Final report – Third Draft for comment

UNEP-SETAC Life Cycle Initiative - Flagship Project 3a (Phase 1)

Hotspots Analysis: mapping of existing methodologies, tools and guidance and initial recommendations for the development of global guidance

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UNEP-SETAC Life Cycle Initiative - Flagship Project 3a (Phase 1)

Hotspots Analysis: mapping of existing methodologies, tools and guidance and initial recommendations for the development of global guidance
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Authors

WRAP: Mark Barthel, Keith James, Jacqueline Guinness, Claire Barker.
PE INTERNATIONAL: Jim Fava, Curtis Haranana, Andrea Smerek.
Cd2e: Naeem Adibi.
UNEP: Sonia Valdivia, UN Online Volunteer Programme: Sofia Khan.

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Stephen Allen, Senior Associate, Sustain
Anne-Claire Asselin, Consultant, Life Cycle Thinking, Sustainable Consumption and Production, UNEP
Imola Bedo, Production Coordinator at European Commission - DG Environment
Katrin Bienne, Wuppertal Institute for Climate, Environment and Energy
Tom Brightman, Land Steward, Longwood Gardens
Sylvain Chevassus, SCP Policy Officer, French Ministry for Ecology, Sustainable Development and Energy
Brennan Conaway, Procurement Analyst, United States General Services Administration (US GSA)
Helene Cruypenninck, Consultant, Sustainable Lifestyles and Education, Sustainable Consumption and Production, UNEP
Nadia El-Hage Scialabba, Senior Officer, Food and Agriculture Organization of the United Nations
Dr Michele Galatola, Product Team Leader, European Commission DG Environment – Sustainable Production and Consumption Unit
Curt Garrigan, Coordinator, Sustainable Buildings and Climate Initiative, UNEP
Sriram Gopal, Policy Analyst, Association of Home Appliance Manufacturers (AHAM)
Mark Goedkoop, Chief Executive Officer, PRé Consultants
Priscilla Halloran, Senior Environmental Health Specialist, United States Environmental Protection Agency (US EPA)
Jacob Halcomb, Consultant, Sustainable Buildings and Climate Initiative, UNEP
Cuchulain Kelly, Consultant, Sustainable Public Procurement, Sustainable Consumption and Production, UNEP
Hanako Negishi Priestnall, Operator of EcoLeaf, Japan Environmental Management Association for Industry (JEMAI)
Arjen Hoekstra, Co-Founder and Member, Supervisory Council, Water Footprint Network (WFN)
Stuart Mann, Sustainability Certification Supervisor, Water Quality Association (WQA)
Dr. Llorenç Milà i Canals, Programme Officer, Science Focal Point – Sustainable Consumption and Production, UNEP
Simon Miller, Founding Partner, 3keel
Euan Murray, Chief Strategy Officer, The Sustainability Consortium (TSC)
Catherine Benoit Norris, VP Social Sustainability, New Earth
Helen Santiago Fink, Sr. Programme Officer, Buildings and Cities Acting Head, Built Environment Unit, UNEP
Georg Schöner, Concept Development Manager, SET initiative for applied sustainability - BASF Nutrition & Health
Jean-Paul Ventere, Chargé de mission, French Ministry for Ecology, Sustainable Development and Energy
Farid Yaker, Programme Officer, Sustainable Public Procurement, Sustainable Consumption and Production, UNEP
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**Acronyms and Abbreviations**

10YFP The 10 Year Framework of Programmes on SCP
ACLCA American Center for Life Cycle Assessment, Institute for Environmental Research & Education
AHAM Association of Home Appliance Manufacturers
AI Accountability International
ALCAS Australian Life Cycle Assessment Society
BSI British Standards Institution
CEN/TC Standards European Committee for Standardization/technical committee
CI Consumers International
CIP Consumer Information Programme
CIRAIG The Interuniversity Research Centre for the Life cycle of Products, Processes and Services
CREEA Compiling and Refining Environmental and Economic Accounts
CSP Category Sustainability Profile
DECC The UK Energy Efficiency Deployment Office
Defra The UK Department for Environment Food & Rural Affairs
DIY Do-It-Yourself
EC DG Environment The Directorate-General for the Environment is one of the more than 40 Directorates-General and services that make up the European Commission. Commonly referred to as DG Environment
E-LCA Environmental Life Cycle Assessment
EU EIPRO Environmental Impact of Products, analysis of the life cycle environmental impacts related to the final consumption of the EU-25 countries
EU FP7 Fusions FUSIONS (Food Use for Social Innovation by Optimising Waste Prevention Strategies) is a project about working towards achieving a more resource efficient Europe by significantly reducing food waste. It is funded by the European Commission framework programme 7.
FICCI Federation of Indian Chambers of Commerce
FLA Fair Labor Association
FSC Forest Stewardship Council
FTAO Fair Trade Advocacy Office
GHG Greenhouse Gas
GNR Getting the Numbers Right methodology
GPC Global Protocol for Community-Scaled GHG Emissions
HSA hotspots analysis
ICLEI Local Governments for Sustainability
ICRT International Consumer Research & Testing Ltd
IREE The Institute for Environmental Research and Education
ILAB US International Bureau of Labor Affairs
ILCD The International Reference Life Cycle Data System
ILO International Labour Office
INPSI International Network of Product Sustainability Initiatives
IOE International Organization of Employers
ISCP Institute for Sustainable Consumption & Production, College of Architecture & Environment, Sichuan University.
ISEAL International Social and Environmental Accreditation and Labelling Alliance
ISEAL Alliance The ISEAL Alliance is the global membership association for sustainability standards
ISO International Organization for Standardization
ITUC International Trade Union Confederation
JEMAI Japan Environmental Management Association for Industry
KPIs Key performance indicators
LC Life Cycle
LCA Life Cycle Assessment
LCC Life Cycle Costing
LCI Life Cycle Inventory
LCIA Life Cycle Impact Assessment
MSC Marine Stewardship Council
NCBA National Cattlemen’s Beef Association
NGO A non-governmental organization is any non-profit, voluntary citizens’ group which is organized on a local, national or international level.
PAS A consultative document where the development process and written format is based on the British Standard model. A Publicly Available Specification (PAS) is a sponsored fast-track standard driven by the needs of the client organizations and developed according to guidelines set out by BSI.
PCRs Product Category Rules
PGSI Public Gardens Sustainability Index
PSF Product Sustainability Forum
SAFA Sustainability Assessment of Food and Agriculture systems
SAI Sustainable Agriculture Initiative Platform
SASB Sustainability Accounting Standards Board
SCP Sustainable Consumption and Production
SEDEX The Supplier Ethical Data Exchange, is a not for profit membership organisation dedicated to driving improvements in responsible and ethical business practices in global supply chains
SETAC Society of Environmental Toxicology and Chemistry
SHSA Sustainability Hot Spots Analysis
S-LCA Social Life Cycle Assessment
SME Small- to Medium-sized enterprise
SPLC Sustainable Purchasing Leadership Council
TSC The Sustainability Consortium
UCLG United Cities and Local Governments
UN FAO UN Food and Agriculture Organization
UNEP United Nations Environment Programme
UNEP SBCI Greening the Building Supply Chain
UNEP SBCI UNEP Sustainable Building and Climate Initiative SBCI
US GSA (General Services Administration) Supply Chain Hotspots Project
WBCSD World Business Council for Sustainable Development (The Cement Sustainability Initiative)
WBCSD World Business Council for Sustainable Development
WFN Water Footprinting Network
WQA Water Quality Association
WRF World Resources Forum
WRI World Resources Institute
Definitions

Life Cycle Approaches:
Life Cycle Approaches: Life Cycle (LC) approaches encompass a wide range of methodologies and tools for the evaluation of various stages of the life of a product or organization, from raw material acquisition to final disposal, covering simplified methodologies from qualitative screening tools via footprint analysis (ISO 14046 and 14067), hotspot analysis and detailed life cycle assessment (LCA), (such as environment or social LCA or life cycle costing) based on the ISO standards of the ISO 14040 series and ISO 14072.

LC approaches can cover one or more impact categories (e.g. Water use, climate change and land use).

For the purpose of identifying organizations using LC approaches to reduce the impacts along the life cycle, applications that use the findings from such LC methodologies and tools are also considered LC approaches such as: Life Cycle Management, Sustainable Public Procurement, Eco or Sustainable Design and Eco-labels (based on the ISO 14020 series).

Note: Why hotspot analysis should be included in the LC approaches definition: Hotspot analysis typically uses life cycle approach based methodologies to identify hotspots in the product category / sector/ nation. The outcome from such hotspot analysis is used to identify actions and improvement opportunities to reduce the impact of the identified hotspots. Hotspot analysis is more materiality, research and stakeholder inclusion based evaluation, than tool-based evaluation to identify hotspots.

Hotspots Analysis:
A methodological framework that allows for the rapid assimilation and analysis of a range of information sources, including life cycle based studies, market, and scientific research, expert opinion and stakeholder concerns. The outputs from this analysis can then be used to identify potential solutions and prioritize actions around the most significant economic, environmental and social sustainability impacts or benefits associated with a specific country, industry sector, organization, product portfolio, product category or individual product or service. Hotspots analysis is often used as a pre-cursor to developing more detailed or granular sustainability information.
Foreword

This research is funded by the UNEP SETAC Life Cycle Initiative and forms part of the delivery of all three (3) of the objectives of its Phase 3 strategy, namely:

**Objective 1: Building the Science**
Enhance the global consensus and relevance of existing and emerging life cycle methodologies and data management

**Objective 2: Building the Capacity**
Expand capability worldwide to apply and to improve life cycle approaches; making them operational for organisations

**Objective 3: Supporting the Demand**
Communicate current life cycle knowledge and be the global voice of the Life Cycle community to influence and partner with stakeholders

This research project forms the first phase of the Life Cycle Initiative’s Flagship Project 3a, in which global hotspots analysis methodologies will be mapped and analysed to identify and understand their commonalities and differences. Ultimately the outcome of this study will be used to produce: a common methodological framework and global guidance for sustainability hotspots analysis; a protocol for the appropriate use and communication of sustainability information derived from hotspots analysis; and to evaluate and, if possible, implement a range of options to bring together the findings from existing hotspots studies to provide a richer, global picture of sustainability hotspots in the economy and society. The target audience for this study are hotspots analysis methodology owners/developers, users (entry-level through to experts), as well as interested observers and anyone with an interest in creating greater alignment / harmonization and consistency of approach between existing approaches to hotspots analysis.

The project also supports many of the objectives and needs of the programmes within the United Nations 10 Year Framework of Programmes on Sustainable Consumption and Production Patterns (10YFP on SCP), including the 10YFP programmes on Consumer Information (CIP), Sustainable Lifestyles and Education, Sustainable Food Systems, Sustainable Public Procurement, Sustainable Tourism and Sustainable Buildings and Construction.
Executive Summary

Background, introduction and context to the project

The information-age has led to a proliferation of content, ranging from the assimilation and analytical challenges associated with 'big data' through to ever-increasing publication lists of research and innovation findings. The major challenge for businesses, policy-makers, academic researchers and consumers is deciding where and how to act to have the maximum impact. For any action a balance must be struck between speed of response and pragmatism and the need to be informed by reliable and trustworthy science-based evidence.

A growing number of different analytical disciplines are using a prioritisation method called 'hotspotting' or 'hotspots analysis'. It is being used to filter and distil often large volumes of information to identify and prioritise hotspots for further investigation or action by industry, governments and other stakeholders. There is a rapidly growing number of examples globally of how hotspots analysis is being used to address significant sustainability challenges, like unsustainable levels of resource use and waste; water scarcity and improved river catchment management; product sustainability and the setting of sectoral sustainability strategies; by helping to provide focus in an era of information overload.

The findings from hotspots analysis provide a more comprehensive understanding of impacts. They also allow for the prioritization of resources and actions in countries, industry sectors, product portfolios, product categories or individual products that really matter by virtue of their environmental, social and ethical impact profile and/or their physical trading volumes and economic value in the economy.

In addition to streamlining research and analysis, a common feature of hotspots analysis is the presentation of information and findings in accessible formats, including for non-technical audiences, who are often the key decision-makers in policy and business settings.

The benefits of hotspots analysis include the following factors:

- The rapid assimilation and analysis of multiple evidence threads leading to accessible outputs and a clearer understanding of the actions required to eliminate, reduce or mitigate identified hotspots;
- A highly cost-effective approach to life cycle thinking and management across multiple impact categories and issues, sectors or product categories that is perhaps more suited to developing countries, emerging economies and SMEs trying to find an evidence-based focus for their actions;
- A ‘beyond LCA’ view of hotspots that helps users to overcome some of the limitations associated with traditional LCA (e.g., the assessment of multiple, cumulative impacts from different activities in the same geographical location; a more explicit way of understanding wasted resources in a sector of product system; the inclusion of ethical and governance issues in the analysis); and
- The provision of both technical and non-technical information to decision-makers in government, business and civil society.

However, there is currently no common global approach to hotspots analysis; nor has there been any effort to bring together or share best practice amongst those organisations or initiatives currently developing and using these methods. Nor is there any accepted guidance.
on how to translate and apply the results of hotspots analysis into meaningful sustainability
information and insight for use by industry, governments and other stakeholders.

Recognising that this situation may result in a range of negative impacts, including a lack of
consistency in methodological approach, difficulties in comparing the results of hotspots
studies and the potential for conflicting sustainability information in the marketplace; the
UNEP SETAC Life Cycle Initiative established a new Flagship Project to address these and
other issues.

This report includes the findings from the first phase of this new Flagship Project 3a on
‘Hotspots Analysis and Sustainability Information’.

The ultimate aim of this Flagship Project is to produce:

- A common methodological framework and global guidance for sustainability hotspots
  analysis;
- A protocol for the appropriate use and communication of sustainability information derived
  from hotspots analysis; and,
- To evaluate and, if possible, implement a range of options to bring together the findings
  from existing hotspots studies to provide a richer, global picture of sustainability hotspots
  in the economy and society.

The primary focus of this project is to identify existing methodologies, tools and resources
that can or could be applied at three scales or levels of detail, namely at the national,
sectoral or product category-level. A secondary research objective is to seek to determine
the potential use, adoption or adaptation of these methodologies by developing countries,
emerging economies, SMEs or for use at the city-scale. The use of these methodologies at
the organisational level is out of the scope of this project.

The project also supports many of the objectives and needs of the programmes within the
UNEP’s 10 Year Framework of Programmes on Sustainable Consumption and Production
(10YFP on SCP), including the 10YFP programmes on Consumer Information (CIP),
Sustainable Lifestyles and Education, Sustainable Food Systems, Sustainable Public
Procurement and Sustainable Buildings and Construction.

Project objectives and approach

This initial phase of the project, which occurred between May and September 2014, involved
the identification and mapping of existing hotspots studies, initiatives and methodologies
from around the world in order to better understand the:

- Range and diversity of approaches to hotspots analysis in existence and how they are
  being applied;
- Suitability of different hotspots analysis methodologies for use at different scales or levels
  of granularity (e.g., at the national-, sector- or product category-level);
- Commonalities and differences among these different methodologies and the reasons
  behind them, including key methodological components and process steps;
- Body of best practice that already exists around methodology development and
  application;
- Who is developing and using these methodologies and the business models behind them;
- Topics, sectors of the economy and product categories they are being applied to;
The range of outputs, findings, outcomes and impacts that result from these studies, initiatives and methodologies; and

Opportunities to develop a common global approach to hotspots analysis that is flexible enough to be applied at a range of different scales and levels of granularity and accuracy based on user needs and budget.

Overview of the research methodology and process

In order to achieve these objectives the following research methodology and process has been used to identify, short-list and analyse hotspots analysis methodologies:

Shortlisting and screening of existing methodologies for preliminary selection:

- Development of criteria for shortlisting the hotspots analysis methodologies identified by the authors and signed-off by the project sponsors in May 2014 (see section 2.2 of the report below). As per the project brief, three (3) national, five (5) sector-level and ten (10) product category-level hotspot analysis methodologies were to be shortlisted for further investigation.
- Desktop research was conducted by the authors during May and June 2014 to gather publicly available information on existing hotspots analysis methodologies and their application at different scales and levels of detail.
- An online survey was developed and run over a three-week period in June and July 2014 with relevant groups of methodology developers, owners and users to identify new hotspots methodologies or secure more information on the list of existing methodologies identified by the project team. See Annex 4.3 for a list of survey questions. Over eighty (80) responses were received to the survey and a preliminary list of forty-four (44) methodologies was compiled as a result (see Table 1 for more information on these methodologies).

Further review of selected methodologies for secondary selection:

- The selection criteria were then applied to the preliminary list of methodologies in order to identify those methodologies considered worthy of further investigation.
- A review of the popularity of different hotspots analysis approaches based on simple analysis of website traffic using Amazon’s on-line Alexa tool. The purpose of this review was to further evaluate and prioritize the long list of forty-four (44) hotspot methodologies identified by through desktop research and by respondents to the on-line survey. As information regarding traffic to websites is confidential and not commonly shared the authors used the Alexa tool to estimate how popular the methodologies were based on online activity, and used this information as a proxy for their likely scale of uptake or application.
- Approximately twenty (20) telephone interviews and e-mail exchanges took place with methodology developers, owners and users during July and August 2014 to gather additional specific information on hotspots analysis methodologies.

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1 Three (3) of these methodologies are exclusively national-level, thirteen (13) are sector-focused and eighteen (18) are applied at the product-level. Nine methodologies were broader in their application since they could be applied in more than one of scale of application – five (5) methodologies may be applied to national, product and sector, and four (4) to both the product- and sector-levels.

2 Alexa.com is an online tool that allows users to do a basic analysis of the ‘popularity’ of different websites. See: http://www.alexa.com/
Access to privileged information / data / study findings through agreements or understandings with certain hotspot methodology owners for further in-depth analysis.

**Figure ES 1:** Preliminary list of forty three (43) hotspots analysis methodologies characterized by scale of application – national, sector and product.

While forty-four (44) hotspots analyses were identified, The European Investment Bank (2014) Methodologies for the Assessment of Project GHG Emissions and Emission Variations methodology is excluded from further analysis since its scale of application is at the project level and outside the scope of this project. Therefore only forty-three (43) are included in the Venn diagram.

NOTE: There are two distinct hotspots analysis methodologies included under Social Life Cycle Assessment (Social LCA) in the product-level methodologies segment of this Venn diagram. These are: the UNEP/SETAC Life Cycle Initiative’s Guidelines for Social Life Cycle Assessment of Products; and the Roundtable for Product Social Metrics’ Handbook for Product Social Impact Assessment.
At the end of this process twenty-nine (29) methodologies were shortlisted (see Table 2 for further details of shortlisted methodologies); and methodology summaries were prepared for each methodology (see Annex 4.7). These methodology summaries allowed the authors to bring together all of the research threads developed so far (desktop research, on-line survey findings and telephone interviews and e-mail exchanges with methodology owners/developers and users) to provide a coherent view of each shortlisted methodology.

In a small number of cases more than one methodology was included in a single methodology summary, as they were considered to be sufficiently similar (e.g. the GHG Protocol Standards); or very complementary approaches (e.g. the UNEP SETAC Life Cycle Initiative guidance on Social LCA and the Roundtable for Social Product Metrics’ Handbook for Product Social Impact Assessment).

Further investigation showed that eight (8) of the twenty-nine (29) shortlisted methodologies were sufficiently similar to other shortlisted methodologies that they could be put to one side as far the development of the global guidance was concerned. For example, the ISO 14067, PAS 2050 and the GHG Protocol Standards all shared a very similar methodological approach, rule sets, assumptions, etc. allowing the authors to use one methodology as a proxy for three methodologies in this case.

In-depth assessment and segmentation of selected methodologies:

As such, the authors then focused their efforts on the analysis of commonalities and differences for the remaining twenty-one (21) of the shortlisted methodologies, including:

- four (4) methodologies that are predominantly applied at the national-level;
- five (5) methodologies that are predominantly applied at the sector-level; and
- twelve (12) methodologies that are predominantly applied at the product category-level;

three more methodologies than was originally specified in the quotas contained in the project brief.

Analysis of the key commonalities and differences among methodologies was drawn from the information in the methodology summaries for the remaining twenty-one (21) prioritised methodologies using the following parameters for each methodology (as contained in Section 2.4):

- **Approach**: is the methodology based on a quantitative or qualitative approach, or a combination of the two – i.e. a ‘beyond LCA’ approach?
- **Single or multi-impact** category or issues addressed?
- **Breadth of impacts / hotspots covered**: environmental, social, ethical, economic, governance
- **Level of stakeholder engagement**: in the development, piloting and broader use of the methodology
- **Availability of supporting tools**: does the methodology provide supporting tools or explicitly include measures or approaches to support stakeholder efforts to address hotspots or impacts (e.g. identifying hotspots, supporting tools, data or knowledge bases, supporting piloting of a range of solutions to identified hotspots, etc.)?
- **Outreach**: is the methodology well-known, widely disseminated or applied?
- **Target audience**: ability to cater for different user needs and potential for flexibility in application across relevant sectors or product categories
- **Business model**: how was / is the development and use of the methodology funded?

As part of this process, the authors also segmented the twenty-one (21) prioritised methodologies according to their principal scale of application – i.e. national, sectoral or product category-level usage. This analysis is summarised in Tables 3-5 of this report with accompanying narrative contained in Sections 2.4.1, 2.4.2 and 2.4.3. An integrated analysis
is also provided in Section 2.5 and in Figure 4, which is reproduced below for ease of reference.

For more information on the key findings and conclusions from this research please see the section below.
**Figure ES 2**: Reproduction of Figure 2: Key hotspots analysis methodologies - summary of evaluation against several parameters

### Legend
- Full engagement and pilot testing
- Moderate engagement throughout process
- Limited phases of engagement
- Easy
- Moderate
- Difficult

### Scale of Application
<table>
<thead>
<tr>
<th>Methodology</th>
<th>Stakeholder engagement</th>
<th>Impact coverage</th>
<th>Applicability to SMEs</th>
<th>Applicability to Emerging Economies</th>
<th>Ease of Use</th>
<th>Business Model</th>
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Key findings and conclusions

General findings

Existing hotspots analysis methodologies are being developed with a number of audiences and sustainability-based applications in mind. Some studies are being used to help government policy-makers to focus voluntary agreements or action plans with industry in areas where sustainability hotspots have been identified. For example, as is the case with WRAP’s Product Sustainability Forum’s work in the UK food chain; the French Government’s work to provide more sustainability information to consumers; or the Water Footprint Network’s analysis of water scarcity hotspots in major river catchments.

Businesses are using hotspots analysis to focus their resources, drawing up action plans and practical programmes of work to eliminate, reduce or mitigate hotspots in their global value chains; and tackling major societal and commercial issues like food waste, food and resource security (future supply risk and resilience issues); and water use in agriculture. For example, the work of UK grocery retailer, Tesco, to tackle the food losses and food waste associated with the international sourcing of its products and their use by consumers; and the work of The Sustainability Consortium in building consensus around the key sustainability hotspots to address in consumer goods value chains.

Other stakeholders are using the findings from hotspots analysis to inform their thinking. For example, the Oxford Martin School at Oxford University is working alongside WRAP in the UK to use hotspots analysis to inform its thinking on the research, policy and business drivers to facilitate a mass movement over time to healthier, more sustainable eating patterns or diets.

In some cases, the scope of hotspots analysis methodologies and studies are broadening beyond consideration of one or more environmental impact categories and including ‘beyond LCA’ approaches and wider sustainability topics like biodiversity management, animal welfare, fair trading arrangements, land use and land use change and governance issues around raw materials or water resources. This development would suggest that both methodology developers and users see the value in securing a more holistic view of hotspots, allowing them to identify where trade-offs may need to be considered (e.g. between traditional intensive agricultural practices and the potential impact on the agri-ecosystems that support them). The importance of taking a ‘beyond LCA’ approach to the development of hotspots analysis methodology was also highlighted by stakeholders as can be seen below and in Section 3.1.3.

As per Table 4 above, the vast majority of the twenty (21) prioritised methodologies (20 out of 21) were considered suitable for use by SMEs. Whilst three quarters of the methodologies (15 out of 21) were considered suitable for use in developing countries and emerging economies. However, it is also important to note that the analysis in Table 2 of the main report illustrates that none of the shortlisted methodologies was considered ‘easy’ to use. More than half were considered ‘difficult’, requiring some expert knowledge or experience; and the remainder were classed as ‘moderate’, requiring some expert guidance to use. As a tool that is used to facilitate decision-making as a precursor to (or in lieu of) a more detailed
analysis, hotspots analysis still seems to require some expert input.

Examples of how hotspots analysis is being applied world-wide include the assimilation and analysis of life cycle-based information, supporting scientific research, market information, expert opinion and stakeholder concerns to prioritise the development and implementation of:

- Product- and sector-level sustainability standards;
- Government or trade association sponsored voluntary agreements or action plans with industry;
- Policy and research and innovation activities to drive more sustainable forms of production and consumption;
- Strategic prioritization of areas for impact management in global value chains;
- Information to inform consumer-facing campaigns and messages on key sustainability themes; and
- Pilots, value chain and stakeholder collaborations and partnerships to address key sustainability hotspots.

Three broad business models for methodology development and use were identified (public funding, private funding and hybrid funding – where support can come from a mix of government, private sector and charitable foundations. This review suggests that there is no set pattern to the evolution of business models. More information on these business models can be found at Section 2.4.3.

**Specific findings: application of hotspots analysis at different scales**

The findings from this project suggest that hotspots analysis is highly adaptable and flexible, and can be used at a number of different scales or levels (e.g. countries, cities, industry sectors, product portfolios, product categories or individual products) to overcome some of the challenges around managing and applying ‘big data’ and the ever increasing volumes of research findings available to decision-makers. The findings suggest that existing sector-level hotspots analysis have the potential to be applied across multiple sectors of an economy. Similarly, product category-level hotspots analysis methodologies also exhibit the potential to be applied across a range of different product categories. Examples of the sectors that existing hotspots analysis methodologies cover include: food and grocery products, DIY (home improvement) products, textiles and clothing, electrical and electronic products, household appliances, toys and leisure (public gardens).

Some hotspots methodologies have been deliberately developed to be iterative in nature, starting by conducting an analysis of the hotspots in a national economy, then selecting priority sectors or cross-cutting hotspots for further analysis; and then identifying and taking action on the priority products and hotspots in product categories (e.g. bakery products) or for groups of similar products within a broader product category (e.g. white bread). Other methodologies can accommodate or be adapted to operate at more than one scale or level of detail. Examples of this approach can be found in the methodologies from WRAP’s PSF, EU EIPRO, Getting the Numbers Right, Social Hotspots Database, Social LCA and the Water Footprint Network.

It is possible to draw some general conclusions (based on our analysis of the short-listed methodologies) on the composition and use of hotspots analysis methodologies at different scales of application.
For example:

**National-level methodologies** all utilise a quantitative approach, are generally based on input/output analysis and materials flows analysis; and focus solely on environmental impacts. All involve multiple stakeholders in their development.

**Sector-level methodologies** (with one exception) cover environmental and social impacts; with the majority including both quantitative and qualitative inputs. Some include a broader range of impacts, including economic and governance impacts. All involve multiple stakeholders in their development and provide some form of support tools for their users.

**Product category-level** methodologies all use a quantitative approach as a minimum with the majority combining this with qualitative inputs. The predominant scope of product category-level methodologies is environmental impacts, with roughly half the methodologies identified focusing on a broader range of impacts and issues, such as economic impact (e.g. WRAP’s Product Sustainability Forum); and social and ethical impacts (e.g., The Sustainability Consortium, Social Hotspots Database and the Wuppertal Institute’s Sustainability Hot Spots Analysis methodology). All involve multiple stakeholders in their development and use. With two exceptions (AHAM and WQA) all methodologies are applied across multiple product categories and therefore have broad target audiences.

**Recommendations for the development of global guidance**

**Key stakeholder feedback**

Feedback from telephone interviews and e-mail exchanges with methodology developers/owners and users has highlighted some key learning and observations from experience of existing hotspots methodologies that should be considered in the development of global guidance (more detailed feedback on these points can be found in Section 3.1.3):

**‘Beyond LCA’:** Most stakeholders were in favour of hotspots analysis methodologies that utilise a mix of quantitative and qualitative analysis to make the analysis more well-rounded, market relevant and able to overcome some of the limitations of traditional LCA approaches.

**Goal and scope clarity:** was considered to be critically important to the successful application of any hotspots analysis methodology, including early engagement with key stakeholders.

**Stakeholder credibility and a phased approach** to the development and application of any hotspots analysis methodology is seen as another important factor; building internal capability, engaging critical friends to review the approach and highlighting quick wins and successes all help to achieve a successful outcome.

**Keep it actionable and manageable:** Stakeholders suggested that it is really important to identify how many hotspots can be practically dealt with at one time. This has implications for how thresholds or materiality criteria are set – i.e., when does an aspect or impact become a hotspot? Clarity of actions required to address the hotspot is also seen as important component in the development of any methodology.

**Prioritization and the ‘addressability’ of hotspots:** Many stakeholders called for clarity around the nature, scale and location of the hotspot in the sector, product lifecycle or value chain; and how ‘addressable’ they are in the current infrastructure, market, operational or economic context (e.g. ability of the company to influence the hotspot, ease and cost of implementation of solutions to address the hotspot, complexity of the sector or value chain, etc.). In some cases it is likely that some form of pre-competitive collaboration will be required to tackle a hotspot – i.e. to share the cost of implementation; agree a common
targeted approach; or build and share expertise and capacity and capability to respond.

