PRODUCT CATEGORY RULES (PCR)
DATE 2025-05-05

ARABLE AND VEGETABLE CROPS

PRODUCT CATEGORY CLASSIFICATION: UN CPC 011, 012, 014, 017, 0191

PCR 2020:07
VERSION 1.0.3

VALID UNTIL: 2026-06-07

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1 INTRODUCTION

This document constitutes Product Category Rules (PCR) developed in the framework of the International EPD® System: a programme for type III environmental declarations[1] according to ISO 14025:2006. Environmental Product Declarations (EPD) are voluntary documents for a company or organisation to present transparent information about the life cycle environmental impact for their goods or services.

The rules for the overall administration and operation of the programme are the General Programme Instructions, publically available at www.environdec.com. A PCR complements the General Programme Instructions and the standards by providing specific rules, requirements and guidelines for developing an EPD for one or more specific product categories (see Figure 1). A PCR should enable different practitioners using the PCR to generate consistent results when assessing products of the same product category.

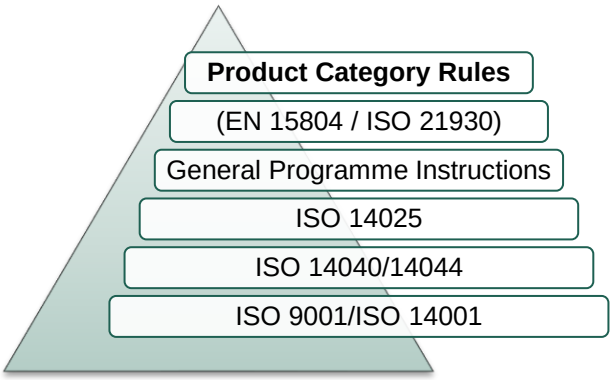

Figure 1 Illustration PCR in relation to the hierarchy of standards and other documents.

Within the present PCR, the following terminology is adopted:

- The term “shall” is used to indicate what is obligatory.
- The term “should” is used to indicate a recommendation, rather than a requirement.
- The term “may” or “can” is used to indicate an option that is permissible

For the definition of terms used in the document, see the normative standards.

A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. The latest version of the PCR is available via www.environdec.com. Stakeholder feedback on PCRs is very much encouraged. Any comments on this PCR document may be given via the PCR Forum at www.environdec.com or sent directly to the PCR moderator during its development or during the period of validity.

Any references to this document should include the PCR registration number, name and version.

The programme operator maintains the copyright of the document to ensure that it is possible to publish, update when necessary, and available to all organisations to develop and register EPDs. Stakeholders participating in PCR development should be acknowledged in the final document and on the website.

[1] Type III environmental declarations in the International EPD® System are referred to as EPD, Environmental Product Declarations.

2 GENERAL INFORMATION

2.1 ADMINISTRATIVE INFORMATION

Name:	Arable and vegetable crops
Registration number and version:	2020:07 (Version 1.0.3)
Programme:	The International EPD® System
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. Website: www.environdec.com E-mail: info@environdec.com
PCR moderator:	Paola Borla, Life Cycle Engineering, borla@studiolce.it
PCR Committee:	Filippo Sessa, Quantis, filippo.sessa@quantis-intl.com Giuseppe Maio, CCPB, gmaio@ccpb.it Laura Marchelli, Barilla, Laura.Marchelli@barilla.com Francesca Falconi, LCAlab, francesca.falconi@enea.it
Date of publication and last revision:	2025-05-05 (Version 1.0.3) A version history is available in Section 8. Version 1.0 was published 2020-12-07.
Valid until:	2026-06-07
Schedule for renewal:	A PCR is valid for a pre-determined period of time to ensure that it is updated at regular intervals. When the PCR is about to expire the PCR moderator shall initiate a discussion with the Secretariat how to proceed with updating the document and renewing its validity. A PCR document may be revised during its period of validity provided significant and well-justified proposals for changes or amendments are presented. See www.environdec.com for up-to-date information and the latest version.
Standards conformance:	▪ General Programme Instructions of the International EPD® System, version 3.01, based on ISO 14025 and ISO 14040/14044 ▪ PCR Basic Module, CPC Division 01: Products of agriculture, horticulture and market gardening, version 3.01, dated 2018-11-06
PCR language(s):	This PCR was developed and is available in English. In case of translated versions the English version takes precedence in case of any discrepancies.

2.2 SCOPE OF PCR

2.2.1 PRODUCT CATEGORY DEFINITION AND DESCRIPTION

This document provides Product Category Rules (PCR) for the assessment of the environmental performance of Arable crops and Vegetables and the declaration of this performance by an EPD. The product category corresponds to UN CPC 011, 012, 014, 017, 019.

Included in these product groups are cereals, vegetables, oilseeds, pulses and forage products; see below. Pseudocereals[2] , although not included in any CPC group, have to be considered arable crops and therefore included in this product group.

Group: 011 – Cereals

- 0111 (Wheat)
- 0112 (Maize)
- 0113 (Rice)
- 0114 (Sorghum)
- 0115 (Barley)
- 0116 (Rye)
- 0117 (Oats)
- 0118 (Millet)
- 0119 (Other cereals)

Group: 012 – Vegetables

- Class 0121: Leafy or stem vegetables
- Class 0122: Melons
- Class 0123: Fruit-bearing vegetables
- Class 0124: Green leguminous vegetables
- Class 0125: Root, bulb or tuberous vegetables
- Class 0126: Vegetable seeds, except beet seeds
- Class 0127: Mushrooms and truffles
- Class 0129: Vegetables, fresh, n.e.c.

Group: 014 – Oilseeds and oleaginous fruits

- 0141 (Soya beans)
- 0142 (Groundnuts in shell)
- 0143 (Cottonseed)
- 0144 (Other oilseeds)

Group: 017 – Pulses (dried leguminous vegetables)

[2] A pseudocereal is a plant grown to produce starchy grain suitable for human food. As the name implies, pseudocereals resemble (but are not) cereals, nor legumes, oilseeds or nuts. The major pseudocereals are:

- Amaranth (“Inca wheat”) - the seeds are used sprouted, toasted, ground into flour, baked, cooked as porridge and popped;
- Quinoa – it is rich in protein, fat and fiber, with a good balance of essential amino acids;
- Buckwheat (unrelated to wheat) – it is milled into grits for breakfast food or roasted to be boiled, steamed or baked.

Source: *Fletcher RJ (2016) Pseudocereals: Overview. In: Encyclopedia of Food Grains. Volume 1. Elsevier, pp 274–279.*

DOI: 10.1016/B978-0-12-394437-5.00039-5

- 0170 (Pulses)

Group: 018 – Sugar crops

- 01801 - Sugar beet
- 01802 - Sugar cane
- 01803 - Sugar beet seeds
- 01809 - Other sugar crops n.e.c.

