

# Technical Helpdesk for National LCA Databases

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## Training on LCI Dataset Review – Concept and criteria

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# Contwnts

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1. Criteria background
2. Criteria
3. Example results

# Criteria background (1/2)

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- **Reviewing data is not a novel exercise**
  - Commercial databases have been doing it for a while
  - Use of self-defined processes and criteria
  - Not common in public databases (national and regional specially)
- **Why review?**
  - Assurance and verification of **data quality** in the contained datasets



Critical element of creating and managing databases

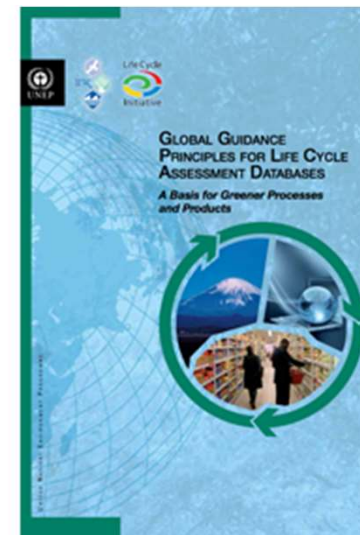
# Criteria background (2/2)

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- Current criteria come from Life Cycle Initiative's Nantes Workshop in 2016
- Based on UNEP/SETAC Life Cycle Initiative publication on Global Guidance Principles for LCA Databases and LCI Dataset Review Criteria (Ciroth et al. 2015)



“Updated review criteria”



# Criteria (1/2)

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- **COMPREHENSIVE** while allowing reviewers to complete the review in a **REASONABLE AMOUNT OF TIME**
- **Two generic and basic requirements for the LCA datasets:**

1

*Every process dataset is a model of reality; as with every model, it is a simplification of reality, but should reflect important aspects of reality in a correct way*

2

*As a process dataset, the model will be used as part of a Life Cycle Assessment, and consist of input and output flows and meta-information, following principles of ISO 14048*

Data should be:

**Correct**

**Understandable  
and clear**

**Reflective of the basic  
LCA data structure  
described in ISO 10048**

# Criteria (2/2)

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**There are 21 criteria divided in 5 clusters:**

- Cluster I: Goal and scope documentation completeness (7)
- Cluster II: Conformance (4)
- Cluster III: Sample conformance, correctness and reliability (5)
- Cluster IV: Materiality (3)
- Cluster V: Procedural and meta-information (2)

# Criteria - C1: Goal and scope documentation completeness

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Criterion	Scope	Assessment
Reference time	Dataset level	YES - Reference is element specified for the dataset NO - Reference element is missing
Reference geography	Dataset level	YES - Reference element is specified for the dataset NO - Reference element is missing
Reference technology	Dataset level	YES - Reference element is specified for the dataset NO - Reference element is missing
Reference model completeness	Dataset level	YES - Reference element is specified for the dataset NO - Reference element is missing
Reference sample completeness	Dataset level	YES - Reference element is specified for the dataset NO - Reference element is missing
Sample approach	Dataset level	Expert base Scientific
Supported LCIA methods with version number	Dataset level	N/A

# Criteria – C2: Conformance

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Criterion	Scope	Assessment
<p><b>Time related conformance</b></p> <p><i>Time difference between the reference time foreseen for the dataset according to the documentation and the time period for which data were surveyed</i></p>	<p>Flow / exchange level and individual dataset field level</p>	<p>1 - Less than 3 years of difference to the time period of the dataset (reference time)</p> <p>2 - Between 3 and 6 years of difference to the time period of the dataset (reference time)</p> <p>3 - Between 6 and 10 years of difference to the time period of the dataset (reference time)</p> <p>4 - Between 10 and 15 years of difference to the time period of the dataset (reference time)</p> <p>5 - Age of data unknown or more than 15 years of difference to time period of the dataset</p>



# Criteria – C2: Conformance

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Criterion	Scope	Assessment
<p><b>Geographical conformance</b></p> <p><i>Geographical difference between the reference area foreseen for the dataset according to the documentation and the area for which data were surveyed</i></p>	<p>Flow / exchange level and individual dataset field level</p>	<p>1 - Data from an area under study</p> <p>2 - Average data from a larger area from which the reference area is included</p> <p>3 - Data from an area with similar production conditions</p> <p>4 - Data from an area with slightly similar production conditions</p> <p>5 - Data from unknown or distinctly different area</p>