**Make it visual:** A number of stakeholders commented on the fact that the clear and intuitive visualization of hotspots analysis findings is really important to them and particularly to their non-technical colleagues who are faced with making a decision on the actions that they need to take or mandate to address a hotspot. Sector heat maps and product hotspot matrices, synthesized findings in slide deck form, short digestible action plans and searchable libraries of solutions are all considered helpful.

**Periodic review and revision of hotspots:** Stakeholders suggested that hotspot analysis should be revisited and updated periodically to capture any changes that take place over time, which could affect the applicability, usability or purpose of the hotspot analysis.

**Clear communication of uncertainty:** A number of stakeholders called for clearer statements of uncertainty in the findings from hotspots analysis; and for the inclusion within hotspots analysis methodology of clear guidance and tools to support the development of data quality, management and analysis protocols, methods for uncertainty testing; clear rules for the communication of assumptions, proxy products or processes and any models used in the analysis.

**Case studies:** Several stakeholders stated that case studies and examples that showed how to apply a methodology were incredibly helpful, particularly when applying the methodology for the first time. One specific example was given for the GHG Protocol Product Standard, which is peppered with case studies from road-testing companies to support users of the Standard.

**Suggested methodology and process for hotspots analysis**

Utilizing insights gained from stakeholders interviewed, as well as from assessing the key hotspots analysis methodologies, we recommend the following methodological process steps, as requisite, in conducting hotspots analysis (regardless of scale) (more detailed information is available in Section 3.2.1):

1. **Define, clarify and solicit agreement of the goal and scope** of study utilizing, wherever possible, a life cycle approach, including identification of the target audience for the hotspots analysis (stakeholder mapping and engagement) and gaining a good understanding of their practical needs.

2. **Gather data, seek expert insight, knowledge building and analysis**, compile and organize data, information and insights according to the scope and requirements of the study, including: data quality and management parameters; appropriate use of expert insight; stakeholder consultations; identification of relevant existing studies; the 'normalization', aggregation or disaggregation of studies and data in order to provide a consistent view / boundary of findings; uncertainty testing; identifying any other useful information; and organizing the data and information to facilitate the identification of any significant aspects and impacts.

3. **Identify and validate hotspots** utilizing all of the evidence threads from Step 2 to build a picture of the likely issues and impact hotspots that will need to be addressed; and validating them with key experts and stakeholders.

4. **Identify and prioritize actions** by working with key stakeholders to identify, validate and shortlist potential impact reduction opportunities, which can be used to tackle the ‘priority’ sectors or product categories and associated hotspots identified in Step 3. Produce tools and resources to support action by stakeholders and pilot or road test a range of solutions to identify proven or effective solutions. Publish and disseminate findings, including case studies, business case tools, calculators, industry
events, etc. Capture and publish progress over time to encourage others to do the same.

5. **Review initial findings** with experts and key stakeholders.

6. **Presentation and validation of findings.**

7. **Identification of any implementation gaps and recommendations** for how they might be filled.

8. **Revisit hotspots identified** after specified period and re-evaluate against new life cycle or technical data, changes to stakeholder perceptions, new issues arising or potential impacts, progress made/challenges encountered in managing previously identified hotspots.

**Next steps**

In order to take forward the findings from this initial mapping project the authors propose the following practical steps (further detail can be found in Section 3.3):

1. Finalise the report following a wider stakeholder engagement and consultation process with the list of organisations and initiatives identified in Section 3.2.2 of this report. The principal objective of this consultation is to test and refine the initial thinking and structure for the common methodological framework, global guidance and protocol.

2. Undertake a short piece of research and targeted stakeholder engagement and consultation to better understand the current use and communication of product sustainability information derived from hotspots analysis. This will form the basis for the next iteration of the protocol for discussions with the wider stakeholder group identified in this report.

3. Plan and execute one or more one to two-day regionally representative facilitated rapid prototyping workshops to further develop the global guidance; and to investigate the options available to build and transfer knowledge, data, information and best practice from existing hotspots analysis initiatives (dependent on available budget).

4. Use the feedback and learning from these workshops to hone the three (3) deliverables and, if budget permits, undertake a final validation, refinement and consensus-building exercise by running a single global three to five (3-5) day Pellston-style5 workshop.

5. An optional further stage would be to undertake a series of practical piloting projects to road-test the three (3) deliverables with interested parties in advance of publication.

**General Disclaimer:** Owing to time and budget constraints, the list of hotspots analysis methodologies included in this report is not meant to be - and should not considered to be - exhaustive. While it is the authors’ intent to be as comprehensive as possible, given the limitations of the Phase 1 schedule and budget available for this mapping project, we recognize that there may be methodologies (e.g. Life Cycle Costing, etc.) that could be included and further analysed in future phases of the broader Flagship Project 3a. Some of these methodologies, which came to light during the closing stages of this phase of the project, are listed in Annex 4.5. Given the emerging and evolving nature of hotspots analysis methodologies, it is also likely that other methodologies may be discovered and elucidated during upcoming stages in the development of the global guidance. Clearly these methodologies still have the opportunity to be included and addressed in future phases of the broader Flagship Project 3a (e.g., as additional seed documents for the development of the global guidance; or as a result of future stakeholder consultations and workshops).

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5 A Pellston workshop is an intensive, week-long event format developed by the Society of Environmental Toxicology and Chemistry (SETAC) in the 1970's. Each of the more than 50 such workshops held to date has adhered to the same structure, format, and ground rules. Among these are the requirements that each of the invited participants agrees to engage as an individual expert, not as a representative of an organization, participate for the entire duration, contribute to a major publication derived from the effort, and respect the consensus building process employed during the conduct of the workshop. SETAC Pellston workshops have produced seminal publications across a variety of environmental science topics and issues, including five such publications on LCA.
1.0 Background and Introduction

1.1 Background

The UNEP Programme of Work on Resource Efficiency and Sustainable Consumption and Production has an area of work focusing on the following objective:

Demand-side decisions and consumption choices favour more resource efficient and environmentally responsible products, driven and enabled by harmonized and internationally recognized product sustainability information.

The availability of high quality, transparent, credible and easily accessible information on the sustainability of products is one of the critical enabling conditions for advancing society towards more sustainable consumption and production patterns and the transition to a green economy.

Sustainability information should be based on the assessment of a product’s impacts throughout the life cycle, from the extraction and use of raw materials to end of life. This information allows different market actors to identify critical areas for action and ensures net environmental, social / ethical (including governance) and economic improvements can be achieved without shifting impacts from one part of the lifecycle to another. Information should be also made available in a format understandable to the user to make it meaningful and usable in different contexts (e.g. supporting informed purchasing decisions and providing advice and guidance on the responsible use, reuse, recycling and disposal of products).

Hotspots analysis is an analytical tool that is being used as a pre-cursor to developing product sustainability information. It allows for the identification and prioritization of key production and consumption hotspots and the range of actions required to reduce their impact, whether they be technological, social, behavioural or eco-innovation\(^6\) solutions. This approach can be positioned at a country level (national) and at a product/value chain level (industry sectors, individual organizations, product portfolios, product categories or individual products). The findings from hotspots analysis helps different actors to understand and focus on what really matters by virtue of the scale of the environmental, social and ethical\(^7\) impacts identified and /or their physical trading volumes and economic value in the economy.

While a tool on ‘hotspots analysis’ can be helpful in many regards, there is currently no common global approach to hotspots analysis; nor has there been any effort to bring together or share best practice amongst those organisations or initiatives currently developing these methods. Nor do any accepted principles or guidance exist on how to translate and apply the results of this hotspot analysis into meaningful sustainability information and insight for use by industry, governments and other stakeholders.

Source: The International Life Cycle Board of the UNEP/SETAC Life Cycle Initiative

\(^6\) The UNEP definition of eco-innovation is as follows: Eco-innovation is the development and application of a business model, shaped by a new business strategy that incorporates sustainability throughout all business operations based on life cycle thinking and in cooperation with partners across the value chain. It entails a coordinated set of modifications or novel solutions to products (goods / services), processes, market approach and organizational structure which leads to a company’s enhanced performance and competitiveness.

\(^7\) Ethical impacts are often treated separately from social impacts (which typically cover issues such as workplace health and safety or labour standards); and can include topics such as animal welfare or fair trading practices.
The potential negative impacts of not having a common global approach to hotspots analysis are manifold and might cause for example:

- The exclusion of significant impacts or hotspots due to limited regional (geographical) scoping of analysis; or as a result of impacts or hotspots being excluded from the analysis; or as a result of different methods setting different thresholds for when an impact should be considered as a hotspot (e.g. does an impact become a hotspot if it accounts for 15% or 25% of the total impacts of the product life cycle);
- Conflicting sustainability information for the same (or similar) products, arising from the use of different methodologies thereby limiting comparability of studies and findings;
- Duplication of effort and inefficient use of resources by initiatives working in parallel to create sustainability standards and information for the same product;
- Duplication of effort at the user level as a result of having to provide similar information in different ways, as required by different customers, stakeholders or markets, causing confusion for users;

This lack of consistency in hotspots analysis methodologies is partly driven by the absence of a global overview and understanding of available hotspot analysis methodologies; their commonalities and differences; and the reasons behind these differences.

Addressing this market information failure and gaining an improved understanding of existing methodologies and their application would help to align existing work and seek agreement on future work to develop global guidance and principles for hotspots analysis.

This research funded by the UNEP SETAC Life Cycle Initiative (as described in the Foreword) forms part of the delivery of its Phase 3 strategy. This project forms the first phase of the Life Cycle Initiative’s Flagship Project 3a, in which global hotspots analysis methodologies will be mapped and analysed to identify and understand their commonalities and differences. Ultimately the outcome of this study will be used to produce:

- a common methodological framework and global guidance for sustainability hotspots analysis;
- a protocol for the appropriate use and communication of sustainability information derived from hotspots analysis; and
- to evaluate and, if possible, implement a range of options to bring together the findings from existing hotspots studies to provide a richer, global picture of sustainability hotspots in the economy and society.

In addition, the provision of access to best practice approaches to hotspots analysis; and the availability of comparable, consistent, credible, and comprehensive information about the sustainability performance of sectors, products’ and companies will enable and support positive change in the global marketplace.

There is an opportunity to utilise sustainability information derived from hotspots analysis world-wide through the joint work of various concerned actors working together under a recently launched global CIP, which has been prioritized under the 10YFP on SCP adopted at the UNCSD Rio+20 Conference in June 2012. An International Network of Product Sustainability Initiatives (INPSI) has also recently come together to support the 10YFP.

The 10YFP builds on the experience gained during a preparatory process, known as the Marrakesh Process, which identified the regional needs and priorities for the promotion and adoption of more sustainable consumption and production practices.
In line with Programme Area 1 of the Consumer Information Programme (CIP) on ‘Improving Availability, Methodologies and Quality of Consumer Information’ this study is a key building block to address key challenges outlined in Sub Programme Area 1c of the CIP to ‘Improve availability, credibility and relevance of consumer information through principles & guidelines’.

1.2 Introduction to hotspots analysis: what is it and what does it involve?

1.2.1 Hotspot Analysis

The information-age has led to a proliferation of content, ranging from the assimilation and analytical challenges associated with 'big data' through to ever-increasing publication lists of research and innovation findings. The major challenge for businesses, policy-makers, academic researchers and consumers is deciding where and how to act to have the maximum impact. For any action a balance must be struck between speed of response and pragmatism and the need to be informed by reliable and trustworthy science-based evidence.

A growing number of different analytical disciplines are using a prioritisation method called 'hotspotting' or 'hotspots analysis'. It is being used to filter and distil often large volumes of information to identify and prioritise hotspots for further investigation or action by industry, governments and other stakeholders. There is a rapidly growing number of examples globally of how hotspots analysis is being used to: address significant sustainability challenges, like unsustainable levels of resource use and waste; water scarcity and improved river catchment management; product sustainability and the setting of sectoral sustainability strategies; by helping to provide focus in an era of information overload.

The findings from hotspots analysis allow for the prioritisation of resources and actions in countries, industry sectors, product portfolios, product categories or individual products that really matter by virtue of their environmental, social and ethical impact profile and/or their physical trading volumes and economic value in the economy. Examples of how hotspots analysis is being applied world-wide include the assimilation and analysis of life cycle-based information, supporting scientific research, market information, expert opinion and stakeholder concerns to prioritise the development and implementation of:

- Product- and sector-level sustainability standards;
- Government or trade association sponsored voluntary agreements with industry;
- Policy and research and innovation activities to drive more sustainable forms of production and consumption
- Strategic prioritization of areas for impact management in supply chains;
- Information to inform consumer-facing campaigns and messages on key sustainability themes; and
- Pilots, value chain and stakeholder collaborations and partnerships to address key sustainability hotspots

In addition to streamlining research and analysis, a common feature of hotspots analysis is the presentation of information and findings in accessible formats, including for non-technical audiences, who are often the key decision-makers in policy and business settings.
The benefits of hotspots analysis include the following factors:

- The rapid assimilation and analysis of multiple evidence threads leading to accessible outputs and a clearer understanding of the actions required to eliminate, reduce or mitigate identified hotspots;
- A highly cost effective approach to life cycle thinking and management across multiple impact categories and issues, sectors or product categories that is perhaps more suited to developing countries, emerging economies and SMEs trying to find an evidence-based focus for their actions;
- A ‘beyond LCA’ view of hotspots that helps users to overcome some of the limitations associated with traditional LCA (e.g. the assessment of multiple, cumulative impacts from different activities in the same geographical location; a more explicit way of understanding wasted resources in a sector of product system; the inclusion of ethical and governance issues in the analysis); and
- The provision of both technical and non-technical information to decision-makers in government, business and civil society.

An analysis of the existing hotspots analysis methodologies highlighted during this research project has identified four (4) common methodological phases or process steps in conducting a hotspots analysis. These are illustrated in Figure 1 below and described in more detail in the text below under the following headings:

1) Goal and scope definition
2) Data gathering, expert insight and analysis
3) Hotspots identification and validation
4) Prioritizing action

**NOTE:** These initial findings and the proposed phases, process steps and content for a common methodological framework and global guidance on how to conduct hotspots analysis (contained in Section 3.2.1 of this report) will form the basis for further consultations with stakeholders at later stages in this Flagship Project.
**Figure 1**: Overview schematic of a typical hotspots analysis process showing four key phases of the analysis and anticipated / potential outputs from each phase.

### 1.2.2 Typical steps for hotspots analysis

The following steps illustrate what a typical hotspots analysis involves.

**Phase 1: Goal and scope definition**

- Define the audience for the study and their likely needs - i.e. the goal and scope of the study;
- Stakeholder mapping and engagement (NOTE: in practice, as noted in Figure 1 above, this activity is usually on-going across all phases of the analysis);
- Consult the audience for the study and agree the study boundary and the selection of appropriate issues, impact categories and metrics to focus on (these can be confirmed in Phase 3 following wider stakeholder consultation);
- Identifying and compiling suitable data sources and setting data quality parameters, including the ground rules for any assumptions, use of ‘proxy’ products, processes or studies where data gaps exist, etc.; and
- Stakeholder mapping and engagement.
Phase 2: Data gathering, expert insight and analysis

- Knowledge building and data mining, including expert interviews and stakeholder consultations; and
- Drawing together different evidence threads – e.g., available life cycle data, input / output and country / sectoral analysis, product portfolio, supporting scientific research, product specifications, product sourcing information, sales volumes, trade data and physical materials flows, expert opinion and stakeholder concerns and viewpoints.

Phase 3: Hotspots identification and validation

- Agreement of materiality or significance thresholds – i.e. when does an aspect or impact become a hotspot and why;
- Identification, analysis, ranking, characterization and stakeholder validation of hotspots, including the development and agreement of the criteria to be used in the ranking process;
- Identification and prioritization of impact reduction opportunities and of any existing initiatives that are already addressing part or all of an identified hotspot;
- Review of initial findings by experts and key stakeholders;
- Presentation and validation of the findings (including for non-technical audiences); and
- Identification of any implementation gaps and recommendations for how they might be filled.

Phase 4: Prioritising action

- Action planning, development of industry guidance and standards and evidence-based government policy, piloting or road-testing of potential solutions, industry collaborations, etc.; and
- Working with relevant stakeholders to disseminate and mainstream proven or effective solutions based on feedback from piloting activities.

NOTE: As suggested in Figure 1 above, particularly in Phase 2 process ‘arrow’, hotspots analysis can also be an iterative process operated at a number of different scales or levels of detail. For example, an analysis may start with an assessment of the hotspots in the sectors of a national economy and continue over time through to the identification of hotspots at the product category-level.

1.2.3 Information gathering for hotspot analysis

A number of aspects could be taken into account when considering the types of information that may need to be derived from hotspots analysis:

- Where are the hotspots located in the country, sector, product lifecycle and / or the value chain?
- What is the impact category associated with the hotspot: material, water or energy use; greenhouse gas emissions; waste arising from the sourcing of raw materials, manufacture, distribution, use or end of life disposal; or recycling or re-use of the product?
- What are the likely material flows or known economic sales / value in the economy – i.e., is something worthy of further investigation by virtue of its associated physical materials flows or value to the economy?
What are the likely or known environmental, economic, social, ethical or governance\textsuperscript{8} hotspots?

Are there any geographical or temporal issues that need to be highlighted (e.g., regional or seasonal water scarcity)?

What are the potential impact reduction opportunities associated with the hotspots, how might they be best deployed and by whom?

What assumptions have been made during the analysis, what is the level of confidence that can be taken from the exercise and are there any known limitations in the findings that should be highlighted to those wanting to use the analysis?

What information is available on existing initiatives already tackling the hotspots identified in the analysis? Which opportunities add value to these initiatives? What are the implementation gaps requiring action?

What parameters may be used to rank and subsequently prioritize the hotspots identified? These parameters may be based on: magnitude, geospatial location, ‘addressability’ or elasticity, economic or environmental savings potential, value chain characteristics and relationships, etc.

\textsuperscript{8} Governance-based hotspots can include a range of issues and concerns – e.g. the governance and involvement of stakeholders in the use and management of water resources a river catchment; land ownership, access to - and use of - land by local communities, etc.
2.0 Research Methodology and Analysis

On behalf of the UNEP SETAC Life Cycle Initiative, the authors jointly developed an analytical framework to identify, map, characterise and analyse existing hotspot analysis methodologies, tools and resources. The research methodology used in this report to analyse the hotspot identification methodologies includes the following:

- Development of criteria for shortlisting the hotspots analysis methodologies identified by the authors and signed-off by the project sponsors in May 2014 (see section 2.2 of the report below). As per the project brief, three (3) national, five (5) sector-level and ten (10) product category-level hotspot analysis methodologies were to be shortlisted for further investigation.

- Desktop research was conducted by the authors during May and June 2014 to gather publicly-available information on existing hotspots analysis methodologies and their application at different scales and levels of detail.

- An online survey was developed and run over a three-week period in June and July 2014 with relevant groups of methodology developers, owners and users to identify new hotspots methodologies or secure more information on the list of existing methodologies identified by the project team. See Annex 4.3 for a list of survey questions. Over eighty (80) responses were received to the survey and a preliminary list of forty-four (44) methodologies was compiled as a result (see Table 1 for more information on these methodologies).

- The selection criteria were then applied to the preliminary list of methodologies in order to identify those methodologies considered worthy of further investigation.

- A review of the popularity of different hotspots analysis approaches based on simple analysis of website traffic using Amazon’s on-line Alexa tool. The purpose of this review was to further evaluate and prioritize the long list of forty-four (44) hotspot methodologies identified by through desktop research and by respondents to the on-line survey. As information regarding traffic to websites is confidential and not commonly shared the authors used the Alexa tool to estimate how popular the methodologies were based on online activity, and used this information as a proxy for their likely scale of uptake or application.

- Approximately twenty (20) telephone interviews and e-mail exchanges took place with methodology developers, owners and users during July and August 2014 to gather additional specific information on hotspots analysis methodologies.

- Access to privileged information / data / study findings through agreements or understandings with certain hotspot methodology owners for further in-depth analysis.

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9 The European Investment Bank (2014) Methodologies for the Assessment of Project GHG Emissions and Emission Variations methodology is included in this Table 1 and counted as one of the methodologies received in the survey. However it is excluded from further analysis since its scale of application is at the project level and outside the scope of this project.

10 Three (3) of these methodologies are exclusively national-level, thirteen (13) are sector-focused and eighteen (18) are applied at the product-level. Nine methodologies were broader in their application since they could be applied in more than one of scale of application – five (5) methodologies may be applied to national, product and sector, and four (4) to both the product- and sector-levels.
## 2.1 Preliminary list of hotspot analysis methods identified

The forty-four\(^{11}\) (44) hotspots methodologies in Table 1 represent a preliminary list of methodologies identified by the authors for analysis. This list was further refined via subsequent process steps, including: an online survey, desktop research and interviews and e-mail exchanges with methodology owners and key users.

Table 1 also provides a high-level summary of these methodologies. For additional information, a summary of a subset of these methodologies may be found in Annex 4.7.

### Table 1: Preliminary list of hotspots analysis methodologies identified

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Scale of Application (National / Sector / Product / All)</th>
<th>Owner</th>
<th>Summary Available in Annex 4.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association of Home Appliance Manufacturers Hotspots Analysis for developing Sustainability Standards</td>
<td>Product</td>
<td>AHAM / PE INTERNATIONAL</td>
<td>Yes</td>
</tr>
<tr>
<td>CEN Technical Committee 350 (Environmental product declarations for construction products and sustainability assessment of the built environment)</td>
<td>Sector</td>
<td>European Committee for Standardization (CEN)</td>
<td>Yes</td>
</tr>
<tr>
<td>Condominium Environmental Performance Indication of the Tokyo Metropolitan Government</td>
<td>Sector</td>
<td>Tokyo Metropolitan Government</td>
<td>No</td>
</tr>
<tr>
<td>Defra Guidance on Environmental Key performance Indicators – Reporting Guidelines for UK Business</td>
<td>Sector</td>
<td>The UK Department of Environment, Food and Rural Affairs (Defra)</td>
<td>No</td>
</tr>
<tr>
<td>Ecological footprint methodology</td>
<td>National / Sector / Product</td>
<td>Global Footprint Network</td>
<td>No</td>
</tr>
<tr>
<td>US EPA Hotspots Project</td>
<td>National</td>
<td>US EPA</td>
<td>Yes</td>
</tr>
<tr>
<td>EU EIPRO Project (Environmental Impact of Products study)</td>
<td>National / Sector / Product</td>
<td>European Commission, DG Joint Research Centre</td>
<td>Yes</td>
</tr>
<tr>
<td>European Investment Bank (2014) Methodologies for the Assessment of Project GHG Emissions and Emission Variations</td>
<td>Project</td>
<td>European Investment Bank</td>
<td>No</td>
</tr>
<tr>
<td>EU Organization Environmental Footprinting Methodology</td>
<td>Sector</td>
<td>European Commission</td>
<td>Yes</td>
</tr>
<tr>
<td>EU Product Environmental Footprinting Methodology</td>
<td>Product</td>
<td>European Commission</td>
<td>Yes</td>
</tr>
<tr>
<td>Getting the Numbers Right</td>
<td>National / Sector /</td>
<td>WBCSD (The)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

\(^{11}\) The European Investment Bank (2014) Methodologies for the Assessment of Project GHG Emissions and Emission Variations methodology is included in this Table 1 and counted as one of the methodologies received in the survey. However, it is excluded from further analysis since its scale of application is at the project level and outside the scope of this project.
<table>
<thead>
<tr>
<th>Methodology</th>
<th>Scale of Application (National / Sector / Product / All)</th>
<th>Owner</th>
<th>Summary Available in Annex 4.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>(GNR) system</td>
<td>Product</td>
<td>Cement Sustainability Initiative)</td>
<td></td>
</tr>
<tr>
<td>French BPX 30-323-0 Standard</td>
<td>Product</td>
<td>French Ministry of Ecology, Sustainable Development and Energy</td>
<td>Yes</td>
</tr>
<tr>
<td>GHG Protocol Corporate Value Chain (Scope 3) Standards</td>
<td>Sector</td>
<td>WBCSD/WRI Greenhouse Gas Protocol</td>
<td>Yes</td>
</tr>
<tr>
<td>Global Protocol for Community Scale GHG emissions</td>
<td>National</td>
<td>Cities Footprint Project</td>
<td>Yes</td>
</tr>
<tr>
<td>Handbook for Product Social Impact Assessment</td>
<td>Product</td>
<td>Roundtable for Social Product Metrics</td>
<td>Yes (included in summary on S-LCA)</td>
</tr>
<tr>
<td>International Reference Life Cycle Data System (ILCD)</td>
<td>Sector</td>
<td>European Commission</td>
<td>No</td>
</tr>
<tr>
<td>InstantLCA: Tool from RDC, based on ISO 14044</td>
<td>Product</td>
<td>Intertek</td>
<td>No</td>
</tr>
<tr>
<td>ISO14040 family of international standards on Life Cycle Assessment (LCA)</td>
<td>Sector / Product</td>
<td>International Organization for Standardization (ISO)</td>
<td>Yes</td>
</tr>
<tr>
<td>ISO 14044 - international standards on Life Cycle Assessment (LCA)</td>
<td>Product</td>
<td>International Organization for Standardization (ISO)</td>
<td>Yes</td>
</tr>
<tr>
<td>ISO 14064-1: 2006 – Greenhouse gases – Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals</td>
<td>Sector</td>
<td>International Organization for Standardization (ISO)</td>
<td>Yes</td>
</tr>
<tr>
<td>Japanese Carbon Footprint Program</td>
<td>Product</td>
<td>Japan Environmental Management Association for Industry (JEMAI)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

---

12 Environmental Life cycle Assessment (E-LCA) was identified in the survey, however this is captured in a codified form within the ISO 14040 series of standards and is not repeated in this list so as to avoid unnecessary duplication of methodologies.
<table>
<thead>
<tr>
<th>Methodology</th>
<th>Scale of Application (National / Sector / Product / All)</th>
<th>Owner</th>
<th>Summary Available in Annex 4.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japanese EcoLeaf Program</td>
<td>Product</td>
<td>Japan Environmental Management Association for Industry (JEMAI)</td>
<td>Yes</td>
</tr>
<tr>
<td>National Cattlemen’s Beef Association (NCBA) Hotspots Analysis</td>
<td>Sector / Product</td>
<td>National Cattlemen’s Beef Association</td>
<td>Yes</td>
</tr>
<tr>
<td>Open House and SuPerBuildings</td>
<td>Sector</td>
<td>European Commission (FP7 Research Programme)</td>
<td>No</td>
</tr>
<tr>
<td>PAS 2050</td>
<td>Product</td>
<td>British Standards Institution (BSI)</td>
<td>No</td>
</tr>
<tr>
<td>Public Gardens Sustainability Index Hotspots Analysis</td>
<td>Sector</td>
<td>Longwood Gardens</td>
<td>Yes</td>
</tr>
<tr>
<td>ReCiPe 2008</td>
<td>Product</td>
<td>ReCiPe</td>
<td>Yes</td>
</tr>
<tr>
<td>Resource intensity in global food chains: the Hot Spot Analysis</td>
<td>Sector</td>
<td>The Wuppertal Institute</td>
<td>No</td>
</tr>
<tr>
<td>REWE (German Retailer) PRO PLANET, <a href="http://www.proplanet-label.com/">http://www.proplanet-label.com/</a> (German only)</td>
<td>Product</td>
<td>PRO PLANET</td>
<td>No</td>
</tr>
<tr>
<td>Social Life Cycle Assessment</td>
<td>Product</td>
<td>UNEP- SETAC Life Cycle Initiative</td>
<td>Yes</td>
</tr>
<tr>
<td>Social Hotspots Database</td>
<td>National / Sector / Product</td>
<td>New Earth</td>
<td>Yes</td>
</tr>
<tr>
<td>Sustainability Accounting and Reporting Board's (SASB) Materiality Map™</td>
<td>Sector</td>
<td>SASB</td>
<td>Yes</td>
</tr>
<tr>
<td>Sustainable Apparel Coalition - PCRs</td>
<td>Product</td>
<td>The Institute for Environmental Research and Education (IERE)</td>
<td>No</td>
</tr>
<tr>
<td>Sustainability Assessment of Food and Agriculture systems (SAFA) tool</td>
<td>Sector</td>
<td>UN Food and Agriculture Organization (UN FAO)</td>
<td>Yes</td>
</tr>
<tr>
<td>Sustainability Hot Spots Analysis (SHSA) tool</td>
<td>Product / Sector</td>
<td>The Wuppertal Institute</td>
<td>Yes</td>
</tr>
<tr>
<td>Tesco Food Waste and Losses Hotspots Study¹³</td>
<td>Product</td>
<td>Tesco</td>
<td>No</td>
</tr>
<tr>
<td>The Sustainability Consortium (TSC) Consumer Products Hotspots Toolkits</td>
<td>Product</td>
<td>The Sustainability Consortium</td>
<td>Yes</td>
</tr>
<tr>
<td>UNEP SBCI Greening the Building Supply Chain</td>
<td>Sector</td>
<td>UNEP</td>
<td>No</td>
</tr>
<tr>
<td>US EPA Hotspots Project</td>
<td>National</td>
<td>US EPA</td>
<td>Yes</td>
</tr>
<tr>
<td>US GSA supply-chain hot spot project</td>
<td>National</td>
<td>US GSA</td>
<td>Yes</td>
</tr>
<tr>
<td>Water Footprint Methodology</td>
<td>National / Sector / Product</td>
<td>Water Footprint Network</td>
<td>Yes</td>
</tr>
</tbody>
</table>

¹³ More information on this study can be found on pages 12-15 of the Tesco and Society Report 2014.
Methodology | Scale of Application (National / Sector / Product / All) | Owner | Summary Available in Annex 4.7
---|---|---|---
Water Quality Association Hotspots Analysis for developing Sustainability Standards | Product | Water Quality Association (WQA) / PE INTERNATIONAL | Yes
WRAP’s Product Sustainability Forum, UK Grocery Sector | Sector / Product | Product Sustainability Forum (PSF)\(^{14}\) | Yes

### National Level Methodologies

Whilst the original quota for shortlisted methodologies highlighted the need for three (3) shortlisted national-level methodologies, subsequent discussions with project sponsors lead to the inclusion of four (4) shortlisted national-level hotspots analysis methodologies to be reviewed in more detail for this report. These are:

- EU EIPRO
- GNR
- Global Protocol for Community-scale GHG emissions
- US GSA Supply Chain Hotspots Project

Additionally, these methodologies are summarized in Annex 4.7.

