is low, zero or negative cannot justify a separate treatment. Nor can the fact that "the upstream and production process that produce the outputs are not deliberately modified for the outputs" be a justification for treating these outputs differently from other co-products. The separate definition and description thus becomes an unnecessary complication. The necessary treatment of the residues will contribute emissions to the determining product, just like any other non-determining co-product or waste. | Delete | Yes | This comment is from a consequential perspective: in which all emissions are assigned to the determining product and avoided emissions resulting from byproducts subtracted from the total. In an attributional perspective, and for purposes of providing clear guidance in these documents, the classification of materials as co-, by-products, residuals or wastes which may or may not, depending upon the classification, carry upstream burdens into downstream processes remains valuable. Replace bullets P35:25 with: • They are sold in the condition in which they are created in the process and do not contribute revenue to the company;<br>• The upstream and production process that produce the outputs are not deliberately modified for the by-products, and the by-product has a subsequent use. There may be value-added steps beyond | A cross-TAG decision | |

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| | | | | | | | | | | | | the boundary of the poultry system under study, but these activities do not impact the poultry system calculations in these guidelines. | | |
| **86** | Original | Revised | 36 | 20 | 9.2 | | ge | IDELE | I wonder if considering some co-products as residues is already making the choice of economic allocation… | | Yes | An interesting point: there is certainly crossing of system models when economic value is used as the factor to determine the classification of a by-product as residual or waste. | A cross-TAG decision | |
| **87** | Original | Revised | 36 | 24 | 9.2 | | | IDELE | If by-products are value-added steps, they are of interest and they may be considered as co-product, not residue. In France, the case of meat co-products was studied. For some meat co-products (animal grease for example) the economic value can be very low but there are economic sectors that use it. (Gac et al. 2014, paper submitted to LCA Food conference) The European Directive 2008/98/CE on wastes has a specific part concerning animal coproducts. It is said that a coproduct should fulfil all of the 4 following criteria (I hope the translation is correct...); if not it has to be considered as a waste: Critère 1 : subsequent use is sure; - Critère 2 : the substance can be directly used without any specific treatment, only the current industrial practices -Critère 3 : The substance or the object is produced by being an integral part of a process of production; - Critère 4 : the subsequent use is in accordance with regulation (legal). Some products (animal grease for example) would be a residue in those guidelines but a coproduct following European recommendation… | | Yes | Reject. The TAGs agreed that the Residual concept was a useful one. It can be argued that "within the system boundary that we have defined and for the defined Functional Unit", it does not matter if the Residue is picked up and used subsequently with further value added. That would belong to another product and related system boundary. | | |

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| **88** | Original | Revised | 36 | 20 | 9.2 | | ge | IDELE | clear definitions should be given at this stage for the 3 outputs: co-products, residue, waste. In the document, only residue is clearly defined. It could help to have a clear definition for the 3 of them. | | Yes | Point is recognised. Waste is clearly defined on page 36, lines 30-34. This section re-written and harmonized across documents. | A generic comment, and worth further consideration across all Guidelines | |
| **89** | Original | Revised | 36 | 31 | 9.2 | | te | IDELE | The distinction between a waste and a co-product could also be determined by the status of the company which use it: does it have the legal capability to receive and treat waste or not? | | Yes | The term waste was defined as something that has to be disposed of e.g. by landfill or incineration - which is a clear definition implying it is not further processed for anything | | |
| **90** | Original | Revised | 37 | 14 | 9.2 | | ge | IDELE | Blood can be edible. We have probably to define the different types of byproducts generated (at farm and processing), look at their destination in different contexts through the world and then we would be able to define how to group them, their status (waste or not, etc.) It could be a useful exercise to see if the current guidelines have some limits through contexts | | Yes | Accept. Valid point. Reworded to - …various human-edible components (e.g. carcass cuts, edible offal and sometimes blood), which can be grouped before allocation to distinguish between them and inedible co-products such as hide and renderables. | | |
