

PAS 2050-2:2012

Assessment of life cycle greenhouse gas emissions

Supplementary requirements for the application of PAS 2050:2011 to seafood and other aquatic food products



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Credit: NOAA's Fisheries Collection

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Foreword

This Publicly Available Specification (PAS) is published by BSI Standards Limited, under licence from The British Standards Institution, and is expected to come into effect in November 2012.

This PAS was prepared at the request of seafood industry representatives, sponsored by the Sea Fish Industry Authority (Seafish) in the UK by Jonna Meyhoff Fry as Technical Author. This was supported by a Steering Group and wider network of stakeholders drawn from the global seafood and aquatic food products industry. The members of this Steering Group are listed below and their valuable contribution is gratefully acknowledged here:

Adolfo Alvial	Consultancy Company Natural Resources & Environmental Management	Chile
David Anderson	Aberdeen Fish Producers Organisation	UK
Bundit Chakkasongan	SEAFDEC	Thailand
William Davies	Icelandic UK	UK
Jonna Meyhoff Fry	ERM Group	UK
Angus Garrett	Seafish	UK
Dan Lee	Global Aquaculture Alliance	UK
Phil MacMullen	Seafish	UK
Annik Magerholm Fet (Dr. Ing.)	Norwegian University of Science & Technology	Norway
Rattanawan Munkung PhD	Faculty of Science, Kasetsart University	Thailand
Alex Olsen	A. Espersen A/S	Denmark
John Ryder	Food and Agriculture Organization of the United Nations (FAO)	Global
Antonello Sala	CNR-ISMAR Institute of Marine Sciences	Italy
Erik Skontorp-Hognes (MSc)	SINTEF Fisheries & Aquaculture AS	Norway
Jamie Smith	Scottish Salmon Producers Organization	UK

Comments from other parties were also sought by BSI, at a meeting held in conjunction with the World Fisheries Congress Edinburgh in May 2012, where world fisheries experts contributed through a series of discussions around key topics and through the period of 'Expert Review and Public Comment' which took place during June 2012. The expert contributions from all the organizations and individuals contributing to the development of this PAS are also gratefully acknowledged.

Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.



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Introduction

As an industry, the provision of seafood and other aquatic food products compares well with other proteins with regard to its emissions of greenhouse gases. However, there is no room for complacency and there is growing industry recognition that there will always be room for improvement in this area, right across the supply chain.

In response to this, the British Standards Institution, with the support of seafood industry representatives and sponsorship from Seafish, has brought together an international group which includes representatives drawn from many areas of the world with strong fishing and aquaculture interests, to establish a common approach for the industry to assess its GHG emissions and enable informed action to reduce those emissions globally and locally.

This group has gathered and shared current knowledge on emissions from fisheries and aquaculture production units across the world and developed a common understanding of the aquatic food products industry, leading to a broad consensus on how greenhouse gases from seafood and other aquatic food products can best be assessed, using the methodology provided by PAS 2050:2011.

The relationship with PAS 2050:2011

This Publicly Available Specification (PAS), PAS 2050-2, contains requirements for the assessment of life cycle greenhouse gas (GHG) emissions specifically associated with seafood and other aquatic food products. The requirements are supplementary to those specified in PAS 2050:2011, which provides a generic method for assessing the life cycle GHG emissions of goods and services.

The purpose of this PAS is to provide supplementary requirements and additional guidance for the consistent application of PAS 2050:2011 to seafood and other aquatic food products, by providing:

- a fisheries and aquaculture focus for aspects of the PAS 2050:2011 assessment where options are permitted;
- rules or assessment requirements that are directly relevant to the main sources of emissions from capture fisheries and aquaculture; and
- clarity on how to apply specific elements of the PAS 2050:2011 assessment within the seafood sector.