Group: 0191 – Forage products, fibres, living plants, cut flowers and flower buds, unmanufactured tobacco, and natural rubber

- 01911 (Maize for forage and silage)
- 01912 (Alfalfa for forage and silage)
- 01913 (Cereal straw, husks, unprepared, ground, pressed, or in the form of pellets)
- 01919 (Forage products, n.e.c.)

The product group and CPC code, if available, shall be specified in the EPD.

Additional information can be found at *http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=25*.

2.2.2 GEOGRAPHICAL REGION

This PCR is applicable to be used globally.

2.2.3 EPD VALIDITY

An EPD based on this PCR shall be valid from its registration and publication at www.environdec.com and for a five year period starting from the date of the verification report (“approval date”), or until the EPD has been de-registered from the International EPD® System.

An EPD shall be updated and re-verified during its validity if changes in technology or other circumstances have led to:

- an increase of 10% or more of any of the indicators listed in Section 5.4.5.1,
- errors in the declared information, or
- significant changes to the declared product information, content declaration, or additional environmental information.

If such changes have occurred, but the EPD is not updated, the EPD owner shall contact the Secretariat to de-register the EPD.

3 PCR REVIEW AND BACKGROUND INFORMATION

This PCR was developed in accordance with the process described in the General Programme Instructions of the International EPD® System, including PCR review and open consultation.

3.1 PCR REVIEW

3.1.1 VERSION 1.0

PCR review panel:	The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com. Members of the Technical Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee, and were excused from the review.
Chair of the PCR review:	Maurizio Fieschi
Review dates:	2020-09-30 until 2020-10-26

3.2 OPEN CONSULTATION

3.2.1 VERSION 1.0

This PCR was available for open consultation from 2019-11-15 until 2020-01-17, during which any stakeholder was able to provide comments by posting on the PCR forum on www.environdec.com or by contacting the PCR moderator.

Stakeholders were invited via e-mail or other means to take part in the open consultation and were encouraged to forward the invitation to other relevant stakeholders. The following stakeholders provided comments during the open consultation, and agreed to be listed as contributors to the PCR and at www.environdec.com:

3.3 EXISTING PCRS FOR THE PRODUCT CATEGORY

As part of the development of this PCR, existing PCRs were considered in order to avoid overlaps in scope. The existence of such documents was checked in the public PCR listings of the following programmes based on ISO 14025 or similar:

- International EPD® System. www.environdec.com.

No PCRs with overlapping scope are currently valid. However, it should be noted that the present document represents the merger of two expired PCRs:

- PCR 2011:20 CPC 012 Vegetables (Version 2.0), expired on 2019-12-11 (https://www.environdec.com/PCR/Detail/?Pcr=8074)
- PCR 2013:05 Arable crops (Version 2.0), expired on 2020-06-23 (https://www.environdec.com/PCR/Detail/?Pcr=8804)

3.4 REASONING FOR DEVELOPMENT OF PCR

This PCR was developed in order to enable publication of Environmental Product Declarations (EPD) for this product category based on ISO 14025, ISO 14040/14044 and other relevant standards to be used in different applications and target audiences. This document is also a cross-cutting PCR which was developed from two expired ones (see section 3.3). The reason behind this merger is that vegetables and arable crops, although being different product categories, can be modelled by adopting the same methodological approach and can therefore be included in a single PCR.

In other terms, the present document allows to evaluate with the same methodology the production of vegetables and arable crops in all the PCRs where this production is an upstream process. All these PCRs shall refer to the PCR for arable and vegetable crops when defining rules and requirements for the cultivation process.

3.5 UNDERLYING STUDIES

The methodological choices made during the development of this PCR (functional unit/declared unit, system boundary, allocation methods, impact categories, data quality rules, etc.) in this PCR were primarily based on the following underlying studies:

- EMEP/CORINAIR Emission Inventory Guidebook - 3rd edition October 2002
- Frischknecht R, Steiner R, & Jungbluth N, The Ecological Scarcity Method – EcoFactors (2006b): A method for impact assessment in LCA. 2009, Federal Office for the Environment FOEN: Zürich und Bern
- IPCC, 2006. Guidelines for National Greenhouse Gas Inventories
- Milà i Canals L, Romanyà J, Cowell SJ (2007b). Method for assessing impacts on life support functions (LSF) related to the use of 'fertile land' in Life Cycle Assessment (LCA). J Clean Prod 15 1426-1440
- Nemecek T., Kagi Thomas, 2007. Life Cycle Inventories of Agricultural Production Systems. Ecoinvent report No.15
- Prahsun V., 2006. Erfassung der PO4-Austrage fur die Okobilanzierung SALCA Phosphor. Agroscope Reckenholz –Tanikon ART, 20p

4 GOAL AND SCOPE, LIFE CYCLE INVENTORY AND LIFE CYCLE IMPACT ASSESSMENT

The goal of this section is to provide specific rules, requirements and guidelines for developing an EPD for the product category as defined in Section 2.2.1.

4.1 DECLARED UNIT

A food processing phase may be required to turns the agricultural product into something that can eventually be eaten (*e.g.* the milling of wheat grains and the subsequent use of wheat flour for the production of bread). This processing is outside the scope of this PCR and shall be excluded from the analysis. Conversely, the use phase (*i.e.* cooking phase) must be considered for all agricultural products that can be consumed as they are.

Therefore, the reference flow shall be defined at the customer gate, thus including within the system boundary the product use (if applicable) and the wastes end-of-life.

The declared unit shall be defined as 1 kg of agricultural product (*e.g.* 1 kg of cereal grains, 1 kg of whole vegetables). The weight of the packaging is not included in this 1 kg. The product moisture and nutrients content shall be specified. The declared unit shall be stated in the EPD, and the environmental impact shall be given per declared unit. This PCR uses a declared unit instead of a functional unit as all functional and qualitative aspects are not possible to capture in the same unit. These aspects should be taken into consideration when comparing EPDs that are based on this PCR.

4.2 REFERENCE SERVICE LIFE (RSL)

Not applicable for this product category.

4.3 SYSTEM BOUNDARY

The International EPD® System uses an approach where all attributional processes from “cradle to grave” shall be included using the principle of “limited loss of information at the final product”. This is especially important in the case of business-to-consumer communication.

The scope of this PCR (and EPDs based on it) is cradle-to-grave, with the inclusion of the use phase only when applicable.

As stated in section 4.1, any additional processing of the arable crop (or vegetable) must be excluded from the system boundary. Therefore, the production of any semi-finished product (*e.g.* durum wheat semolina) or Processed Agricultural Product[3] (*e.g.* chocolate, confectionary, sweet drinks, beers, spirits, biscuits and bakery products) is outside the scope of this PCR. For each of these products, the life cycle environmental impact shall be calculated and presented in a dedicated PCR.