# Criteria – C2: Conformance

Criterion	Scope	Assessment
<p><b>Technological conformance</b></p> <p><i>Technological difference between the reference technology or technology mix foreseen for the dataset, according to documentation, and the technology for which data were surveyed. The criteria list distinguishes organisation, process (of creating or producing the product), and product. "Product" is not only quality but the sheer material, e.g. "steel" vs. "aluminium".</i></p>	<p>Flow / exchange level and individual dataset field level</p>	<p>1 - Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e. identical technology)- Data from processes and materials under study (i.e. identical technology) but from different organisations</p> <p>2 - Data from processes and products under study (with similar technology). Evidence of deviations in state of technology, e.g. different by-product.</p> <p>3 - Data from processes and products under study but from different technology. This score is also applied when NO technology is specified, e.g. "wheat (no further specification)"</p> <p>4 - Data on related processes or products; e.g. "organic wheat" under study, data for "organic rye" provided.</p> <p>5 - Data on related processes but with a different scale or from different technology; e.g. "organic wheat" under study, data for "conventional wheat" provided.</p>

# Criteria – C2: Conformance

Criterion	Scope	Assessment
<p><b>Model completeness conformance, flows and documentation</b></p> <p><i>Availability of information required for practitioners to select a dataset for application, beyond the narrower time, geography and technology criteria. This criterion is to combine all model-related aspects, which includes the reference flows used, and other dataset modelling aspects as well.</i></p>	Dataset level	<p>1 - Sufficient documentation easily available for the data set for modelling procedure, sources, aggregation procedure, system boundary setting, limitations; for sources also on the flow level.</p> <p>2 - One of the aspects modelling procedure, sources, aggregation procedure, system boundary setting, limitations insufficiently described or not easily available for the data set, for sources also on the flow level.</p> <p>3 - Two of the aspects modelling procedure, sources, limitations insufficiently described or not easily available for the data set.</p> <p>4 - Insufficient documentation (two of the aspects modelling procedure, sources, limitations lacking; or all not easily available for the data set).</p> <p>5 - No or very minimal documentation available.</p>

# Criteria - C3: Sample conformance, correctness and reliability

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Criterion	Scope	Assessment
<p><b>Sample conformance</b></p> <p><i>Representativeness of the information provided</i></p>	<p>Flow / exchange level and individual dataset field level</p>	<p>1 - Sample and thereby data is representative.</p> <p>2 - Sample and thereby data is in principle representative with some small exceptions.</p> <p>3 - Sample and thereby data mostly representative.</p> <p>4 - Doubts about representativeness of sample and thereby data.</p> <p>5 - Sample and thereby data is not representative of representativeness unknown.</p>

# Criteria - C3: Sample conformance, correctness and reliability

Criterion	Scope	Assessment
<p><b>Accuracy of the provided information</b></p> <p><i>This criterion measures the degree to which flow values in the dataset deviates from available benchmarks. This criterion serves to evaluate whether the dataset deviates from an unknown true value. Accuracy cannot not be evaluated per se. Inconsistent data is possibly not accurate. Similar to consistency, comparison to other reliable datasets and to technical domain expertise and natural laws for example can reveal whether a dataset is accurate</i></p>	<p>Entire dataset, preferably assessed at flow level</p>	<p>1 - Values are very close to those expected from benchmarks and/or relevant differences can be fully justified            2 - Values are close to those expected from benchmarks and/or relevant differences can be partially justified            3 - Some values deviate from those expected from benchmarks and differences cannot be justified            4 - Many values deviate from those expected from benchmarks and differences cannot be justified            5 - Most values deviate greatly from those expected from</p>

# Criteria - C3: Sample conformance, correctness and reliability

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Criterion	Scope	Assessment
<p><b>Precision of the provided information</b></p> <p><i>The criterion serves to evaluate the information provided regarding the variance of any value given in the dataset. This criterion does not assess the variability of the values within the sample or the population.</i></p>	<p>Flow exchange level / focus is here on quantitative amount of exchanges</p>	<p>1 - Information is listed as datapoint and distribution with parameters, and the CV &lt; 1</p> <p>2 - Information is listed as a range between value “x” and “y” and range divided by mean is &lt; 0.5</p> <p>3 - Information is listed as datapoint</p> <p>4 - Information is listed as greater than “x”</p>