| **91** | Original | Revised | | | | | | | | | | | | |
| **92** | Original | Revised | 37 | 4-14 | 9.2 | | te | Weidema | The speculations here are irrelevant when applying subdivision or system expansion to all co-products. | Delete | Yes | Decline. This is not speculation but a reasoning why economic allocation is used. | | |
| **93** | Original | Revised | 37 | 22-25 | 9.2.1 | | te | Weidema | To apply worst-case estimates is not a useful recommendation or requirement. Good practice must be to provide a best estimate with a corresponding uncertainty, cf. the requirement in section 10.4, 2nd bullet. Anyway, 100% empty return trips can hardly be called worst case. In Europe, the worst national average for empty trips is 45% (for Cyprus). Anyway, this can hardly be a relevant topic in a chapter on allocation. This would fit better in a chapter on data sources. | Delete | Yes | in the revised version this section doesn't exist. The only mention of a section on allocation of transport is in the table of contents. **Add:** It is good practice to provide a best estimate with a corresponding uncertainty, per the requirement in section 10.4. | To revise if appropriate, but be consistent across all Guidelines | |
| **94** | Original | Revised | 38 | 15 | 9 | 9.2 | Te. | ENEA | it is said that the existing standards do not allow a credit for sold electricity or natural gas. Nevertheless, both figure 12 as well as page 43, line 4, and page 41, line 16, allow the system expansion/substitution. | This point should be clarified: is the substitution (and the use of credits) allowed or not? | Yes | Offset credits are not allowed. This is different than substitution (also not allowed under the guidelines). This discussion deleted from revision. | | |

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| **95** | Original | Revised | 38 | 18-20 | 9.3 | | te | Weidema | Update references to Revised Figure 7, if necessary. | Delete references to Figure 7, or revise as relevant. | Yes | Revised by replacing "i.e." on lines18 and 20 with "using" | | |
| **96** | Original | Revised | 38-40 | | 9.3 | | Ge | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Would be good to include reasoning behind the choice of allocation method chosen for each process, including the reasons why the earlier options in the allocation hierarchy were not selected (e.g. system expansion). | | Yes | The reason for limited recommendation of system expansion was noted as referring to use only where a substitute product is unambiguously definable e.g. in relation to an energy source (page 35, lines 10-19). Reasoning for bio-physical allocation at farm level is explicitly stated on page 38 lines13-17. Similarly, for primary processing the reasoning is given on page 40 lines 10-17 and is aligned to the Decision Tree approach as determining which methodology to use. | To review depending on final decision about whether system expansion /substitution remains as an acceptable method | |
| **97** | Original | Revised | 39 | 1-6 | 9.3 | Table 2 | te | Weidema | There is no need to separate activities that are anyway all going to be assigned to the same determining product. Biophysical causality is not relevant for joint products, since the outputs cannot be individually varied. Economic allocation of very different products shall be avoided, when system expansion is possible. | For second row (Meat, fibre, milk): Change “1. Separate activities; 2. Biophysical causality” to “1. System expansion” and change the text under Basis to: “Identify the determining product (meat, fibre or milk). Then move all other co-products to be negative inputs thereby displacing the marginal market supplies from production units that have these products as their determining outputs.” For third row (Milk processing to milk products): Change “1. Separate activities; 2. Mass of fat + protein” to “1. System expansion” and change the text under Basis to: “Identify the determining product (milk, cheese or other processed milk product). Then move all other co-products to be negative inputs thereby displacing the marginal market supplies from production units that have these products as their determining outputs.” For fourth row (Fibre processing to clean fibre and lanolin): Change “1. Separate activities; 2. Economic” to “1. System expansion” and change the text under Basis to: “Move the lanolin to be a negative input thereby displacing the marginal market supply of lanolin-equivalent triglyceride products.” For fifth row (Meat processing to meat and non-meat products): Change “2. Economic” to “2. System expansion” and change the text under Basis to: “First, identify the determining meat products. | Yes | This is relevant for consequential LCA as noted in this comment, and issues relating to this were discussed previously. | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| | | | | | | | | | | When more than one, then separate the activities specific to each meat product where possible. Then move all other co-products to be negative inputs thereby displacing the marginal market supplies of these products." | | | | |
