FOUNDATION EARTH

POSITION PAPER 4

ENSURING MINIMUM DATA QUALITY THRESHOLDS WHEN ASSESSING THE ENVIRONMENTAL IMPACT OF FOOD PRODUCTS

Objective

This position paper intends to give a clear view of the Data Quality indicator which is proposed for the harmonised PEF methodology developed by Foundation Earth. The paper explains the reasoning behind the system, and how it will be implemented within the Foundation Earth PEF system.

Foundation Earth PEF-friendly assessment system

Ecolabelling is dependent on the implementation of systems which can measure environmental impact. Multiple systems exist to enable this, with the most recognised system used being the European Union's Product Environmental Footprint (PEF). This system defines 16 Impact Categories for assessment, but stops short of defining the exact steps for each calculation, leaving room for interpretation in many instances. This means that PEF assessments carried out by different assessors may not be directly comparable because each assessment may be subtly different.

A significant failing of the PEF system is that analyses produced from the system primarily use standardised databases, and do not include information from the specific supply chain which is being studied. This means that currently PEF only enables different food products to be compared, not similar food products from different supply chains. This means that, as it stands, the PEF system cannot deliver against the aims of Foundation Earth – namely the identification of methods within individual supply chains which can reduce environmental impact, enabling consumers to choose lower impacting foods within each food type.

Foundation Earth has set out to address this challenge, adapting PEF to utilise primary data from specific supply chains through a targeted development programme. However, it is acknowledged that for an extended period of time it will be necessary to use secondary data in instances where primary data is not currently available.

Foundation Earth has set out to maximise the use of primary data to enable accurate estimations of environmental impacts. To incentivise the use of such data, we will indicate the type of data that has been used to complete each assessment.

Consequently, a data quality assessment and indication component has been included in the Foundation Earth PEF-friendly methodology. This assessment has been adapted from the PEF Data Quality Rating (DQR), detailed below.

Quality measurement of data used in the assessment

Data quality is a measure of the condition of data based on parameters such as accuracy, completeness, consistency, reliability, etc.. Data quality is important as a complementary assessment of the accuracy of (LCA) environmental results. Importantly, consideration of data quality requires the assessment of both data source (primary/secondary) and the background data used in the LCA models.

According to the PEF, DQR is calculated as:

$$DQR = \frac{\overline{Te_R} + \overline{G_R} + \overline{Ti_R} + \overline{P}}{4}$$

*Where **TeR** is the Technical Representativeness, **GR** is the Geographical Representativeness, **TiR** is the Time Representativeness and **P** is the Precision, and values are 1 to 5.*

Within the PEF DQR method, precise, accurate data quality ratings can be calculated. However, the PEF DQR method is very time consuming, complex to apply and difficult to interpret results. Additionally, not all background databases contain DQR scores, which makes it impossible to apply them in a Foundation Earth assessment.

Foundation Earth approach

Within the Foundation Earth PEF methodology, a simplified approach to data quality assessment has been designed. Whilst the PEF rating system requires numerical scoring for four quality characteristics (time representativeness, geographical representativeness, technological representativeness, and precision), Foundation Earth will use a more qualitative approach which is easier to apply and interpret.

Our approach assesses both primary and secondary data: [accuracy primary data; year primary data; accuracy secondary data]. Multiple categories have been defined and are shown in the following table:

	Quality Rating category	Definition
Primary data accuracy	measured	Datapoint is measured/documented by the data provider (e.g., kWh from electricity bill, number of grams in a recipe)
	estimate	Datapoint is estimated (e.g., plant average electricity consumption or based on expert judgement) or based on literature (representative technology)
	default	Datapoint is a default value provided by the PEF/FE methodology
Secondary data accuracy	primary	Datapoint is connected to a process that is based on primary data (the process is supply chain specific)
	good	Datapoint is connected to a background dataset that matches the product and country of origin
	middle	Datapoint is connected to a background dataset that matches the product but not the country (origin not known or not available in background database)
	low	Datapoint is connected to a background dataset that does not match the product, a proxy is chosen as followed by FE proxy methodology

When assessing the data quality of secondary data , the following rules are applied:

- When the process/product is not available in a secondary database (for the specific origin) the proxy methodology shall be used (as described in the Foundation Earth Methodology Document). The background accuracy is defined accordingly.
- When a process/product from an alternative secondary database (other than those specified by the methodology) is used, the quality rating of the secondary data accuracy is downgraded one level.
- Each process in the LCA model is assessed separately.
- Direct (farm) emissions:
    - Emissions from fertiliser application are assessed as one process (1 foreground data quality rating for N, P and K application)
    - Emissions from manure are assessed as one process (1 foreground data quality rating for activity data related to emission from manure)
    - Emissions from animals are assessed as one process (1 foreground data quality rating for activity data related to enteric emissions)
    - Background processes are not assessed (as there is no connection to background process)

Examples of application of data quality rating:

1. Primary data for electricity consumption given by a food producer at their factory and matched to the country grid would become [**measured; 2022; good**]
2. A PEF default for refrigerant leakage at retail where there is no foreground data, connected to a generic refrigerant production dataset would become [**default; n.d.; middle**]
3. Using a proxy of wheat cultivation for a feed ingredient, while knowing the exact quantity, would become [**measured; 2022; low**]
4. Using wheat (RER) instead of wheat (NL) cultivation for a feed ingredient, while knowing the exact quantity, would become [**measured; 2022; middle**]

Weighing the data quality ratings

Similar to the PEF DQR method, the data quality assessment is weighted based on the contribution of the process to the total environmental single score. For each life cycle stage that is modelled, the contribution to the total single score impact for each process to that life cycle stage is calculated. To assess the total data quality assessment, the specific rating of each process is weighted based on the single score contribution to the total footprint of that life cycle stage.

In addition, some key parameters in LCA - *which are not reflected in the contribution to the total impact, but do have a significant effect on the total impact* - are weighted:

- Mass balance (yield in case for farm production)
- Allocation keys (in case of multifunctional processes)

The PEFCR for feed (European Commission, 2020) provides fixed weighing factors for those parameters for both farm production and further processing.

Farm production	Weight
Yield	12.5%
Allocation keys	2.5%
Processing	
Mass balance	2.5%
Allocation keys	10%

The following activity (foreground) data is assessed:

- Yield / mass balance
- Relative price (economic allocation), DM content (mass allocation) or energy content (energy allocation)

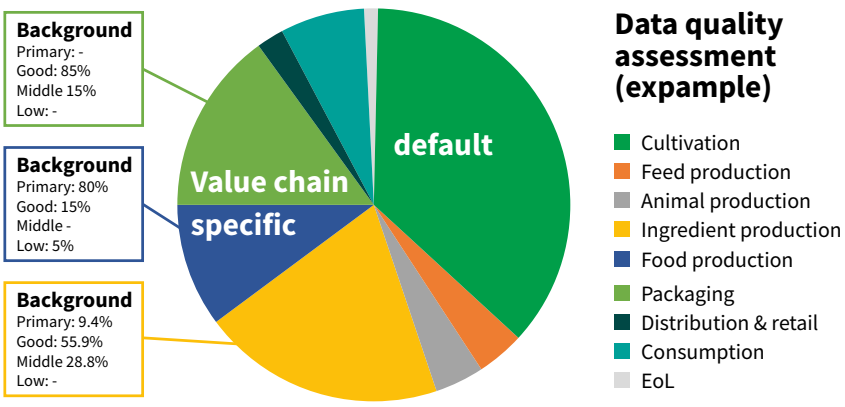
Background accuracy is not assessed (as there is no connection to a background database). The other foreground data assessment is rescaled to 100% (hence maintaining the relative values).

Reporting data quality rating

The Foundation Earth DQR is aggregated and reported for each life cycle stage. In the case that primary data is available on production of inputs (e.g. for food processing life cycle stage, some food ingredients are based on primary production data), the data quality assessment of the underlying processes is aggregated based on the contribution of that input to the single score of the life cycle stage.

The foreground accuracy score for each life cycle stage is then aggregated to an overall foreground accuracy score based on the single score contribution of each life cycle stage.

The total score can be visually represented in a diagram such as shown below, where the striped areas represent impacts calculated with default data, and the solid coloured parts represent impact from primary data points.



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