### Sector Level Methodologies

Five (5) sector-level methodologies were highlighted and reviewed for this report. These are:

- GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standards
- NCBA Hotspots Analysis
- Public Gardens Sustainability Index Hotspots Analysis
- SASB Materiality Map™
- SAFA tool

Additionally, these methodologies are summarized in Annex 4.7.

### Product Category Level Methodologies

Whilst the original quota for shortlisted methodologies highlighted the need for ten (10) shortlisted product category-level methodologies, subsequent discussions with project sponsors lead to the inclusion of twelve (12) product-level methodologies to be reviewed in more detail. These are:

- AHAM Hotspots Analysis
- French Grenelle I and II BPX 30-323-0 Product Lifecycle Environmental Impact Quantification Guidance Standard
- GHG Protocol Product Life Cycle Accounting and Reporting Standards
- ISO/TS 14067: Greenhouse gases - Carbon footprint of products
- Japanese Carbon Footprint Program

\(^{14}\) NOTE: WRAP’s PSF Hotspots Analysis Methodology has also been applied in the home improvement (DIY), textiles and clothing and electrical and electronic products sectors. For more information please see the methodology summary in Annex 4.7.
Additionally, these methodologies are summarized in Annex 4.7. Further details, key insights and other findings derived from the survey are included in the Annex 4.2.

2.2 Relevance of hotspot analysis methodologies at different scales and levels of detail

As per Section 1 above, hotspots analysis is an approach developed to help policy-makers, businesses and other stakeholders to collate, analyse and visualize sustainability hotspots information and insight drawn from a range of different data and information sources in order to move more swiftly from research and analysis towards tangible actions.

Hotspots analysis is highly adaptable and flexible, and can be used at a number of different scales or levels (e.g., countries, industry sectors, product portfolios, product categories or individual products) to overcome some of the challenges around managing and applying ‘big data’ and the ever increasing volumes of research findings available to decision-makers.

Some hotspots analysis methodologies have been deliberately developed to be iterative in nature, starting by conducting an analysis of the hotspots in a national economy, then selecting priority sectors or cross-cutting hotspots for further analysis; and then identifying and taking action on the priority products and hotspots in product categories (e.g., bakery products) or for groups of similar products within a broader product categories (e.g., white bread). Other methodologies can accommodate or be adapted to operate at more than one scale or level of detail.

This section summarizes the relevance of each of the short-listed hotspot analysis methodologies. Relevance in this context identifies the degree of applicability, scalability and usability. Inputs for this study includes information derived from on-line survey responses, stakeholder interviews and e-mail exchanges and supporting desktop research.

A total of twenty-nine (29) hotspots analysis methodologies (listed in Table 2 were reviewed within the context of the relevance attributes (cf. Section 2.2), however, only twenty-one (21) of these methodologies were included in the final selection to be assessed in terms of commonalities and differences.

Eight (8) methodologies were not selected since they were deemed to be sufficiently similar to some of those final twenty one (21) methodologies selected for further analysis (e.g., PAS 2050 and the GHG Protocol Product Life Cycle and ISO 14067 standards, or ISO 14040, ISO 14044 and ReCiPe, or US GSA supply chain hotspots and US EPA hotspots project), thus the authors made a decision not to include these.

The final recommendations, key observations and conclusions are based on these twenty-one (21) selected methodologies. The attributes for relevance include:

- Scale of application of the hotspot analysis methodologies. (National, Sector, Product)
- Breadth of impacts covered by the hotspots analysis methodologies (Economic, Environmental, Governance and Social)
- Ease of use of the hotspots analysis methodologies (Easy: no expert knowledge or experience required; Moderate: may require some expert knowledge or experience; Difficult: requires expert knowledge or experience)
- Relevance of the hotspots analysis methodologies for the respective purpose and scale as identified by the users (as per the online survey responses, e-mail exchanges and interviews)
- Applicability of the hotspots analysis methodologies to emerging economies and Small and Medium Enterprise (SMEs)

The table below shows analysis of the relevance attributes for each of the shortlisted hotspots analysis methodologies. Broadly the study shows that most of the hotspots analysis methodologies cover environmental impacts; are moderate or difficult to use; are relevant for the purpose / goal and are applicable to emerging economies and SMEs. Please refer to the table below to read specifics on the analysis for individual hotspots analysis methodologies.

**Table 2: Relevance attributes for shortlisted hotspots methodologies**

<table>
<thead>
<tr>
<th>Name of the methodology</th>
<th>Scale of Application</th>
<th>Breadth of Impacts Covered</th>
<th>Ease of Use</th>
<th>Relevance as per survey responses</th>
<th>Applicable to emerging economies/SMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association of Home Appliance Manufacturers (AHAM) Hotspots Analysis for developing Sustainability Standards</td>
<td>Product</td>
<td>Environmental, Social &amp; Governance</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>CEN TC 350</td>
<td>Sector</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Essential</td>
<td>No/Yes</td>
</tr>
<tr>
<td>EU Product Environment Footprint</td>
<td>Product</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Somewhat relevant</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>EU Environmental Impact of Products (EIPRO)</td>
<td>National/Sector/Product</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Essential</td>
<td>No/No</td>
</tr>
<tr>
<td>Getting the Numbers Right (GNR)</td>
<td>National/Sector/Product</td>
<td>Carbon footprint</td>
<td>Moderate</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
</tbody>
</table>

The analysis of applicability of hotspots analysis methodologies to emerging economies is equally valid for applicability to developing countries. Therefore for all instances in this report (unless otherwise specified), if a methodology is applicable to an emerging economy, the reader also should consider it applicable for use in a developing country.

Easy: does not require expert knowledge or experience; Moderate: may require some expert guidance; Difficult: requires some expert knowledge or experience.
<table>
<thead>
<tr>
<th>Name of the methodology</th>
<th>Scale of Application</th>
<th>Breadth of Impacts Covered</th>
<th>Ease of Use(^{17})</th>
<th>Relevance as per survey responses</th>
<th>Applicable to emerging economies/SMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standards</td>
<td>Sector</td>
<td>Environmental (Carbon footprint)</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>GHG Protocol Product Life Cycle Standard</td>
<td>Product</td>
<td>Environmental (Carbon Footprint)</td>
<td>Difficult</td>
<td>Relevant</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Global Protocol for Community-scale GHGs</td>
<td>National and sub-national level</td>
<td>Environmental (Carbon Footprint)</td>
<td>Difficult</td>
<td>Somewhat relevant</td>
<td>Yes/No</td>
</tr>
<tr>
<td>French BPX 30-323-0 Standard Handbook for Product Social Impact Assessment</td>
<td>Product</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>ISO 14040</td>
<td>Sector/Product</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>ISO 14044</td>
<td>Product</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>ISO 14067</td>
<td>Product</td>
<td>Environmental (Carbon footprint)</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Japanese Carbon Programme</td>
<td>Product</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Somewhat relevant</td>
<td>No/Yes</td>
</tr>
<tr>
<td>Japanese EcoLeaf Program National Cattlemen’s Beef Association (NCBA) Hotspots Analysis</td>
<td>Product</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Somewhat relevant</td>
<td>No/Yes</td>
</tr>
<tr>
<td>National Cattlemen’s Beef Association (NCBA) Hotspots Analysis</td>
<td>Sector/Product</td>
<td>Sustainability impacts across the beef value chain</td>
<td>Moderate</td>
<td>Somewhat relevant</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Public Garden Sustainability Index (PGSI) Hotspots Analysis</td>
<td>Sector</td>
<td>Environmental, Social, Governance &amp; Financial</td>
<td>Moderate</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>ReCiPe</td>
<td>Product</td>
<td>Environmental</td>
<td>Moderate</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Sustainability Assessment of Food and Agriculture (SAFA) Systems tool</td>
<td>Sector</td>
<td>Governance, Economic, Environment and Social Indicators covering 21</td>
<td>Moderate</td>
<td>Relevant</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Name of the methodology</td>
<td>Scale of Application</td>
<td>Breadth of Impacts Covered</td>
<td>Ease of Use&lt;sup&gt;17&lt;/sup&gt;</td>
<td>Relevance as per survey responses</td>
<td>Applicable to emerging economies/SMEs</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------</td>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>-----------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Social Hotspot database</td>
<td>National/Sector/Product</td>
<td>Social</td>
<td>Moderate</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Social LCA</td>
<td>Product</td>
<td>Social</td>
<td>Moderate</td>
<td>Essential</td>
<td>No/Yes</td>
</tr>
<tr>
<td>Sustainability Accounting Standards Board (SASB) Materiality Map™</td>
<td>Sector</td>
<td>Environment Governance Social Economic</td>
<td>Moderate</td>
<td>Somewhat relevant</td>
<td>No/Yes</td>
</tr>
<tr>
<td>Sustainability Hot Spots Analysis (SHSASA) tool</td>
<td>Sector/Product</td>
<td>Environment Social</td>
<td>Moderate</td>
<td>Somewhat relevant</td>
<td>No/Yes</td>
</tr>
<tr>
<td>The Sustainability Consortium (TSC)</td>
<td>Product</td>
<td>Environmental and Social</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>US EPA Hotspots Project</td>
<td>National</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Somewhat relevant</td>
<td>Potentially</td>
</tr>
<tr>
<td>US GSA supply chain hotspots</td>
<td>National</td>
<td>Environmental</td>
<td>Difficult</td>
<td>Somewhat relevant</td>
<td>Potentially/Yes</td>
</tr>
<tr>
<td>WRAP's Product Sustainability Forum (PSF)</td>
<td>Sector/Product</td>
<td>Environmental and Economic</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Water Footprint Methodology</td>
<td>National/Sector/Product</td>
<td>Environmental</td>
<td>Moderate</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
<tr>
<td>Water Quality Association (WQA) Hotspots Analysis for developing Sustainability Standards</td>
<td>Product</td>
<td>Environmental, Social, &amp; Governance</td>
<td>Difficult</td>
<td>Essential</td>
<td>Yes/Yes</td>
</tr>
</tbody>
</table>

### 2.3 Integrated Analysis Matrix

Figure 4 below summarizes the relationships among the forty-three<sup>18</sup> (43) hotspots analysis methodologies identified by the survey. Three (3) of these methodologies are exclusively national-level, thirteen (13) are sector-focused and eighteen (18) are applied at the product-level. Nine methodologies were broader in their application since they could be applied in

<sup>18</sup> While forty three (43) hotspots analyses were identified, the European Investment Bank (2014) Methodologies for the Assessment of Project GHG Emissions and Emission Variations methodology is excluded from further analysis since its scale of application is at the project level and outside the scope of this project. Therefore only forty-three (43) are included in the Venn diagram.
more than one of scale of application – five (5) methodologies could be applied to national, product and sector, and four (4) to both the product- and sector-levels.

**Figure 2**: Primary\(^{19}\) hotspots analysis methodologies\(^{20}\) characterized by scale of application – national, sector & product.

---

\(^{19}\) While forty three (43) hotspots analyses were identified, the *European Investment Bank (2014) Methodologies for the Assessment of Project GHG Emissions and Emission Variations* methodology is excluded from further analysis since its scale of application is at the project level and outside the scope of this project. Therefore only forty-three (43) are included in the Venn diagram.

\(^{20}\) NOTE: There are two distinct hotspots analysis methodologies included under Social Life Cycle Assessment (Social LCA) in the product-level methodologies segment of this Venn diagram. These are: the UNEP/SETAC Life Cycle Initiative’s Guidelines for Social Life Cycle Assessment of Products; and the Roundtable for Product Social Metrics’ Handbook for Product Social Impact Assessment.
2.4 Commonalities and Differences

This section describes common characteristics and differences among the key hotspots analysis methodologies identified in section 2.2 above. An overview of the research methodology and key parameters used to analyse these commonalities and differences are also included. Finally, this section will summarize the general findings on commonalities and differences, while providing specific insights for each level of application (i.e., national, sectoral and product).

All information gathered on each prioritised methodology was summarized in a common methodology summary template; and the following parameters were extracted in order to compare commonalities and contrast differences among the key hotspots methodologies:

- **Approach**: Does the methodology utilize a quantitative approach (e.g. traditional LCA data, product, trade, or contextual market data); qualitative approach (e.g., expert opinion, stakeholder concerns); or both qualitative and quantitative approaches? Part of the intent of this parameter is to identify whether or not the methodology moves beyond traditional LCA.

- **Single or Multi-Impact**: Does the methodology address one impact or issue or multiple impacts or issues?

- **Breadth of Impacts**: What types of impacts are covered by this methodology (i.e., environmental, ethical, social, economic, governance, all / combination)?

- **Stakeholder involvement**: Were stakeholders engaged and involved in the development and use of the methodology? If yes, which ones (i.e., academics, organizations, government, NGOs, etc.)?

- **Supporting Tools**: Does the methodology provide supporting tools or explicitly include measures or approaches to support stakeholder efforts to address hotspots or impacts (e.g. identifying hotspots, supporting tools, data or knowledge bases, supporting the piloting of a range of solutions to address identified hotspots)?

- **Outreach**: Is the methodology well known, widely disseminated or applied?

- **Target audience**: LCA practitioners / expert users, industry, government, investors, consumers, NGOs, relevant sectors or product categories in which methodology was applied or may apply, etc.;

- **Business model**: What was the source of funding for the development of the methodology private (e.g. corporate or industry association), public (e.g. government) or hybrid (i.e., mix of private and public funding or contributions from charitable foundations, which may stem from funding from private or public sector donors)?

**NOTE**: The authors did attempt to include a parameter on the accessibility of different methodologies but rapidly found that this involved a number of what could be biased value judgements. For example, the ISO 14040 LCA Standards are made publicly available but at a price which some stakeholders (e.g. SMEs / developing countries) may not be able to afford.

Specific analyses and insights into the commonalities and differences for each of the national, sectoral and product-level methodologies are addressed in the sections below.

### 2.4.1 National Methodologies: Commonalities & Differences

This section summarizes the commonalities and differences for each hotspot analysis methodology applied at the national level. There were four (4) national-level methodologies selected for analysis, including:
EU EIPRO

GNR

Global Protocol for Community-scale GHG emissions

US GSA Supply Chain Hotspots Project
Table 3: Summary of Analysis of Key National-Level Hotspots Analysis Methodologies is purely alphabetical and is not intended to present any particular ranking.

Commonalities among the four (4) key national hotspots analysis methodologies include:

- All utilize a quantitative approach and focus solely on environmental impacts
- All involve multiple stakeholders in their development
- In general, the focus is on the use of input/output analysis or materials flows analysis.

Differences among the four (4) key national hotspots analysis methodologies include:

- **GNR** and the *Global Protocol for Community-scale GHG emissions* both focus on a single attribute – carbon/GHG emissions, however, the *US GSA Supply Chain Hotspots Project* and *EU EIPRO* includes several environmental impacts.
- The business models for funding each of these four (4) methodologies are different
- Target audiences for *EU EIPRO*, *GNR* and the *US GSA Supply Chain Hotspots Project* are fairly specific (e.g., Getting the Numbers Right is specific to the cement / construction industry), whereas the target audience for the *Global Protocol for Community-scale GHG emissions* is much broader covering all communities globally. Similarly, the former two methodologies have limited application in other sectors, whereas the latter two methodologies have been applied across a broad range of sectors.
## Table 3: Summary of Analysis of Key National-Level Hotspots Analysis Methodologies

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Approach (quantitative, qualitative, both)</th>
<th>Single or Multi-Impact</th>
<th>Breadth of Impacts (Env, Social, Econ, combo)</th>
<th>Stakeholder Involvement</th>
<th>Supporting tools</th>
<th>Outreach (known and applied)</th>
<th>Target audience</th>
<th>Business model</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU EIPRO</td>
<td>Quantitative</td>
<td>Multiple Impacts</td>
<td>Environmental</td>
<td>Included representatives of academia, life cycle consultancies, private businesses, trade associations and DG Environment</td>
<td></td>
<td>Yes</td>
<td>European Commission Member States</td>
<td>Hybrid</td>
</tr>
<tr>
<td>GNR</td>
<td>Quantitative</td>
<td>Single</td>
<td>Environmental</td>
<td>43 multinational or national cement companies</td>
<td>Secured Internet data collection tool specifically designed for the GNR system</td>
<td>Yes (extent of outreach unknown)</td>
<td>Cement companies, Policy makers, Investors</td>
<td>Private</td>
</tr>
<tr>
<td>Global Protocol for Community-scale GHG emissions</td>
<td>Quantitative</td>
<td>Single (only GHGs)</td>
<td>Environmental</td>
<td>Multiple stakeholders</td>
<td>Yes (extent of outreach unknown)</td>
<td>Yes (extent of outreach unknown)</td>
<td>Anyone assessing the GHG emissions of a geographically defined area May be applied in sectors: Stationary energy, Transportation, Waste, Industrial Processes and Product Use Emissions Agriculture, Forestry and Other Land Use</td>
<td>Hybrid</td>
</tr>
<tr>
<td>US GSA Supply Chain Hotspots Project</td>
<td>Quantitative</td>
<td>Multiple Impacts</td>
<td>Environmental</td>
<td>Yes</td>
<td>Excel Tool and CEDA database</td>
<td>Yes (extent of outreach unknown)</td>
<td>Sustainable Purchasing Subject Matter Experts within GSA</td>
<td>Public</td>
</tr>
</tbody>
</table>

### 2.4.2 Sectoral Methodologies: Commonalities & Differences

This section summarizes the commonalities and differences for each hotspot analysis methodology applied at the sector level. There were five (5) sectoral-level methodologies selected for analysis, namely:

- GHG Protocol Product Life Cycle Accounting and Reporting Standards
- NCBA Hotspots Analysis
- PGSI Hotspots Analysis
- SASB Materiality Map™
- SAFA tool
Table 4 is purely alphabetical and is not intended to present any particular ranking.

Commonalities among the five (5) key sectoral hotspots analysis methodologies include:

- With the exception of GHG Protocol Product Life Cycle Accounting and Reporting Standards, all methodologies cover environmental and social impacts.
- With the exception of GHG Protocol Product Life Cycle Accounting and Reporting Standards and SASB Materiality Map™, all approaches include both qualitative and quantitative inputs.
- With the exception of the GHG Protocol Product Life Cycle Accounting and Reporting Standards and NCBA Hotspots Analysis, all approaches include a full suite of sustainability impacts (i.e., environmental, social, economic and governance impacts).
- All involve multiple stakeholders in their development and provide some form of support tools to these stakeholders.

Differences among the five (5) key sectoral hotspots analysis methodologies include:

- The methodologies associated with GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard and the SASB Materiality Map™, both have a wide potential applicability in a range of sectors, whereas the other methodologies tend to be developed for and limited to a single sector (e.g. PGSI).
- Of the five (5) methodologies, two are privately funded and two utilize a hybrid approach and only the SAFA tool is publicly-funded.

Table 4: Summary of Analysis of Key Sector-Level Hotspots Analysis Methodologies

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Approach</th>
<th>Single or Multi-Impact</th>
<th>Breadth of Impacts (Env, Social, Econ, combo)</th>
<th>Stakeholder Involvement</th>
<th>Supporting tools</th>
<th>Outreach (known and applied)</th>
<th>Target audience</th>
<th>Business model</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard</td>
<td>Quantitative</td>
<td>Single</td>
<td>Environmental</td>
<td>Yes Multiple stakeholders globally</td>
<td>Stakeholder Engagement in Road-testing and supporting calculation tools</td>
<td>Yes</td>
<td>Global</td>
<td>Hybrid</td>
</tr>
<tr>
<td>NCBA Hotspots Analysis</td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Environmental, Social</td>
<td>Yes, NCBA members, industry experts, suppliers, customers, NGOs</td>
<td>Online survey</td>
<td>No</td>
<td>Beef Association members</td>
<td>Private</td>
</tr>
<tr>
<td>PGSI Hotspots Analysis</td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Environmental, Social, Economic and Governance</td>
<td>Yes, American Public Garden Association plus approx.25 public gardens</td>
<td>Online survey, Proven Practice Workbook</td>
<td>No</td>
<td>Public gardens and arboretums in North America</td>
<td>Private</td>
</tr>
<tr>
<td>Methodology</td>
<td>Approach (quantitative, qualitative, both)</td>
<td>Single or Multi-Impact</td>
<td>Breadth of Impacts (Env, Social, Econ, combo)</td>
<td>Stakeholder Involvement</td>
<td>Supporting tools</td>
<td>Outreach (known and applied)</td>
<td>Target audience</td>
<td>Business model</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------</td>
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<td>----------------</td>
</tr>
<tr>
<td>SASB Materiality Map™</td>
<td>Qualitative</td>
<td>Multiple Impacts</td>
<td>Environmental, Social, Economic and Governance</td>
<td>Yes Corporations, market participants, and public interest and intermediaries</td>
<td>Surveys</td>
<td>Yes Broad Outreach</td>
<td>SASB standard development Working Groups and other relevant stakeholders</td>
<td>Applied to several sectors including the following: Architecture &amp; Engineering Consumption Energy Financial Food &amp; Beverage Forestry and Paper Health Care Home &amp; Office Non-renewable Resources Personal Care Products Pharmaceuticals Real Estate Renewable Resources &amp; Alternative (Solar, Geothermal, Nuclear, Wind) Resource Transformation Services Technology &amp; Communications Transportation</td>
</tr>
<tr>
<td>SAFA tool</td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Environmental, Social, Economic and Governance</td>
<td>Yes, Dialogue with thousands of public &amp; private stakeholders over a 5 year period</td>
<td>Surveys and stakeholder consultation</td>
<td>Yes Outreach included individuals and association in the food and agriculture sectors (as well as crop, livestock, forestry, aquaculture sub-sectors); government, investors, policy makers, and NGOs</td>
<td>Small, medium and large-scale companies, organizations and other stakeholders that participate in crop, livestock, forestry, aquaculture and fishery value chains</td>
<td>Applied to Food &amp; Agriculture Sector</td>
</tr>
</tbody>
</table>
2.4.3 Product Category Methodologies: Commonalities & Differences

This section summarizes the commonalities and differences for each hotspot analysis methodology applied at the product category level. There were twelve (12) product-level methodologies selected for analysis, including:

- AHAM Hotspots Analysis
- French Grenelle I and II BPX 30-323-0 Product Lifecycle Environmental Impact Quantification Guidance Standard
- GHG Protocol Product Life Cycle Accounting and Reporting Standards
- ISO/ TS 14067: Greenhouse gases - Carbon footprint of products
- Japanese Carbon Footprint Program
- Japanese EcoLeaf Program
- Social Hotspots Database
- Social LCA
- SHSA tool
- TSC
- WRAP's PSF
- WQA Hotspots Analysis

A summary of the analysis of the twelve (12) key product-level methodologies is included in Table 5. The order of the methodologies listed above and presented in Table 5 is purely alphabetical and is not intended to present any particular ranking.

Commonalities among the twelve (12) key product hotspots analysis methodologies include:

- At a minimum all utilize some quantitative approach either exclusively or together with qualitative inputs;
- All involve multiple stakeholders in their development and use;
- All methodologies are widely applied, in some cases across multiple product categories;
- With the exception of product carbon footprint methodologies, which are single impact by nature, all other methodologies take a multi-impact approach;
- With the exception of the Social Hotspots Database, all quantitative approaches focus exclusively on environmental impacts (one focuses on economic impacts as well);
- Generally all the methodologies (with the exception of the AHAM, WQA and Social Hotspots Database methodologies) tend to have a broad target audience;
- All methodologies tend to be funded privately or via a hybrid of public and private funding. None of the methodologies seem to be exclusively publicly-funded;
- In general, most of these methodologies have been applied to, or may be adapted/adopted for use in a wide range of product categories; and
- Privately-funded methodologies tend to focus on multi-impacts.

---

Differences among the twelve (12) key product hotspots analysis methodologies include:

- Five (5) of these methodologies focus solely on environmental impacts while the other seven (7) move beyond environmental impacts by including social, ethical or economic impacts;
- Social Hotspots Database and Social LCA are the only methodologies that do not include environmental impacts;
- Only AHAM and WQA methodologies include governance impacts.

### Table 5: Summary of Analysis of Key Product-Level Hotspots Analysis Methodologies

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Approach (quantitative, qualitative, both)</th>
<th>Single or Multi-Impact</th>
<th>Breadth of Impacts (Env, Social, Econ, combo)</th>
<th>Stakeholder Involvement</th>
<th>Supporting tools</th>
<th>Outreach (known and applied)</th>
<th>Target audience</th>
<th>Business model</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHAM Hotspots Analysis</td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Environmental, Social, Governance</td>
<td>Yes, AHAM, CSA Group, UL Environment, PE INTERNATIONAL and several major appliance manufacturers</td>
<td>Stakeholder review of methodology and pilot testing of standards</td>
<td>Yes Outreach to major home appliance manufacturers globally as well as key value chain players (incl. government, regulatory, retailers, other multi-lateral organizations)</td>
<td>AHAM's sustainability standards Task Force members as well as key value chain stakeholders</td>
<td>Applied to the home appliance product sector Methodology may be adopted / adapted for other product sectors</td>
</tr>
<tr>
<td>French Grenelle I and II BPX 30-323-0 Product Lifecycle Environmental Impact Quantification Guidance Standard</td>
<td>Quantitative</td>
<td>Multiple Impacts</td>
<td>Environmental</td>
<td>Yes, Multiple Stakeholders</td>
<td>Pilot testing Base-IMPACTS database</td>
<td>Yes</td>
<td>Consumer goods manufacturers and retailers and service companies in the French economy. The main audience for the findings from the application of the methodology was French consumers.</td>
<td>Hybrid</td>
</tr>
<tr>
<td>GHG Protocol Product Life Cycle Accounting and Reporting Standards</td>
<td>Quantitative</td>
<td>Single</td>
<td>Environmental</td>
<td>Yes Multiple stakeholders globally</td>
<td>Stakeholder Engagement in Road-testing and supporting calculation tools</td>
<td>Yes Global outreach</td>
<td>All products in all sectors, globally</td>
<td>Hybrid</td>
</tr>
<tr>
<td>ISO/TS 14067: 2013 - Carbon footprint of products - Requirements and guidelines for quantification and communication</td>
<td>Quantitative</td>
<td>Single</td>
<td>Environmental</td>
<td>Yes, Multiple stakeholders</td>
<td>Yes Global outreach</td>
<td>Organizations (producers, owners and commissioners of CFP study), governments, communities and other interested stakeholders</td>
<td>Hybrid (government initially)</td>
<td></td>
</tr>
<tr>
<td>Japanese Carbon Footprint Program</td>
<td>Quantitative</td>
<td>Single</td>
<td>Environmental</td>
<td>Yes, Multiple Stakeholders</td>
<td>Yes (extent of outreach unknown)</td>
<td>Industrial goods, durable consumer goods, daily necessities, energy such as electricity,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program</td>
<td>Data Type</td>
<td>Stakes</td>
<td>Stakeholders</td>
<td>Outreach</td>
<td>Hybrid</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>--------------------------------</td>
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<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japanese EcoLeaf Program</td>
<td>Quantitative</td>
<td>Multiple</td>
<td>Environmental</td>
<td>Yes, Multiple Stakeholders</td>
<td>Industrial goods, durable consumer goods, daily necessities, energy such as electricity, buildings, food, and services associated with these products</td>
<td>Hybrid (government initially)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Hotspots Database</td>
<td>Quantitative</td>
<td>Multiple</td>
<td>Social</td>
<td>Yes, Multiple Stakeholder Including: academics, NGOs, government, etc.</td>
<td>LCA practitioners, University students, companies, consultants, and NGO’s. Users need to be familiar with LCA tools in order to understand the database.</td>
<td>Private</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social LCA</td>
<td>Both</td>
<td>Multiple</td>
<td>Social Economics</td>
<td>Yes, Multiple stakeholders</td>
<td>Product manufacturers and other value chain stakeholders engaging in the assessment of social and socio-economic impacts of products life cycle</td>
<td>Hybrid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td>Coverage</td>
<td>Multiple Impacts</td>
<td>Stakeholder Inclusion</td>
<td>Application Areas</td>
<td>Decision Makers along the Value Chain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SHSA tool</strong></td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Yes</td>
<td>Environmental, Social</td>
<td>Stakeholders are included in the final stage of the SHSA. They review the overall process and results to verify that analysis results are robust and accurate (e.g., production process, identified literature and facts, hot spot identification). May be applied to the tool can be applied to many different product groups from food to electronics, textiles or furniture.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TSC</strong></td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Yes, Multiple stakeholder, Civil society, private sector, government and academics</td>
<td>Product category Dossier, a Category Sustainability Profile (CSP), and Key Performance Indicators (KPIs)</td>
<td>Multiple stakeholders, producers, retailers, and users of consumer products. Applied to the following sectors: Clothing, Footwear and Textiles, Electronics, Food, Beverage and Agriculture, General Merchandise, Home and Personal care, Paper Pulp and Forestry, Packaging, Logistics and Toys.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WRAP’s PSF</strong></td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Yes, Multiple stakeholders</td>
<td>Visual technical and non-technical support tools – e.g. product summary slide decks, impact reduction opportunities library, action plans, topic guides, Online PSF Knowledge Base, Pilot testing and Pathfinder demonstration projects</td>
<td>Major retailing and manufacturing businesses, NGOs, academics and governments. Applied to food, DIY (home improvement) products, electrical and electronic products, clothing and textiles, retail sectors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WQA Hotspots Analysis</strong></td>
<td>Both</td>
<td>Multiple Impacts</td>
<td>Yes, WQA, PE INTERNATIONAL and several drinking water treatment</td>
<td>Stakeholder review of methodology and pilot testing of standards</td>
<td>WQA’s sustainability standards Working Group members as</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*SHSA*: Strategic Health and Safety Assessment
*TSC*: Triad of Sustainability Council
*WRAP*: Waste and Resources Action Programme
*WQA*: Water Quality Association
2.4.4 General Commonalities & Differences

While the key hotspots analysis methodologies identified in section 2 differ in terms of application, there are a number of general commonalities in approach, including:

- All of the key methodologies engage several stakeholders in their development;
- All (with the exception of two) methodologies include environmental impacts;
- All methodologies, at a minimum, utilize a quantitative life cycle approach. Some exclusively, other also incorporate qualitative elements;
- The majority of approaches address multiple impacts.