4.3.1 LIFE CYCLE STAGES

For the purpose of different data quality rules and for the presentation of results, the life cycle of products is divided into three different life cycle stages:

- Upstream processes (from cradle-to-gate)
- Core processes (from gate-to-gate)
- Downstream processes (from gate-to-grave)

In the EPD, the environmental performance associated with each of the three life-cycle stages above shall be reported separately. The processes included in the scope of the PCR and belonging to each life cycle stage are described in Sections 4.3.1.1–4.3.1.3.

[3] Processed Agricultural Product are listed in Regulation (EU) no 510/2014 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R0510)

4.3.1.1. Upstream processes

The following attributional processes are part of the product system and classified as upstream processes:

- Production of materials used in agriculture (fertilizers, pesticides, seeds, seedling, cuttings or plants for the cultivation)
- Production of materials for greenhouses, mulching, trays and substrates (peat, vermiculite...)
- Production of electricity and fuels used in the upstream module
- Production of auxiliary products used such as detergents for cleaning, etc.
- Production of semiproducts used in the core process, if applicable
- Manufacturing of primary and secondary packaging, if applicable

Upstream processes not listed may also be included. All elementary flows at resource extraction shall be included, except for the flows that fall under the general cut-off rule in Section 4.5.

4.3.1.2. Core processes

The following attributional processes are part of the product system and classified as core processes:

- External transportation to the core processes
- Agriculture including e.g. operations at the farm(s), air and water emissions from energy wares used in the agriculture as well as emissions to air, water and soil (*i.e.* pesticides) from agriculture. The cradle for the agriculture is soil preparation and cultivation.
- Maintenance (e.g. of the machines)
- Preparation of the final product
- Waste treatment of waste generated during manufacturing (e.g. pips for drip irrigation)
- Production of electricity and fuels used in the core module
- Production of agricultural machinery (e.g. tractors, plows, planters, harvesters, etc.)

Manufacturing processes not listed may also be included. The production of the raw materials used for production of all product parts shall be included. A minimum of 99% of the total weight of the declared product including packaging shall be included.

The technical system shall not include:

- Manufacturing of production equipment, buildings and other capital goods
- Business travel of personnel
- Travel to and from work by personnel
- Research and development activities

4.3.1.3. Downstream processes

The following attributional processes are part of the product system and classified as downstream processes:

- Transportation from agriculture, horticulture and market gardening, to an average customer or consumer shall be included.
- End-of-life processes of any wasted part of the product over the distribution chain shall be included, if relevant. It may include End-of-life processes of primary packaging waste.
- In case of a B2C market with direct consumption, the use stage of the product (heating, storage, etc.) shall be included, if relevant. As the possible uses vary greatly between the products covered by this PCR, it is not possible to define a standard scenario for the product use.
- End-of-life processes of any wasted part of the product at consumer home (domestic food losses) shall be included, as well as end-of-life processes of packaging waste at consumer home. Both shall be reported within the use stage. Given the width and heterogeneity of this product category, it is not possible to provide indications on how to estimate losses, nor on the subsequent end-of-life. Indeed, domestic losses can vary greatly based on food habits and cultural differences among consumers living in different regions/countries (e.g. whether or not to consume potato peel).

4.3.2 OTHER BOUNDARY SETTING

4.3.2.1. Boundary towards nature

The boundary to nature is defined as the point where the flows of material and energy resources leave from nature and enter the technical system (*i.e.* the part of the environment that is made or modified by humans). System boundary is also crossed by emissions to air, water and soil that are emitted from the product system.

4.3.2.2. Boundaries in the life cycle

See Section 4.3.1. The EPD may present the information divided into additional sub-divisions.

4.3.2.3. Boundaries towards other technical systems

See Section 4.6.3.

4.4 SYSTEM DIAGRAM

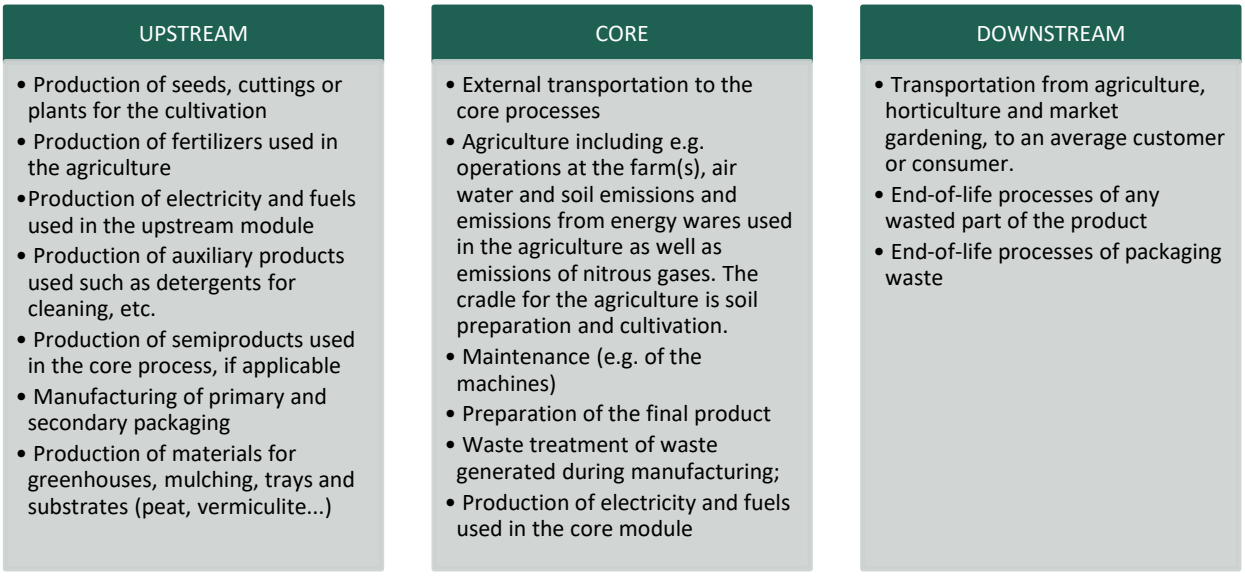

Figure 2. *System diagram illustrating the processes that are included in the product system, divided into upstream, core and downstream processes.*

4.5 CUT-OFF RULES

Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary as described in Section 4.3).

The check for cut-off rules in a satisfactory way is through the combination of expert judgment based on experience of similar product systems and a sensitivity analysis in which it is possible to understand how the un-investigated input or output could affect the final results.