In conjunction with PAS 2050:2011, this PAS provides a common and comprehensive method for the reliable, repeatable assessment of GHG emissions from the whole life cycle of seafood and other aquatic food products. The supplementary requirements provided in this PAS relate only to the cradle-to-gate stages of the life cycle, where in this case cradle-to-gate includes distribution until the product reaches the retailer, food service or similar gate. For feed production, retail, food service and all subsequent stages (e.g. retail, use and end-of-life) the requirements of PAS 2050:2011 apply.

PAS 2050:2011 sets out generic requirements for undertaking a GHG emissions assessment of all aspects of the life cycle of aquatic food products, whilst this PAS provides supplementary requirements and additional guidance on those elements that have been found to present particular challenges in an aquatic food products context, such as allocation, system boundaries and land use change. Although, hitherto, it has been possible for those experienced in the use of PAS 2050:2011 to achieve acceptable assessment outcomes using PAS 2050:2011 alone, for new or less experienced users the use of this PAS in conjunction with PAS 2050:2011, in an assessment of the GHG emissions from seafood or other aquatic food products, can be expected to ensure greater accuracy and uniformity of application.

Because of the global nature of trade in seafood and other aquatic food products, it is essential that the supplementary requirements provided in this PAS are applicable wherever an assessment of emissions from aquatic food products is to be made. The development of PAS 2050-2 has therefore been undertaken with participation by experts from different countries with experience in a range of seafood and other aquatic food production systems.

Relationship with other GHG assessment standards

PAS 2050 was introduced in 2008 (revised in 2011) with the aim of providing a consistent internationally applicable method for quantifying the GHG emissions of products and services. In 2011, another product life cycle assessment method was published by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) that in addition to providing a methodology to quantify the GHG inventories of products, also included requirements for public reporting. Both standards are broadly consistent in their quantification methods, but their differing objectives have resulted in some variation in approach.

The Product Life Cycle Accounting and Reporting Standard built on the initial PAS 2050 method in developing its own requirement. In turn, the PAS 2050 drew upon lessons learned during the Product Standard's development process in its 2011 revision. As a result of this cross collaboration, the key methodological rules underpinning quantification in both standards are consistent and in particular approaches to the following are in alignment:

- sector or product rules;
- inclusion of biogenic carbon;
- recycling;
- land-use-change; and
- delayed emissions.

While both PAS 2050:2011 and the Product Standard provide requirements for quantifying the GHG impact of a product over its lifetime, the Product Standard

includes requirements for public reporting whilst the PAS 2050:2011 approach focuses on recording of information to support the assessment process. As a result, while harmonization on all aspects of the assessment was sought during the development of both standards, some differences do remain but these are of relatively minor significance.

Annex H provides a review of each aspect of the compared methodologies, identifying any differences between them, and the implication for the assessment outcome.

Importantly, both standards provide a consistent approach to promoting the use and development of sector specific rules – known as “product rules” in the Product Standard and “supplementary requirements” in PAS 2050:2011. This approach recognizes the importance that sector/product specific rules can have in aiding consistent application of the standards within sectors. As further supplementary requirements are developed, it is expected that those same criteria may be applied to either standard to bring further consistency in product carbon assessments internationally.

Other GHG assessment methods relevant to at least part of the range of aquatic food product covered by this PAS will be found under the International EPD System which provides a PCR Basic Module, referenced CPC Division 04 *Fish and other fishing products*.

Norway has published Product Category Rules (PCR) for preparing an Environmental Product Declaration (EPD) for wild caught fish, although this is believed to be under revision.

Note *The International Standards Organization (ISO) is also developing a standard for the carbon footprint of products (ISO 14067) with which collaboration is on-going.*



1 Scope

This Publicly Available Specification (PAS) establishes supplementary requirements for use in conjunction with PAS 2050:2011 for the cradle-to-gate assessment of the GHG emissions from seafood and other aquatic food products derived from both wild capture and aquaculture production.

This PAS is appropriate for use by organizations operating in the seafood and other aquatic food product sectors that are intending to undertake a programme of GHG emission reduction of their product life cycle, or those needing to provide information on the GHG emissions from their products or processes to downstream business partners or other stakeholders (e.g. environmental regulators).