Some of the general differences include:

- National-level methodologies all exclusively utilize a quantitative approach which addresses environmental impacts, while sectoral- and product-level methodologies tend to be more diverse in the impacts and issues they address, as well as in the use of more qualitative elements and inputs;
- National-level methods tend to focus on the use of input/output analysis or materials flows analysis; whereas sector- or product-level methodologies tend to focus on life cycle approaches or 'beyond LCA' approaches;
- While the hybrid funding appears to be dominant among the methodologies, there is no common model that can be attributed to any of the three methodology levels.

Other observations:

- Nine (9) of the twenty-one (21) key methodologies move beyond traditional LCA by including more than environmental impacts and both qualitative as well as quantitative inputs;
- Some methodologies are applicable to several scales or levels, for example the Water Footprint Methodology which is applicable to national, sector and product levels.

2.4.5 Business Models

Essentially, there appear to be three (3) main business models enabling the development of hotspots analysis methodologies, and their subsequent maintenance: Public funding, private funding or a hybrid approach. A description of each business model is provided below.

- **Public funding**, where it occurs, is typically in the early development stage of a method. Subsequently, business models for maintenance and refinement of a method vary between government, funding by interested parties, or a combination of the two.
**Private funding** by interested parties may draw funding directly from industry, through trade associations, or through membership organisations which bring together a diverse range of organisations on a particular topic of common interest.

**Hybrid funding** where there may be funding from both public and private sources where there is a common interest in the methodology (i.e. a potential link to policy and business objectives). In some cases funding is also obtained from charitable foundations where the method and its application meet their charitable aims.

The review suggests that there is no set pattern to the evolution of business models. Not all methods linked to government policy are solely publicly funded (e.g. Grenelle), and likewise methodologies specific to a sector are not necessarily funded by that sector (e.g. CEN/TC 350 Standards).

### 2.5 Integrated Analysis Matrix

The following Figures 5 & 6 graphically summarise the outcomes of the analysis for each of the twenty-one (21) key hotspots analysis methodologies.

Figure 5 classifies these key methodologies based on four (4) main aspects: (1) stakeholder engagement; (2) approach (quantitative, qualitative or a combination of the two); (3) the number of impacts included (i.e., single vs. multiple impacts); and (4) the type of business model used for funding (public, private or a hybrid of both). Essentially all of these key methodologies utilize some form of stakeholder engagement. Just over half of the methodologies solely utilize a quantitative approach and roughly half include some degree of qualitative parameters in addition to a quantitative approach. This can be explained by the fact that the majority of methodologies are based on a life cycle approach. Only one of these methodologies utilized only a qualitative approach. All of the national-level methodologies were based on a quantitative approach, while the sector and product methodologies tended to move "beyond traditional LCA" by including qualitative aspects.

The majority of these methodologies address multiple impacts. Only three (3) methodologies are exclusively developed with public funding, the other methodologies are roughly split equally between private and a hybrid of public/private funding.
**Figure 3**: Key hotspots analysis methodologies\(^\text{22}\) characterized by breadth of impacts, type of approach / inputs used, as well as engagement of stakeholders

<table>
<thead>
<tr>
<th></th>
<th>Quantitative</th>
<th>Combined Approach</th>
<th>Qualitative</th>
<th>Single Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Global Protocol for Community-scale SMEs</td>
<td></td>
<td></td>
<td>Private</td>
</tr>
<tr>
<td></td>
<td>UNEP/SETAC Life Cycle Initiative's Guidelines for Social Life Cycle Assessment of Products</td>
<td></td>
<td></td>
<td>Hybrid</td>
</tr>
<tr>
<td></td>
<td>Social Hotspots Database</td>
<td></td>
<td></td>
<td>Public</td>
</tr>
<tr>
<td></td>
<td>French MPS 30-32-9</td>
<td></td>
<td></td>
<td>Multi-impact</td>
</tr>
<tr>
<td></td>
<td>Sustainability Assessment of Food and Agriculture Systems (SAFEA) tool</td>
<td></td>
<td></td>
<td>National Sector Product</td>
</tr>
<tr>
<td></td>
<td>L.E.S. SSA Supply Chain Hotspots Project</td>
<td></td>
<td></td>
<td>Product</td>
</tr>
</tbody>
</table>

Double-click icon below to open an expanded view of Figure 3:

- **Figure 3**

Figure 6 includes several of the analysis parameters included in Figure 5 and discussed above, but represents these slightly differently in a tabular format. Figure 4 also utilizes three (3) additional parameters in analysing these twenty one (21) key hotspots analysis methodologies: applicability to SMEs, applicability to emerging economies\(^\text{23}\) and ease of use. The following legend applies to the icons used in Figure 6 (on the following pages).

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\(^{22}\) Note: There are two distinct hotspots analysis methodologies included under Social Life Cycle Assessment (Social LCA). These are: the UNEP/SETAC Life Cycle Initiative’s Guidelines for Social Life Cycle Assessment of Products; and the Roundtable for Product Social Metrics’ Handbook for Product Social Impact Assessment.

\(^{23}\) The analysis of applicability of hotspots analysis methodologies to emerging economies is equally valid for applicability to developing countries. Therefore for all instances in this report (unless otherwise specified), if a methodology is applicable to an emerging economy, the reader also should consider it applicable for use in a developing country.
**Figure 4:** Key hotspots analysis methodologies - summary of evaluation against several parameters

<table>
<thead>
<tr>
<th>Scale of Application</th>
<th>Methodology</th>
<th>Stakeholder engagement</th>
<th>Impact coverage</th>
<th>Applicability to SMEs</th>
<th>Applicability to Emerging Economies</th>
<th>Ease of Use</th>
<th>Business Model</th>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>EU EIPRO</td>
<td>■</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>+</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>Getting the Numbers Rights</td>
<td>■■■■</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>++</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>Global Protocol for Community Scale GHG emissions</td>
<td>■■■■</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>+</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>US GSA Supply Chain Hotspots Project</td>
<td>■</td>
<td>○</td>
<td>✓</td>
<td></td>
<td>+</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Sector</td>
<td>GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard</td>
<td>■■■■</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
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**Legend**
- ■■■■ Full engagement and pilot testing
- ■■■ Moderate engagement throughout process
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- ☁ Moderate
- ☂■ Difficult
- $++; $++; $+++ Easy
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24 NOTE: There are two distinct hotspots analysis methodologies included under Social Life Cycle Assessment (Social LCA) in the product-level methodologies section of this table. These are: the UNEP/SETAC Life Cycle Initiative’s Guidelines for Social Life Cycle Assessment of Products; and the Roundtable for Product Social Metrics’ Handbook for Product Social Impact Assessment.
2.6 Applicability of hotspots methodologies to cities

While not specifically reviewed as a dimension of our analysis in this report, we do recognize that some of the key short-listed hotspots analysis methodologies may have the potential to be applied at the city-scale. In a few cases (e.g., Global Protocol for Community Scale GHG emissions) the general methodological framework may be directly adopted for use by cities without change, and in several others (e.g., Product Sustainability Forum) the methodology could be used by cities with some level of adaptation.

It is important to note that while some existing methodological frameworks may have some level of applicability to cities, they also come with some potential implementation barriers. For example, in scaling up a methodology to a city level, data may not be readily available to identify hotspots. In a similar way, costs may grow exponentially at this level of scaling that may either lower the feasibility of commencing or completing a comprehensive hotspots analysis. Finally, the engagement of a wide variety of experts and stakeholders in a city-level application may be hampered by the resources and time available to conduct an effective engagement, especially if the methodology requires multiple engagements and a piloting phase.

It is our recommendation that further research and investigation is required to help determine the applicability of specific existing hotspots analysis methodologies to the city-level, including the analysis of several other parameters, which are not included in this report. The analysis in this report can therefore only provide a limited insight to application of these methodologies to identify and prioritize the sustainability hotspots associated with cities.
3.0 Key Learning & Next Steps

3.1.1 Key Observations and Conclusions

Existing hotspots analysis methodologies are being developed with a number of audiences and sustainability-based applications in mind. Some studies are being used to help government policy-makers to focus voluntary agreements or action plans with industry in areas where sustainability hotspots have been identified. For example, as is the case with WRAP’s Product Sustainability Forum’s work in the UK food chain; the French Government’s work to provide more sustainability information to consumers; or the Water Footprint Network’s analysis of water scarcity hotspots in major river catchments.

Businesses are using hotspots analysis to focus their resources, drawing up action plans and practical programmes of work to eliminate, reduce or mitigate hotspots in their global value chains; and tackling major societal and commercial issues like food waste, food and resource security (future supply risk and resilience issues); and water use in agriculture. For example, the work of UK grocery retailer, Tesco, to tackle the food losses and food waste associated with the international sourcing of its products and their use by consumers; and the work of The Sustainability Consortium in building consensus around the key sustainability hotspots to address in consumer goods value chains.

Other stakeholders are using the findings from hotspots analysis to inform their thinking. For example, the Oxford Martin School at Oxford University is working alongside WRAP in the UK to use hotspots analysis to inform its thinking on the research, policy and business drivers to facilitate a mass movement over time to healthier, more sustainable eating patterns or diets.

In some cases, the scope of hotspots analysis methodologies and studies are broadening beyond consideration of one or more environmental impact categories and including ‘beyond LCA’ approaches and wider sustainability topics like biodiversity management, animal welfare, fair trading arrangements, land use and land use change and governance issues around raw materials or water resources. This development would suggest that both methodology developers and users see the value in securing a more holistic view of hotspots, allowing them to identify where trade-offs may need to be considered (e.g. between traditional intensive agricultural practices and the potential impact on the agri-ecosystems that support them). The importance of taking a ‘beyond LCA’ approach to the development of hotspots analysis methodology was also highlighted by stakeholders as can be seen below.

While there is still a clearly defined niche for traditional life cycle assessment (LCA) approaches that solely utilize quantitative data and exclusively address environmental impacts, there are a growing number of hotspots analysis methodologies that move beyond traditional LCA and include either additional quantified data and information (e.g. trade, market and sales data; contextual sector or product category information; supporting scientific research and innovation; materiality studies); and / or qualitative inputs, such as expert opinions, stakeholder concerns, consumer behaviour insights, etc.. This trend appears to be most prominent among product- and sector-level hotspots analysis methodologies.

This observation does not preclude the fact that the majority of methodologies share a common foundation in that they utilize a life cycle approach to hotspots analysis. Most of the methodologies reviewed by the authors also follow a pragmatic approach that includes the identification of all life cycle aspects and impacts within a study boundary before applying materiality criteria or significance thresholds in order to define which ones are “hot”. In some circumstances (not necessarily for the key methodologies identified) a methodology may not
consider the whole life cycle at the start, since there may be sufficient existing studies for the same sector or product category suggesting that the hotspots always lie in one or more specific life cycle stages.

The initiation of methodology development stems from a variety of different organisations, and is often linked to a specific objective. Governments may act in relation to policy, whereas the private sector may act based on a recognition of a business case for action. NGOs may be informed by recognition that a methodology can help in articulating the need for action in line with their objectives.

Common features of all the methodologies identified by the authors are their engagement with a wide stakeholder base in development and their quantitative nature, though some methodologies also incorporate qualitative information drawn from a range of sources. The majority are focussed on multiple impacts and issues, with most covering a core set of environmental issues, though issue-specific methods also exist. The national-level methodologies reviewed exclusively utilize a quantitative approach which addresses environmental impacts, while sectoral- and product-level methodologies tend to be more diverse in the impacts and issues they address, as well as utilising qualitative elements.

While the hybrid funding appears to be dominant among the methodologies, there is no common model applied at a national, sector, or product level.

Another interesting observation that was alluded to in the analysis in Table 2 was that none of the hotspots analysis methodologies listed was “easy” to use. More than half were considered to be “difficult” requiring some expert knowledge or experience; and the remainder were “moderate” and may require some expert guidance in order to use. As a tool that is used to facilitate decision-making as a precursor to (or in lieu of) a more detailed analysis, hotspots analysis still seems to require at least some expert input.

In terms of gaps, few methods appear to incorporate financial data, in particular on the costs and benefits of addressing hotspots. The methods are generally linked to quantification activity. Links to identification of a range of associated opportunities or solutions to reduce the impact of hotspots identified are often sparse, with notable exceptions in the methodologies developed by TSC and WRAP’s PSF. Whilst the need for action is recognised in principle, its incorporation into methods is generally limited. In particular, there is a lack of guidance on how to assess the potential for reducing a hotspot. This was also raised in the interviews (see below).

3.1.2 Opportunities for alignment of methodologies

GHG and carbon accounting methodologies all share common characteristics in their approaches, calculation rules and methodological steps, due to the high-profile, global multi-stakeholder development processes involved in the Greenhouse Gas Protocol and ISO Standards. These standards already have well-established processes and international acceptance and do not require further alignment. However, as with some of the other methodologies identified in this study, stakeholder interviews and the authors’ knowledge suggest that they are useful seed documents and offer valuable learning from their development processes that can be fed into the development of the common methodological framework and global guidance for hotspots analysis.

There may also be some potential to look for synergies among methodologies, databases and tools that are based on globally-accepted LCA guidance approaches (e.g. ISO 14040 / ISO 14044) to expand them to cover other impact categories and issues beyond environmental impacts to include social, ethical, economic and governance impacts (e.g. Social Hotspots Database). Since the development of Social LCA tools and resources are
rooted in a traditional LCA framework (i.e., based on ISO 14040 and ISO 14044 principles) it may be worthwhile exploring, identifying and documenting any lessons learned in the process of extending traditional (environmental) LCA methods to cover other issues and seeing if they can be applied to the wider range of impacts and issues covered in other hotspots analysis methodologies. This would facilitate the development of more robust multi-criteria methodologies and tools that would improve the efficiency and resolution of hotspots identification whilst using a broader sustainability lens.

The hotspots analysis methodologies utilized by AHAM, WQA, PGSI and NCBA have all been completed and privately-funded by industry associations and their members and all share the following characteristics:

- Utilize both quantitative and qualitative inputs
- Focus on multiple impacts that include environmental, social and governance impacts
- Involve multiple internal and external stakeholders at different steps in the process
- Include a pilot testing phase

Other methodologies that are generally similar (with some minor differences) include:

- WRAP’s PSF – focus on environmental and economic sustainability, but not social, ethical or governance impacts or concerns; utilises hybrid funding model
- TSC – includes environmental and social impacts but does not include economic or governance impacts; funded by members’ fees, government and foundation grants and licensing fees
- SAFA tool – publicly-funded

All of these methodologies are good candidates for further investigation with developers and owners to see if there is are opportunities to:

- Align and improve existing common methodological components and approaches;
- Better understand the rationale for differences in existing methodological approaches;
- Share and further develop best practice;
- Share study findings, data, knowledge and insight, where the business models of methodology owners allows; and ultimately
- Work together to develop a common methodological framework and global guidance on hotspots analysis and the appropriate application and communication of findings in the marketplace.

There may also be good potential for these methodologies to be applied or adapted for other sectors or product categories, included at the same scale or level or for cross-level applications (e.g. applying or adapting a product-level methodology to a sector-level application or vice versa).

### 3.1.3 Key stakeholder feedback

As part of the research methodology for this project, stakeholder interviews and e-mail exchanges were conducted to obtain key insights on the identified hotspot analysis methodologies. The interviews were conducted with methodology users and developers who have either responded to the survey or were identified by the authors. Ten (10) interviews\(^{25}\) were conducted and below are some of the key insights from the stakeholders’ interviews.

\(^{25}\) The list of interview participants is included in Annex 4.4.
Beyond LCA: Most of the stakeholders interviewed were in favour of hotspots analysis methodologies that utilised a mix of quantitative and qualitative analysis as, in their view, this makes hotspots analysis more market relevant, flexible and adaptable, comprehensive, responsive to stakeholders needs; and able to address some issues and topics that traditional LCA approaches struggle with (e.g. biodiversity loss, water scarcity, cumulative impacts from multiple products sold and consumed, etc.).

Goal and scope clarity: Several of the stakeholders insisted on the need to identify the goal and scope of any hotspots analysis project. It is important to think about what do you want to achieve? What difference will this make to the existing situation and how? How will this help in achieving some of the sustainability challenges that the nation/sector/product in scope is facing? As part of the goal and scope activity it is also important to understand the impacts that are in scope (e.g. environmental only or including social, economic and governance impacts); and the likely sources of available data and information required to support the analysis.

The importance of stakeholder credibility and a phased approach: Stakeholders identified the importance of building credibility and engagement with key stakeholders as you develop and apply a hotspots analysis methodology. A phased approach was strongly advised as described below:

- Using internal expertise and initial dialogue and interviews with the critical friends in your wider stakeholder group to understand their needs and outline key methodological components and process steps and test the likely availability of critical data.
- Build a methodological framework or structure for these components and a clear operational logic and process for them.
- Flesh-out each methodological component and develop a process flow diagram that shows the interaction between these components and their outputs.
- Share the draft methodology with a wider group of stakeholders and obtain their feedback and perspectives on it.
- Refine the methodology and move towards a consensus position through further engagement with key stakeholders allowing adequate time to facilitate their buy-in.
- Pilot or road-test a final draft of the methodology with a manageable number of stakeholders, refine it and make it available for wider use.
- Over time, develop and test tools and resources that make it easier for stakeholders to use the methodology.
- Periodically revise the methodology in the light of experience of using it, new science and best practice, etc.

Keep it actionable and manageable: Stakeholders suggested that it is important to identify how many hotspots you can deal with at a time. There is need to think about actionability, having too much information also leads to confusion and overwhelms the users. It is preferable to set the thresholds for when an aspect or impact is considered a hotspot high enough to generate a manageable list of hotspots to tackle. Over time, as the primary hotspots are addressed, thresholds can be reduced to identify new, ‘secondary’ hotspots to focus attention on. For example, WRAP’s PSF uses a threshold for primary hotspots that equates to 25% or more of the product lifecycle impacts associated with a given metric or metrics. This typically produces between four (4) and six (6) hotspots per product category or group.
Prioritization and the ‘addressability’ of hotspots: Many stakeholders stated that the hotspots identified should be further reviewed and prioritized to meet the needs and goals of those who will be addressing them. This involves clarity around the nature, scale and location of the hotspot in the sector, product lifecycle or value chain; and how ‘addressable’ they are in the current infrastructure, market, operational or economic context (e.g. ability of the company to influence the hotspot, ease and cost of implementation of solutions to address the hotspot, complexity of the sector or value chain, etc.). In some cases it is likely that some form of pre-competitive collaboration will be required to tackle a hotspot – i.e. to share the cost of implementation; agree a common targeted approach; or build and share expertise and capacity and capability to respond.

Make it visual: A number of stakeholders commented on the fact that the clear and intuitive visualization of hotspots analysis findings is really important to them and to their non-technical colleagues who are faced with making a decision on the actions that they need to take or mandate to address a hotspot. Sector heat maps and product hotspot matrices, synthesized findings in slide deck form, short digestible action plans and searchable libraries of solutions are all considered helpful.

Periodic review and revision of hotspots: Stakeholders suggested that hotspot analysis should be revisited and updated periodically to capture any changes that take place over time, which could affect the applicability, usability or purpose of the hotspot analysis. This could include situations where primary hotspots have been fully or partially addressed and thresholds need to be lowered to identify new ones; changes in stakeholder concerns or expert opinion, the introduction of new, higher performing products in the market place; the availability of better data and information to re-evaluate hotspots, etc.

Clear communication of uncertainty: A number of stakeholders called for clearer statements of uncertainty in the findings from hotspots analysis; and for the inclusion within hotspots analysis methodology of clear guidance and tools to support the development of data quality, management and analysis protocols, methods for uncertainty testing; clear rules for the communication of assumptions, proxy products or processes and any models used in the analysis.

Case studies: Several stakeholders stated that case studies and examples that showed how to apply a methodology were incredibly helpful, particularly when applying the methodology for the first time. One specific example was given for the GHG Protocol Product Standard, which is peppered with case studies from road-testing companies to support users of the Standard.

3.2 Key learning for development of global guidance

3.2.1 Suggested methodology/process for hotspot analysis

Utilizing insights gained from stakeholders interviewed, as well as from assessing the key hotspots analysis methodologies, we recommend the following methodological process steps, as requisite, in conducting hotspots analysis (regardless of scale):

1. Define, clarify and solicit agreement of the goal and scope of study utilizing, wherever possible, a life cycle approach, including identification of the target audience for the hotspots analysis (stakeholder mapping and engagement) and gaining a good understanding of their practical needs. For example, stakeholders should be consulted on the following issues:

   - The primary and secondary goals of the study;
The scale or level at which the study is to be conducted (e.g. national, sectoral, product, etc.);

The study boundary (e.g. geographical scope / location; production and consumption; industry sector / product categories / individual products to be covered; whole life cycle or a collaborative gate to gate approach; etc.);

The issues and impact categories to be covered by the study (i.e., environment, social, economic, governance, or mix of these);

Other relevant businesses, organizations or key stakeholders that should be consulted or engaged during the course of the study;

Any other existing initiatives that are relevant to the study, including potential collaborators, topic or sector experts;

Any potential sources of data or information for use in the study; and

Their willingness to participate in a multi-stakeholder steering group and working groups (e.g. methodology development; peer review; product category-specific activities; tool and resource development; communications).

2. **Gather data, seek expert insight, knowledge building and analysis**, compile and organize according to the scope and requirements of the study, including:

- The development and agreement of data quality parameters, including assumptions, use of ‘proxy’ products, processes or studies where data gaps exist, etc.;
- The development and agreement of a protocol for the collection, storage, analysis and sharing of data and information during the course of the study;
- The appropriate use of expert insight (e.g. face-to-face or telephone interviews or working group meetings) to bolster or support scientific evidence or provide insight into industry practices;
- Any other stakeholder consultations required to identify or better understand stakeholder concerns in relation to the scope of the study and the issues and impact categories it is seeking to cover;
- The identification of relevant existing studies (e.g. national or sectoral input / output analysis or product LCAs and foot-printing studies) and other sources of data and information (e.g. peer reviewed and other academic studies and journal articles, environmental product declarations, corporate and government data sets, LCA databases and tools);
- The commissioning of sector studies, LCAs (e.g., scoping-level LCA to model scenarios in the absence of primary data or to validate initial impacts identified) or foot-printing studies where significant data gaps exist against the issues and impact categories agreed in Step 1;
- Where possible, the ‘normalization’, aggregation or disaggregation of studies and data in order to provide a consistent view / boundary of findings (e.g. normalizing the findings from life cycle studies to use the same functional unit);
- Uncertainty testing to understand the reasons behind different impact values or factors for the same products or product groups in order to gain a better understanding of the key variables driving or mitigating impacts;
- Identifying any other information that might be useful in the identification of hotspots in an economy, industry sector or product category (e.g. trading and sales volumes for materials or products; physical materials flows associated with a
national economy, industry sectors or products; contextual information on the
nation, industry sector or products included in the study); and

- Organizing the data and information to facilitate the identification of significant
  aspects and impacts.

3. **Identify and validate Hotspots** utilizing all of the evidence threads from Step 2 to
build a picture of the likely issues and impact hotspots that will need to be addressed.
This step includes the following:

- Agreement of materiality or significance thresholds for the study – i.e. when does an
  aspect or impact become a hotspot and why? What is the threshold?
- The identification, analysis, ranking, characterization and stakeholder validation of
  hotspots, including agreement of the criteria to be applied to the ranking of ‘priority’
  sectors or products and / or the hotspots associated with them.
- The preparation and refinement of national, sector, product category or product
  ‘heat maps’ to provide an at a glance view of the hotspots identified in the study,
  the issues or impact categories associated with them and their location in the
  economy, product lifecycle or value chain. This is based on the initial analysis of the
  core project team involved in the delivery of the study and is refined based on
  detailed expert feedback and discussions with key stakeholders.
- Agree and apply a set of parameters to assess the ‘addressability’ of the hotspots
  identified in the study in order to help prioritize actions; and sense check with
  stakeholders. For example, consideration of the market power and sphere of
  influence of those involved in the study; barriers (including those based on financial,
  technical and technological feasibility) and enablers to action, etc.
- The preparation of other visual technical and non-technical tools and resources to
  bring the findings of the hotspots analysis alive and to make the outputs usable by a
  range of stakeholders and functions within an organization: e.g. product summary
  slide decks, info-graphics, etc.

4. **Identify and prioritize actions** by working with key stakeholders to:

- Develop an initial long list of potential impact reduction opportunities which can be
  used to tackle the ‘priority’ sectors or product categories and associated hotspots
  identified in Step 3, using a combination of desktop research, expert interviews,
  technology appraisals, brainstorming sessions and innovation workshops.
- Agree the selection criteria to shortlist impact reduction opportunities for further
  investigation (e.g. ease and cost of implementation, availability of technology or
  infrastructure, payback period, economic and environmental savings potential,
  reducing risk, improvements in supply chain resilience, etc.); and then undertake
  shortlisting process.
- Develop shortlisted impact reduction opportunities and validate with industry
  experts, policy-makers and other key stakeholders.
- Produce tools and resources to support action by governments, industry and others
  (e.g., documented impact reduction opportunities, action plans and guidance
  materials).
- Agree and initiate pilots to test a range of solutions to tackle the hotspots identified,
  refining tools, standards and resources based on pilot results and additional
  feedback.
Mainstream proven or effective solutions based on feedback from piloting activities and publish and disseminate, including case studies, business case tools, calculators, industry events, etc.

Bring together all of the findings and resources from the study and publish.

Capture and publish progress over time to encourage others to do the same.

5. **Review initial findings** with experts and key stakeholders.

6. **Presentation and validation of findings.**

7. **Identification of any implementation gaps and recommendations** for how they might be filled.

8. **Revisit hotspots identified** after specified period and re-evaluate against new life cycle or technical data, changes to stakeholder perceptions, new issues arising or potential impacts, progress made/challenges encountered in managing previously identified hotspots.

### 3.2.2 Suggested stakeholders for development of hotspot analysis global guidance

Below is the list of potential stakeholders that can be contacted to support the development of a common methodological framework and global guidance for hotspots analysis.