4.6 ALLOCATION RULES

4.6.1 GENERAL RULES

The following step-wise procedure shall be applied for multifunctional products and multiproduct processes other than cultivation:

1. Allocation shall be avoided, if possible, by dividing the unit process into two or more sub-processes and collecting the environmental data related to these sub-processes.
2. If allocation cannot be avoided, the inputs and outputs of the system shall be partitioned between its different products or functions in a way that reflects the underlying physical relationships between them; i.e. they should reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system.
3. If not possible, economic allocation is suggested.

4.6.2 SPECIFIC RULE FOR CULTIVATION PROCESSES

If straw (or a product comparable to straw) is harvested and sold as a by-product, allocation between main products and straw shall be done using an economic method, based on real prices on the local level. The allocation factors proposed in the Ecoinvent database[4] and reported in Table 1 could be used.

In case real prices on the local level are considered instead of the ones used in Ecoinvent database, please specify and justify each change.

Crop	Production system	% allocated to grains	% allocated to straw
Wheat	Extensive	92.5	7.5
	Integrated production	92.5	7.5
	Organic	93.1	6.9
Rye	Extensive	90.3	9.7
	Integrated production	90.3	9.7
	Organic	91.9	8.1
Barley	Extensive	89.9	10.1
	Integrated production	89.9	10.1
	Organic	91.3	8.7

Table 1 Allocation factors proposed in the Ecoinvent database.

4.6.3 REUSE, RECYCLING, AND RECOVERY

In the framework of the International EPD® System, the methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). This means that the generator of the waste shall carry the full environmental impact until the point in the product's life cycle at which the waste is transported to a scrapyard or the gate of a waste processing plant (collection site). The subsequent user of the waste shall carry the environmental impact from the processing and refinement of the waste but not the environmental impact caused in the "earlier" life cycles. See General Programme Instruction for further information and examples.

4.7 DATA QUALITY REQUIREMENTS

An LCA calculation requires two different kinds of information:

[4] Nemecek T., Kagi Thomas, 2007. Life Cycle Inventories of Agricultural Production Systems. Ecoinvent report No.15

- data related to the **environmental aspects** of the considered system (such as materials or energy flows that enter the production system). These data usually come from the company that is performing the LCA calculation.
- data related to the **life cycle impacts** of the material or energy flows that enter the production system. These data usually come from databases.

Data on environmental aspects shall be as specific as possible and shall be representative of the studied process.

Data on the life cycle of materials or energy inputs are classified into three categories – specific data, selected generic data, and proxy data, defined as follows:

- **specific data** (also referred to as "primary data" or "site-specific data") – data gathered from the actual manufacturing plant where product-specific processes are carried out, and data from other parts of the life cycle traced to the specific product system under study, e.g. materials or electricity provided by a contracted supplier that is able to provide data for the actual delivered services, transportation that takes place based on actual fuel consumption, and related emissions, etc.,
- **generic data** (sometimes referred to as "secondary data"), divided into**:**
  - **selected generic data** – data from commonly available data sources (e.g. commercial databases and free databases) that fulfil prescribed data quality characteristics for precision, completeness, and,
  - **proxy data** – data from commonly available data sources (e.g. commercial databases and free databases) that do not fulfil all of the data quality characteristics of "selected generic data".

As a general rule, specific data shall always be used, if available, after performing a data quality assessment. It is mandatory to use specific data for the core processes as defined above. For the upstream processes, downstream processes, and infrastructure, generic data may also be used if specific data are not available. Generic data should especially be used in cases where they are representative for the purpose of the EPD, e.g. for bulk and raw materials on a spot market, if there is a lack of specific data on the final product or if a product consists of many components.

Any data used should preferably represent average values for a specific reference year. However, the way these data are generated could vary, e.g. over time, and in such cases they should have the form of a representative annual average value for a specified reference period. Such deviations should be declared.

For crops that are grown and harvested in less than one-year (e.g. lettuce produced in 2 to 4 months) data shall be gathered in relation to the specific time period for production of a single crop, from at least three recent consecutive cycles.

4.7.1 RULES FOR USING GENERIC DATA

The attributional LCA approach in the International EPD® System forms the basic prerequisites for selecting generic data. To allow the classification of generic data as "selected generic data", they shall fulfil selected prescribed characteristics for precision, completeness, and representativeness (temporal, geographical, and technological), such as:

- the reference year must be as current as possible and preferably assessed to be representative for at least the validity period of the EPD,
- the cut-off criteria to be met on the level of the modelled product system are the qualitative coverage of at least 99% of energy, mass, and overall environmental relevance of the flows,
- completeness in which the inventory data set should, in principle, cover all elementary flows that contribute to a relevant degree of the impact categories, and
- the representativeness of the resulting inventory in the given temporal, technological, and geographical reference should, as a general principle, be better than ±5% of the environmental impact of fully representative data.

Section 4.8 provides a list of recommended databases/data sets to be used for generic data.

If selected generic data that meets the requirements of the International EPD® System are not available as the necessary input data, proxy data may be used and documented. The environmental impacts associated with proxy data shall not exceed 10% of the overall environmental impact from the product system.

The EPD may include a data quality declaration to demonstrate the share of specific data, selected generic data and proxy data for the environmental impacts.

4.8 RECOMMENDED DATABASES FOR GENERIC DATA

Table 2 lists recommended databases for generic data. Please note that this listing does not imply that other data that fulfil the data quality requirements may not be used and that data quality assessment shall also be performed for the data sets in the recommended database by an LCA practitioner.

PROCESS	GEOGRAPHICAL SCOPE	RECOMMENDED DATASET	DATABASE
Fertilizers	All	Ecoinvent 3.7	Ecoinvent 3.7

Table 2 Recommended databases for generic data.

4.9 IMPACT CATEGORIES AND IMPACT ASSESSMENT

The EPD shall declare the default impact categories as described in the General Programme Instructions. The characterisation models and factors to use for the default impact categories are available on www.environdec.com/impact-categories and shall be updated on a regular basis based on the latest developments in LCA methodology and ensuring the market stability of EPDs. The source and version of the characterisation models and the factors used shall be reported in the EPD. Alternative regional life cycle impact assessment methods and characterisation factors are allowed to be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

4.10 OTHER CALCULATION RULES AND SCENARIOS

4.10.1 UPSTREAM PROCESSES

The following requirements apply to the upstream processes:

- Data referring to processes and activities upstream in a supply chain over which an organisation has direct management control shall be specific and collected on site.
- Data referring to contractors that supply main parts, packaging, or main auxiliaries should be requested from the contractor as specific data, as well as infrastructure, where relevant.
- The transport of main parts and components along the supply chain to a distribution point (*e.g.* a stockroom or warehouse) where the final delivery to the manufacturer can take place may be based on the actual transportation mode, distance from the supplier, and vehicle load. All these aspects shall be specified in the EPD.
- In case specific data is lacking, selected generic data may be used. If this is also lacking, proxy data may be used.
- For the electricity used in the upstream processes, electricity production impacts shall be accounted for in this priority when specific data are used in the upstream processes:

  1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[5]
  2. National residual electricity mix or residual electricity mix on the market
  3. National electricity production mix or electricity mix on the market.