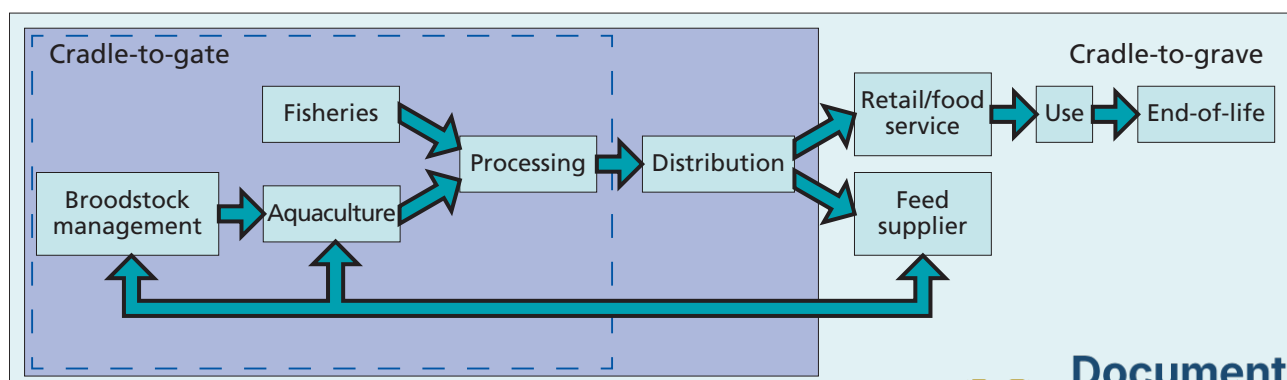
This PAS has been developed in accordance with the principles on supplementary requirements as set out in PAS 2050:2011 4.3 and follows the structure and form of that PAS. Due to the specific circumstances of the seafood and other aquatic food products sectors, and the choices left open to practitioners in PAS 2050:2011, this PAS provides clarity on the issues associated with those choices and establishes supplementary requirements, in particular with regard to system boundary, allocation and land use change. It clearly identifies where PAS 2050:2011 requirements are to be applied without supplement, and provides sector-specific requirements and guidance, where permitted by PAS 2050:2011.

The scope of this PAS is limited to the cradle-to-gate stages of the life cycle, which for aquatic food products for human consumption is from fisheries or broodstock management to the incoming gate of the retail or food service and for animal consumption, is from fisheries or broodstock management to the incoming gate of the feed supplier. This is illustrated in Figure 1 below. Where an assessment of aquatic food products is to extend beyond distribution (i.e. to include retail/food service, use and end-of-life), the requirements of PAS 2050:2011 should be applied to the subsequent stages.



Credit: NOAA's Fisheries Collection Photographer: William L. High, NMFS

Figure 1 The scope of PAS 2050-2 in the context of PAS 2050:2011



Note 1 This PAS provides supplementary requirements for the cradle-to-gate processes up until the aquatic food product reaches the retailer, food service, or equivalent. However, as illustrated by the dashed line, cradle-to-gate boundaries can vary according to the position of the “gate”. Depending on the purpose, organizations conducting an assessment of aquatic food products may choose to position the “gate” elsewhere, or conduct a full cradle-to-grave assessment.

Note 2 Figure 1 is a simplified illustration of the life cycle of aquatic food products. The purpose of the figure is to illustrate the scope of this PAS, not to show all processes in the life cycle of aquatic food products or flows into and from the different processes.

Note 3 The simplified system representation of Figure 1 shows the feed supplier outside the cradle-to-gate boundary. However, given the potentially significant contribution of feed to the emissions of aquaculture products it is important to recognize that in its accounting for inputs of feed to the aquaculture processes an assessment needs to include the GHG emissions of the feed supplier. The figure illustrates that, in terms of aquatic food products for animal consumption, the scope of this PAS covers distribution until the receiving gate of the feed supplier or similar.