**Table 6**: List of possible stakeholders to be included in the development of global guidance

| 1. | American Center for Life Cycle Assessment, Institute for Environmental Research & Education (ACLCA) |
| 2. | Agriculture and Agri-Food Canada (Agri-Food Supply Chain Greening Initiative) |
| 3. | Australian Life Cycle Assessment Society (ALCAS) |
| 4. | Association of Home Appliance Manufacturers (AHAM) |
| 5. | Better Cotton Initiative |
| 6. | Beverage Industry Environmental Roundtable |
| 7. | Brazilian Life Cycle Association |
| 8. | British Retail Consortium |
| 9. | Business in the Community |
| 10. | C40 Climate Cities Initiative |
| 11. | Consumer Goods Forum |
| 12. | Carbon and Water Disclosure Project |
| 13. | CIRAIG the Interuniversity Research Centre for the Life cycle of Products, Processes and Services |
| 14. | Compiling and Refining Environmental and Economic Accounts (CREEA) |
| 15. | Climate Change Office |
| 16. | CSA Group |
| 17. | Consumers International |
| 18. | Cool Farm Institute |
| 19. | Carbon Disclosure Project |
| 20. | Centre for sustainable design |
| 21. | Cargill (Agri Tech / supply) |
| 22. | Corporates |
| 23. | Collaborating Centre on Sustainable Consumption & Production |
| 24. | Defra (UK) (Sustainable Products and Consumers) |
| 25. | DECC (UK) (Energy Efficiency Deployment Office) |
| 26. | EC DG Environment |
| 27. | European Food SCP Roundtable |
| 28. | EC DG Joint Research Centre |
| 29. | EU FP7 Fusions Project (SIK) |
| 30. | EU Retail Forum for Sustainability |
| 31. | Federation of Indian Chambers of Commerce (FICCI) |
| 32. | French Ministry of Ecology, Sustainable Development and Energy |
| 33. | Forum for the Future (UK) |
| 34. | Fundación Chile |
| 35. | Food & Climate Research Network (Oxford University - Oxford Martin School) |
| 36. | FoodDrinkEurope |
| 37. | Forest Stewardship Council (FSC) |
| 38. | GHG Protocol Product and Value Chain Initiative, World Resources Institute |
| 39. | GS1 Global Standards 1 (Global Office) |
| 40. | Institute for Sustainable Consumption & Production (ISCP) College of Architecture & Environment, Sichuan University |
| 41. | ICLEI Local Governments for Sustainability |
| 42. | International Organization for Standardization (ISO) |
| 43. | ISEAL Alliance |
| 44. | Japanese Environmental Management Association for Industry - Carbon Footprint of Products Initiative and EcoLeaf Program |
| 45. | Marine Stewardship Council (MSC) |
| 46. | New Economics Foundation (UK) |
| 47. | Product Environmental Footprinting World Forum |
| 48. | PRé Sustainability |
| 49. | Planet Ark |
| 50. | Product Sustainability Round Table |
| 51. | Quebec Carbon Footprint Pilot Project |
| 52. | Secretariat (Product Sustainability Forum) |
| 53. | SEDEX (Social and ethical auditing and trading platform) |
| 54. | South African SCP Roundtable |
| 55. | South African Ministry for the Environment, Cleaner Production Centre |
| 56. | Sustainable Apparel Coalition |
| 57. | Sustainable Agriculture Initiative (SAI) Platform |
| 58. | Sustainability Coalition for Australia |
| 59. | Sustainable Consumption Institute (University of Manchester) |
| 60. | Sustainable Purchasing Leadership Council (SPLC) |
| 61. | Sustainable Soy Roundtable |
| 62. | The Natural Capital Coalition (formerly the TEEB for Business Coalition) |
| 63. | The Great Recovery Project (RSA) (funded by the UK Government through the TSB) |
| 64. | The Product Life Institute |
| 65. | The Sustainability Consortium |
| 66. | UL Environment |
| 67. | UK Dream |
| 68. | UK Global Food Security Research Platform |
| 69. | UNEP Consumer Information Programme |
| 70. | UNEP SETAC Lifecycle Initiative |
| 71. | UNEP Sustainable Building and Climate Initiative (SBCI) |
| 72. | UNEP 10 Year Framework of Programmes on SCP |
3.3 Next steps

In order to take forward the findings from this initial mapping project and use them to inform the development of:

- A common methodological framework for hotspots analysis capable of being used at different scales and levels of detail and supported by global guidance on its application;
- An initial outline for a protocol on the appropriate use and communication of (national, sectoral and product) sustainability information derived from hotspots analysis based on existing knowledge; and
- A range of options for knowledge capture, building and transfer to facilitate the wider uptake and application of hotspots analysis, as a route to more sustainable production and consumption patterns in the future.

We propose the following practical steps:

1. Finalise the report following a wider stakeholder engagement and consultation process with the list of organisations and initiatives identified in this report. The principle objective of this consultation is to test and refine the initial thinking and structure for the common methodological framework, global guidance and protocol.

2. Undertake a short piece of research and targeted stakeholder engagement and consultation to better understand the current use and communication of product sustainability information derived from hotspots analysis. This will form the basis for the next iteration of the protocol for discussions with the wider stakeholder group identified in this report.

3. Plan and execute one or more one to two-day facilitated rapid prototyping workshops (dependent on available budget). These workshops will be structured to:

   a. Engage existing and new stakeholders (from the different UN regions around the world) interested in developing hotspots analysis methodology and applying it in a range of different situations;
b. Identify, record and distil the key learning, experiences and best practices from a range of existing hotspots analyses initiatives and studies in an interactive, face-to-face environment;

c. Use this information to refine the three (3) deliverables above; and build and agree a consensus view of:

- The common methodological components and process steps required to deliver a methodological framework flexible enough to be used at different scales and levels of detail;
- Current best practice in relation to hotspots analysis methodologies and studies for incorporation into the global guidance, including case study examples to aid implementation; and examples of current best practice in this field;
- The appropriate use and communication of sustainability information derived from hotspots analysis; and
- The options available to capture, build and transfer knowledge from existing hotspots analysis initiatives to minimise duplicated effort, further extend best practice approaches, support new initiatives and advance global thinking. Again, if budget allows, it would also be a very worthwhile exercise to gather the findings and data from existing hotspots analyses to provide a richer, global picture of where sustainability hotspots exist and the range of potential solutions to address them.

4. Use the feedback and learning from these workshops to hone the three (3) deliverables and, if budget permits, undertake a final validation, refinement and consensus-building exercise by running a single global three to five (3-5) day Pellston-style\textsuperscript{26} workshop.

5. An optional further stage would be to undertake a series of practical piloting projects to road-test the three (3) deliverables with interested parties in advance of publication.

\textsuperscript{26} A Pellston workshop is an intensive, week-long event format developed by the Society of Environmental Toxicology and Chemistry (SETAC) in the 1970’s. Each of the more than 50 such workshops held to date has adhered to the same structure, format, and ground rules. Among these are the requirements that each of the invited participants agrees to engage as an individual expert, not as a representative of an organization, participate for the entire duration, contribute to a major publication derived from the effort, and respect the consensus building process employed during the conduct of the workshop. SETAC Pellston workshops have produced seminal publications across a variety of environmental science topics and issues, including five such publications on LCA.
4.0 Annexes

4.1 Survey questions shared via Survey Monkey

Global Hotspots Analysis Methodology Survey

Context:
In support of the UNEP 10 Year Framework of Programmes on Sustainable Consumption and under the leadership of the phase 3 Life Cycle Initiative's flagship on 'Hotspots Analysis Guidance', Mark Barthel from WRAP (UK) and Jim Fava (PE INTERNATIONAL), the UNEP/SETAC Life Cycle Initiative is currently analyzing existing hotspots analysis methodologies and their application based on various priority criteria, with the aim of developing global guidance on the development and use of these methodologies. For more information about the flagship activity:


This survey, an initial step in this analysis, seeks to identify an exhaustive list of hotspots analysis methodologies that are being developed and used globally. It will also distil additional insights on the scope of these methodologies, the issues that they cover, as well as their application within emerging economies and Small and Medium Enterprises (SMEs). Finally, the results of this survey will help us to identify the key stakeholders that we need to be engaging with; and the process steps to facilitate the development of global guidance on hotspot analysis methodologies.

Instructions:
The nine (9) questions in this survey should require approx. 20 minutes to complete. Please respond to each question to the best of your ability. Most of the questions require you to select an answer and other questions provide text boxes for you to provide additional information, as appropriate. We are seeking your input on up to five (5) different hotspots analysis methodologies that you are most familiar with or are most relevant to your organization.

All responses will then be analyzed, aggregated and published without attribution to individual respondents or organizations, unless written permission is expressly received by the survey administrators.

The final report will be published as UNEP/SETAC publication and disseminated worldwide. Respondents will receive a draft report before it is being finalized for your kind feedback and your names would be listed in the acknowledgements page.

---

27 Hotspots Analysis: A methodological framework that allows for the rapid assimilation and analysis of a range of information sources, including life cycle based studies, market, and scientific research, expert opinion and stakeholder concerns. The outputs from this analysis can then be used to identify potential solutions and prioritize actions around the most significant economic, environmental and social sustainability impacts or benefits associated with a specific country, industry sector, product portfolio, product category or individual product or service. Hotspots analysis is often used as a pre-cursor to developing more detailed or granular sustainability information.
Thank you in advance for your time, participation and insights on behalf of the UNEP/SETAC Life Cycle Initiative.

Please provide us with:

Respondent's name: 
Organisation's name: 
Phone: 
Email: 
Organisation's web address: 

What kind of organisation do you work for?

- Academia 
- Government 
- Manufacturer 
- NGOs 
- Regulator 
- Trade Association 
- Other 

Size of Organisation:

- Large (> 250 employees) 
- Medium (51-250 employees) 
- Small (11-50 employees) 
- Micro (1-10 employees) 

Q.1 Please skim through the list of hotspots analysis methodologies in the dropdown menu and indicate the one you are most familiar with or is the most relevant to your organization. (If you know more than one, you will be guided later to fill in the survey for up to five (5) methods)

Note: The hotspots analysis methodologies listed in the dropdown menu are not exhaustive, but rather a preliminary indicative list for your thinking and reference.

In case you want to describe another methodology that is not in the list, please select "Hotspots analysis methodology 1" and add the name in the box below (as well as other relevant information including owners, users, web links and any contact details).

Hotspots Method 1

Methodology name and details 

Q.2 Please select your level of exposure (i.e., level of knowledge / understanding / familiarity) to the hotspots analysis methodology identified above.

(Guidance: Please use dropdown box under Exposure Level to select your level of knowledge / understanding / familiarity. Please provide additional details in the Comment Box, if "Others" is selected.)
Q.3 Please select the predominant application for the methodology.
(Guidance: Please use dropdown list to select type of application - e.g., national, sector, product category, other)
- National
- Sector
- Product category
- Other

Q.4 Please select the breadth of issues covered by the hotspots analysis methodology that you have selected above.
(Guidance: For example, five environmental impact categories / metrics covered by this methodology include: GHG emissions, material use, water use, waste and embodied energy in the product category)

Economic
Environment
Ethical
Governance
Social

Comment box

Q.5 Please select the following for the hotspots analysis methodology that you selected above.
(Guidance: From the dropdown box, please select the most suitable response for each aspect listed below):

*Geographical application (i.e., the region in which the methodology is applied)
*Ease of Use / Implementation (i.e., the degree of expert knowledge or guidance required in use / implementation)
*Data availability in non-OECD countries: data availability to implement the methodology in non-OECD countries (please try to answer this question even if the methodology is not applied in Non OECD countries yet as it aims at understanding the potential of use)
*Data availability for OECD countries: data availability to implement the methodology in OECD countries

[Comment box: Please list the name of the methodology in the comment box, in case it is not in the dropdown list. Please also add the name of the country and any other specifics.]
<table>
<thead>
<tr>
<th>Select geographical application</th>
<th>Ease of Use / Implementation</th>
<th>Relevance to Organization</th>
<th>Select data availability in non-OECD countries</th>
<th>Select data availability in OECD countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Select geographical application</td>
<td>Ease of Use / Implementation</td>
<td>Relevance to Organization</td>
<td>Select data availability in non-OECD countries</td>
<td>Select data availability in OECD countries</td>
</tr>
</tbody>
</table>

**Q.6** Please select the level of accessibility (i.e., the associated costs for accessing these) for the hotspots analysis methodology that you selected above. (Guidance: For each methodology you identified, please select an appropriate level of accessibility from those listed in the dropdown menu. If required, please use the Comment Box to provide additional details on your response.)

- [ ] Fully Accessible (i.e., publicly-available, free access)
- [ ] Accessible (i.e., publicly-available, low cost fee to access)
- [ ] Partially Accessible (may be offered publicly or may require secondary contact for access, high cost to access)
- [ ] Low Accessibility (i.e., not publicly-available, limited ability to access, cost prohibitive fees, etc.)
- [ ] Not accessible / Not available for use
- [ ] Don't know

**Q.7** Please identify the sector(s) for which the hotspots analysis methodology is applicable. (Guidance: For each methodology, please select one or more applicable sectors from those listed. If you select "Cross-Sector" or "Others" please use the Comment Box to provide additional details.)

- [ ] Agrifood
- [ ] Building construction and building material
- [ ] Chemicals
- [ ] Tourism
- [ ] Consumer goods
- [ ] Cross-sector
- [ ] Other
Suitability for SMEs

Very suitable
Suitable
Not suitable

Do you know any other relevant methods that you would like to complete this survey for? (Up to 5)

Yes
No

**IF the answer is yes then Q1 to Q7 repeats in the same order for maximum 5 times.**

Would you be interested in being contacted/ interviewed further for this study? (If YES please provide a preferred method of contact: e-mail or phone number in the space provided)

Yes
No

Please provide any additional comments/ feedback on this survey.

Thank you for your time to respond to this survey and for sharing your valuable insights.

### 4.2 Summary of responses to survey questions

An online survey (the initial step in the overall review of hotspots methodologies) was conducted to identify an exhaustive list of hotspots analysis methodologies that are currently being developed and used globally. In addition to identifying methodologies, the survey questions revealed additional insights on the scope of these methodologies, issues covered, as well as application within emerging economies and SMEs. Finally, the results of this survey identified the key stakeholders and process steps to facilitate the development of global guidance on hotspot analysis methodologies.

All hotspot methodologies, along with the insights revealed through the survey, are below in Table 7. The survey responses have been translated into points. The points that each methodology received on the various evaluation criteria were then added together to provide a comparable score. This score shows, relative to other methodologies, how relevant, applicable, easy to use, and transparent each methodology is.
<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Known / applied?</th>
<th># of Impacts</th>
<th>Relevance</th>
<th>Applicability to Emerging Economies</th>
<th>Ease of use</th>
<th>Availability of data</th>
<th>Accessibility</th>
<th>Transparency</th>
<th>Score</th>
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<td>All applications (sector, product, national)</td>
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4.3 Stakeholder interview questions

Methodology Owner/Developers Interview Topic Guide: Global Hotspots Analysis

Methodology
In support of the UNEP 10 Year Framework of Programmes on Sustainable Consumption and under the leadership of the phase 3 Life Cycle Initiative's flagship on 'Hotspots Analysis Guidance', Mark Barthel from WRAP (UK) and Jim Fava (PE INTERNATIONAL), through the UNEP/SETAC Life Cycle Initiative are currently analyzing existing hotspots analysis methodologies and their application in a range of different situations, with the aim of developing global guidance on the development and use of these methodologies.28

These interviews, a secondary step in this analysis, seek to build on methodologies and information identified in the online survey that you responded to. The combined survey and interview results will inform the development of global guidance on hotspot analysis methodologies.

This interview should take no more than 30 minutes. Please contact Andrea Smerek with any questions and to schedule a convenient time for your interview.

PE INTERNATIONAL, Inc.
Ottawa, ON Canada
Phone +1 613 722 6629 ext. 228
E-Mail a.smerek@pe-international.com

We are looking to complete all interviews as soon as possible and would therefore be very grateful for your early response.

Thank you in advance for your time and participation

<table>
<thead>
<tr>
<th>Introductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Title</td>
</tr>
<tr>
<td>Organisation</td>
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### Development

<table>
<thead>
<tr>
<th>Methodology Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(please fill out a separate guide if discussing further methodologies)</em></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>What were the key drivers for the development of the methodology?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Why did you not use an existing method?</td>
</tr>
<tr>
<td>- Are there barriers to accessing ‘the best’ methodologies?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Was the methodology developed based on any existing practices?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Has, or was it intended to address a limitation with an existing method?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Who was involved in the development of the methodology?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- How was it funded/resourced?</td>
</tr>
<tr>
<td>- Was a peer reviewer involved?</td>
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</table>

<table>
<thead>
<tr>
<th>Can you provide a copy of the methodology for us to look at in more detail?</th>
</tr>
</thead>
</table>

Has the methodology evolved or changed since this documented version?  
(or if the interviewee is unable to provide a copy of the methodology, please ask the following question):  
- What are the main elements of the methodology and what process steps does it follow?

### Use

<table>
<thead>
<tr>
<th>How is (or was) this hotspots methodology used?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Is it the most commonly used in a specific context?</td>
</tr>
<tr>
<td>- <em>(optional question) Are you aware of who is using this methodology?</em></td>
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</tbody>
</table>

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<thead>
<tr>
<th>What are the strengths of this methodology?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Does it work best in certain contexts?</td>
</tr>
<tr>
<td>- Is this the best methodology? What, if anything, is better?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What are the limitations of the methodology?</th>
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<tbody>
<tr>
<td>- Could these be overcome? If so, how?</td>
</tr>
<tr>
<td><strong>Revisions</strong></td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Have there been any revisions to the methodology?</td>
</tr>
<tr>
<td>- If so, what?, why?</td>
</tr>
<tr>
<td>- Are there any future changes planned?</td>
</tr>
</tbody>
</table>

| **What advice/recommendations would you give to someone intended to design a hotspot methodology?** |
| - Is there a need? |
| - What should be the starting position? |

<table>
<thead>
<tr>
<th><strong>Final things</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Any final comments?</td>
</tr>
</tbody>
</table>

Are you happy for us to contact you again in future, for example to clarify information taken in this interview? Y / N Your information will be held in confidence, in line with our [Privacy Policy](http://www.wrap.org.uk/content/privacy-policy).
Methodology Users Interview Topic Guide: Global Hotspots Analysis Methodology

In support of the UNEP 10 Year Framework of Programmes on Sustainable Consumption and under the leadership of the phase 3 Life Cycle Initiative’s flagship on 'Hotspots Analysis Guidance', Mark Barthel from WRAP (UK) and Jim Fava (PE INTERNATIONAL), through the UNEP/SETAC Life Cycle Initiative are currently analyzing existing hotspots analysis methodologies and their application in a range of different situations, with the aim of developing global guidance on the development and use of these methodologies.30

These interviews, a secondary step in this analysis, seek to build on methodologies and information identified in the online survey that you responded to. The combined survey and interview results will inform the development of global guidance on hotspot analysis methodologies.

This interview should take no more than 30 minutes. Please contact Andrea Smerek with any questions and to schedule a convenient time for your interview.

PE INTERNATIONAL, Inc.
Ottawa, ON Canada
Phone +1 613 722 6629 ext. 228
E-Mail a.smerek@pe-international.com

We are looking to complete all interviews as soon as possible and would therefore be very grateful for your early response.

Thank you in advance for your time and participation

<table>
<thead>
<tr>
<th>Introductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Title</td>
</tr>
<tr>
<td>Organisation</td>
</tr>
</tbody>
</table>

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## Methodology

**Methodology Name**

<table>
<thead>
<tr>
<th>How did you select this methodology?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Was it recommended? Is it perceived as an industry standard?</td>
<td></td>
</tr>
<tr>
<td>What were the key drivers for using the selected methodology?</td>
<td></td>
</tr>
<tr>
<td>- Why did you choose this method?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Can you provide a copy of the methodology for us to look at in more detail?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the methodology evolved or changed since this documented version?</td>
<td></td>
</tr>
</tbody>
</table>

## Use

<table>
<thead>
<tr>
<th>How is (or was) this hotspots methodology used?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- In what sector or area?</td>
<td></td>
</tr>
<tr>
<td>- Is it the most commonly used in a specific context?</td>
<td></td>
</tr>
<tr>
<td>- Have you made/influenced a change in practice as a result of the analysis?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What are the strengths of this methodology?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- How reliable do you perceive the results are?</td>
<td></td>
</tr>
<tr>
<td>- Does it work best in certain contexts?</td>
<td></td>
</tr>
<tr>
<td>- Is this the best methodology? What, if anything, is better?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What are the limitations of the methodology?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Could these be overcome? If so, how?</td>
<td></td>
</tr>
</tbody>
</table>

## Revisions

<table>
<thead>
<tr>
<th>Do you wish the methodology was different in any way?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- If so, how? Why?</td>
<td></td>
</tr>
<tr>
<td>- Would you value: Increased scope? Enhanced rigour? Increased access? Supporting software being made available?</td>
<td></td>
</tr>
<tr>
<td>- Are there aspects of other methodologies you would value?</td>
<td></td>
</tr>
</tbody>
</table>
What advice/recommendations would you give to someone intending to consider using a hotspot methodology?
- Is there a need?
- What should be the starting position?

**Final things**
- Any final comments?

Are you happy for us to contact you again in future, for example to clarify information taken in this interview? Y / N Your information will be held in confidence, in line with our Privacy Policy. 31

In order to gain additional insight for selected hotspot methodologies, telephone interviews were conducted with ten (10) stakeholders directly involved with the development or use of various methodologies. Where time constraints did not allow for a telephone interview to take place, the project team sought feedback via e-mail. Each stakeholder represented a different methodology.

During the interviews, stakeholders were asked the following questions:

1. Describe your affiliation with the hotspot methodology (e.g., methodology developer / owner, methodology use, interested observer).
2. Please provide a description of the hotspot methodology development and use.
3. What is the application of the hotspot methodology? (e.g., product, sector, national)
4. What are the expected outcomes and impacts of the methodology?
5. Who is the target audience for the hotspot methodology?
6. How were stakeholders involved in the development of the methodology?
7. Who funded the development of the hotspot methodology?
8. Is there anything else that you would like to share about the hotspot methodology? (e.g., what did you learn from the use/development of the methodology? What would you change about the methodology? What advice would you give to someone developing a hotspot methodology?)

Interview responses are summarized in Annex 4.7.

### 4.4 List of Stakeholders Interviewed

The following is a list of stakeholders interviewed and their affiliated organization. Details on responses provided or specific input on hotspots analyses are not directly attributed so as to protect the confidentiality of the participating stakeholders and their organizations. An overview of the interview participants, their organizations, and the hotspot methodology(s) that they discussed is provided.

31 [http://www.wrap.org.uk/content/privacy-policy](http://www.wrap.org.uk/content/privacy-policy)
### Table 8: List of stakeholders interviewed

<table>
<thead>
<tr>
<th>Interview Participant</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brennan Conway</td>
<td>US GSA</td>
</tr>
<tr>
<td>Priscilla Halloran</td>
<td>US EPA</td>
</tr>
<tr>
<td>Nadia Scialabba</td>
<td>Food and Agriculture Organization (FAO) of the United Nations</td>
</tr>
<tr>
<td>Mark Goedkoop</td>
<td>PRé Consultants</td>
</tr>
<tr>
<td>Stephen Allen</td>
<td>Sustain</td>
</tr>
<tr>
<td>Catherine Benoit Norris</td>
<td>New Earth</td>
</tr>
<tr>
<td>Georg Schöner</td>
<td>BASF</td>
</tr>
<tr>
<td>Zubeida Zwavel</td>
<td>ZZwavel Environmental Consulting</td>
</tr>
<tr>
<td>Jean-Paul Ventere</td>
<td>Department of Ecology, Sustainable Energy Development</td>
</tr>
<tr>
<td>Hanako Negishi Priestnall</td>
<td>Japan Environmental Management Association for Industry (JEMAI)</td>
</tr>
</tbody>
</table>

#### 4.5 List of additional hotspot analysis stakeholders and methods not included in this study

The following stakeholders and hotspots analysis methodologies have been highlighted by reviewers but have not been contacted or incorporated into this Flagship Project at this time. We will seek to involve these stakeholders in future consultations and workshops at later stages in the project. Additional methodologies may be incorporated into this analysis at a later stage subject to stakeholder views and available budget.
### Table 9: List of additional hotspots analysis methodologies and contact) not included in this study

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Stakeholder</th>
<th>Contact / Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban Anchor</strong></td>
<td>World Bank</td>
<td>Stephen Hammer (<a href="mailto:shammer@worldbank.org">shammer@worldbank.org</a>)</td>
</tr>
<tr>
<td>Inter-American Development Bank</td>
<td>David Wilt (Climate Change Office)</td>
<td><a href="mailto:davidw@iadb.org">davidw@iadb.org</a></td>
</tr>
<tr>
<td><strong>UNEP's Common Carbon Metric</strong></td>
<td>UNEP BEU</td>
<td>NOTE: GHG calculation for building operations</td>
</tr>
<tr>
<td><strong>CREEA Project</strong></td>
<td>UNEP, International Resources Panel</td>
<td>Sangwon Suh (<a href="mailto:suh@bren.ucsb.edu">suh@bren.ucsb.edu</a>)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE: The CREEA (Compiling and Refining Environmental and Economic Accounts) study endeavours to provide an insight into the environmental footprint of final consumption in the 43 countries covered. The methodology develops &quot;Multi-regional Environmentally Extended Supply and Use/Input-Output Tables&quot; using &quot;EXIOBASE&quot; database.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://creea.eu/index.php/7-project/8-creea-booklet">http://creea.eu/index.php/7-project/8-creea-booklet</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.exiobase.eu/">http://www.exiobase.eu/</a></td>
</tr>
<tr>
<td><strong>Life Cycle Costing</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.6 Desktop Research

When possible, the methodologies identified through the online survey were further examined by conducting follow-up interviews or e-mail exchanges with the survey respondents. In cases where the survey respondent was not available for an interview, desktop research was conducted. Websites, articles, and additional documentation were reviewed in an attempt to answer the questions asked in interviews (see section 4.4 for a list of these questions). A summary of the findings can be found in Annex 4.7 Methodology Summaries.

### 4.7 Methodology Summaries

A total of twenty-six (26) summaries were developed to capture information from interviews and/or desktop research on key hotspots analysis methodologies referenced in this report.

The following summary sheets provide an overview of the information obtained from the survey and subsequent research conducted during this project and will be used in our analysis.
Association of Home Appliance Manufacturers (AHAM)

Information derived from:

☐ Interview
☒ Desktop Research

Summary completed by: Curtis Harnanan

Description

AHAM assembled a Task Force of manufacturers and other key stakeholders. This Task Force developed and utilized the following approach to identify and prioritize attributes for inclusion within the refrigeration and subsequent sustainability standards. While refrigeration products are used to illustrate some of the steps below, the process is analogous for other AHAM product categories.

(a) Develop preliminary insights on value chain heat map to be used in a hot spot analysis via a review of existing literature, manufacturer interviews, as well as a review of existing standards.

- Environmental Product Declarations (e.g. Korea’s EPD 2002-30(1) for Refrigerators)
- Life Cycle Studies (government, manufacturers & academia)
- PE Expertise

Manufacturers ranked level of importance (H, M, L) of ~24 environmental impacts of refrigerators & stakeholder concerns

- Other Product / Sustainability Standards (e.g. Green Seal, NSF 140 Sustainable Carpet Assessment Standard, BIFMA, etc.)

(b) Evaluate preliminary results of hot spots to determine whether or not additional information is required for the preliminary insights on value chain heat map before moving on the decision point to achieve agreement on the hot spot priorities. If there is insufficient information and/no agreement on the hot spot priorities from the review of existing literature, manufacturer interviews, and existing standards, then

   (i) collect primary data; and
   (ii) conduct and scoping level LCA to re-evaluate, weight, and prioritize the hot spots on the value chain “heat map”.

(c) Draft the scoping document from the final selection of attributes for inclusion in the standard.

(d) Engage stakeholders to evaluate the scope for the standard.

(e) Draft the standard based on stakeholder input and final selection of attributes from the value chain heat map.

(f) Engage stakeholders to evaluate the contents of the draft Standard.

(g) Pilot the resulting draft Standard to determine if it reflects the intent of the scope:
(i) If the draft Standard does not reflect the intent of the scope, then re-evaluate and adjust the Standard.

(ii) If the draft Standard does reflect the intent of the Standard, then finalize then publish the standard for use.

Additional details of the hot spot analysis steps are provided below:

**Development of value chain heat map template for use in hotspots analysis and identification of attributes for this Standard**

Prior to commencing the hot spot analysis, the Task Force created a template value chain heat map to identify sustainability attributes for this Standard. This involved the review and condensation of the typical life cycle assessment (LCA) impact categories into a more simplified format that would facilitate harmonizing, categorizing, and analysing environmental/sustainability issues (i.e., hot spots) with broader stakeholder pressures (i.e., hot buttons).

“Community” was added as a final simplified impact category to incorporate the social aspects of sustainability. Key stakeholders, stakeholder pressures, and sustainability issues were also identified by value chain segment, including raw materials, manufacturing/assembly, packaging/distribution, use, and end-of-life.

**Literature review to identify preliminary hot spots**

A first set in identifying attributes for refrigeration products involved a review of existing scientific literature on the life cycle impacts of refrigeration products. The following sources of information were reviewed:

(a) Product category rules:


(ii) Korea (Samsung): Refrigerators [EDP 2002-30(1)]:  
http://61.61.241.144/data/korea/refrigerators.pdf

(iii) Taiwan Electrical and Electronic Manufacturers’ Association (TEEMA) and the TECO Electric and Machinery Co., Ltd. Product-Category Rules (PCR) for preparing an environmental product declaration (EPD) for Refrigerators Version 1.1 2008-11-11:  

(b) Government studies:

http://www.arb.ca.gov/research/seminars/mathis/mathis.pdf

http://www.arb.ca.gov/research/rsc/10-28-11/item7dfr07-330.pdf


(iii) Preparatory Studies for Eco-design EuP Requirements of the EuPs (Tender TREN/D1/40-2005) Lot 13: Domestic Refrigerators & Freezers Task 5 Definition of base Case Revision 3:  
http://www.ebpg.bam.de/de/ebpg_medien/013_studyf_08-12_part3-5.pdf
(c) Company studies:
(iii) BASF — Eco-Efficiency Analysis (2002).

d) Academic studies:

Manufacturer interviews to identify preliminary hot spots

Another key contribution to the hot spot analysis involved interviews with selected manufacturers. A total of four (4) manufacturers participated in this exercise. Each manufacturer was asked to rank the level of importance (i.e., high, medium, or low) of addressing each of approximately twenty-four (24) environmental impacts across the five life-cycle stages of the product category. The results of the literature review, stakeholder interviews, as well as review of other existing standards were aggregated into a heat map to graphically provide a preliminary view into priority environmental impacts and stakeholder concerns.

Evaluation of preliminary results of hot spots to determine whether additional information is required

The Task Force then reviewed these results to assess whether or not there was sufficient information and agreement in order to prioritize the hot spots and select attributes for this Standard. Upon review of the literature, the Task Force determined that a separate LCA, as defined by ISO 14040 and ISO 14044, of a representative North American refrigeration product was warranted as North American products are typically larger than European or Asian products, can use different refrigerants and foam blowing agents, and can undergo different treatment processes at end-of-life.
Life cycle assessment to validate and supplement preliminary results of hot spots

UL led the effort in conducting a screening-level life cycle assessment (LCA) in order to obtain the necessary information to validate and supplement preliminary results of the hot spots analysis. The LCA research involved collecting primary data on representative North American products. The collected data were compared to the EU LCA study on refrigeration appliances and statistical analyses were performed on the data to remove any outliers. This data was then input into advanced LCA modelling software to determine how each life cycle phase influences various environmental impact categories. Potential environmental impacts arising from the life cycle of a refrigeration appliance under the various scenarios considered (i.e., lifetime, end-of-life disposal methods, energy consumption during use, etc.).