  The mix of electricity used in upstream processes shall be documented in the EPD, where relevant.
- Packaging: specific data shall be used for the consumer packaging production if it is under the direct control of the organization or if the environmental impact related to the consumer packaging production is more than 10% of the total product environmental indicators. In other cases, generic data may be used. When consumer packaging shows the organization's logo, the LCA report should report the exerted/non exerted direct control on the production of consumer packaging by the organization.

[5] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

4.10.2 CORE PROCESSES

The following requirements apply to the core processes:

- Specific data shall be used for the production and processing of the main product as well as for on-site generation of steam, heat, electricity, etc., where relevant.
- For the electricity used in the core processes, electricity production impacts shall be accounted for in this priority:
    1. Specific electricity mix as generated, or purchased, from an electricity supplier, demonstrated by a Guarantee of Origin (or similar, where reliability, traceability, and the avoidance of double-counting are ensured) as provided by the electricity supplier. If no specific mix is purchased, the residual electricity mix from the electricity supplier shall be used.[6]
    2. National residual electricity mix or residual electricity mix on the market
    3. National electricity production mix or electricity mix on the market.

    The mix of electricity used in the core processes shall be documented in the EPD, where relevant.
- Transport from the final delivery point of raw materials, chemicals, main parts, and components (see above regarding upstream processes) to the manufacturing plant/place of service provision should be based on the actual transportation mode, distance from the supplier, and vehicle load, if available.
- Waste treatment processes of manufacturing waste should be based on specific data, if available.
- If there are no site or region-specific data available, emissions due to fertilizers and pesticides use shall be calculated according to the rules presented in the paragraphs from 4.10.2.1. to 4.10.2.7.

	EMISSION	**PARAGRAPH**	**SOURCE**
Emission in air	NH_3, NO emission	4.10.2.1	IPCC, 2019[7]
	N_2O – direct and indirect emissions	4.10.2.2	Zampori and Pant (2019)[8]
	CH_4 – direct emissions	4.10.2.3	IPCC, 2019[9]
Emission in water	Nitrates	4.10.2.4	IPCC, 2019
	Urea and liming	4.10.2.5	
	Phosphorus	4.10.2.6	Zampori and Pant (2019)
Emission in soil	Pesticides	4.10.2.7	

Table 3 Sources of the emission factors proposed in the paragraphs from 4.10.2.1 to 4.10.2.7.

4.10.2.1. NH_3 and NO emissions

If no site or region-specific data are available, ammonia volatilized shall be estimated using the latest IPCC emission factors available[8].

[6] The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total production mix of the electricity supplier.

[7] IPCC 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories; N_2O emissions from managed soils, and CO_2 emissions from lime and urea application table A7-3 (updated)

[8] Zampori L, Pant R, 2019. Suggestions for updating the Product Environmental Footprint (PEF) method. Luxembourg, Publications Office of the European Union. JRC115959 / EUR 29682 EN. DOI: 10.2760/424613. ttps://ec.europa.eu/jrc/en/publication/suggestions-updating-product-environmental-footprint-pef-method

[9] IPCC 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 5.5

FERTILIZERS TYPE	EMISSION FACTOR FOR NH_3	EMISSION FACTOR FOR NO
Ammonium nitrate (AN)	0.030	0.029
Anhydrous ammonia (AA)	0.029	0.001
Diammonium phosphate (DAP)	0.091	0.007
Monoammonium phosphate (MAP)	0.053	0.007
Ammonium sulphate (AS)	0.095	0.007
Calcium ammonium nitrate (CAN)	0.016	0.016
Sodium nitrate	0.002	0.001
Urea	0.142	0.011
Animal manure[10]	0,210	0.005

Table 4 Total NH_3 emissions from cultures due to fertilizer volatilization: values are kg NH_3-N volatilized per kg of N in fertilizers applied, Total NO emissions from cultures due to fertilizer volatilization: values are kg NO-N volatilized per kg of N in fertilizers applied

For fertilizers not covered in Table 4 the following suggested mix shall be used[11]:

FERTILISER PRODUCT	FERTILISER MIX
Nitrogen solutions	Urea (50%), AN (25%), CAN (25%)
Other N straight	AN (50%), CAN (50%)
Other NP (N)	AN (50%), CAN (50%)
AP	MAP (50%), DAP (50%)
N K compound (N)	Sodium Nitrate
N P K compound (N)	AN (50%), CAN (50%)
Where AN = Ammonium nitrate, CAN = calcium ammonium nitrate AS = ammonium sulphate, AP = ammonium phosphate, MAP = monoammonium phosphate and DAP = diammonium phosphate.	

Table 5 Assumption of the potential mix of different fertilizers products

4.10.2.2. Direct and indirect emissions of N_2O

If no site or region-specific data are available, N_2O direct and indirect emissions shall be estimated using the emission factor reported in Table B.16 of Zampori and Pant (2019), namely: 0.022 kg of N_2O emitted to air per each kg of N synthetic fertilizer and manure applied.

4.10.2.3. Direct emissions of CH_4 from paddy water

If no primary data on direct emissions from paddy water are available, shall be estimated using the IPCC standard - refinement 2019, Volume 4, Chapter 5.5, tier 2.

4.10.2.4. Emission of nitrates

Nitrates leaching and runoff shall be estimated using the most accurate methodology available. If more accurate methodologies cannot be used, they can be estimated using the emission factor proposed by the IPCC.

[10] IPCC 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories 11.3 (updated)

[11] IPCC 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories A7-2 (updated)

	EMISSION FACTOR NO_3^- INDIRECT EMISSION
per kg of N in fertilizers applied	0.24

Table 8 Total NO_3- emissions due to leaching and runoff. Values are kg NO_3^--N emitted per kg of N in fertilizers applied

4.10.2.5. CO_2 direct emissions from liming and urea distribution on field

It is important to avoid a double count between the CO_2 emissions removed during urea production and those emitted during field distribution.

4.10.2.6. Emission of phosphorus

If no site or region-specific data are available, phosphorus emissions shall be estimated using the emission factor reported in Table B.16 of Zampori and Pant (2019), namely: 0.05 kg of P emitted to water per each kg of P based fertilisers applied

4.10.2.7. Active substance of pestices

To calculate the impact of pesticides production, the content in active substance of the specific products shall be considered.

As default approach, the pesticides applied on the field shall be modelled as 90% emitted to the agricultural soil compartment, 9% emitted to air and 1% emitted to water. However, if no primary data on the active ingredient in the pesticide is available, it is not possible to know its volatile components. In this case, since the emissions to air cannot be modelled, it shall be assumed that all pesticides applied are 100% emitted to agricultural soil.