As with PAS 2050:2011, this PAS addresses the single impact category of global warming. It does not assess other potential social, economic and environmental impacts arising from the provision of seafood and other aquatic food products, such as non-GHG emissions, acidification, eutrophication, toxicity, biodiversity, labour standards or other social, economic and environmental impacts that may be associated with the life cycle of such products. Thus, an assessment of the GHG emissions of seafood and other aquatic food products using this PAS in conjunction with PAS 2050:2011 does not provide an indicator of the overall environmental impact of these products, such as may result from other types of life cycle assessment.

In line with the principle adopted for PAS 2050:2011, this PAS does not specify requirements for communication of assessment outcomes of GHG emissions assessments of seafood and other aquatic food products. However, it is recognized that there may be situations where disclosure may be required or could be appropriate. Therefore, both directly and by reference to PAS 2050:2011, it does include requirements relating to what information on GHG emissions arising during the cradle-to-gate stages of seafood and other aquatic food products are to be conveyed when disclosed to a third party (e.g. a downstream business partner).

2 Normative references

The following document, in whole or in part, is normatively referenced in this document and is indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

PAS 2050:2011 *Specifications for the assessment of life cycle greenhouse gas emissions from goods and services*



Credit: ©FAO/Rocco Rorandelli

3 Terms and definitions

For the purposes of this PAS, the terms and definitions given in PAS 2050:2011 and the following apply.

3.1 aquaculture

farming of aquatic organisms for food or feed, involving intervention in the rearing process to enhance production

3.2 aquatic food products

fish, molluscs, crustaceans, echinoderms and other forms of marine and freshwater life regarded as food for human consumption or feed for animal consumption

Note 1 This term is used through the remainder of the document to denote both seafood and aquaculture products.

Note 2 See also Annex A.

3.3 broodstock

sexually mature female and male specimens of aquatic organisms kept for the purpose of controlled reproduction in aquaculture, as well as younger specimens destined to be used for the same purpose

3.4 capture fisheries

all activities associated with the harvesting of wild aquatic organisms

3.5 (aquatic food product) cradle-to-gate assessment

assessment of GHG emissions arising from activities associated with an aquatic food product, from capture fisheries or broodstock management for aquaculture through to the point at which the aquatic food product reaches retail, food service or equivalent

3.6 distribution

movement of aquatic food products from processing to point of retail sale, including associated transport and warehousing

3.7 end of life

collection and treatment of waste products (including packaging) generated from the use phase, including, but not limited to, landfill, incineration, recycling and composting

3.8 processing

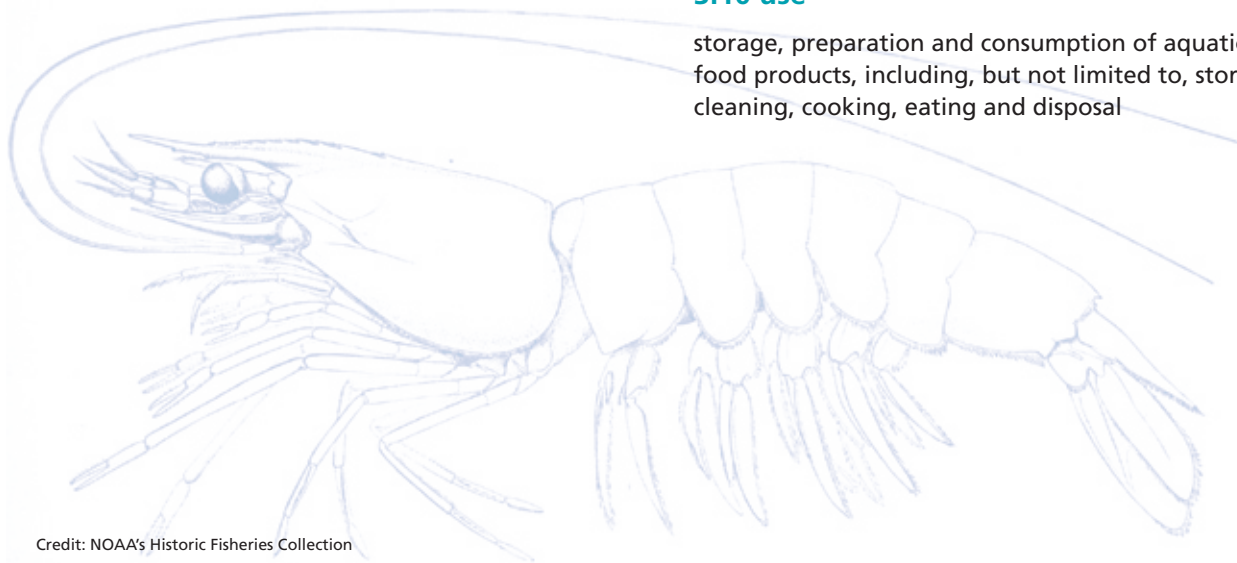
all activities relating to the receiving, preparation, preservation and packing of aquatic organisms as food products