# Criteria - C3: Sample conformance, correctness and reliability

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Criterion	Scope	Assessment
<p><b>Reliability of the provided information</b></p> <p><i>Origin of the information used to create the dataset, according to documentation, flows and meta information.</i></p>	<p>Flow / exchange level and individual dataset field level</p>	<p>1 - Independently verified measurement according to goal and scope with documented method compliant with relevant standards</p> <p>2 - Unverified measurement according to goal and scope or verified measurement or verified calculation</p> <p>3 - Unverified calculation</p> <p>4 - Estimation with documented basis</p> <p>5 - Undocumented estimate</p>

# Criteria - C3: Sample conformance, correctness and reliability

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Criterion	Scope	Assessment
<p><b>Consistency of the provided information</b></p> <p><i>This criterion serves to document whether data for input and output flows and for meta data does correspond and whether obvious data gaps and imbalances exist. It is assumed that data that do not show such flaws are consistent</i></p>	Dataset level	<p>1 – No inconsistencies found</p> <p>2 – Minor inconsistencies found that do not affect the overall reliability of the data set</p> <p>3 – Some inconsistencies found where the overall impact on the data set is not clear</p> <p>4 – Inconsistencies found which are likely to have an effect on the data set</p> <p>5 – The data set is inconsistent</p>



# Criteria – C4: Materiality

Criterion	Scope	Assessment
<p><b>Mass and energy balance in line with the goal and scope</b></p> <p><i>The difference in balance is assessed in relation to the sum of input or output, (depending on which is the larger amount) as follows:</i></p> <div style="background-color: #4a86e8; color: white; padding: 5px; margin: 10px 0;"> <math display="block">\Delta m = ( m_i - m_o ) / \max(m_i, m_o)</math> <math display="block">\Delta e = ( e_i - e_o ) / \max(e_i, e_o)</math> </div> <p><i>With: “mi”: sum of input mass flows</i></p> <p><i>“mo”: sum of output mass flows</i></p> <p><i>“ei”: sum of input energy flows</i></p> <p><i>“eo”: sum of output energy flows</i></p>	Dataset level	<p>1 - Mass and energy balance in line with goal and scope</p> <p>2 - Mass and energy balance mostly in line with goal and scope (e.g. <math>\Delta x &lt; 5\%</math>)</p> <p>3 - Mass and energy balance partly in line with goal and scope (e.g. <math>\Delta x &lt; 15\%</math>)</p> <p>4 - Mass and energy balance mostly not in line with goal and scope (e.g. <math>15\% \leq \Delta x \leq 75\%</math>)</p> <p>5 - Mass and energy balance is not in line with goal and scope (e.g. <math>\Delta x &gt; 75\%</math>)</p>

# Criteria – C4: Materiality

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Criterion	Scope	Assessment
<p><b>LCIA in line with goal and scope</b></p> <p><i>This criterion refers to the completeness of the LCIA results in relation to the environmental impact categories and methods declared in the goal and scope</i></p>	Dataset level	<p>1 - LCIA complete regarding goal and scope</p> <p>5 - LCIA <u>not</u> complete regarding goal and scope</p>

# Criteria – C4: Materiality

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Criterion	Scope	Assessment
<p><b>Order of 5 main drivers for main LCI results in line with goal and scope</b></p> <p><i>This criterion assesses whether the order, i.e. the rank when ordered by amount, of main LCIA results is in line with goal and scope</i></p>	Dataset level	<p>1 - Order of 5 main drivers for main LCI results in line with goal and scope</p> <p>5 - Order of 5 main drivers for main LCI results <u>not</u> in line with goal and scope</p>

# Criteria – C5: Procedural and meta-information

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Criterion	Scope	Assessment
<p><b>Number of reviewers and their relation with the data provider</b></p> <p><i>This criterion serves to document whether the dataset has been critically reviewed and how, according to different review schemes</i></p>	Dataset level	<p>1 - One or more independent external reviewers</p> <p>2 - Two or more independent internal reviewers</p> <p>3 - One independent internal or two or more internal reviewers</p> <p>4 - One internal reviewer</p> <p>5 - No review has been performed</p>

# Criteria – C5: Procedural and meta-information

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Criterion	Scope	Assessment
<b>Data access</b>  <i>Data access refers to the extent to which it is possible to check the underlying data and model of a fully or partially aggregated dataset.</i>	Dataset level	1 - Full access to the supply chain model  3 - Limited access to the supply chain model  5 - No access to the supply chain model