Any deviation from these rules must be declared in the LCA and in the EPD.

4.10.3 DOWNSTREAM PROCESSES

The following requirements apply to all the downstream processes. With specific regard to the Use stage, all related impacts shall be reported in a separate section, since the use of the product is strictly dependent on consumer behaviour (see further details in section 5.4.2).

Data on the **pollutant emissions** from the use stage should be based on documented tests, verified studies in conjunction with average or typical product use, or recommendations concerning suitable product use. Whenever applicable, test methods shall be internationally recognised.

The use of **electricity** in the region/country where the product is used (as specified in the geographical scope of the EPD) shall be accounted for in the following priority:

1. National residual electricity mix or residual mix on the market
2. National electricity production mix or electricity mix on the market

The mix of electricity used in the downstream processes shall be specified in the EPD, where relevant.

4.10.3.1. Cooking

Specific data should be used when available and relevant. If there are no specific data available, the impacts related to the cooking phase could be estimated considering the following hypotheses[12]:

- Boiling in the pot on stove: 0.18 kWh for each kg of water brought to a boil + 0.05 kWh per minute of cooking
- Cooking in the pan on stove: 0.09 kWh per minute of cooking
- Cooking in the oven: 0.55 kWh for the pre-heating (15 minutes) + 0.04 kWh per minute of cooking
- Cooking in microwave oven: 0.02 kWh per minute of cooking

[12] Supporting Technical Paper of Double Pyramid 04/09/2015 • Version: 3; www.barillacfn.com

The following example could help the interpretation of the rule.

The cooking of 1 kg of potatoes requires 3 litres of water and 30 minutes. Energy requirements are:

- Boiling phase: 0.18 x 3 = 0.54 kWh
- Cooking phase: 0.05 x 30 = 1.50 kWh
- Total: 2.04 kWh

The cooking time considered in the study shall be declared in the EPD, as well as the typical cooktop (*i.e.* induction, electric or gas cooktop) used in the region/country where the product is used.

4.10.3.2. Transportation

The transport of the product to the customer shall be described in the reference PCR, which should reflect the actual situation to the best extent possible. The following priority should be used:

1. Actual transportation distances and types.
2. Hypothetical transportation distance, approximated to the average distance between the production site and the customer in the region/country where the product is used. The most representative means of transport in the region/country shall be considered in the model.

4.10.3.3. End of life (EoL)

Scenarios for the end-of-life stage shall be technically and economically practicable and compliant with current regulations in the relevant geographical region based on the geographical scope of the EPD. Key assumptions regarding the end-of-life stage scenario shall be documented.

Food waste occurring in the retail and consumer stages shall be excluded from the model, since the wasted quantity does not depend on the activities carried out by the company applying the PCR, and the company is not expected to have access to this data. On the contrary, the packaging shall be considered throughout its entire life cycle, including the EoL.

5 CONTENT AND FORMAT OF EPD

EPDs based on this PCR shall contain the information described in this section. Flexibility is allowed in the formatting and layout provided that the EPD still includes the prescribed information. A generic template for EPDs is available via www.environdec.com

As a general rule the EPD content:

- shall be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations - General principles),
- shall be verifiable, accurate, relevant and not misleading, and
- shall not include rating, judgements or direct comparison with other products.

An EPD should be made with a reasonable number of pages for the intended audience and use.

5.1 EPD LANGUAGES

EPDs should be published in English, but may also be published in additional languages. If the EPD is not available in English, it shall contain an executive summary in English including the main content of the EPD. This summary is part of the EPD and thus subject to the same verification procedure.

5.2 UNITS AND QUANTITIES

The following requirements apply for units and quantities:

- The International System of Units (SI units) shall be used, e.g., kilograms (kg), Joules (J) and metres (m). Reasonable multiples of SI units may be decided in the PCR to improve readability, e.g., grams (g) or megajoules (MJ). The following exceptions apply:
  - Resources used for energy input (primary energy) should be expressed as kilowatt-hours (kWh) or megajoules (MJ), including renewable energy sources, e.g., hydropower, wind power and geothermal power.
  - Water use should be expressed in cubic metres (m^3)
  - Temperature should be expressed in degrees Celsius (°C),
  - Time should be expressed in the units most practical, e.g., seconds, minutes, hours, days or years.
- Three significant figures[13] should be adopted for all results, The number of significant digits shall be appropriate and consistent.
- The thousand separator and decimal mark in the EPD shall follow one of the following styles (a number with six significant figures shown for illustration):
  - SI style (French version): 1 234,56
  - SI style (English version): 1 234.56

  In case of potential confusion or intended use of the EPD in markets where different symbols are used, the EPD shall state what symbols are used for thousand separator and decimal mark.
- Dates and times presented in the EPD should follow the format in ISO 8601. For years, the prescribed format is YYYY-MM-DD, e.g., 2017-03-26 for March 26th, 2017.
- The result tables shall:
  - Only contain values or the letters “INA” (Indicator Not Assessed). It is not possible to specify INA for mandatory indicators. INA shall only be used for voluntary parameters that are not quantified because no data is available.[14]
  - Contain no blank cells, hyphens, less than or greater than signs or letters (except “INA”).

[13] Significant figures are those digits that carry meaning contributing to its precision. For example with two significant digits, the result of 123.45 shall be displayed as 120, and 0.12345 shall be displayed as 0.12. In scientific notation, these two examples would be displayed as 1.2×10^2 and 1.2×10^{-2}.

[14] This requirement does not intend to give guidance on what indicators are mandated (“shall”) or voluntary.

- Use the value 0 only for parameters that have been calculated to be zero.
- Footnotes shall be used to explain any limitation to the result value.

5.3 USE OF IMAGES IN EPD

Images used in the EPD, especially pictures featured on the cover page, may in themselves be interpreted as an environmental claim. Images such as trees, mountains, wildlife that are not related to the declared product should therefore be used with caution and in compliance with national legislation and best available practices in the markets in which the EPD is intended to be used.

5.4 EPD REPORTING FORMAT

The reporting format of the EPD shall include the following sections:

- Cover page (see Section 5.4.1)
- Programme information (see Section 5.4.2)
- Product information (see Section 5.4.3)
- Content declaration (see Section 5.4.4)
- Environmental performance (see Section 5.4.5)
- Additional environmental information (see Section 5.4.6)
- References (see Section 5.4.9)

The following information shall be included, when applicable:

- Information related to Sector EPDs (see Section 5.4.7)
- Differences versus previous versions (see Section 5.4.8)
- Executive summary in English (see Section 5.4.10)

5.4.1 COVER PAGE

The cover page shall include:

- Product name and image,
- Name and logotype of EPD owner,
- The text “Environmental Product Declaration” and/or “EPD”
- *Programme: The International EPD® System, www.environdec.com,*
- *Programme operator: EPD International AB*
- Logotype of the International EPD® System,
- EPD registration number as issued by the programme operator[15],
- *Date of publication (issue): 20XX-YY-ZZ,*
- *Date of revision: 20XX-YY-ZZ*, when applicable,
- *Date of validity; 20XX-YY-ZZ*
- A note that “*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*.”
- A statement of conformity with ISO 14025,

[15] The EPD shall not include a “registration number” if such is provided by the certification body, as this may be confused with the registration number issued by the programme operator.