The phase of the product’s life cycle covering distribution from manufacturing final assembly location to the retailer was assumed to be consistent with the European situation and was not included as part of the North American data collection.

The results of the LCA were used to validate the preliminary results from the hot spot analysis, to adjust ranking/prioritization of impacts, and to identify additional impacts. It is important to note that this LCA was high-level and the intent of it was to inform the scoping and weighting of this Standard and was not intended to be a full refrigeration industry wide ISO 14044 compliant LCA study. The results of this LCA were in alignment with the outcomes from the literature review.

Re-evaluation, weighting, and prioritization of hot spots

The Task Force acknowledges that the methodology in determining the weighting of the Standard, while rooted in science, required some level of subjectivity. Where necessary, value judgments were informed by input from a broad spectrum of key stakeholders. In the development of this Standard, the Task Force also sought out input from a broad spectrum of key stakeholders. These stakeholder groups included representatives from the following sectors: manufacturers, suppliers, retailers, government agencies, consumer groups, and non-governmental organizations.

Selection of final set of attributes for the Standard

The final set of attributes for the sustainability standard were derived from the overall life cycle screening (including the hot spot analysis, scoping-level LCA, weighting) stakeholder input, agreed-upon principles, as well as discussion and professional judgment of the Task Force.
Application

Product Category: refrigeration appliances, clothes washers, cooking ranges, dishwashers

Expected Outcome and Impact

To identify and prioritize life cycle sustainability impacts of AHAM’s product categories as a means to select appropriate attributes and criteria that would form the core of AHAM sustainability standards.

_target Audience

AHAM’s sustainability standards Task Force members as well as key value chain stakeholders (see Stakeholder section below)

Stakeholder Involvement

Task Force: AHAM, CSA Group, UL Environment, PE INTERNATIONAL and several major appliance manufacturers.

The Task Force also sought out input from a broad spectrum of key stakeholders. These stakeholder groups included representatives from the following sectors: manufacturers, suppliers, retailers, government agencies, consumer groups, and non-governmental organizations.

Participant stakeholders included Carbon Disclosure Project (CDP), Consumers Union, Environment Canada, Environmental Defense Fund, Lowes, Kohl’s, Sears-Kenmore, The Sustainability Consortium, US Environmental Protection Agency (EPA) Energy Star, as well as several suppliers to AHAM member companies.

Funded by

AHAM

Other Comments

References (if Desktop Research)


_DATE: 1st August, 2014
VERSION #: 1
French Grenelle I and II BPX 30-323-0 Product Lifecycle Environmental Impact Quantification Guidance Standard

http://www.developpement-durable.gouv.fr/Product-Environmental-Footprint.html

Information derived from:

☒ Interview
☐ Desktop Research

Date of Interview: 7 August 2014

☒ Methodology Developer / Owner
☐ Methodology User
☐ Interested Observer

Interviewed by: Mark Barthel

Summary completed by: Mark Barthel

Description

BPX30-323, which is a standard methodology and a repository of best practice on product environmental footprinting and eco-labelling was prepared under the French Government’s Grenelle I and II laws (from 2009 and 2010 respectively), which established the prospect of regulatory communication of environmental information relating to product.

The methodology was developed under the ADEME (the French Agency for Environment and Energy Management) / AFNOR (the French National Standards Body) platform that was established to drive forward work under the Grenelle laws to develop a major French Government initiative to dramatically increase the number of products for which product lifecycle-based information is available to French consumers.

BPX30-323 is in line with the international ISO 14040 and ISO 14044 Standards but has evolved over time to align itself with a new European Commission Product Environmental Footprinting (EU PEF) methodology. The latest (third) version of the French methodology, published in June 2014, has aligned itself with the EU PEF; although some differences remain (e.g. end of life, recycling and recycled content, cut-off criteria).

BPX30-323 gives general principles for the environmental communication of products. The carbon footprint is required whatever the category of product. The environmental communication includes indicators limited in number and specific to a category of product. These indicators take into account the main relevant impacts generated by the product.

BPX30-323 defines main principles for drawing up methodological guides specific to product categories (PCR). These methodological guides are developed by relevant stakeholders of different sectors and are validated by the ADEME / AFNOR platform.

23 product category rules (PCR) are now available to participants and work continues on the development of more PCRs under new voluntary arrangements (see below) following the piloting of the methodology.
In parallel, ADEME has initiated the development of a public database (the Base-IMPACTS database) to provide generic (secondary) data that will support companies using the methodology.

The BP X 323-30-0 methodology includes the following process steps for the development of PCRs:

1. Scope of the methodology
2. Agreement of system boundaries (mandatory inclusion of greenhouse gas emissions for all products);
3. Exclusions (e.g. carbon offsets, R&D phase of product, employee commuting);
4. Cut-off criteria (materiality assessment), allowing for the exclusion of all impacts that represent less than 5% of the total impacts of the product);
5. Allocation rules between products and co-products;
6. Requirements governing life cycle phases and the models to be used (e.g. energy and transport analysis models; distribution and use phase guidance, end of life rules);
7. Uncertainties in the results (requirement for uncertainty and sensitivity analysis).

It also includes annexes covering the following issues:
• Greenhouse gas emissions using 100 year global warming potentials for these gases;
• The naming system for the application of recycling rates;
• Characterization methods for impact indicators, including those for water consumption-related flows;
• Example data tracking sheets for upstream transportation, unit processes and LCIA data collection;
• A cross-table of environmental indicator selection criteria.

Following a year-long piloting process between 2011 and 2012, the French Government has decided to take forward the development and use of the methodology by industry on a voluntary basis. Working groups are currently developing recommendations for consideration by government and industry, including the development of a consistent approach to eco-labelling based on four to five impact categories, namely:

• Greenhouse gas emissions expressed as CO₂ equivalent emissions;
• Consumption of resources;
• Air Quality;
• Water use and pollution; and
• Biodiversity.

Companies are likely to be expected to communicate the greenhouse gas emissions associated with all of their products, but will have the flexibility to communicate any of the other impact categories, based on their relevance to their products. Absolute values for these impact categories will be included alongside the eco-label pictograms displayed on each product.

The BP X-323-30-0 Standard is available for purchase from the French National Standards Body, AFNOR.

Application
The BP X-323-30-0 methodology is intended to apply to all mass market products, excluding building products, which were covered by a separate existing standard. It is intended to be used at the product category, product group or individual product level.

Expected Outcome and Impact
The principle objective of this methodology is to increase the number of French mass market products and services carrying a lifecycle based eco-label.
The evaluation process for the pilots described above suggest that the initiative has raised consumer awareness and that, as a result, 91% of French consumers are interested in seeing eco-labels on the products that they buy; although there is currently limited evidence to suggest any noticeable changes in purchasing behaviour.

Over 90% of the 168 pilots selected by the French Government have been completed after a year, with 75% of participants wanting to continue and 60% satisfied to have taken part. The evaluation results also suggest that the process has prompted a considerable amount of capacity-building and expertise available in and to French consumer goods and service companies.

**Target Audience**

The primary target audience of the methodology itself is consumer goods manufacturers and retailers and service companies in the French economy. The main audience for the findings from the application of the methodology was French consumers.

**Stakeholder Involvement**

The BP X-323-30-0 standard and the good practice documentation that supports it was developed with the involvement of over 1,000 experts from over 670 organisations representing all the various relevant stakeholders, sectors, and NGOs gathered under the ADEME (Agency for Environment and Energy Management) / AFNOR (French Association of Normalization) platform that was established to drive forward work under the Grenelle I and I laws in France.

There were 230 applications by individual organisations and consortia to take part in the piloting process for the standard. Of these, the French Government selected 168 pilot projects covering over 1,000 consumer products. Between 2011 and 2012, 90% of these pilot projects were completed, with 75% stating they were happy to continue their work.

**Funded by**

All of the work undertaken on the BP X 323-30-0 Standard and good practice guidance on econ-labelling and the wider communication of the lifecycle environmental impacts of products and services was funding through a joint ADEME / AFNOR platform. Subsequent corporate piloting of the methodology with businesses was funded by the French Ministry of Ecology, Sustainable Development and Energy with in-kind (financial and human resource) contributions from the companies involved in the piloting process.

On-going revisions of the methodology via the ADEME / AFNOR platform were funded through ADEME.

**Other Comments**

Following the piloting process under the French Grenelle II law and the evaluation of pilots have led to a decision by the French government to continue the Grenelle-based eco-labelling of products and services on a voluntary basis, with all discussions of a mandatory approach put to one side.

**References (if Desktop Research)**

*DATE: 7 August 2014*

*VERSION: 1.0*
In 2000, the European Commission identified a potential concern in the various national schemes that had been developed to assess the environmental impact of buildings and construction products. The concern was that these various schemes may begin to create barriers to trade within the European Union.

To avoid the development of technical trade barriers, EU Member States asked the European Committee for Standardization (CEN) to develop a harmonized approach to measuring the environmental, social and economic impacts of building construction products and whole buildings across their entire lifecycle.

Working groups are developing six standards to define a unified method for using LCA at the building level.

The inter-linkages between the standards are illustrated in figure 1.

**Figure 1 relationship between the components of CEN TC 350 (Afnor 2012)**

<table>
<thead>
<tr>
<th>Concept level</th>
<th>User and Regulatory Requirements</th>
<th>Integrated Building Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framework level</td>
<td>Environmental Performance</td>
<td>Social Performance</td>
</tr>
<tr>
<td></td>
<td>Economic Performance</td>
<td>Technical Performance</td>
</tr>
<tr>
<td>Framework level</td>
<td><strong>EN 15643-1</strong> Sustainability Assessment of Buildings – General Framework</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>EN 15643-2</strong> Framework for Environmental Performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>EN 15643-3</strong> Framework for Social Performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>EN 15643-4</strong> Framework for Economic Performance</td>
<td></td>
</tr>
<tr>
<td>Building level</td>
<td><strong>EN 15978</strong> Assessment of Environmental Performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>prEN 16309</strong> Assessment of Social Performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>WI 017</strong> Assessment of Economic Performance</td>
<td></td>
</tr>
<tr>
<td>Product level</td>
<td><strong>EN 15804</strong> Environmental Product Declarations</td>
<td></td>
</tr>
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<td><strong>EN 16942</strong> Comm. Format E-to-E</td>
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<td>CEN/TC 15941</td>
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*NOTE* At present, technical information related to some aspects of social and economic performance are included under the provisions of EN 15804 to form part of EPD.
The standards are also informed by and refer to ISO standards on environmental labelling and life cycle assessment (ISO 14025, ISO 14040, ISO 14044). Whilst there are similarities to the EU Environmental Footprinting Guidelines, there are specific differences on the approach to cut-offs, end of life and reviewer qualifications.

Application
The CENT TC 350 standards are applicable at a sector level to buildings and construction products. The standards use quantitative and qualitative indicators, both of which are measured without value judgments. The purpose of these European Standards is to enable comparability of the results of assessments. They do not set benchmarks or levels of performance.

Expected Outcome and Impact
The developed voluntary standards provide guidelines for the environmental, economic, and social performance of whole buildings and construction products. These standards are replacing overlapping national standards with more unified requirements.

Target Audience
Member states of the European Union are required to use the standards, where they exist, when regulating (i.e., any member states setting requirements for whole buildings or building construction products must use the CEN TC350 standards).

Stakeholder Involvement
Technical committees were established in 2005, and divided into six (6) working groups to develop the following six (6) standards:
- CEN/TC 350/ : TG Framework
- CEN/TC/WG1 : Environmental performance of buildings
- CEN/TC WG2 : Building life cycle description
- CEN/TC WG3 : Product Level (EPD’s, communication formats etc.)
- CEN/TC WG4 : Economic Performance Assessment of Buildings
- CEN/TC WG5 : Social Performance Assessment of Buildings

National committees have been established in each of the EU member states to regularly meet and review the development of each working group. The national committees develop unified feedback on the outputs.

The standards have been published progressively since 2009, and in January 2012 CEN/TC 350 finalised EN 15804 ‘Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products’ as well as EN 15978 “Sustainability of construction works — Assessment of environmental performance of buildings — Calculation method”, which governs the scope and the requirements for the application of EPD in Building Assessment.

Funded by
CEN TC 350 is funded by the European Commission.

Other Comments
References (if Desktop Research)

Eco Platform website:

Bre website:

Afnor website

CEN website CEN/TC 350 - Sustainability of construction works

DATE: September 1st, 2014
VERSION #: 2
EcoLeaf and JEMAI CFP Program by Japan Environment Management Association for Industry (JEMAI)

Information derived from:
☒ Interview
☒ Desktop Research

Date of Interview: 07 August 2014
☒ Methodology Developer / Owner
☐ Methodology User
☐ Interested Observer

Interviewed by: Jack Guinness /WRAP

Summary completed by: Jacks Guinness/WRAP and Sofia Khan/UNEP Research Volunteer

Description

EcoLeaf Environment Label is an Application of ISO 14025 developed by JEMAI (Japan Environmental Management Association for Industry) a public corporation, organized by a membership of about 700 companies. EcoLeaf label applies to Type III environmental labels (ISO14025) and incorporates third-party verification of products (and systems). The EcoLeaf label can apply to multiple issues & systems. The Carbon Footprint (CFP) model is for single-issue studies and both the systems are run by JEMAI.

EcoLeaf environmental label uses the LCA method to quantitatively show the environmental information of products through life cycle stages from the extraction of resources to manufacturing, assembly, distribution, use, discarding and recycling. The assessment regarding the best way for Japan to combat global warming was conducted in 1998 and the EcoLeaf environmental declaration was developed as the results of conclusions reached in discussion on what environmental declarations should be like in an environmentally friendly society. It is a Japan-based environmental declaration whose full implementation started in April 2002, conforms to ISO type III environmental declarations (ISO14025). There are eighty (80) current Product Category Rules (PCRs), which have been developed by PCR working group(s).

Running alongside EcoLeaf is the Carbon Footprint Program (CFP), which is managed by JEMAI. This has been developed following a CFP Pilot Project stage which was completed in March 2012. Since April 2012, JEMAI has taken over the Japanese CFP scheme, and has been officially starting the operations of the “CFP Communication Program” (now called “JEMAI CFP Program”).

As the official operations started, this website provides the comprehensive overview of JEMAI CFP Program: http://www.cfp-japan.jp/english/

It is the intention that by March 2017 both schemes will be merged.

Application

- Products & Services produced mainly in Japan.
- EcoLeaf is free to join and there is no payment needed to develop a PCR (unless separately paid for assistance to external consultants). A fee is payable at registration & verification level, once the PCR has been agreed.
- Registration to Carbon Footprint Program (CFP) requires a fee payable to JEMAI
Expected Outcome and Impact

Increasing numbers of Japanese businesses register for EcoLeaf to demonstrate sustainability credentials of their products/services with the aim that it would be used in:

- **Sales Promotion**, such as its use to promote a company, product or service that is actively managed in an eco-friendly way, or its use to make sales activities easier, or to highlight a product's unique features.

- **Company structure**, e.g. The EcoLeaf label assists companies to compare their products environmental impacts and re-define the future goals for eco-product designs. Note that CFP comparison shall not be conducted in JEMAI CFP program.

Key characteristics of the EcoLeaf program include

- Quantitative information declaration without judgment
- Conformity to ISO 14020 series and ISO 14040 series (LCA methods)
- Assisting the comparability of the declared contents, backed by set rules on data collection/processing, verification, and registration/publication called PCR (Product Category Rule)
- Flexibility by optional certification program called "System Certification" to authorize label publisher's internal operation system for label publication (data collection/processing, verification, and registration/publication systems)
- Objectivity of the declaration by independent verifiers appointed by JEMAI
- Readability in adding assisting summary information sheet of the LCA results with product summary called P.E.A.D.: Product Environmental Aspects Information Declaration
- Accessibility to the declaration contents in offering whole EcoLeaf label contents: three (3) sheets set per product in principle

Target Audience

The target audience for EcoLeaf includes industrial goods, durable consumer goods, daily necessities, energy such as electricity, buildings, food, and services associated with these products.

Figure 1

![Current-registered EcoLeaf label (Updated in Jan, 2014)](image_url)
Stakeholder Involvement

Launched following wide dialogue. See steps in Figure 2

Figure 2

EcoLeaf History

Funded by

- Developed initially with funding from the Japanese Government. Now that the scheme is running, public funding has stopped and it is run using the fees generated by the EcoLeaf scheme
- Registration to Carbon Footprint Program (CFP) requires a fee payable to JEMAI

Other Comments

- Companies seem to be adopting CFP due to flexibility of the calculation scheme, simple and credible third party certification and ability to communicate with consumers by demonstrating transparency
- JEMAI 2015 goals include unifying operations of EcoLeaf and CFP, fulfilling international consistency and improving program awareness and market acceptance.

References (if Desktop Research)

http://www.ecoleaf-jemai.jp/eng/ (EcoLeaf)
http://www.cfp-japan.jp/english/ (JEMAI CFP Program)

DATE: 7th August 2014
VERSION #: 1
Environmental Impact of Products (EIPRO) - Analysis of the life cycle environmental impacts related to the final consumption of the EU-25

[http://ec.europa.eu/environment/ipp/identifying.htm](http://ec.europa.eu/environment/ipp/identifying.htm)

Information derived from:

☐ Interview
☒ Desktop Research

Summary completed by: Keith James

Description

In June 2003, the European Commission adopted a Communication on Integrated Product Policy (COM (2003) 302 final). This included plans to identify products with the greatest potential for improvement.

The EIPRO study supports the development of an EU Integrated Product Policy by clarifying which products have the greatest environmental impacts from a life-cycle perspective. A methodology was developed and applied which builds on the methods and results of previous research as far as possible and complements this with a new systematic analysis of the environmental impacts of products for the EU-25. The new analysis was done with an environmentally extended input-output model that allowed distinguishing several hundreds of products. The methodology and results were discussed with experts and stakeholders in a series of workshops and meetings.

The project comprised five (5) stages: definition of goal and scope; evaluation of existing research; development and refinement of the methodology; application of the methodology, and; stakeholder consultation.

**Goal and Scope**

The goals of the work were to identify products on the basis of life cycle impacts, on the basis of final consumption in twenty-five (25) Member States and impact per Euro in the year 2000. This should cover household and public expenditure. All processes from cradle to grave are covered regardless of where they occur, including capital and intermediate products. The impact of goods made in the EU-25 and exported are excluded. No environmental impact category was excluded or specified initially.

The inventory / emission data for the EU-15 was multiplied up to EU-25 on the assumption that there were no relevant differences.

To assess the environmental impact of products, the final consumption of Europe was divided into product categories. This was done in the following ways;

1. Functional areas of consumption; up to a dozen elements, e.g. transport, clothing, healthcare, recreation
2. Consumption domains; several elements e.g. transport contributing to healthcare, recreation
3. Product groupings, e.g. sub-division of consumption domains into car transport, rail, air etc.
4. Homogenous product groups, e.g. medium range diesel cars
5. Individual products e.g. a specific diesel car.
EIPRO covered groupings 1-3. The results of existing studies were combined with new research to close knowledge gaps.

**Evaluation of existing research**
The literature review covered existing Life Cycle Assessments based on Material Flow Analysis (Bottom Up) and Input-Output tables produced by statistical organisations describing production and consumption in an economy (Top Down). Seven studies were selected from the literature review for full evaluation. Despite different methodological approaches and limitations, all provided quite robust results at the level of functional areas of consumption and up to fifty (50) consumption domains or product groupings. The results of the studies were compared at a product aggregation level. The common indicators covered by all studies were global warming; acidification, photochemical ozone formation and eutrophication.

Because of differences in boundaries, definitions etc., the comparison was on percentage contribution of a given product grouping to overall impacts, rather than absolute measures, and product groupings which appeared significant for all four indicators were identified. Whilst cars, food, heating and house building were clearly important, there was no consistency in the mid-range groupings below these.

**Development and refinement of the methodology:**
The next step was to develop the CEDA EU-25 Products and Environment model. The input-output model covers the environmental impact of products consumed in EU-25 including all life cycle stages. The model consists of matrices which describe and quantify the relationships of the production and consumption systems in Europe with regard to purchase and sale of products, as well as resource use and emissions. They cover private and final government consumption.

Input-output models assume each sector uses the outputs of other sectors in fixed proportions in order to produce its output. Inputs from other sectors and outputs to other sectors are shown in monetary value. It is then assumed that the monetary splits are the same as the split of environmental impacts, creating an Environmentally Extended Input-Output model. The CEDA model contains United States Sectoral data, adapted to Europe. This distributes all EU impacts amongst sectors, based on their economic interactions. The analysis quantifies overall impacts per product consumed and per Euro spent, and are calculated as a percentage of total EU impact.

**Application of the methodology**
The detailed analysis using CEDA EU-25 distinguishes 283 consumed product groupings. Caution should be taken in interpreting the results, as they are based on single studies rather than a number of converging studies.

**Stakeholder consultation**
Please see Stakeholder Involvement.

**Application**
The EIPRO study represents the first phase of work initiated under the Communication on Integrated Product Policy. It clarifies which products have the greatest environmental impacts from a life-cycle perspective. The study shows that food and drink, cars and products for housing are particularly relevant for the environment. Together are responsible for 70-80 % of environmental impacts of private consumption and also account for some 60 % of consumption expenditure altogether. All other areas of consumption together account for no more than 20–30 % of most environmental impacts. These findings are based on a review of existing studies
plus supplementary work on a new methodology developed by the JRC-IPTS in cooperation with organisations of the ESTO research network.

The second phase was IMPRO (environmental IMprovement of PROducts). This attempted to identify possible ways in which the life-cycle environmental impacts can be reduced for some of the products that are among those with the greatest environmental impacts. The analysis first considered improvement potentials that are technically feasible. Following this, the associated socio-economic impacts were considered and analyzed. Reports were prepared on cars, buildings, meat and dairy and dietary change.

**Expected Outcome and Impact**

The third phase of the work is policy implications; namely to address policy measures for the products that are identified to have the greatest potential for environmental improvement at least socio-economic cost.

**Target Audience**

The target audience is the European Commission and EU Member States.

**Stakeholder Involvement**

Two stakeholder meetings were held in May and September 2004 and an expert stakeholder workshop held in July 2005. The participants are identified in Annex 3 of the EIPRO report [http://ec.europa.eu/environment/ipp/pdf/eipro_annex.pdf](http://ec.europa.eu/environment/ipp/pdf/eipro_annex.pdf) and include representatives of academia, life cycle consultancies, private businesses, trade associations and DG Environment.

**Funded by**

European Commission Joint Research Centre

**Other Comments**

**References (if Desktop Research)**

*European Commission* Identifying products with the greatest potential for environmental improvement [http://ec.europa.eu/environment/ipp/identifying.htm](http://ec.europa.eu/environment/ipp/identifying.htm)


*DATE:* 5th September, 2014

*VERSION #:* 1
Getting the Numbers Right (GNR)

Information derived from:
☐ Interview
☒ Desktop Research

Summary completed by: Sofia Khan & Mark Barthel (Project Co-Chair)

Description
In 2007-2008, the Cement Sustainability Initiative (CSI), operating under the umbrella of the World Business Council for Sustainable Development (WBCSD), developed the “Getting the Numbers Right” (GNR) system for its members. GNR is a CO2 and energy performance information system, based on emissions data from individual cement plants. It aims to develop representative statistical information on the CO2 and energy performance of clinker and cement production worldwide. The CSI initiated the GNR project to respond to internal and external stakeholder requests for reliable, up-to-date CO2 emissions data from the industry. The CSI recognized that having accurate and detailed data would enable its members to identify the factors and levers that can impact those emissions, and use this information to develop practical climate mitigation strategies.

Below is the step-by-step process:

- The WBCSD/CSI CO2 Accounting and Reporting Standard for the Cement Industry was first developed in 2001-02 following principles outlined in work by the WBCSD and the World Resources Institute (WRI) in the GHG Protocol. The on-going purpose of this tool is to provide a common language, set of definitions and methodologies to estimate CO2 emissions from cement production facilities. This version of the Protocol (referred to as the WBCSD/CSI Protocol) is specific to the cement industry, and includes tailored rules for accounting for different fuels and their carbon content, biomass, clinker substitutes and several Key Performance Indicators (KPIs).

- Each company participating in the GNR system collects information related to CO2 emissions and energy consumption at facility, company and national levels, using the WBCSD/CSI CO2 reporting protocol and reporting template.

- Each participating company, using a secured Internet data collection tool specifically designed for the GNR system, uploads its data to PricewaterhouseCoopers (PwC), the database owner and manager.

- The PwC team performs the final consolidation and reporting phase, which involves implementing coherence checks and data consolidation at global and regional levels.

Application
(e.g., national, sector, product category?)
Cement Sector (National and Regional level)

Expected Outcome and Impact
(i.e., what has been done differently (or will be) following its use?)
The objective of the CSI “Getting the Numbers Right” (GNR) system was to develop representative statistical information on the CO\textsubscript{2} and energy performance of clinker and cement production worldwide and regionally to serve the needs of internal and external stakeholders.

The GNR would allow CSI to provide accurate information of its CO\textsubscript{2} emissions to policy makers and key stakeholders in order to work effectively towards reductions. GNR would also provide sound analytical basis for emissions benchmark setting.

The cement industry has achieved a significant decoupling of economic growth and absolute CO\textsubscript{2} emissions. Cement production by GNR companies increased by 61% from 1990 to 2010, whereas the absolute net CO\textsubscript{2} emissions increased by only 39%. The rate of decoupling between production and net emissions is increasing, but this trend cannot, of course, continue indefinitely.

**Figure 1:** CO\textsubscript{2} emissions from cement production (1990 to 2010)

![Graph showing CO\textsubscript{2} emissions from cement production (1990 to 2010)](image)

**Source:** GNR database

**Target Audience**
Cement companies, Policy makers, Investors

**Stakeholder Involvement**
The GNR system includes information from forty-three (43) multinational or national cement companies, totalling 844 installations (2006 figures), covering 73% of cement production in Kyoto Protocol Annex 1 countries. All WBCSD CSI members participate in GNR by submitting CO\textsubscript{2} and energy performance data. Additionally, association participates in GNR and has adopted the WBCSD/CSI Protocol. It has collected information from non-CSI cement plants, ensuring nearly full participation of all cement installations in Europe. Some other national and regional organizations have, or are in the process of developing, national or regional information systems (e.g., the Australian Cement Industry Federation (CIF), the Cement Association of Canada (CAC), and the Japan Cement Association (JCA)).
NOTE: as at August 2014, the Cement Sustainability Initiative (CSI) is still very much a global effort by 24 major cement producers with operations in more than 100 countries who believe there is a strong business case for the pursuit of sustainable development. Collectively these companies account for around 30% of the world’s cement production and range in size from very large multinationals to smaller local producers.

The GNR system is the only cement industry CO₂ and energy database with global coverage, however it does not yet include the total cement industry worldwide, and its level of coverage and representativeness varies across regions. The GNR system has almost complete coverage for Europe and represents over two-thirds of production in the Americas and around 40% in India, Africa & the Middle East and Japan-Australia-New Zealand.

Funded by
Information not available online

Other Comments:

- Typical data required includes absolute and net CO₂ emissions, specific gross and net CO₂ emissions per tonne of clinker and per tonne cementitious product, average thermal energy consumption, Specific electric energy consumption as a kWh/tonne cement, fuel mix (fossil fuel/alternative fossil fuel / biomass), Clinker to cement ratio per tonne of clinker.
- Individual CSI companies participating in GNR have agreed to independent third party limited assurance of their CO₂ emissions information, beginning in 2006.
- The homepage for the WBCSD / CSI (www.wbcsdcement.org) also includes access to technology roadmaps to 2050 to support member company’s efforts to reduce emissions and be more energy efficient; the Cement CO₂ and energy database; information on best practice for recycling cement; and more information on the CSI’s sector approach and modelling work.
- A 10 Year Progress report highlighting the wider work and achievements of the Cement Sustainability Initiative is available at: csiprogress2012.org (Dated May 2012). This illustrates the fact that the CSI has increased the range of sustainability issues that its members focus on, including biodiversity management, health and safety, water management and air emissions management.

References (if Desktop Research)

“The cement sustainability Initiative “Getting the Number Right” WBSCD Publication”

The CO₂ Accounting and Reporting Standard for the Cement Industry Protocol and instructions are available from: www.wbcsdcement.org

To use information from the GNR system or make specific queries about the data, send requests to: gnrrpmc@wbcsd.org

More information on the members of the CSI can be found at:

DATE: 27th August 2014
VERSION #: 2.0
Description
The World Resources Institute (WRI) and the World Business Council on Sustainable Development (WBCSD) started to develop their corporate standard in 1998 and their Product and Value Chain GHG Accounting and Reporting Standards in September 2008.

The Corporate Value Chain (Scope 3) and Product Life Cycle Accounting and Reporting Standards were published in October of 2011 after a three-year multi-stakeholder development process. These standards include requirements and guidelines on both product life cycle accounting and calculation and reporting of corporate “Scope 3” emissions – i.e. corporations’ indirect emissions, other than those already counted under “Scope 2” emissions from the generation of purchased energy. These two standards are based on the life cycle approach. The Scope 3 standard is a supplement to the Corporate Standard, while the Product Standard builds upon the ISO 14040 series of standards.

The Corporate Value Chain (Scope 3) Standard allows companies to assess their entire value chain emissions impact and identify the most effective ways to reduce emissions. Often, the majority of total corporate emissions come from scope 3 sources, which means many companies have been missing out on significant opportunities for improvement when focused only on direct operations and purchased electricity (scope 1 and 2). Users of the Scope 3 Standard can now account for emissions from 15 categories of scope 3 activities, both upstream and downstream of their operations. The scope 3 framework also supports strategies to partner with suppliers and customers to address climate impacts throughout the value chain.