3.9 seafood

aquatic food products from marine sources intended for human consumption

3.10 use

storage, preparation and consumption of aquatic food products, including, but not limited to, storage, cleaning, cooking, eating and disposal



Credit: NOAA's Historic Fisheries Collection

4 Principles and implementation

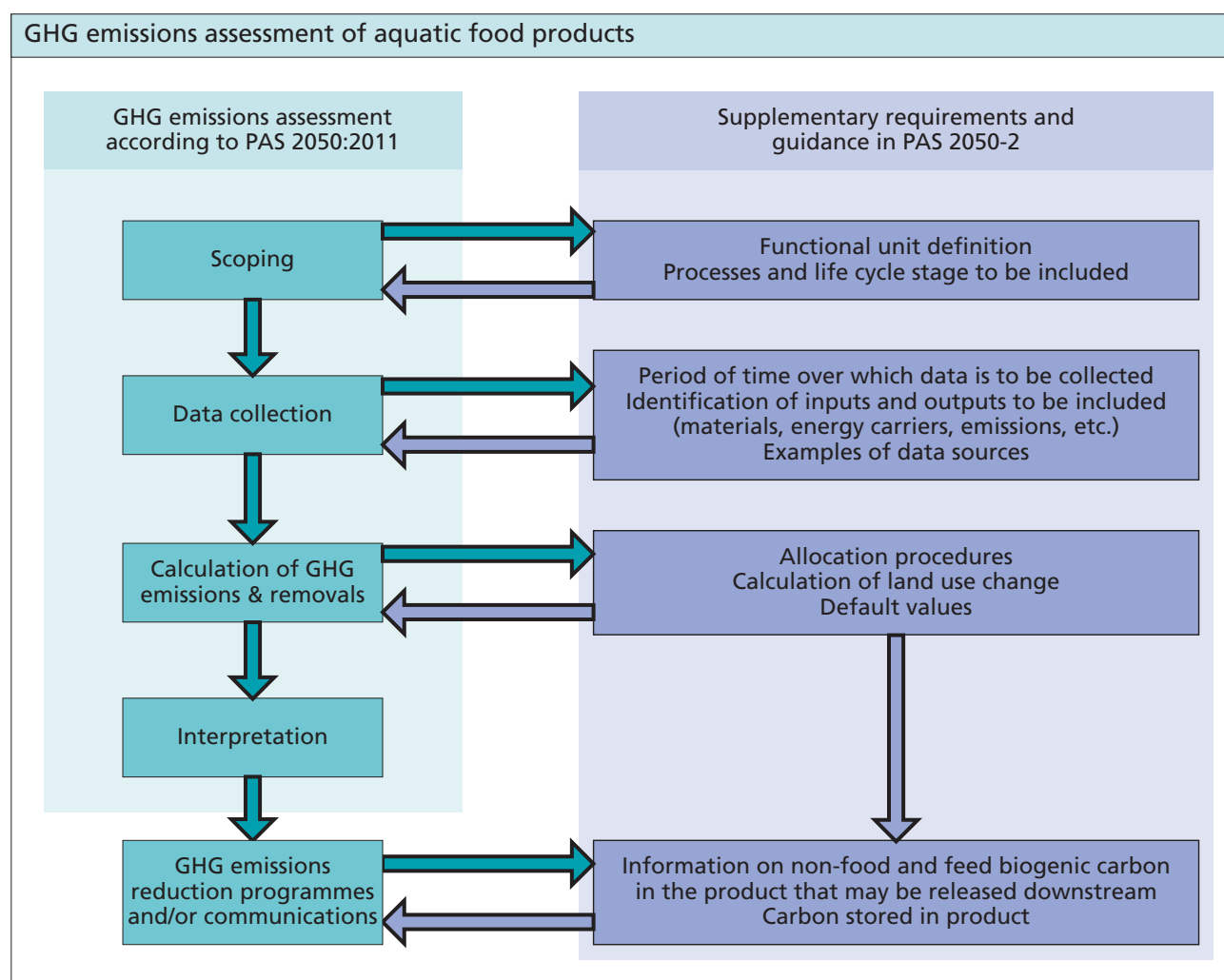
4.0 Overview

Provision for the development and use of supplementary requirements are included in PAS 2050:2011 because it is recognized that their use can enhance the application of PAS 2050:2011 for some product sectors or categories.

The primary objective of this PAS is to provide greater clarity as to how the inputs of goods, materials, energy carriers and land and related GHG emissions can best be attributed consistently to the aquatic food product that is being assessed (Figure 2). It does this by setting further requirements, as well as by providing additional guidance, including clarity on material inputs to be included and examples of calculations.

To facilitate a cradle-to-gate assessment of GHG emissions in accordance with PAS 2050:2011, this PAS also provides requirements on what needs to be reported when communicating the GHG emissions assessment to a third party, including reporting on biogenic carbon stored in aquatic food products (and its packaging) that is transferred to users and may be released downstream. The potential GHG emissions likely to arise from these products after the cradle-to-gate stages of production are to be assessed in accordance with the requirements of PAS 2050:2011.

Figure 2 Relationship between PAS 2050-2 and PAS 2050:2011



Notwithstanding its focus on the cradle-to-gate stages of the aquatic food product lifecycle, this PAS can be used in conjunction with PAS 2050:2011 for the proper undertaking of a GHG assessment (in accordance with PAS 2050:2011) for both of the situations described in 1 and 2, below:

- 1) A practitioner intends to undertake an assessment in response to or in anticipation of a request for GHG emissions information from the cradle-to-gate stages to support an assessment being performed further on in the supply chain, such as by a processor or retailer.
- 2) A practitioner intends to conduct a whole life cycle assessment up to and including the disposal stage.

However, in situation 1, where an assessment is being carried out to provide information to support assessments undertaken at subsequent stages of the supply chain, particular care will be required to ensure that the functional unit used in the cradle-to-gate assessment is known as part of the information provided, so as to facilitate its correct use in the subsequent assessment (see also 6.2.4).

4.1 General requirements

Assessment of the GHG emissions and removals from aquatic food product systems, claimed to be in conformance with PAS 2050-2, shall be carried out using the principles and methods specified in PAS 2050:2011 supplemented by the provisions made in this PAS in respect of the cradle-to-gate stages of those products.

4.2 Supplementary requirements – implementing PAS 2050-2

Organizations claiming that an assessment of aquatic food products conforms to PAS 2050:2011 shall ensure that the cradle-to-gate stages of those products are assessed using the supplementary principles and methods specified in this PAS.

In accordance with PAS 2050:2011:

- the assessment of cradle-to-gate GHG emissions and removals arising from aquatic food products shall include the GHG emissions and removals (including all upstream emissions) arising up to and including distribution of the aquatic food product until the gate of retail, food service or equivalent;
- the assessment shall include the emissions from materials classified as waste from the cradle-to-gate stages; and
- in addition, actions taken during the cradle-to-gate stages that could result in emissions arising during and after transfer of the product to retail, food service or equivalent shall be recorded separately (5.2.2).