| **98** | Original | Revised | 39 | 7-20 | 9.3 | | te | Weidema | Mixing system expansion and allocation in the same study leads to the result being neither attributional nor consequential. System expansion is not relevant for attributional questions and allocation is not relevant for consequential questions. Each allocation method provides an answer to a specific question, so when combining several different allocation methods within the same study, both the question and the answer is obscured. Consistently applying system expansion for joint production and subdivision by physical causality for combined production provides an unambiguous answer to the question of the consequences of a decision, which is the purpose of the majority (if not all) LCAs. | Replace by: "For sheep or goats as single production units, allocation shall be avoided by identifying the determining product and applying system expansion to the remaining by-products. In practice, this is done by changing the by-products to inputs with a negative sign, whereby they directly cause a reduction in the contribution from the production units that have products as their determining products." | Yes | Only relevant for consequential LCA, and issues relating to this were discussed previously. This section has no comment on use of system expansion | | |
| **99** | Original | Revised | 39+40 | Table 2 +10 to 12 | Chapter 9.3 | | ge | French Ministry of Ecology, Sustainable development and Energy | In French declination of BPX-30-323 for milk products, allocation between co-products for the milk primary processing stage is based on total solids including lactose (and not only mass of fat and protein). | | No | Accept. Inclusion of lactose is a valid point, and was noted in calculation of ECM. It has been changed to fat + protein + lactose | | |

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| **100** | Original | Revised | 39 | Table 2 | Chapter 9.3 | | ge | French Ministry of Ecology, Sustainable development and Energy | The recommendation for fibre and meat processing is to use an economic allocation based on a minimum of three years of recent average prices. For information, in French project Agribalyse, economic allocation should be based on data smoothed on five years excluding the two extreme years (Olympic average): it allows to avoid strong prices fluctuations. | | Yes | | A common method should be used across all TAGs | |
| **101** | Original | Revised | 40 | 14-18 | 9.3 | | te | IDELE | I wonder if this sentence is clear enough regarding the decision tree and what is recommended What about case 3B? I understand that in this case, it is possible to divide co-products on physical properties (parameters) Am I correct? Or, we should add a comment to say that edible meat products are in the 1B situation ... | | Yes | This is a valid point if just following the Decision Tree. However, it also needs to align with recommendations on page37 lines 4-9 which states that (bio)physical allocation is "not allowed where they have dissimilar properties or markets" | Consideration for all TAGs as to whether more words are needed near the 3b decision point in Figure 7 | |
| **102** | Original | Revised | 40 | 17 | 9.3 | | Te | IDELE | Economic allocation is here suggested but it should be physical? at least for groups of co-products that have the same function? | | Yes | Accept with modification. This point is correct for a product group as noted for meat and offal. Extra words were added in line17 to become - "....approach to allocate between the edible meat product group and the other non-edible co-products (e.g. hide, tallow, renderables), using Figure 7....." | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **103** | Original | Revised | 40 | 1-9 | 9.3 | | te | Weidema | The recommendation is not in line with the physical causality. It is unnecessarily complicated to allow different options for the allocation of manure. The suggestion here is to describe the treatment exhaustively here and delete Appendix 4. Animal manure is always a by-product that varies with the amount of animal production. All consequences of this must therefore be assigned to the determining product of the animal production. This includes both the on-farm manure handling, the application of the manure on the field and the resulting emissions. When the manure displaces artificial fertiliser, the net emissions from the field application thus becomes those of the manure minus those of the corresponding amount of displaced artificial fertiliser. This results in a clean separation of the emissions caused by the animal system and those caused by the crop production. | Replace by: “Manure: Animal manure is always a by-product that varies with the amount of animal production. All consequences of this shall therefore be assigned to the determining product of the animal production. This includes both the on-farm manure handling, the application of the manure on the