5.4.2 PROGRAMME INFORMATION

The programme information section of the EPD shall include:

- Address of programme operator: *EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com*
- The following mandatory statement from ISO 14025: "*EPDs within the same product category but from different programmes may not be comparable*."
- A statement that the EPD owner has the sole ownership, liability and responsibility of the EPD
- Information about verification[16] and reference PCR in a table with the following format and contents:

Product category rules (PCR): Arable crops, 2015:05, Version 2.1. UN CPC 011, 014, 017 and 019.
PCR review was conducted by: The Technical Committee of the International EPD® System. Review chair: Maurizio Fieschi Contact via info@environdec.com.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☐ EPD verification
Third party verifier: *<name, organisation and signature of the third party verifier>* *In case of certification bodies:* Accredited by: *<name of the accreditation body and accreditation number, if applicable>.* *In case of individual verifiers:* Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☐ No

5.4.3 PRODUCT INFORMATION

The product information section of the EPD shall include:

- Address and contact information to EPD owner,
- Description of the organisation. This may include information on products- or management system-related certifications (e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates and EMAS-registrations) and other relevant work the organisation wants to communicate (e.g. SA 8000, supply-chain management and social responsibility),
- Name and location of production site,
- Product identification by name, and an unambiguous identification of the product by standards, concessions or other means,
- Identification of the product according to the UN CPC scheme system. Other relevant codes for product classification may also be included, e.g.
  - Common Procurement Vocabulary (CPV),
  - United Nations Standard Products and Services Code® (UNSPSC),
  - Classification of Products by Activity (NACE/CPA) or
  - Australian and New Zealand Standard Industrial Classification (ANZSIC),

[16] If the EPD has been verified by an approved individual verifier who has received contractual assistance from a certification body that is not accredited, this certification body shall not be included in this table.

- Description of the product, its application/intended use and technical functions, e.g. expected service life time,
- Geographical scope of the EPD, i.e., for which geographical location(s) of use and end-of-life the product's performance has been calculated,
- Declared unit,
- Reference service life (RSL), if applicable,
- Declaration of the year(s) covered by the data used for the LCA calculation and other relevant reference years,
- Reference to the main database(s) for generic data and LCA software used, if relevant,
- System diagram of the processes included in the LCA, divided into the life cycle stages,
- Description if the EPD system boundary is "cradle-to-gate", "cradle-to-gate with options" or "cradle-to-grave",
- Information on which life cycle stages are not considered (if any), with a justification of the omission,
- Relevant websites for more information or explanatory materials.
- Species and variety of the product, if relevant
- Production system (i.e. conventional or organic), if relevant,

This section may also include:

- Name and contact information of organisation carrying out the underlying LCA study,
- Additional information about the underlying LCA-based information, such as assumptions, cut-off rules, data quality and allocation.
- Technical description of the product in terms of functional characteristics, main product components and or materials, expected service life time etc.,
- Manufacturers logotype,

5.4.4 CONTENT DECLARATION

The content declaration shall have the form of a list of materials and chemical substances including information on their environmental and hazardous properties. The gross weight of material shall be declared in the EPD at a minimum of 99 % of one unit of product.

Information on the hazardous properties of materials and chemical substances should follow the requirements given in the latest revision of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)[17], issued by United Nations or national or regional applications of the GHS.

As an example, the following regulations should be used for EPDs intended to be used in the European Union:

- Regulation (EC) No 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures

5.4.4.1. Information about recycled materials

Not relevant for this product category.

5.4.4.2. Information about packaging

As packaging is strongly connected with the product, the producer shall provide information about packaging in the EPD, when applicable. Packaging may be classified as:

[17] The GHS document is available on www.unece.org.

- Distribution Packaging: packaging designed to contain one or more articles or packages, or bulk materials, for the purposes of transport, handling and/or distribution (ISO 21067-1:2016, Par. 2.2.6)
- Consumer Packaging: packaging constituting, with its content, a sales unit for the final user or consumer at the point of retail (ISO 21067-1:2016, Par. 2.2.7).

Consumer packaging is generally the outcome of eco-design processes, or other activities, under direct control of the organisation. Many critical categories with strict legal requirements belong to consumer packaging category like food contact packaging and pharmaceutical packaging.

The type and function of packaging shall be reported in the EPD.

A statement of the source of the materials (pre-consumer or post-consumer) shall be presented in the EPD when the packaging is made in whole or in part by recycled materials.

5.4.5 ENVIRONMENTAL PERFORMANCE

5.4.5.1. Environmental impacts

The EPD shall declare the environmental impact indicators, per declared unit and per life cycle stage and in aggregated form (as stated in Section 4.10.3, the impacts of the use stage shall be reported separately, as illustrated in Table 3), using the default impact categories, characterisation models and factors available on www.environdec.com/impact-categories. The source and version of the characterisation models and the factors used shall be reported in the EPD.

Table 3 Illustration of how the use stage shall be separately declared.

INDICATOR	UNIT	UPSTREAM	CORE	DOWNSTREAM (without use stage)	TOTAL (without use stage)	Use stage
GWP-fossil	kg CO_2 eq.					
Etc.						

Alternative regional life cycle impact assessment methods and characterisation factors are allowed to be calculated and displayed in addition to the default list. If so, the EPD shall contain an explanation of the difference between the different sets of indicators, as they may appear to the reader to display duplicate information.

Some additional optional indicators that may be included in the LCA report and in the EPD are reported in the following paragraphs.

AQUATIC ECOTOXICITY

This indicator is measured in Comparative Toxic Unit (CTU) and refers to the impact of toxic substances (chemical and physical agents) on aquatic ecosystems. The impact is obtained by three characterisation factors:

- the fate factor, representing the persistence of a chemical in the environment,
- the exposure factor, representing the bioavailability of a chemical (fraction of the chemical dissolved)
- the effect factor, reflecting the change in the potentially affected fraction of species due to change in concentration

The method suggested for the calculation of the indicator is USEtox[18] (http://www.usetox.org/).

LAND USE

This indicator is measured mass of C deficit. and represents the impact related to the use of soil.