The Scope 3 Standard provides a methodology that can be used to account for and report emissions from companies of all sectors, globally. The standard is accompanied by user-friendly calculation guidance and tools developed by the GHG Protocol.

Table 3.1 on page 21 of the Corporate Value Chain Standard provides a summary of requirements of this standard.
Figure 1: Overview of GHG Protocol scopes and emissions across the value chain

Figure 2: Overview of steps in Scope 3 accounting and reporting
The Product Standard can be used to understand the full life cycle emissions of a product and focus efforts on the greatest GHG reduction opportunities. This is the first step towards more sustainable products. Using the standard, companies can measure the greenhouse gases associated with the full life cycle of products including raw materials, manufacturing, transportation, storage, use and disposal. The results can create competitive advantage by enabling better product design, increasing efficiencies, reducing costs, and removing risks. The Product Standard will also help companies respond to customer demand for environmental information and make it easier to communicate the environmental aspects of products.

The Scope 3 and Product standards provide a methodology that can be used to account for and report emissions from companies of all sectors, globally. They are accompanied by user-friendly guidance and tools developed by the GHG Protocol.

Table 3.1 (pp. 13-17 inclusive) in the Product Standard provides an overview of the requirements of the standard.

According to users the standards are well-written, easy to follow and peppered with good case studies to help others implement them. Users also state that they feel that they get reliable results from the standards and that the methodologies within the standards offer good guidance in most areas where other standards are lacking – e.g. managing uncertainties, critical review and assurance statements.

Both methodologies are available free of charge from the GHG Protocol website using the URLs below the titles of each methodology at the beginning of this summary.
Application

The Corporate Value Chain (Scope 3) Standard can be used by all companies in all sectors, globally – i.e. it is intended to be used at the corporate level in any sector of the economy. The Product Standard can be used on any product or service in any sector of the economy. Both standards are rapidly becoming the de facto international standards in relation to their scope of application.

Expected Outcome and Impact

[Copy below taken from the GHG Protocol web pages at: http://www.ghgprotocol.org/about-ghgp]

Since the publication of the first edition of The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Corporate Standard) in 2001, more than 1,000 businesses and organizations worldwide have developed their GHG inventories using the GHG Protocol. Some of the world’s largest companies are using the GHG Protocol’s Corporate Standard. The 2007 Corporate Climate Communications Report of the Fortune 500 companies by CorporateRegister.com reported 63 % of companies use the GHG Protocol. The Carbon Disclosure Project - a non-profit organization that represents investors with assets totalling $41 trillion - regularly surveys the world’s largest companies to assess investment-related risks and opportunities related to climate change using the GHG Protocol as the framework. In 2008, 72 % of Fortune 500 companies responded to the survey.

The 2010 GHG Workforce Survey from GHG Management Institute and Sequence Staffing found that the overwhelming majority of respondents said GHG Protocol is the second most important climate program after Kyoto Protocol in the successful measurement and management of climate change.

A list of companies using the GHG Protocol Corporate Standard can be found on the GHG web pages at: http://www.ghgprotocol.org/about-ghgp/users - but no equivalent information appears to be available for users of the GHG Protocol Scope 3 or Product Standards; although quotes from some corporate users are present on the site and include: Kraft Foods, Walmart and SC Johnson.

Target Audience

All companies and products in all sectors, globally.

Stakeholder Involvement

The development of the GHG Protocol Corporate Value Chain Standard involved:

- 2,300 participants from 55 countries;
- 96 members participated in technical working groups to draft the standard, and;
- 34 companies from various industries road tested the standard in 2010.

The development of the GHG Protocol Product Lifecycle Accounting and Reporting Standard involved:

- 2,300 participants were involved from 55 countries;
- 112 members formed technical working groups to draft the standards, and;
- 38 companies from various industries road tested the standards in 2010.
Funded by
The predominant income stream for the GHG Protocol appears charitable foundations, corporations, and governments. A full list is available here: http://www.ghgprotocol.org/about-ghgp/funders. Support from WBCSD is provided through their membership.

Other Comments
A very impressive range of supporting tools, calculators, videos, case studies and an e-learning platform are all provided to support users of the GHG Protocol Standards.

References (if Desktop Research)
Please see URLs for each of these methodologies at the beginning of this summary beneath the titles for each methodology.

DATE: 25 August 2014
VERSION: 2
Global Protocol for Community-Scaled Greenhouse Gas Emission Inventories (GPC)


Information derived from:
☐ Interview
☒ Desktop Research

Summary completed by: Curtis Harnanan

Description

The Global Protocol for Community-Scale GHG Emissions (GPC) is the result of a collaborative effort between the World Resources Institute (WRI), C40 Cities Climate Leadership Group (C40), and ICLEI – Local Governments for Sustainability (ICLEI).

Development of the GPC began in Sao Paulo in June 2011 as a result of a Memorandum of Understanding between C40 and ICLEI. In 2012, the partnership expanded to include WRI and the Joint Work Programme of the Cities Alliance between the World Bank, UNEP, and UN-HABITAT.

An early draft (Version 0.9) was released in March 2012 for public comment. The GPC was then updated (Version 1.0) and tested with 35 cities worldwide. This GPC Version 2.0 incorporates the feedback from the pilot testing and is slated for publication at the end of 2014.

The GPC responds to this challenge, offering a robust and clear framework that builds on existing methodologies for calculating and reporting city-scale GHG emissions.

The GPC sets out requirements and provides guidance for calculating and reporting city-scale GHG inventories, consistent with the 2006 IPCC Guidelines for National GHG Inventories. The GPC seeks to:

- Help cities develop a comprehensive and robust GHG inventory in order to support climate action planning through a thorough understanding of their GHG impacts.
- Ensure consistent and transparent measurement and reporting of GHG emissions between cities, following internationally recognized GHG accounting and reporting principles.
- Enable city inventories to be aggregated at subnational and national levels.
- Demonstrate the important role that cities play in tackling climate change, and facilitate insight through benchmarking – and aggregation – of comparable data.

The GPC specifies the principles and rules for compiling a city-level GHG emissions inventory; it does not require specific methodologies to be used to produce emissions data.

The GPC provides guidance on calculation methodologies (i.e., defining boundaries, defining emission sources, calculation guidance) for individual emission sources including:

- Stationary energy
- Transportation
- Waste
- Industrial Processes and Product Use Emissions
• Agriculture, Forestry and Other Land Use
Application

Sub-national but GPC allows for aggregation at the national level. The GPC is primarily designed for cities inclusive of communities of all shapes and sizes. The accounting framework can also be used for boroughs or wards within a city, towns, districts, counties, prefectures, provinces, and states.

Expected Outcome and Impact

To allow for more credible reporting, meaningful benchmarking and aggregation of climate data, greater consistency in GHG accounting is required.

Target Audience

The GPC can be used by anyone assessing the GHG emissions of a geographically defined area.

Stakeholder Involvement

- Agence de l’Environnement et de la Maîtrise de l’Énergie (ADEME)
- Bloomberg Philanthropies
- British Standard Institute (BSI)
- C40 Cities Climate Leadership Group
- Carbon Disclosure Project (CDP)
- Children’s Investment Fund Foundation (CIFF)
- Clean Air Asia (CAI Asia)
- EU Covenant of Mayors
- ICLEI – Local Governments for Sustainability South America
- ICLEI – Local Governments for Sustainability South Asia
- ICLEI – Local Governments for Sustainability Southeast Asia
- ICLEI – Local Governments for Sustainability USA
- ICLEI US Community Protocol Steering Committee
- Indonesia Climate Change Center (ICCC)
- Institute for Global Environmental Strategies and National Institute for Environmental Studies (IGES/NIES)
- Instituto Nacional de Ecología y Cambio Climático (INECC) / Secretaría del Medio Ambiente del Gobierno del Distrito Federal
- Intergovernmental Panel on Climate Change (IPCC)
- International Organization for Standardization (ISO)
- Organization for Economic Co-operation and Development (OECD)
- R20 Regions of Climate Action
- Siemens
- The World Bank
- United Nations Environment Program (UNEP)
- United Nations Framework Convention on Climate Change (UNFCCC)
- United Nations Human Settlements Program (UN-HABITAT)
- University of Toronto
- World Bank Group
- World Business Council on Sustainable Development (WBCSD)
- World Resources Institute
- World Wide Fund for Nature (WWF)
Funded by

Development of the GPC began in Sao Paulo in June 2011 as a result of a Memorandum of Understanding between C40 and ICLEI. In 2012, the partnership expanded to include WRI and the Joint Work Programme of the Cities Alliance between the World Bank, UNEP, and UN-HABITAT.

Other Comments

In 2015 the GPC authors will begin developing an expanded version, which will provide additional guidance on identifying and quantifying GHG emissions occurring outside the city boundary associated with cities activities (e.g., scope 3 emissions). This will allow cities to take a broader and more holistic approach to measuring their GHG impact, as well as identify opportunities for realizing more efficient urban supply chains. The authors anticipate launching this expanded version at the end of 2015.

References (If Desktop Research)


DATE: 25 August 2014
VERSION #: 2
ISO 14040 Environmental Management – Life Cycle Assessment – Principles and Frameworks

Information derived from:
☐ Interview
☒ Desktop Research

Summary completed by: Andrea Smerek

Description
ISO 14040 outlines the principles and frameworks for life cycle assessment (LCA). This includes guidance on defining the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations to the LCA, the relationship between the LCA phases, and conditions for use of value choices and optional elements.

Application
ISO 14040 is applied to products, goods, and services.

Expected Outcome and Impact
ISO 14040 is expected to standardize life cycle assessment (LCA) and life cycle inventory (LCI) studies.

The application of the results is discussed within ISO 14040 during the definition of the goal and scope. Typical application includes product development and improvement, strategic planning, public policy making, marketing etc. However, how the results are used are outside of the scope of ISO 14040.

Target Audience
LCA practitioners

Stakeholder Involvement
ISO 14040 was developed, by a technical committee comprised of representatives from international, government and non-governmental organizations. The standard was first published in 1997 and the latest version was released in 2006. Once drafted, the standard was circulated to International Standard members. To be approved, at least 75% of members must cast a vote.

Funded by
International Organization for Standardization (ISO) national members pay subscription fees. The sale of ISO standards also provides a source of revenue.

Other Comments
ISO 14040:2006 does not describe the LCA technique in detail.
ISO 14040:2006 does not specify any particular methodology for individual phases of LCA.
References (if Desktop Research)

International Organization for Standardization website:

\textit{DATE:} 25 August 2014  \\
\textit{VERSION #:} 2
ISO 14044 Environmental management – Life cycle assessment – Requirements and guidelines

Information derived from:

☐ Interview
☒ Desktop Research

Interviewed by:

Summary completed by: Andrea Smerek

Description
ISO 14044 outlines the requirements and provides guidelines for life cycle assessment (LCA). This includes guidelines and requirements on defining the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations to the LCA, the relationship between the LCA phases, and conditions for use of value choices and optional elements.

Application
ISO 14044 is applied to products, good, and services.

Expected Outcome and Impact
ISO 14044 is expected to standardize life cycle assessment (LCA) and life cycle inventory (LCI) studies.

Target Audience
LCA practitioners.

Stakeholder Involvement
ISO 14044 was developed by a technical committee comprised of representatives from international, government and non-governmental organizations. Once drafted, the standard was circulated to International Standard members. To be approved, at least 75% of members must cast a vote.

Funded by
International Organization for Standardization (ISO) national members pay subscription fees. The sale of ISO standards also provides a source of revenue.

Other Comments

References (if Desktop Research)

DATE: 25 August 2014
VERSION #: 2
ISO/ TS 14067: Greenhouse gases - Carbon footprint of products
http://www.iso.org/iso/catalogue_detail?csnumber=5952

Information derived from:

☐ Interview
☒ Desktop Research

Contact Name:
Organization:
Date of Interview:

☐ Methodology Developer / Owner
☐ Methodology User
☒ Interested Observer

Interviewed by:

Summary completed by:  Curtis Harnanan

Description
The ISO 14067 Technical Specification details principles, requirements and guidelines for the quantification and communication of the carbon footprint of products (CFP), including both goods and services, based on GHG emissions and removals over the life cycle of a product. Requirements and guidance for quantification and communication of a partial carbon footprint of products (partial CFP) are also provided. The communication of the CFP to the intended audience is based on a CFP study report that provides an accurate, relevant and fair representation of the CFP.

Where the results of a CFP study are reported according to ISO/TS 14067:2013, procedures are provided to support both transparency and credibility and also to allow for informed choices.

ISO/TS 14067:2013 also provides for the development of CFP-product category rules (CFP-PCR), or the adoption of product category rules (PCR) that have been developed in accordance with ISO 14025 and that are consistent with ISO/TS 14067:2013.

ISO/TS 14067:2013 addresses only one impact category: climate change.

This Technical Specification is based on existing International Standards ISO 14020, ISO 14024, ISO 14025, ISO 14040 and ISO 14044 and aims to set specific requirements for the quantification and communication of a CFP, including additional requirements where the CFP information is intended to be publicly available.

A CFP study according to this Technical Specification includes four phases of LCA: goal and scope definition, life cycle inventory analysis for CFP, life cycle impact assessment and life cycle interpretation.

The unit processes comprising the product system shall be grouped into life cycle stages (e.g., raw material acquisition, production, distribution, use and end-of-life.)
Application
Products, goods and services

Expected Outcome and Impact

- To provide requirements for the methods to be adopted in assessing the CFP
- To facilitate the tracking of performance in reducing GHG emissions
- To assist in the creation of efficient and consistent procedures to provide CFP information to interested parties
- To provide a better understanding of the CFP such that opportunities for GHG reductions may be identified
- To provide CFP information to encourage changes in consumer behaviour which could contribute to reductions in GHG emissions through improved purchasing, use and end-of-life decisions
- To provide correct and consistent communication of CFPs which supports comparability of products in a free and open market
- To enhance the credibility, consistency and transparency of the quantification, reporting and communication of the CFP;
- To facilitate the evaluation of alternative product design and sourcing options, production and manufacturing methods, raw material choices, recycling and other end-of-life processes;
- To facilitate the development and implementation of GHG management strategies and plans across product life cycles as well as the detection of additional efficiencies in the supply chain

CFPs prepared in accordance with the Technical Specification contribute to the objective of GHG related policies and/or regimes.

Target Audience
Organizations (producers, owners and commissioners of CFP study), governments, communities and other interested stakeholders

Stakeholder Involvement
Multiple stakeholders

Funded by
International Organization for Standardization (ISO) national members pay subscription fees. The sale of ISO standards also provides a source of revenue.

References (if Desktop Research)

International Organization for Standardization website:

DATE: 25 August 2014
VERSION #: 2
National Cattlemen's Beef Association Hotspots Analysis

Information derived from:

☒ Interview  ☐ Desktop Research

Date of Interview: 6th August 2014

☒ Methodology Developer / Owner  ☐ Methodology User  ☐ Interested Observer

Interviewed by: Curtis Harnanan, Andrea Smerek

Summary completed by: Andrea Smerek

Description

The overall driver for this analysis was to highlight all potential sustainability impacts within the beef value chain (i.e., including qualitative impacts that are not typically captured in LCA). This analysis, an important step prior to conducting an LCA, was required to find out what stakeholders’ perceptions were of the hot topics. The goal of the qualitative perception analysis was to cover issues not covered by LCA.

An online survey completed by various stakeholder of the beef industry (e.g., industry experts, customers, members of association), prioritized a long list of potential impacts by requiring participants to weight the topic against several value chain steps. Online survey participants were also allowed to provide comments within open text boxes.

Following the online survey, additional detail was gathered through phone interviews with select survey participants.

Although the interviews were very beneficial, and yielded insightful responses, they were very time consuming to complete. The only survey however, was very efficient and allowed to the association to hear from a wide group of stakeholders with very little effort.

Application

The hotspot analysis results are applied at a sector level to the beef industry. However, the methodology could be easily applied to another product (e.g. poultry).

Expected Outcome and Impact

Understanding the perception of the market is key. While quantitative analysis is beneficial in many ways, a qualitative analysis helps to define stakeholder concerns.

Target Audience

The target audience of this study is the beef association and its members.
Stakeholder Involvement

A third party CSR consultant was involved in the development of the hotspots analysis. While there was no official peer review, stakeholders participate in reviewing collected information. Stakeholders were also encouraged to participate in the online survey and on telephone interviews.

Funded by

The hotspots analysis is funded by the National Cattlemen’s Beef Association.

Other Comments

It is beneficial to define the key objectives of the analysis. Using a phased approach (i.e., including internal stakeholders prior to including external stakeholders) is efficient and allows for gap identification.

DATE:  August 27th
VERSION #: 2
EU Product and Organisation Environmental Footprinting

Information derived from:
☐ Interview
☒ Desktop Research

Summary completed by: Keith James
Review completed by: Mark Barthel

Description

“The development of European methods for the calculation of the EF of products and organisations was mandated to the Commission by the EU Member States (through the Council of the European Union). This request stemmed from a growing concern among Member States and industries related to the rapid growth in the number of “similar-but-different” methods and approaches related to the calculation of various footprints. The request was not to harmonise the existing standards but to develop an approach that could be used in existing or new EU policies.” (Galatola and Pant 2014)

The Roadmap to A Resource Efficient Europe (European Commission 2011) defined the future role of the environmental footprint methodology by explaining that the Commission will:

- Establish a common methodological approach to enable Member States and the private sector to assess, display and benchmark the environmental performance of products, services and companies based on a comprehensive assessment of environmental impacts over the life-cycle (‘environmental footprint’) (in 2012);
- Ensure better understanding of consumer behaviour and provide better information on the environmental footprints of products, including preventing the use of misleading claims, and refining eco-labelling schemes (in 2012).

The use of Product Environmental Footprint Category Rules (PEFCRs) and Organisation Environmental Footprint Sector Rules (OEFSRs) aims to increase the reproducibility, relevance, and consistency of PEF and OEF studies (and therefore, wherever feasible, comparability between PEF/ OEF calculations within the same product category/ sector). The PEFCR and the OEFSR help direct the focus to the most important parameters of the PEF and OEF study, respectively. Once the scope of the PEFCR/ OEFSR has been agreed, the Technical Secretariat shall develop a “model” of the representative product/ organisation existing in the EU market and belonging to the product category/ sector at hand.

The representative product/ organisation allows for:

1) Identification of relevant life cycle stages and processes;
2) Identification of hotspots;
3) Identification of relevant impact categories;
4) The development of benchmarks and comparison between products/ organisations’ that fall within the same RP/ RO, where feasible, relevant and appropriate.

The PEF and OEF methods were published in 2013 (2013/179/EU). They build on existing methods, including ISO 14040.

PEFCRs are currently developed for the following product groups: batteries and accumulators, decorative paints, hot and cold water supply pipes, household detergents, intermediate paper product, IT equipment, leather, metal sheets, non-leather shoes, photovoltaic electricity generation, stationery, thermal insulation, T-shirts, Uninterruptable Power Supply, beer, coffee, dairy, feed, fish, meat, pasta, packed water, pet food,
olive oil and wine. OEFSRs are developed for the retail and copper production sectors.

Application

The main objectives of the PEF and OEF guidance are

- Harmonisation of calculation approach and providing detailed technical guidance for conducting a PEF or OEF study,
- Specify requirements for the development of PEFCRs and OEFSRs as means for benchmarking and comparative assertions,
- Set general requirements regarding reporting and review.

When translated into PEFCRs or OEFSRs, the primary objective is to fix a consistent set of rules to calculate and communicate the relevant environmental information of products/organisations within the same category. An equally important objective is to enable comparisons and comparative assertions in all cases when this is considered feasible, relevant and appropriate.

For businesses, trade associations and other groupings, the guidance can be used for;

- Understanding a product environmental footprint for an agreed functional unit
- Understanding the environmental footprint of a process, company unit or a whole company;
- compare with other products/organisations within the same category/sector where feasible and appropriate;
- Providing product/organisation transparency on life cycle environmental performance;
- Enabling communication on life cycle environmental performance, e.g. through corporate environmental reporting, product labelling, benchmarking, business certification;
- Enabling identification of hotspots and formulation of quantitative reduction targets.

For governments, investors and policy-makers:

- The discussion of policy implications will be held at the end of the pilot period.

Expected Outcome and Impact

The expected outcome is agreed methods for quantifying a product's environmental footprint and organisational environmental footprint to a sufficient level to allow consistency, reproducibility, comparison (where feasible, relevant and appropriate), benchmarking and communication of information.

Target Audience

The target audience of a PEF and OEF information could be the general public, internal stakeholders, supply chain members, governments or NGOs. This is dependent upon the purpose of the application, summarised above.

Stakeholder Involvement

The timeline for the development of the PEF and OEF Guides is shown in figure 1, emphasizing the stages where stakeholders were involved.
**Figure 1: timeline for methodology development (DG Environment 2014)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of existing methodologies</td>
<td>March 2011</td>
</tr>
<tr>
<td>Draft methodological guide</td>
<td>June 2011</td>
</tr>
<tr>
<td>Training on methodology</td>
<td>13-15 July 2011</td>
</tr>
<tr>
<td>Invited stakeholder meeting</td>
<td>28-30 November 2011</td>
</tr>
<tr>
<td>Pilot tests concluded</td>
<td>20 December 2011</td>
</tr>
<tr>
<td>Public stakeholder consultation on the policy options</td>
<td>January 2012 – April 2012</td>
</tr>
<tr>
<td>Final methodological guide</td>
<td>April 2013</td>
</tr>
</tbody>
</table>

The first draft of the Product Environmental Footprint (PEF) methodology was discussed in detail during a workshop. Due to the tight timeline, there was no possibility to provide written feedback to the comments provided.

The technical guide developed by JRC IES was tested using a limited number of pilot studies representative of a wide variety of goods and services based on a call for volunteers. Due to time and resource constraints, the number of pilot tests was limited to 10.

The European Commission gathered views and additional information on the potential measures related to Sustainable Consumption and Production through a public consultation. This included options for policies implementing the Product and Organisation Environmental Footprint. The consultation also looked at the Green Public Procurement. The summary report of the consultation is available.

The policy instruments adopted are the European Commission Communication *Building the Single Market for Green Products* and of the European Commission Recommendation on *the use of common methods to measure and communicate the life cycle environmental performance of products and organisations*.

A three year testing period (2013-2016) involves industry, trade associations, NGOs and public administrations in piloting PEFCRs/OEFSRs for a range of different products/sectors. The pilots will provide feedback and further refinement to the methodology and its application.

Main objectives of the pilot phase are:

- Test the process of developing PEFCRs and OEFSRs;
Test different approaches to verifying PEF and OEF information;
Test different communication vehicles in B2B and B2C situations.
The process of PEFCR and OEFSR development is designed as a multi-stakeholder, open process. Stakeholders can sign up to follow and comment on the pilots through the Environmental Footprint wiki pages and take part in consultation meetings.

On-going piloting of the final methodological guide and the development of PEFCRs/ OEFSRs is taking place in two waves. The first wave of pilots is focusing on non-food, feed and beverage consumer products, sectors, components and materials. The first wave was kicked off 1st of November 2013 and comprises the following products/sectors:

Projects:

1st wave of pilots: PEFCR development

- batteries and accumulators, proposed by Recharge Aisbl;
- decorative paints, proposed by the European Council of Paint, Printing Ink and Artist’s colours Industry (CEPE);
- hot and cold water supply pipes, proposed by the European Plastic Pipes and Fittings Association (TEPPFA);
- household detergents, proposed by the International Association for Soaps, Detergents and Maintenance Products (AISE);
- IT equipment (servers, magnetic disk unit, switching equipment), proposed by Hitachi;
- leather, proposed by the Confederation of National Associations of Tanners and Dressers of the European Community (COTANCE);
- metal sheets, proposed by the European Association of Metals (Eurometaux);
- non-leather shoes, proposed by the Sustainable Apparel Coalition (SAC);
- photovoltaic electricity generation, proposed by the International Energy Agency’s Photovoltaic Power Systems Task 12;
- stationery, proposed by UFIPA
- thermal insulation, proposed by Association Création Développement Eco-Entreprises (cd2e);
- t-shirts, proposed by Cycleco;
- Uninterruptible Power Supply, proposed by Schneider Electric
- Intermediate paper product led by the European Commission’s Joint Research Centre

1st wave of pilots: OEFSR development

- Retail proposed by a consortium including Quantis, Carrefour, Colruyt, Environment Agency Austria, French Environment and Energy Management Agency (ADEME), Friends of Earth Austria, Italian National Agency for new Technologies, Energy and Sustainable Economic Development (ENEA), and Oxylane (Decathlon).
- Copper production (JRC)

The second wave pilots are focusing on food, feed and beverage products. These pilots include consideration of the use of the ENVIFOOD Protocol, developed by the EU Food SCP Roundtable, as a tool during PEFCR development. The second wave pilots were kicked off on the 1st of June 2014 and include the following project and proponents:
The evaluation of all pilots will begin start from 2015.

Funded by

Although the development of the methods has been publically funded, the pilot projects testing the method are privately funded by participants. The contribution from the European Commission is covering the cost of verification tests, providing a technical Helpdesk to participants, testing the concept of four (4) SME tools, providing support with gathering feedback for the communication phase, meeting logistics and the cost of evaluating each pilot project. Furthermore, the European Commission has the leadership for the pilots on intermediate paper product and the copper sector.

Other Comments

References (if Desktop Research)


European Commission, 2014, Environmental Footprint Pilot Guidance document, - Guidance for the implementation of the EU Product Environmental Footprint (PEF) during the Environmental Footprint (EF) pilot phase, v. 4.0, May 2014.

DATE: 28th August 2014
VERSION #: 2
WRAP’s Product Sustainability Forum (PSF) (UK)
www.wrap.org.uk/psf

Information derived from:
☒ Interview
☒ Desktop Research

Date of Interview: 6 August 2014

☒ Methodology Developer / Owner
☐ Methodology User
☐ Interested Observer

Interviewed by: Mark Barthel
Summary completed by: Mark Barthel

Description

The Product Sustainability Forum (PSF) was established by WRAP in late 2010 in response to a request from the UK governments and major retailers and manufacturing companies to establish a significant space for pre-competitive collaboration between industry, business, NGO’s, academia and other key stakeholders to come together to build the evidence to provide a focus for action to help quantify, reduce and communicate the whole lifecycle environmental impacts associated with consumer products consumed in the UK economy. Since its creation in 2010, WRAP’s PSF and the organisations that support it have been working together to achieve these objectives. Following almost three years of research WRAP’s PSF is now beginning to apply its work in a growing number of international supply chains through Pathfinder demonstration projects; mainstreaming projects that seek to embed lifecycle and sustainability thinking at the heart of organisations; and the growing membership and geographical coverage of the International Network of Product Sustainability Initiatives (INPSI), which WRAP’s PSF was instrumental in establishing in 2012.

More information on WRAP’s PSF and the organisations that support it can be found here.

There are four main process steps in WRAP’s PSF hotspots methodology:

1. Definition and agreement of goal and scope of study: this step includes identifying the target audience for the hotspots analysis (stakeholder mapping and engagement) and gaining a good understanding of their practical needs. For example, stakeholders are consulted on the following issues:
   - The primary and secondary goals of the study;
   - The scale or level at which the study is to be conducted (e.g. national, sectoral, product portfolio or category or individual product value chain);
   - The study boundary (e.g. geographical scope / location; production and consumption; industry sector / product categories / individual products to be covered; whole life cycle or gate to gate approach; etc.);
   - The issues and impact categories to be covered by the study;
   - Other businesses, organizations or stakeholders that should be consulted or engaged during the course of the study;
• Any other existing initiatives that are relevant to the study, including potential collaborators, topic or sector experts;
• Any potential sources of data or information for use in the study; and
• Their willingness to participate in a multi-stakeholder steering group and working groups (e.g. methodology development; peer review; product category-specific activities; tool and resource development; communications).

2. **Data gathering, expert insight, knowledge building and analysis**: data and information is gathered, compiled and organized according to the scope and requirements of the study, including:

• The development and agreement of data quality parameters, including the ground rules for any assumptions, use of ‘proxy’ products, processes or studies where data gaps exist, etc.;
• The development and agreement of a protocol for the collection, storage, analysis and sharing of data and information during the course of the study;
• The appropriate use of expert insight (e.g. face-to-face or telephone interviews or working group meetings) to bolster or support scientific evidence or provide insight into industry practices;
• Any other stakeholder consultations required to identify or better understand stakeholder concerns in relation to the scope of the study and the issues and impact categories it is seeking to cover;
• The identification of relevant existing studies (e.g. national or sectoral input / output analysis or product LCAs and foot-printing studies) and other sources of data and information (e.g. peer reviewed studies and journal articles, corporate and government data sets, LCA databases and tools);
• The commissioning of sector studies, LCAs or foot-printing studies where significant data gaps exist against the issues and impact categories agreed in Step 1;
• Where possible, the ‘normalization’, aggregation or disaggregation of studies and data in order to provide a consistent view / boundary of findings – e.g. normalizing the findings from life cycle studies to use the same functional unit; or ‘restricting’ the analysis from raw materials extraction to the delivery of a finished product for sale by a retailer;
• Uncertainty testing to understand the reasons behind different environmental impact values or factors for the same products or product groups (e.g. as a result of different agricultural production methods or the use of different manufacturing processes), so that we can gain a better understanding of the key variables driving or mitigating impacts;
• Identifying any other information that might be useful in the identification of hotspots in an economy, industry sector or product category (e.g. information on the trading and sales volumes for raw materials or finished products; information on the physical materials flows associated with a national economy, industry sectors or products; contextual information on the nation, industry sector or products included in the study; and
• Organizing the data and information to facilitate the identification of significant aspects and impacts.