field and the resulting field emissions. Utilization of manure as fertiliser results in different emissions from the field than from inorganic fertilisers. When the manure displaces artificial fertiliser, the net emissions from the field application thus becomes those of the manure minus those of the corresponding amount of displaced artificial fertiliser. Therefore substitution shall require assignment of the field emissions to the animal product, with a subsequent substitution credit of both the production and field emissions associated with the substituted inorganic fertilizer. It is not required to identify the specific inorganic fertiliser products that are substituted. The field crops require fertilization in terms of specific nutrients, not specifically manure or artificial fertilizer. Thus, the fertilization requirements of the field crops shall be modeled as a demand to the general market for each required nutrient. This is then met by a supply from the unconstrained suppliers of fertiliser, which does not include manure, due to this being constrained by the demand for the animal products. Consequently, the emissions from the field crops shall be modeled fully and exclusively as the emissions resulting from this marginal supply of artificial fertilizer. This procedure results in a clean separation of the emissions caused by the animal system and those caused by the crop production.” | Yes | Due to the SC requirement of strictly attributional modeling for the guidelines, much of the recommendation cannot be directly adopted in the guidelines. The points regarding over fertilization are addressed. | Some valid points here, ignoring the emphasis on system expansion only. I preferred text emphasizing treating it as a Residual and reluctantly adding a reduction of the Appendix as we have it | |

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| **104** | Original | Revised | 40 | 10-22 | 9.3 | | te | Weidema | Mixing system expansion and allocation in the same study leads to the result being neither attributional nor consequential. System expansion is not relevant for attributional questions and allocation is not relevant for consequential questions. Each allocation method provides an answer to a specific question, so when combining several different allocation methods within the same study, both the question and the answer is obscured. Consistently applying system expansion for joint production and subdivision by physical causality for combined production provides an unambiguous answer to the question of the consequences of a decision, which is the purpose of the majority (if not all) LCAs. | Replace by: “For the milk primary processing stage, the determining product may be milk, cheese or another processed milk product such as yoghurt). Allocation is avoided by moving all other co-products to be negative inputs thereby displacing the marginal market supplies from production units that have these products as their determining outputs. Products with different fat and protein content can have very different applications and substitutes and should not be grouped together. Fibre-processing systems, where wool fat is separated from the determining wool product, the displaced products for system expansion is provided by lanolin-equivalent triglyceride products. For meat processing, offal and meat cuts may be seen as having the same function and insignificant differences in the downstream applications, and may therefore be considered together as one “edible meat product”, depending on the scope of the analysis. The remaining meat processing products, collected and used for secondary processing (e.g. used for burning for energy or used for producing blood-and-bone meal). have very different end uses; therefore, system expansion is considered the most appropriate approach.” | Yes | The revised document adopts a strictly attributional modeling framework | | |
| **105** | Original | Revised | 42 | 18 | 10.2 | | te | Weidema | Secondary data may sometimes be of higher quality than primary data. | Add “, of lower quality,” after “available” | Yes | Agree. Adopt proposed change. SECRETARIAT: if higher quality | Needs discussion across TAGs and FAO | |
| **106** | Original | Revised | 48 | 24-29 | 10.4.4 | | Ge | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | The paragraph 10.4.4 is repeated twice | | No | Agree. Section 10.4.4 is deleted | | |

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| **107** | Original | Revised | 49 | | 11.1 | | ge | IDELE | A general recommendation could be given on using country specific models to assess emissions if they exist. Indeed, only IPCC is cited in the text | | No | Accept. Valid point, although the preference for a tier 2 (or 3) method remains. On page53, end-of-line-31, additional wording is given - "In some countries, national specific Inventory-based models (tier 2 or 3) have been developed and validated to estimate different GHG emissions (e.g. enteric methane or excreta $N_2O$) and these can be used as an alternative to the methods described in the following sections, which include default or country-specific IPCC-based emission factors."<br><br>SECRETARIAT: 11.1??????? | | Not relevant for 11.1 but can be considered elsewhere. Is there a main place of concern for this e.g. manure mgmt.? We can consider changes/additions then |