# Example (1/5) - “Wine, processing” dataset

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## C1: Goal and scope documentation completeness

Criterion	General comments	Score
<b>Reference geography</b>	Reference element is specified for the dataset	Yes
<b>Reference technology</b>	“Traditional production”. More details are desired	Yes
<b>Reference model completeness</b>	Metadata is very poor in terms of details. Thus, it is not possible to evaluate model completeness	No
<b>Reference sample completeness</b>	Dataset is based on two different wine producers in Chile representing 90% of national exports. However, it would be good to have additional data about sample size.	Yes
<b>Supported LCIA methods with version number</b>	Data about LCIA methods are missing	N/A

# Example (2/5) - “Wine, processing” dataset

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## C2: Conformance

Criterion	General comments	Score (1-5)
<b>Time - related conformance</b>	Less than 3 years of difference to the time period of the dataset (reference time)	1
<b>Geographical conformance</b>	Details about regional location and specific area under study are missing	2
<b>Technological conformance</b>	It is difficult to understand how wine is produced since there is no description of the system boundaries as well as for the technological approach adopted for each unit process	3
<b>Model completeness conformance, flows and documentation</b>	It is difficult to understand how the dataset was modelled. Foreground and background subsystem should be detailed as well as all the unit processes involved in the modelling process.	4

# Example (3/5) - “Wine, processing” dataset

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## C3: Sample conformance, correctness and reliability

Criterion	General comments	Score (1-5)
<b>Sample conformance</b>	It is not possible to verify the sample conformance	4
<b>Accuracy of the provided information</b>	There is no information about how input and output flows were measured. It is difficult to compare results with other datasets as a benchmark	4
<b>Precision of the provided information</b>	Information is listed as a data point	3 (1-4)
<b>Reliability of the provided information</b>	Most of input and output flows are missed of documentation. Thus, it is not possible to check reliability of information	5
<b>Consistency of the provided information</b>	Some inconsistencies were found where the overall impact on the dataset is not clear. Several flows do not have a unit.	3



# Example (4/5) - “Wine, processing” dataset

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## C4: Materiality

Criterion	General comments	Score (1 or 5)
<b>Mass and energy balance in line with goal and scope</b>	It is not possible to calculate mass and energy balances because there are some flows with unspecified units. Several emissions are missing	5 (1-5)
<b>LCIA results in line with goal and scope</b>	No LCIA method was provided in relation to the goal and scope of the dataset.	5
<b>Order of 5 main drivers for main LCI results in line with goal and scope</b>	As no LCIA method was described in the goal and scope definition as well as any LCIA results was calculated, it is not possible to check this item.	5

# Example (5/5) - “Wine, processing” dataset

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## C5: Procedural and meta-information

Criterion	General comments	Score
<b>Number of reviewers and their relation to the data provider</b>	One or more independent external reviewers	1 (1-5)
<b>Data access</b>	It is not possible to check data access in details because all input and output flows are available in an Excel sheet and not in ecoSpold or ILCD formats.	5 (1,3 or 5)

# For helpdesk assistance –

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- Become a Helpdesk member:
  - To access the Helpdesk exchange space (or any other Clearinghouse area), you will need to create an account in the Clearinghouse ([www.spcclearinghouse.org](http://www.spcclearinghouse.org)):
  - Toward the bottom of the homepage you will see a button labeled ‘Join the Community now’. Click on this link and open a form to allow you to create a login and profile.
  - Once logged in, you can modify or update your profile or explore the various SCP topic areas.
  - Go to ‘About’ and then to ‘Exchange Spaces’ where you will see Lifecycle Approaches in the drop down menu and one menu level below that is the Technical Helpdesk.
  - The Technical Helpdesk space will be available to any visitor, logged in or not. Without being logged in and joining the helpdesk space, any visitor can look at the various sections of the helpdesk space, but cannot contribute any content.
  - In order to become a member of the helpdesk space, on the homepage under the summary, is “Request space membership”. Click here, you will automatically be given rights of a members to contribute content, since it is a public group.
  - For your next login, you go directly to <http://spaces.spcclearinghouse.org/> and then choose the Technical Helpdesk space in the dropdown list.
- Helpdesk Manager - Bruce Vigon, Consultant to SETAC,
- Helpdesk Coordinator – Kristina Bowers, UN Environment, Economy Division