The method suggested for the indicator calculation is Mila i Canals et al., 2007[19]. This method considers Soil Organic Matter (SOM) as a soil quality indicator. SOM is qualified as a keystone soil quality indicator, especially for assessing the impacts on fertile land use (agriculture and forestry systems). It influences properties like buffer capacity, soil structure and fertility.

[18] User manual: Huijbregts M., Hauschild M., Jolliet O., Margni M., McKone T., Rosenbaum R.K., Van de Meent D., “USEtoxTM User manual”; February 2010.

[19] Milà i Canals L, Romanyà J, Cowell SJ (2007b). Method for assessing impacts on life support functions (LSF) related to the use of ‘fertile land’ in Life Cycle Assessment (LCA). J Clean Prod 15 1426-1440

5.4.5.2. Use of resources

The EPD shall declare the mandatory, and may declare the optional, indicators for resource use listed at www.environdec.com/indicators per declared unit, and per life cycle stage and in aggregated form (as stated in Section 4.10.3, the impacts of the use stage shall be reported separately, as illustrated in Table 3).

5.4.5.3. Waste production and output flows

Waste generated along the whole life cycle production chains shall be treated following the technical specifications described in the GPI. The EPD may declare the optional indicators for waste production and output flows as listed at www.environdec.com/indicators per declared, per life-cycle stage and in aggregated form (as stated in Section 4.10.3, the impacts of the use stage shall be reported separately, as illustrated in Table 3)..

5.4.5.4. Other environmental indicators

The following indicators shall be declared in the EPD per declared unit, and per life cycle stage and in aggregated form (as stated in Section 4.10.3, the impacts of the use stage shall be reported separately, as illustrated in Table 3).

- The energy content into some products (such paper or plastic based products) is useful information for the end-of-life management. For this reason the “energy content of product” shall be declared in MJ: its estimation shall be made considering the gross calorific value of the product. Only the energy that is suitable for an eventual energy recovery at the end-of-life shall be considered (energy content of steel due to its carbon content for example shall not be considered since it is not practically recoverable);

5.4.6 ADDITIONAL INFORMATION

Additional environmental information may be added in the EPD. Additional information is such information that is not derived from the LCA, LCI or information modules, but relevant to include in the EPD®, e.g. impact on biodiversity, impact on health, technical life length, maintenance, the final use of product, hazard and risk assessment, preferred waste management option for used products, etc.

Alternative environmental impact indicators are allowed to be calculated and displayed in addition to the default list, if significant to convey specific issues (e.g. pesticide use in agricultural field). If so, the EPD shall contain proper explanation of each additional indicator.

5.4.7 INFORMATION RELATED TO SECTOR EPDS

For sector EPDs, the following information shall also be included:

- a list of the contributing manufacturers that the Sector EPD covers,
- a description of how the selection of the sites/products has been done and how the average has been determined, and
- a statement that the document covers average values for an entire or partial product category (specifying the percentage of representativeness) and, hence, the declared product is an average that is not available for purchase on the market.

5.4.8 DIFFERENCES VERSUS PREVIOUS VERSIONS

For EPDs that have been updated, the following information shall also be included:

- a description of the differences versus previously published versions, e.g. a description of the percentage change in results and the main reason for the change;
- a revision date on the cover page

5.4.9 REFERENCES

A reference section shall include a list of references, including references to:

- Underlying LCA studies
- The name, CPC code and version number of the used PCRs
- Other documents that verify and complement the EPD®

- Instruction for recycling, if relevant
- The General Programme instructions of the International EPD® System
- The source and version of the characterisation models and the factors used shall be reported in the EPD.

5.4.10 EXECUTIVE SUMMARY IN ENGLISH

For EPDs published in another language than English, an executive summary in English shall be included.

The executive summary should contain relevant summarised information related to the programme, product, environmental performance, additional information, information related to sector EPDs, references and differences versus previous versions.

6 GLOSSARY

CO_2	Carbon dioxide
CPC	Central product classification
EPD	Environmental product declaration
ISO	International Organization for Standardization
kg	kilogram
LCA	Life cycle assessment
NH_3	Ammonia
N_2O	Dinitrogen oxide
NO	Nitrogen oxide
NO_3^-	Nitrate
PCR	Product Category Rules
P_2O_5	Phosphorus oxide
SI	The International System of Units
SO_2	Sulphur dioxide
UN	United Nations

7 REFERENCES

CEN (2013), EN 15804:2012+A1:2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EMEP/CORINAIR Emission Inventory Guidebook - 3rd edition October 2002

EPD International (2017) General Programme Instructions for the International EPD® System. Version 3.0, dated 2017-12-11. www.environdec.com

EU, 2018 – Product Environmental Footprint Category Rules for Dry pasta, version 3.0 – European Commission. Official web page: https://ec.europa.eu/environment/eussd/smgp/PEFCR_OEFSR_en.htm

Fletcher RJ (2016) Pseudocereals: Overview. In: Encyclopedia of Food Grains. Volume 1. Elsevier, pp 274–279. DOI: 10.1016/B978-0-12-394437-5.00039-5

Frischknecht R, Steiner R, & Jungbluth N, The Ecological Scarcity Method – EcoFactors (2006b): A method for impact assessment in LCA. 2009, Federal Office for the Environment FOEN: Zürich und Bern.

Guidance for Product Category Rule Development (2013), Ingwersen, W., Subramanian, V., editors. Product Category Rule Guidance Development Initiative. Version 1.0. http://www.pcrguidance.org

ISO (2000), ISO 14020:2000, Environmental labels and declarations – General principles

ISO (2004), ISO 8601:2004 Data elements and interchange formats – Information interchange – Representation of dates and times

ISO (2006a), ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures

ISO (2006b), ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework

ISO (2006c), ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines

ISO (2013), ISO/TS 14067:2013, Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification and communication

ISO (2014), ISO 14046:2014, Environmental management – Water footprint – Principles, requirements and guidelines

ISO (2017), ISO 21930:2017, Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services

IPCC, 2006. Guidelines for National Greenhouse Gas Inventories

IPCC 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

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8 VERSION HISTORY OF PCR

VERSION 1.0, 2020-12-07

- Original version of this PCR.

VERSION 1.0.1, 2023-03-16

- Changed PCR Moderator.
- Editorial changes in Sections 5.4.5.1 to 5.4.5.3, to clarify the indicator list at www.environdec.com applies also for the indicators of resource use, waste production and other output flows.

VERSION 1.0.2, 2024-06-24

- The validity period of the PCR was extended by 6 months, until 2025-06-07, due to the new PCR development for food and beverage products.

VERSION 1.0.3, 2025-05-05

- The validity period of the PCR was extended by 12 months, until 2026-06-07, due to the delay of the PCR development for food and beverage products.

ARABLE AND VEGETABLE CROPS

PRODUCT CATEGORY CLASSIFICATION: UN CPC 011, 012, 014, 017, 019