| **108** | Original | Revised | ~~52~~ 47 | 1 | 10 | 10.3.2 | Te. | ENEA | It is not clear what data quality indicators are and where they can be found. I visited the suggested page by WRI/WBSCD but I did not find anything about data quality indicators. | This point should be clarified. | Yes | The WRI/WB SCD website does not discuss data quality indicators; however, it does provide guidance on uncertainty assessment which is related to data quality indicators. Some additional explanation and references related to data quality indicators has been added to the text: WRI/WBCSD has published additional guidance on quantitative uncertainty assessment which includes a spreadsheet to assist in the calculations. Annex 12 of the ILCD handbook (European Commission et al., 2010) provides detailed discussion of data quality and data quality indicators (DQI), which include the dimensions of: Technological, Geographical, and Time-related representativeness; Completeness and Precision / uncertainty; and Methodological appropriateness and consistency<br>Data collected from primary sources should be checked for validity by ensuring consistency of units for reporting and | these words are from Greg's Poultry revision spreadsheet | |

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| | | | | | | | | | | | | conversion as well as material balances to ensure that, for example, all incoming materials are accounted in products leaving the processing facility. | | |
| **109** | Original | Revised | 52 | 2-4 | 11.2.1 a) | Figure 9 | te | Weidema | When avoiding allocation, the wording of box 16 should reflect this. | Box 16, last 3 lines: Change to: “System expansion may be required to isolate each FU” | Yes | Reject. Current wording is appropriate for an attributional approach, and it does include the word 'may' which does not preclude other decisions | | |
| **110** | Original | Revised | 55 | 2-3 | 11.2.2 | Figure 10 | te | Weidema | Error in the number of Rams | Change the number of Rams to 4 | No | Incorrect. This is a breeding group just like the breeding ewes and number coming in equates to number going out. The word "Rams" was changed to "Breeding rams" to clarify this | | |
| **111** | Original | Revised | 57 | 1-3 | 11.2.2 a) | | te | Weidema | The need to account for protein requirement does not depend on the allocation method chosen. | Delete | No | Disagree. If say economic allocation was used it would not be needed. Wording was corrected by adding "bio-physical" before "allocation" | | |
| **112** | Original | Revised | 57 | 14 | 11.2.2 | | Ge | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural | “as outlined in Section 11.2.2” is a bit strange as this is section 11.2.2 | Change it to: “as outlined in this Section” | No | Accept with modification. “as outlined in Section 11.2.2” was omitted | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| | | | | | | | | Resources Units | | | | | | |
| **113** | Original | Revised | 62 | 5-6 | 11.2.3 b) | | te | Weidema | It is awkward to have the manure emissions split up in two guidelines. Move all manure emissions to this guideline, where they anyway are more relevant. | Account for all manure emissions in this guideline instead of splitting them up between the guidelines. | Yes | Reject. The important thing is to note how they are estimated and avoid double counting. In practice, the emissions occur as part of the Feed production process and so fits best there. | | |
| **114** | Original | Revised | 63 | 19 | 11.2.4 | | te | Weidema | The term “exclusion” is ill chosen | Change “cut-off criteria for exclusion” to “treatment of” | No | Accept. Corrected as suggested | | |
| **115** | Original | Revised | 63 | 31 | 11.2.5 a) | | te | Weidema | It is not immediately obvious what the “biophysical” causality is between feed intake and the mentioned activities. | Change “a biophysical allocation approach” to “the relationship between the relative feed intake of the animals and the feed production on the land area for which these activities are performed” | No | Reject. Suggested wording is incorrect since it relates to shared activities related to the whole farm system and not specific land area where feed production occurs. Therefore it was left as was. | | |