Note 1 *Cradle-to-gate boundaries can vary according to the position of the “gate” (see Figure 1). Although this PAS provides supplementary requirements for the cradle-to-gate processes up until the aquatic food product reaches retail, food service or equivalent, organizations conducting an assessment of aquatic food products may position the “gate” elsewhere.*

Note 2 *This does not preclude organizations undertaking a cradle-to-grave assessment for aquatic food products for which PAS 2050:2011 provides requirements for the other life cycle stages.*

Note 3 *Choices made at the aquaculture, capture and processing stages can affect emissions at subsequent stages of the product life cycle. This may involve the extent of processing the product has undergone and the packaging used, which will affect the level of processing required in subsequent life cycle stages as well as the type and quantity of product and packaging waste to management. Although this PAS only accounts for the cradle-to-gate stages of the product life cycle, information should be recorded separately that allows for subsequent emissions at use and disposal to be accounted for accurately. This enables the intended purpose to inform and drive choices towards reducing emissions across the product life cycle.*

5 Emission and removals

5.1 Primary requirement

The requirements of PAS 2050:2011 Clause 5 shall be applied, supplemented by 5.2.1 to 5.2.4 of this PAS.

5.2 Supplementary requirements implementing PAS 2050-2

5.2.1 Scope of GHG emissions and removals

In relation to PAS 2050:2011 5.1, the cradle-to-gate assessment of aquatic food products shall account for both GHG emissions to, and removals from, the atmosphere arising from all processes, inputs and outputs in the cradle-to-gate life cycle stages. Both fossil and biogenic sources for the gases listed in Annex A of PAS 2050:2011 shall be included, with the exception of human food and animal feed products.

For food and feed, emissions and removals arising from biogenic sources that become part of the product may be excluded. This exclusion shall not apply to:

- a) emissions and removals of biogenic carbon used in the aquaculture, fishing and processing of aquatic food products (e.g. in the combustion of biofuel for transport) where that biogenic carbon does not become part of the product;
- b) non-CO₂ emissions (e.g. methane, nitrous oxide, etc.) arising from degradation of waste food and feed and treatment of waste water from processing of aquatic products; and
- c) any biogenic component in material that is part of the final product but is not intended to be ingested (e.g. packaging).

Note 1 *The exclusion of emissions and removals arising from biogenic carbon for food and feed products avoids the need to calculate the biogenic CO₂ emissions arising from the decomposition of waste from the processing of aquatic food products. Non-CO₂ emissions do need to be accounted for.*

Note 2 *For most aquatic food and feed products, it is unlikely that they persist for more than the 100-year assessment period. However, where this does occur, the carbon storage implications need to be addressed (see 5.2.2). This may be the case for shells, in some circumstances.*

Note 3 *An assessment of greenhouse gas emissions from aquatic food products undertaken in accordance with PAS 2050:2011 in combination with PAS2050-2:2012, will include all the gases identified as GHG under the Kyoto agreement (carbon dioxide, methane, nitrous oxide, sulphur hexafluoride) and two groups of gases (hydrofluorocarbons and perfluorocarbons). Emissions of all of these will therefore need to be accounted for and recorded as CO₂ equivalents (CO₂ e).*

5.2.2 Carbon storage in aquatic food products

The requirements of PAS 2050:2011 5.5.1 and 5.5.2 shall be applied without supplement.

Note 1 *Carbon storage might arise where biogenic carbon forms a part of an aquatic food product not intended for ingestion (e.g. shells of clams, mussels, oysters, etc.).*

Note 2 *Storage of biogenic carbon in aquatic food products varies depending on the type of product and its disposal route (e.g. landfill, incineration).*

Note 3 *While aquaculture activities might result in additional carbon storage through the retention of biogenic carbon in aquatic organisms that have escaped or been discarded or lost to the surrounding natural environment, this potential source of storage is not included in the scope of this PAS.*

5.2.3 Inclusion and treatment of land use change

5.2.3.1 General

The requirements of PAS 2050:2011 5.6 shall be applied, supplemented by 5.2.3.2 of this PAS.