| **116** | Original | Revised | 65-68 | line 32, p. 65 to line1 5, p. 68 | 11.2.5 b) | | | Weidema | Biophysical causality cannot be meaningfully applied when the system is optimized to one product, since the outputs are then not individually variable. Require instead system expansion, which models the actual resulting physical flows and maintains mass and energy balances in the resulting single-product systems. | Change to: “Small ruminants produce meat, milk and fibre. However, most production systems are optimized for the production of one of these products, which is then determining the production system. The remaining outputs are then dependent by-products. Allocation to the by-products is avoided by moving them to be negative inputs, thereby displacing the marginal market supplies from production units that have these by-products as their determining outputs.” | Yes | Reject. Only relevant for consequential LCA as noted in this comment, and issues relating to this were discussed previously. | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **117** | Original | Revised | 67 | 8 | 11.2.5. | | te | PE International | A simple approach on how one can calculate the required parameters (protein req. for fibre; protein req. for meat, protein required for milk) would be very helpful and would increase the applicability of the standard substantially. | My suggestion would be to add a simplified approach to determine the protein req. for wool/growth as follows: Protein rq. for wool: kg output * Protein content * DPLS efficiency Protein rq. for growth: kg output * Protein content * DPLS efficiency Protein content wool: 60% (perhaps it makes sense to give default values for different qualities?) Protein content livestock: 18% DPLS efficiency wool: 0.6 DPLS efficiency other: 0.7 | | Accept with modification. Page 68, lines 1-9 are replaced with - "…..milk is still in a state of development and there has been only one scientific publication addressing the topic in detail (Wiedemann et al. 2014). Based on that paper, biophysical allocation is recommended, preferably using analysis of protein requirements for wool relative to all components of growth (i.e. excluding flock maintenance). Wiedemann et al. (2014) showed that similar results were obtained when a simpler protein mass approach was applied. In practice, use of a protein requirement model may not always be possible and an alternative is use of energy requirements only, although this is less-preferred because there is not as direct a causal relationship since wool production is mainly determined by protein requirements. The recommended hierarchy for calculating biophysical allocation where fibre is a dominant or important co-product is:<br>1. apply a published recommended model (see section 11.2.2a) for protein requirements of fibre relative to all components of growth (i.e. excluding flock/herd maintenance);<br>2. apply a published recommended model for protein requirements based on some simplification [e.g. Allocation% to fibre = fibre yield x fibre protein%/100 x protein-use-efficiency$_{fibre}$%/100 / (fibre yield x fibre protein%/100 x fibre protein conversion efficiency% + liveweight gain x liveweight protein%/100 x protein-use-efficiency$_{growth}$%/100),<br>with default values, in the absence of primary data, of 60% for fibre protein%, | After consultation within SR TAG | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| | | | | | | | | | | | | 60% for protein-use-efficiency$_{fibre}$, 18% for liveweight protein% and 70% for protein-use-efficiency$_{growth}$.<br>3. use protein mass of fibre relative to protein mass of total products.<br>4. use energy requirements for fibre relative to total products.<br>If the first option is not used, it shall be accompanied by a detailed description and justification of the method used for the assessment. | | |
| **118** | Original | Revised | 67 | 8 | 11.2.5. | | te | PE International | It is not clear for what reason the protein required for maintenance, pregnancy and lamb production is required as it is not part of the equation. | | | The extra wording in the previous comment has answered this, where it includes "Based on that paper, biophysical allocation is recommended, preferably using analysis of protein requirements for wool relative to all components of growth (i.e. excluding flock maintenance). " | | |
| **119** | Original | Revised | 68 | 29-30 | 11.3 | | te | Weidema | 100% empty return trips is not a best estimate. It is even worse than a worst case (e.g. in Europe, the worst national average for empty trips is 45%). | Delete | Yes | | Needs discussion across TAGs and FAO | |
| **120** | Original | Revised | 71 | 18-27 | 11.6.1 a) | | te | Weidema | There is no need to separate activities that are anyway all going to be assigned to the same determining product. Biophysical causality is not relevant for joint products, since the outputs cannot be individually varied. | Replace by: “Each dairy operation is optimized for the production of one determining product. The remaining outputs are then dependent by-products. Allocation to the by-products is avoided by moving them to be negative inputs, thereby displacing the marginal market supplies from production units that have these by-products as their determining outputs.” | Yes | Relevant for consequential LCA as noted, and issues relating to this were discussed previously. | | |

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| **121** | Original | Revised | 73 | 24-25 | 11.6.2 a) | | te | Weidema | Mixing system expansion and allocation in the same study leads to the result being neither attributional nor consequential. For consistency, allocation should always be avoided. Several products are marketed as lanolin-substitutes (Sasol Softisan 645 and 649, US patents 8420842 B2 and 20050233015 A1). | Replace by: "Lanolin-equivalent products for use in the pharmaceutical industry are triglycerides, e.g. from coconut oil." | Yes | Relevant for consequential LCA as noted, and issues relating to this were discussed previously. | | |
| **122** | Original | Revised | 73 | 34 | 11.6.2.b) | | te | Weidema | For clarity, add the term "unconstrained" to avoid inclusion of energy sources that cannot be affected by the fibre production. | Add "unconstrained" after "relative" | Yes | Accept. Added the word as suggested | | |
| **123** | Original | Revised | 75 | 9-16 | 11.6.3 a) | | te | Weidema | The lack of published research examples using system expansion should not be an argument for recommending allocation, since that would just prolong the current deplorable lack of publications. All by-products have well-defined functional units and the identification of the affected market should therefore not constitute a barrier to the implementation of system expansion. In the LEAP guideline for poultry, a reference is provided for the products substituted by the secondary rendering products. | Replace by: "The various non-meat products are supplied to markets where they displace the marginal inputs to these markets: Slipe wool displaces wool of the same grade from production units with wool as determining product; blood, inedible offal and other rendering product displace the marginal protein source in pet food (soy meal); tallow displaces the marginal supply to the generic vegetable oil market (palm oil). For some by-products, a treatment is required before the by-product can displace another product: Hide/skin is processed to leather before it is supplied to the market where it displaces the marginal supply of synthetic leather." | Yes | Relevant for consequential LCA as noted, and issues relating to this were discussed previously. | | |
| **124** | Original | Revised | 75 | 20-21 | 11.6.3 a) | | te | Weidema | The variation in prices implies that a demand for a specific meat cut will have very different impacts in terms of induced and/or reduced consumption of other meat cuts (see comment and calculations for Box 4), and that it is not warranted to treat all meat cuts as the same. | Replace by: "The variation in prices implies that a demand for a specific meat cut will have very different impacts in terms of induced and/or reduced consumption of other meat cuts (see Box 4), and that it is not warranted to treat all meat cuts as the same. If grouping of meats are desired, the analysis in Box 4 shows as an example that in this case at least 3 groups should be maintained: 1) Rack, loin and legs; 2) Shoulder, breast and shank; 3) Other meat, including edible offal and neck." | Yes | Relevant for consequential LCA as noted, and issues relating to this were discussed previously. | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **125** | Original | Revised | 76 | | 11.6.3 a) | Box 4 | te | Weidema | Expand the example to include the information on the resulting revenue-based system expansion. If required, space can be saved by deleting the “Average mass” column, since the information is redundant with the “% of total mass”. For easier understanding, sort the Meat section according to falling price. This will result in the following order: Rack; Loin; Legs; Shoulder; Breast and shank; Other meat; Edible offal; Neck. For easier understanding, add two rows: One “Sum edible” instead of the heading “Co-products” and one “Sum total” at the bottom, thus giving 14 rows of numbers in total. For easier understanding, add the formulas and the parameters EA and MA in the table. | For easier understanding, sort the Meat section according to falling price. This will result in the following order: Rack; Loin; Legs; Shoulder; Breast and shank; Other meat; Edible offal; Neck. Add two rows: One “Sum edible” below “Edible offal” and one “Sum total” at the bottom, thus giving 8 rows of numbers in total. Use the following 6 column headers: Mass% (M) Revenue% (R) Induced production in % of TM (I=R*100/EA) Reduced consumption in % of TM (Cr=I-100) Induced consumption in % of TM (Ci=I*(MA-M)/M) Net change in consumption in % of TM (=Cr+Ci) The resulting 6*14 matrix is filled in this way: Column1:3.4;4;13;12.7;4.1;6.7;5.5;1.5;MA=50.9;6.1;4.4;4.9;1.8;32;TM=100.1 Column2:14.3;10.2;32.1;16.1;4.8;6.4;3.9;0.8;EA=88.6;4.3;3;0.1;0.6;3.5;100.1 Column3:16.4;11.51;36.23;18.17;5.42;7.22;4.4;0.9;100;=M*above percentages available for system expansion (for all 5 rows); Column4:-83.86;-88.49;-63.77;-81.83;-94.58;-92.78;-95.60;-99.10; ; ; ; ; ; ; Column5:225.48;134.98;105.63;54.66;61.84;47.65;36.33;29.74; ; ; ; ; ; ; Column6:141.62;46.50;41.86;-27.17;-32.74;-45.12;-59.26;-69.36; ; ; ; ; ; ; In the accompanying text, line 8-9: Change “was used, thereby assuming no difference in “value” between the different