Note 1 *Land use change is especially relevant for feed ingredients production and land-based aquaculture.*

Note 2 *Some uses of land are not covered by the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, because adequate methods are not available. This is, for example, the case for aquaculture ponds. Until a method is developed by IPCC, a temporary approach is provided in the following (see 5.2.3.1).*

5.2.3.2 Limited traceability of products

The following hierarchy shall apply when determining the GHG emissions and removals arising from land use change occurring not more than 20 years prior to making the assessment:

- a) where the country of production is known and the previous land use is known, the GHG emissions and removals arising from land use change shall be those resulting from the change in land use from the previous land use to the current land use in that country, where industrial land is used to represent the current land use of aquaculture.

The GHG implications from land use change consist of GHG emissions and removals from vegetation and soil carbon stocks changes. Vegetation and soil carbon stocks of the previous land use shall be assessed in accordance to the relevant sections of the IPCC Guidelines for National GHG Inventories. In accordance with PAS 2050:2011, the carbon stock change shall be linearly amortised during a period of 20 years;

- b) where the country of production is known, but the former land use is not known, the GHG emissions arising from land use change shall be those resulting from the change in land use from the estimate of the weighted average of the land use in that country over the last 20 years to the current land use, where industrial land is used to represent the current land use of aquaculture.

The land use in the 20 years prior to the assessment shall be considered, using data from the United Nations Food and Agriculture Organization (FAO) (faostat.fao.org), starting with the most recent available year in this database. Estimating the land converted as a result of the new land use shall be calculated using the "maximum" approach. In this approach, the area of land converted is calculated by subtracting the amount of land used 20 years ago from the maximum amount of land used in the previous 20 years; and

- c) where neither the country of production nor the former land use is known, the GHG emissions arising from land use change shall be those resulting from the change in land use from the estimate of the weighted average of the land use in the countries in which the aquatic food product has been produced over the last 20 years to the current land use in those countries, where industrial land is used to represent the current land use of aquaculture.

All GHG emissions from land use change shall be attributed to the production of aquatic food products.

Note 1 Aquatic food products are generally labelled allowing for the identification of the producer and thereby the country of origin and the land area used.

Note 2 Countries in which an aquatic food product is produced can be determined from production statistics, and a cut-off threshold of not less than 90% of production by live weight may be applied.

Note 3 The capture of CO₂ in the previous land use plant coverage and delayed emissions from any harvested and consumed products, burning and decay of biomass is implicitly included in the land use change calculations and shall not be reported in another part of the GHG assessment, because this will result in double-counting.

5.2.4 Unit of analysis

The requirements of PAS 2050:2011 5.9 shall be applied without supplement.

Note 1 Aquatic food products include a great variety of product types each having their own specific features depending on product characteristics and on the market being supplied. Therefore, it is not feasible to establish specific requirements for reference flows or reference units, in a document intended to be applicable across all capture fisheries and aquaculture food products.

However, some general guidance with regard to defining functional units and reference flows can be provided, as follows (see also Annex B):

- be precise in the definition of physical and qualitative properties such as, weight, size, quality ranking, etc. This is especially important in case of assessments being used for comparison when exploring improvement options;
- consider the most appropriate units of analysis for the product. This will generally be the units usually applied in relation to the product type in question. Since the "gate" being considered in this specification is distribution until the retail, food service or equivalent gate, the appropriate functional unit the packaged unit as it arrives at the gate (if sold as a pre-packaged product); and
- be complete in the description of the functional unit. For instance, defining a functional unit as "one whole (gutted) sea bass as supplied to retail gate" means that the assessment would include the product, any packaging used and the proportion of product damaged through the supply chain.

Note 2 Although the unit of analysis is not specified by this PAS, 9.1 sets requirements for disclosing to third parties to ensure a common reporting unit.



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