edible components when applying economic allocation” to “(EA) was used for calculating the induced production from a demand for the amount TM of a specific meat type (column 3)” Change the explanatory text below the table to: ”Since the induced amount is less than the demanded 100%, the remaining amount must come from other consumers’ reduction in consumption of that meat type (column 4). At the same time, the induced production supplies an additional amount of the non-demanded meat cuts, thus inducing an increased consumption of these (column 5), since all markets must be cleared. The net change in consumption is shown in column 6.” | Yes | Comments are relevant for consequential LCA, and issues relating to this were discussed previously. Some table changes were made as suggested. These points may not be applicable where different cuts are traded in different parts of the world and where tastes for different cuts are different as are relative prices between cuts | | |

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| **126** | Original | Revised | 80 | 26-27 | 12.2.3 | | te | Weidema | A normalised result cannot be used to say anything about the overall environmental benefit. Since it is a relative value, it can at best express the relative environmental improvement. | Change “greatest overall environmental benefit” to “largest relative environmental improvement”. | Yes | Accepted change | Needs discussion across TAGs and FAO | |
| **127** | Original | Revised | 99 | | | Appendix 3 | Ge | EC, JRC, IES, Sustainable Assessment & Monitoring Agricultural Resources Units | Would be good if the guide provided also an average breakdown of the carcass to different cuts of meat and offal. | | No | Reject. An example is already given for this for NZ in Box 4. This will vary and so there seems little relevance in providing other data on this | | |
| **128** | Original | Revised | **Other specific changes requested by Stewart Ledgard:** | | | | | | | | | | | |
| **129** | Original | Revised | 4 | 1 | | | | | | | | Omit "generally" | | |
| **130** | Original | Revised | 7 | 9 | Figure 2 | | | | | | | Replace 'Natural resources' with 'Resources' | | |
| **131** | Original | Revised | 7 | 17 | | | | | | | | Omit "natural" | | |
| **132** | Original | Revised | 20 | 6 & 7 | | | | | | | | ….two species at about 23 kg $CO_2$-eq/kg meat. For both….. | | |
| **133** | Original | Revised | 20 | 14 | | | | | | | | omit "(especially" | | |
| **134** | Original | Revised | 20 | 15 | | | | | | | | omit ")" | | |

| Original | Revised | Revised | Page no. | Line no. | Chapter no./ annex/ spreadsheets name (e.g. 3.1) | Paragraph/figure/table/note (e.g. table 1) | Type of comment * | Stakeholders | Comment (justification for change of technical aspects must be supported by either scientific literature or technical documents) | Proposed change | Relevant across all Guidelines | Response | Comment to FAO and TAG | |
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| **135** | Original | Revised | 22 | 23 | | | | | | | | ….shrubs, trees and native vegetation(see the….. | | |
| **136** | Original | Revised | 29 | 12-15 | | | | | | | | Omit this paragraph | | |
| **137** | Original | Revised | 29 | 27-35 | | | | | | | | Replace with Revised wording from Poultry Guidelines | | |
| **138** | Original | Revised | 32 | 18 | | | | | | | | Omit '', Section 9'' | | |
| **139** | Original | Revised | 32 | 23-27 | | | | | | | | Omit these lines | | |
| **140** | Original | Revised | 37 | 12 | | | | | | | | …..the various human-edible meat components (e.g. carcass cuts, edible offal and sometimes blood) which can….. | | |
| **141** | Original | Revised | 37 | 13-14 | | | | | | | | …..such as hide and renderables.<br>i.e. omit '', blood'' | | |
| **142** | Original | Revised | 39 | | Table 2 | | | | | | | Add ''+lactose'' after ''protein'' in the Milk processing row in both the Recommended method and Basis columns | | |
| **143** | Original | Revised | 40 | 12 | | | | | | | | …..protein + lactose. The use……. | | |
| **144** | Original | Revised | 48 | 24-29 | | | | | | | | Omit this whole section | | |
| **145** | Original | Revised | 55 | | Figure 10 | | | | | | | In top right box, replace ''Rams'' with ''Breeding rams'' | | |
| **146** | Original | Revised | 57 | 2 | | | | | | | | add ''biophysical'' after ''that'' | | |
| **147** | Original | Revised | 57 | 14 | | | | | | | | omit '', as outlined in Section 11.2.2'' | | |
| **148** | Original | Revised | 62 | | Figure 11 | | | | | | | In the top right boxes below the NO3 box replace ''$FRAC_{GASM}$'' with ''$FRAC_{LEACH}$'' | | |
| **149** | Original | Revised | 63 | 19 | | | | | | | | Replace ''on cut-off criteria for exclusion'' with ''for treatment'' | | |
| **150** | Original | Revised | 67 | 12 | | | | | | | | add space after Box | | |
| **151** | Original | Revised | 67 | 30 | | | | | | | | …..kg wool), economic allocation or protein mass of 16, 19 and 39 percent, respectively. | | |
| **152** | Original | Revised | 73 | 24 | | | | | | | | Replace ''8'' with ''7'' | | |