3. **Hotspots identification and validation**: at this stage all of the evidence threads from Step 2 are drawn together to build a picture of the likely issues and impact hotspots that will need to be addressed. This step includes the following:

• Agreement of materiality or significance thresholds for the study – i.e. when does an aspect or impact become a hotspot and why? For example, for WRAP’s PSF work in the grocery sector it was agreed that in order to be a considered a primary hotspot an aspect or impact had to account for 25% or more of the total lifecycle environmental impacts of a grocery product category or product; and a secondary hotspot should account for 15-25% of the total lifecycle impacts.
• The identification, analysis, ranking, characterization and stakeholder validation of hotspots, including agreement of the criteria to be applied to the ranking of ‘priority’ sectors or products and / or the hotspots associated with them.
• The preparation and refinement of national, sector, product category or product ‘heat maps’ to provide an at a glance view of the hotspots identified in the study, the issues or impact categories associated with them and their location in the economy or value chain. This is based on the initial analysis of the core project team involved in the delivery of the study and is refined based on detailed expert feedback and discussions with key stakeholders. An example sector heat map for the UK grocery industry can be found here.

• Agree and apply a set of parameters to assess the ‘addressability’ of the hotspots identified in the study in order to help prioritize actions; and sense check with stakeholders. For example, consideration of the market power and sphere of influence of those involved in the study; barriers and enablers to action, etc. (these may be further developed and applied in Step 4 below).

• The preparation of other visual technical and non-technical tools and resources to bring the findings of the hotspots analysis alive and to make the outputs usable by a range of stakeholders and functions within an organization: e.g. product summary slide decks, info-graphics, etc.

4. **Identifying and prioritizing actions**: having identified and agreed the key issues and impact hotspots within the scope of the study in Step 3, this final step involves working with key stakeholders to:

• Develop an initial long list of potential impact reduction opportunities which can be used to tackle the ‘priority’ sectors or product categories and associated hotspots identified in Step 3 using a combination of desktop research, expert interviews, technology appraisals, brainstorming sessions and innovation workshops.

• Agree the selection criteria by which to shortlist impact reduction opportunities for further investigation (e.g. ease and cost of implementation, availability of technology, payback period, economic and environmental savings potential, reducing risk, improvements in supply chain resilience, etc.); and then undertake shortlisting process.

• Work-up shortlisted impact reduction opportunities and validate with industry experts, policy-makers and other key stakeholders.

• Produce tools and resources to support action by governments, industry and others – e.g. documented impact reduction opportunities, action plans and guidance materials.

• Agree pilots and **Pathfinder demonstration projects** to test a range of solutions to tackle the hotspots you have identified, refining tools and resources as you go.

• Mainstream proven or effective solutions based on feedback from piloting activities and publish and disseminate, including case studies, business case tools, calculators, industry events, etc.

• Bring together all of the findings and resources from the study and publish on an online **knowledge base** to support mainstreaming activities.

• Capture and publish progress over time to encourage others to do the same.

**Application**

WRAP’s PSF hotspots methodology has been applied at the level of a national economy, the sectors within it and at the product category and product group-level. It has currently been used to prioritise activities and support voluntary agreements by industry and a range of stakeholders in the retail grocery, home improvement (DIY), electrical and electronic products and textiles and clothing sectors. We are currently undertaking further sectoral analysis to decide which sectors of the UK economy we want to use the approach in.

As the methodology has matured, WRAP’s PSF and its supporting organisations have begun to incorporate new topics and approaches into its work to make it more user-relevant and holistic. For example, we are currently working on the following:
A raw material risk tool to help organizations to assess and manage the sourcing risks associated with critical raw materials and ingredients;

Introducing new impact categories and metrics into the hotspots methodology and our practical work with companies – e.g. practical approaches to biodiversity management; climate change adaptation considerations, like crop varieties, water stewardship, etc.

In partnership with the Oxford Martin School at Oxford University and several major retailers, a research programme to look at the practical steps the food industry, government policy-makers and others can use to allow / nudge consumers to make the transition to healthier and more sustainable diets.

Expected Outcome and Impact

Over the last 18 months, WRAP’s PSF has moved away from a primary focus on hotspots-related research to more of an action-orientated approach, focusing more of its resources on driving change within its supporting organisations through Pathfinder demonstration projects and mainstreaming and embedding activities. Feedback from all of these collaborative activities is now being used to improve and update the data and information gathered during the initial hotspots analysis phases (Steps 1-3 and parts of Step 4 above) based on production-specific and value chain performance information.

In some cases, the more mature Pathfinder projects are already developing significant economic and environmental savings; at the same time as improving future supply chain resilience and reducing sourcing and other forms of corporate risk. For example, a recent Pathfinder project with Cooperative Farms and Cooperative Foods focusing on the farm to fork potato value chain has:

- Identified and begun to realize £600,000 of savings per 50,000 tonnes of packed potatoes;
- Optimized crop varieties to maximise product unitisation and improve resilience to climate change (major flood and drought events);
- Reduce the need for irrigation water by up to 30% by adopting trickle tape irrigation systems, improving crop yield by 4% and end-product quality;
- Identified and begun to realize energy savings potential in refrigerated storage of around 1M kWh per year; and
- Optimized and innovated packaging systems to reduce the use of cardboard by 45 tonnes a year; and reduce instances of greening, which renders potatoes inedible.

WRAP’s PSF is now running Pathfinder activities in a wide range of product categories – e.g. fresh produce, protein (fish, poultry and red meat), bakery, household and personal care products, cosmetics, ready meals, seasonal foods, electrical products, clothing and water using products.

Over time the work of WRAP’s PSF has been also used to help establish and guide the development of voluntary agreements with industry in the grocery industry (the Courtauld Commitment) and the textiles and clothing industry (the Sustainable Clothing Action Plan (SCAP) 2020 Commitment).

At the time of writing two new voluntary agreements are under discussion with industry and governments to take forward action based on the hotspots analysis undertaken by WRAP’s PSF and its supporting organisations:

- The Electrical Sustainability Action Plan (e-SAP); and
- A new farm-to-fork ‘collaborative framework’ (working title) to improve the sustainability of the food chain, including both retail and food service and hospitality.
**Target Audience**

The main target audiences for WRAP’s PSF hotspots methodology are major retailing and manufacturing businesses and governments. Over the last 18 months WRAP’s PSF has begun to extend its work in the value chain spending more time engaging and working with primary producers (e.g. farmers and growers and the minerals and mining sectors); and has begun to extend its research and innovation work into new areas to help consumers to make the transition to more healthy and sustainable lifestyles. This has involved a widening of its target audiences to groups representing these value chain actors and to other specialist fields like social science, behaviour change, psychology and health and nutrition.

**Stakeholder Involvement**

WRAP and the PSF have always encouraged and sought the active participation of stakeholders in its work and runs regular open plenary sessions once or twice each year.

There is an open and transparent governance structure with a multi-stakeholder steering group, a measurement and monitoring working group, project advisory groups for discrete pieces of research and innovation; and a new structure to support the four themes to be taken forward under the proposed collaborative framework on sustainable food chains.

**Figure 1**: current governance structure for WRAP and the PSF.

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**Funded by**

WRAP’s PSF work is currently funded by the governments of the UK, charitable foundations and the private sector companies that it works with. Over time the proportion of funding received from the public sector has been reduced as government budgets have declined; and private sector funding has increased to help support the forum’s work. The forum also receives a considerable amount of in-kind support from the private sector in the form of technical and project management support and the contribution of corporate data and information.

**Other Comments**
We firmly believe that the hotspots methodology we have developed and the approach we have taken to the creation of user-friendly outputs and outcomes can be applied to a wider range of industry sectors and product categories than is currently the case.

As such, we have recently created a ‘blue print’ to allow our methodology, knowledge and operational approach to be transferred into other countries and sectors of the economy. We are actively looking to find collaborative partners to replicate and build on our work elsewhere.

References (if Desktop Research)

For a more detailed description of WRAP’s PSF approach to hotspots analysis in the grocery retail sector please see WRAP’s PSF report: An initial assessment of the environmental impact of grocery products.
Public Garden Sustainability Index (PGSI)

Information derived from:

☐ Interview
☒ Desktop Research

Summary completed by: Curtis Harnanan

Description

Longwood Gardens, the American Public Gardens Association (APGA) and PE INTERNATIONAL assembled a Peer Advisory Group (PAG) that included representatives of approx. 25 public gardens across North America. This PAG utilized the following approach to identify and prioritize attributes for inclusion within the Public Garden Sustainability Index.

(a) Develop preliminary insights on value chain heat map to be used in a hot spot analysis via a review of existing literature, programs and websites, an online sustainability survey, as well as a review of existing standards.

(d) Draft the PGSI based on additional PAG input and final selection of attributes from the value chain heat map.

(f) Engage PAG to evaluate the contents of the draft Standard.

(g) Pilot the resulting draft Standard to determine if it reflects the intent of the scope:
   (i) If the draft Index does not reflect the intent of the scope, then re-evaluate and adjust the Index.
   (ii) If the draft Index does reflect the intent of the Standard, then finalize then publish the Index for use.

Additional details of the hot spot analysis steps are provided below:

**Literature review to identify preliminary hot spots**

A first set in identifying attributes for public garden sustainability involved a review of public reports and studies, as well as program, initiatives and websites of a select number of public gardens. The following sources of information were reviewed:

![Diagram of the value chain heat map and hot spots](image-url)
• Public Reports & Studies:
  • Easewaste website: Tool developed by the Technical University of Denmark. Available for use by consultants, but only after proper training.

• Programs, Initiatives & Websites:
  • Sustainable SITES™ Initiative
  • LEED Existing Buildings Operations & Maintenance (LEED-EB O&M)
  • From six North American Public Gardens
    • United States Botanic Gardens
    • Missouri Botanical Garden
    • Queens Botanical Garden
    • Cleveland Botanical Gardens
    • Olbrich Botanical Gardens
    • New York Botanical Gardens

**Sustainability Survey of Public Gardens to identify preliminary hot spots**
Another key contribution to the hot spot analysis involved an online survey that was open to all PAG members and other select public gardens. A total of 11 gardens completed the survey. The survey was structured to gain insights through a variety of questions on impacts associated with an array of operational activities across public gardens. Participants helped to rank related environmental and social impacts associated with each activity as high, medium or low. The results were summarized in a heat map.

**Additional insights of PAG members to identify top impacts**
Additional insights were solicited from PAG members to further select the top five sustainability impacts that should be addressed via the Index (as well as best practices to be watched)

**Selection of attributes for PGSI**
Input from the survey results and the insights from the PAG were then analysed, scored and ranked. The results were then shared with the PAG for further discussion and prioritization. The final set of attributes for the PGSI were based on the hotspots, insights and professional judgment of PAG members. The final attributes selected included eight environmental, five social, one financial and one governance to complete the sustainability spectrum.
Application

Sector: Public Gardens

Expected Outcome and Impact

To identify and prioritize public garden sustainability impacts as a means to select appropriate attributes and criteria that would form the core of Public Garden Sustainability Index.

Target Audience

PGSI Peer Advisory Group

Stakeholder Involvement


Funded by

Longwood Gardens

Other Comments

References (if Desktop Research)

PE INTERNATIONAL and internal documentation of methodology

DATE: 1st August 2014
ReCiPe
http://www.lcia-recipe.net/

Information derived from:
☒ Interview
☒ Desktop Research

Date of Interview: 6 August 2014
☒ Methodology Developer / Owner
☐ Methodology User
☐ Interested Observer

Interviewed by: Mark Barthel, WRAP/PSF
Summary completed by: Mark Barthel

Description
PRé Consultants, CML, RIVM (the Dutch Health Ministry) and Radboud University Nijmegen are the co-developers of the ReCiPe methodology. No-one ‘owns’ the methodology as the aim is to make it as widely available to users as possible, free of charge.

The ReCiPe methodology builds on the earlier work undertaken to develop the Eco-Indicator 99 methodology and manuals (and its forerunner, Eco-Indicator 95).

The main drivers behind the development of the methodology were to simplify the interpretation of LCA/LCI results and to solve / help with the complexity involved in the use and weighting of end point indicators.

The following description of the ReCiPe methodology, its application, limitations and uncertainties is taken from a combination of content from ReCiPe website and a telephone interview with co-developer of the methodology, Mark Goedkoop.

The ReCiPe methodology
The ISO 14040 and 14044 Standards provide a generic methodological framework for organisations to undertake life cycle assessments (LCAs) of products and activities, including the following stages:

- Determination of the goal and scope of a study;
- Data collection; and
- The development of a life cycle inventory.

This inventory result is usually a very long list of emissions, consumed resources and sometimes other items. The interpretation of this list is often difficult. So an LCIA procedure, such as the ReCiPe method, is designed to help with this interpretation process.

The primary objective of the ReCiPe methodology is, therefore, to transform the long list of life cycle
inventory (LCI) results, into a limited number of indicator scores. These indicator scores express the relative severity of the product or activity on any given environmental impact category. The ReCiPe methodology determines indicators at two levels:

1. Eighteen mid-point indicators
2. Three end-point indicators

ReCiPe uses an ‘environmental mechanism’ as the basis for the modelling. An environmental mechanism can be seen as a series of effects that together can result in a certain level of damage to, for instance, human health or ecosystems.

For instance, for climate change we know that a number of substances (so-called greenhouse gases) increase ‘radiative forcing’. This means that heat is prevented from being radiated from the Earth into space. As a result, more energy is trapped on Earth and temperatures increase. As a result of this increase in temperature, we can expect changes or losses in the habitats that support living organisms and, as a result of this, species may face extinction.

However, using this example it is clear that the further one takes or builds an environmental mechanism, the higher the uncertainties are likely to get. Radiative forcing is a physical parameter that can be relatively easily measured in a laboratory; but the resulting change in temperature is much less easy to determine, as there are many parallel positive and negative feedback loops involved. Similarly, our understanding of the likely change in habitat as a result of a change in temperature is also not complete or well-understood and therefore subject to further and often larger uncertainties.

**Figure 1**: Example of a harmonised mid-point to end-point model for climate change, linking to human health and ecosystem damage.

So the obvious benefit of taking only the first step is the relatively low uncertainty.

**Combining mid-point and end-points**
As mentioned above, the ReCiPe methodology calculates eighteen mid-point indicators and three much more uncertain end-point indicators. The motivation to calculate the end-point indicators is that the large number of mid-point indicators are very difficult to interpret, in part as there are too many; and in part because they can have a very abstract meaning. For example, how would you compare radiative forcing with the base saturation numbers that express acidification? The indicators at the end-point level in the ReCiPe methodology are intended to facilitate easier interpretation, as there are only three, and they have a more understandable meaning.

The idea is that each user of the methodology can choose at which level they want to have the result based on:

- Eighteen mid-points, that are relatively robust, but not easy to interpret; and
- Three easy to understand, but more uncertain end-points, namely:
  - Damage to human health
  - Damage to ecosystems
  - Damage to resource availability

The user can thus choose between uncertainty in the indicators, and uncertainty on the correct interpretation of indicators.

Figure 2 below provides the overall structure of the ReCiPe methodology.

**Figure 2**: Relationship between LCI parameters (left), mid-point indicator (middle) and end-point indicator (right) in ReCiPe 2008
The model is also able to accommodate short-term (50-100 years) and longer-term (up to indefinite) effects on different impact categories by including in the mid-point and end-point indicators factors drawn from three different cultural perspectives. These perspectives represent a set of choices on issues like time / duration or expectations that proper management or future technological development can avoid future damage. The three perspectives are:

- **Individualist**: short-term, optimism that technology can avoid many problems in future.
- **Hierarchic**: consensus model, as often encountered in scientific models, this is often considered to be the default model.
- **Egalitarian**: long-term based on precautionary principle thinking.

The ReCiPe methodology including mid-points and end-points, supporting reports and information, and characterisation and normalisation data are available for download [here](#).

**NOTE**: since the publication of the ReCiPe methodology some minor errors have been corrected.

**Application**

The ReCiPe methodology can theoretically be applied at all scales or levels of detail (national, sector and product category); although to date it has mainly been used to assess / quantify / model the environmental aspects and impacts associated with raw materials (e.g. chemicals) and consumer products.
As it is included in both the Gabi and SimaPro LCA tools, the assumption is that ReCiPe has a wide user base, although there are no precise usage statistics available to support this.

**Expected Outcome and Impact**

As discussed above the main objective of the ReCiPe methodology is to simplify the interpretation of LCI results and provide users with the flexibility to select mid-point and/or end-point indicators and the level of associated uncertainty involved in these choices.

**Target Audience**

The original target audience for both Eco-Indicator 99 and ReCiPe was product designers and developers; but it is now being used widely by a more generalist audience, in part due to its inclusion in market leading LCA tools.

**Stakeholder Involvement**

Unknown beyond the core project team and supporting researchers but the ReCiPe website does invite comments and feedback from the LCA community.

**Funded by**

The original project that led to the development of the ReCiPe methodology was funded by the Dutch Government with in-kind contributions from the co-developers to ensure sufficient time and resource was available to complete the project satisfactorily.

The current work taking place to review the updated science on key topics like climate change and land use and land use change and update and refine the ReCiPe methodology is being undertaken voluntarily by the co-developers and a number of PhD research students, with no follow-up funding from the Dutch government.

A revised version of the ReCiPe methodology will be published at some point during 2015 – no publication date was available at the time of writing. The responsible person for this update is Mark Huijbrechts from the University of Nijmegen.

**Other Comments**

**On the ReCiPe methodology:**

Mark Goedkoop’s view is that the ReCiPe methodology is in need of further refinement, stating the following as issues:

- Large residual uncertainties remain in the models that ReCiPe uses
- More work is required on the water elements of the methodology
- Land use factors are predominantly European and, as a result, are not currently applicable / usable outside of Europe
- Problems with normalization factors remain quite fundamental.

**On the broader issue of developing global guidance for hotspots analysis:**

- Be mindful of the need to balance traditional science-based quantification approaches with more qualitative approaches to hotspots analysis (e.g. engaging and integrating stakeholder concerns into the analysis) as is the case in The Sustainability Consortium’s work.
Seek to utilize existing input / output models and data to undertake an initial assessment of hotspots and include consideration of international trade data (e.g. EU EIPRO and GTAP data respectively).

Need to think about how to accommodate sectors like forestry or fishing (over-exploitation and biodiversity loss) as they are not often handled well in traditional quantification approaches.

Learn from and build on traditional LCA screening approaches.

References (if Desktop Research)

Links to relevant download pages for all of the resources and reports relating to the ReCiPe methodology are provided above.

DATE: 7 August 2014
VERSION 2.0
Sustainability Assessment of Food and Agriculture systems (SAFA)

Information derived from:

☑️ Interview
☑️ Desktop Research

Date of Interview: 06 August 2014

☑️ Methodology Developer / Owner
☐ Methodology User
☐ Interested Observer

Interviewed by: Jacqueline Guinness / WRAP

Summary completed by: Jacqueline Guinness

Description

SAFA is a holistic global framework for the assessment of sustainability along food and agriculture value chains. SAFA establishes an international reference for assessing trade-offs and synergies between all dimensions of sustainability. It has been prepared so that enterprises, whether companies or small-scale producers, involved with the production, processing, distribution and marketing of goods have a clear understanding of the constituent components of sustainability and how strength, weakness and progress could be tackled. By providing a transparent and aggregated framework for assessing sustainability, SAFA seeks to harmonize sustainability approaches within the food value chain, as well as furthering good practices.

The SAFA Guidelines consist of three sections (figure 1). Section 1 provides the basic information on the purpose, linkages, background and use of the SAFA framework in terms of different users and purposes. Section 2 outlines the step-by-step approach for SAFA implementation, including guidance on setting scope, boundaries, contextualization and reporting. Section 3 contains the SAFA protocol for sustainability themes, sub-themes and default indicators. Guidance on default indicators is provided in the Guidelines complement entitled “SAFA Indicators”, with detailed indicators description, relevance, measurement, rating, limitations and sources of information.
Application

Guidelines and an electronic tool are published (see link below) – this would cover a very wide range of application areas since SAFA can be used at multiple levels for multiple purposes and by different actors using a harmonized taxonomy under one framework ensuring consistency, applicability and transparency. Regardless of size, geography or role, all stakeholders have a clear and common language for assessing sustainability. This includes:
Food and agriculture enterprises (individual or associations in the crop, livestock, fisheries, aquaculture and forestry sub-sectors):

- self-assessment for evaluating sustainability of operations and identifying hot-spots for performance improvement;
- gap analysis with existing sustainability schemes for improvement of the thematic coverage;
- managing or benchmarking suppliers to improve sustainable procurement.

**NGOs and sustainability standards and tools community:**

- monitoring outcomes of impacts of projects;
- sharing of, and global learning on, best practices and thresholds;
- gap analysis with existing checklists on all aspects of sustainability.

Governments, investors and policy-makers:

- informing the establishment of Sustainable Development Goals; implementation of regional planning, local procurement, investment or the development of legislation;
- providing a global guidance on sustainable requisites for global supply chains to governments.

SAFA was demand driven owing to a lack of common language on sustainability issues for these supply chain areas (food & Agriculture value chains)

### Expected Outcome and Impact

SAFA was launched in Rome in Nov 2013 and has been piloted up to June 2014. The final tool will be released in during the FAO meeting on Knowledge and Information for Sustainable Food Systems, to be held in Rome on 10-11 September 2014, as part of the FAO-UNEP Sustainable Food Systems Programme of the 10 Year Framework of Programmes on Sustainable Consumption and Production adopted at the Rio+20 Conference. With the final SAFA Tool, users will be able to add their own indicators to the tool in order to generate context-specific results and it will be available for MAC users as well as Windows).

Nadia has been tracking downloads since launch of the pilot tool and so far this number is c 150, predominantly by the academic sector for course referencing and development. Tracking of usage will continue beyond September 14 in order to gauge use by organisation type and seek feedback.

### Target Audience

The target audience of a SAFA assessment is small, medium and large-scale companies, organizations and other stakeholders that participate in crop, livestock, forestry, aquaculture and fishery value chains. However, as a framework and harmonized global assessment approach, SAFA is also relevant to governments’ strategies, policy and planning as well as many academia for learning purposes. So it is very wide reaching.

### Stakeholder Involvement

FAO facilitated the dialogue with thousands of public & private stakeholders over a 5 year period since 2009 when the idea was first conceived. Nadia explained that the draft Sustainability Framework was first defined through a FAO cooperation with the ISEAL Alliance and two expert meetings held in 2009. Since then, the process has been iterative, including stakeholders’ surveys, face-to-face meetings of experts and practitioners and two rounds of public consultations. The SAFA development process was intentionally slowed down in order to ensure that all stakeholders could contribute to the development and ensure their buy-in, and shape the products along existing gaps.
Funded by
FAO and was peer reviewed. Over 100 FAO officers throughout technical Divisions contributed

Other Comments
This is publicly available as open-access software, the SAFA Tool, with a view to assist users in implementation of the Guidelines. The Tool and other SAFA resources are free to download from: http://www.fao.org/nr/sustainability/sustainability-assessments-safa/en/

An application for smallholders for smartphones, SAFA Small APP, is under development & is currently being tested in Colombia & Kenya. The idea for this is that extension officers or local community workers on the ground can assess smallholders’ sustainability performance and provide feedback to them via SMS/voicemail systems once the APP has generated the info relevant to their enterprise(so farmer doesn’t necessarily need a smart phone but will need a cell phone). The purpose of the APP is to identify hotspots that require consideration and hence, build capacities. This APP will be available in 26 languages, with the option to add more local languages, provided that these are made available to FAO, and designed to provide information tailored to individual practice. Completion & launch of SAFA Small APP is due by end of 2014.

A SAFA Database is also under construction. The aim is that this will allow feedback of SAFA assessments, as well as access to information held by FAO in order to facilitate bench mark practice. Completion & launch due by end of 2014.

References (if Desktop Research)

DATE: 6th August 2014
VERSION #: 2
Social Hotspots Database

Information derived from:

☐ Interview
☐ Desktop Research

Date of Interview: 7th August 2014

☐ Methodology Developer / Owner
☐ Methodology User
☐ Interested Observer

Interviewed by: Curtis Harnanan, Andrea Smerek

Summary completed by: Andrea Smerek

Description

The Social Hotspots Database project was launched by New Earth in 2009. The aim of this project is to make detailed information on supply chain human rights and working conditions publicly available.

Content was developed for the Database using Input-Output Life Cycle Assessment. Data for this assessment was sourced from many different databases so that issues related to social impacts in different countries, processes, and sectors of the economy were highlighted. As social impacts in different geographical locations and across different sectors are varied, it was important to consider a wide breadth of data. Social Life Cycle Assessment was used to evaluate the social impacts presented in the data.

An online user portal, which was developed in 2009, allows users to access data on social impact risks by sector, country, or risk theme. All impacts are characterized as having between a low to very-high risk. Users then have the choice to weight social issues (e.g., weighting child labour as high if it is company or region priority) based on what is important to them. Data is currently available in SimaPro and openLCA and should be available in GaBi in 2015.

Application

The Social Hotspots Database can be applied on a sector and product level.

Expected Outcome and Impact

The database will constantly evolve as new data becomes available. The following updates are expected to occur:

- Data updates
- In fall, 2014 there will be an update to the globally used Input-Output LCA model. Data is currently provided by country and sector. In the future, this will potentially expand to include information at the process level.
- The user portal provides information by country and sector but not for life cycle modelling. There is a partnership with UN International Trade Center to evolve this to be more detailed at the commodity level.
Target Audience
The target audience for this database, from the start, has been LCA practitioners, University students, companies, consultants, and NGOs. Users need to be familiar with LCA tools in order to understand the database. Unfamiliar users will face a steep curve to understand the methodology.

Stakeholder Involvement
An advisory board, which represents many stakeholder categories (academics, NGOs, government, etc.) provided input on data, characterization models, the process, etc. The Sustainability Consortium reviewed the database itself, the methodology, and the results.

Funded by
Funding provided by Wal-Mart helped to develop a private database. Colleagues researched data for a set of indicators to produce initial version of database.

The Sustainability Consortium provided funding to continue the development of the database. This included a project to test the database application on seven (7) product categories and then additional funding for 100 product categories in 2012. The Sustainability Consortium reviewed the database itself, the methodology, and the results.

Other Comments
The following advice was provided based on experience from the development of the Social Hotspots Database:

- It is important to set the goal and scope for the project (i.e., what do you want to do? Why do you want to do it?)
- It is necessary to identify how many hotspots are you able to deal with.
- Prioritization for hotspots analysis is key

References:
The Social hotspot database website
http://socialhotspot.org/

DATE: August 7th, 2014
VERSION #: 1
Social Life Cycle Assessment (S-LCA)

Information derived from:

☐ Interview
☒ Desktop Research

Summary completed by: Curtis Harnanan
Review completed by: Andrea Smerek

Description

A social and socio-economic Life Cycle Assessment (S-LCA) is an assessment technique that aims to assess the social and socio-economic aspects of products and their potential positive and negative impacts along their entire life cycle.

S-LCA uses both generic and site-specific data. It differs from other social impacts assessment techniques by its objects: products and services, and its scope: the entire life cycle. Social and socio-economic aspects assessed in S-LCA are those that may directly affect stakeholders positively or negatively during the life cycle of a product. They may be linked to the behaviors of enterprises, to socio-economic processes, or to impacts on social capital. Depending on the scope of the study, indirect impacts on stakeholders may also be considered.

S-LCA documents the product utility but does not have the ability or the function to inform a decision on whether a product should be produced or not. It is correct that information on the social conditions of production, use and disposal may provide elements for thoughts on the topic, but will, in itself, seldom be a sufficient basis for decision.

In theory, S-LCA may be conducted on any products, even those that are knowingly harmful to society (e.g. weapons). It is recommended to use S-LCA ethically, and it is assumed that peer review will prevent inappropriate use. Socially responsible investing firms often provide lists of product categories being excluded for ethical reasons. If the product category studied is listed, it is recommended to detail, in the goal and scope phase of the study, the reason it is ethical and reasonable to conduct an S-LCA of this particular product. Documentation of the product utility and assessment of the use phase of the life cycle will also reflect the unethical or harmful nature of the product.

Environmental LCA\textsuperscript{32} (E-LCA) and Social LCA (S-LCA) have a lot in common. Both methodologies:

- Share a common trunk which consists in the ISO framework (goal and scope definition, life cycle inventory analysis, life cycle impact assessment and interpretation); although there are some specificities for each of these phases in S-LCA;
- Have a huge need for data;
- Work as iterative procedures;
- Encourage and request peer review when communication to the public or comparative assertions are planned;
- Provide useful information for decision-making;
- Do not have the purpose to provide information on whether or not a product should be produced;
- Conduct Hotspots assessments that play the same role;

\textsuperscript{32} Environmental Life Cycle Assessment (E-LCA), normally referred to as Life Cycle Assessment (LCA), is a technique that aims at addressing the environmental aspects of a product and their potential environmental impacts throughout that product’s life cycle.
• Conduct data quality assessment;
• Do not express impacts by functional unit, if semi-quantitative or qualitative data are used.

Complementarity
Environmental LCA, in itself, does not provide all the information to make decisions in a sustainability perspective. An S-LCA provides complementary information, providing a more comprehensive picture of the products’ life cycle impacts.

Difference
The obvious difference between E-LCA and S-LCA is the focus. While the former is concerned with the evaluation of environmental impacts, the latter aims to assess social and socio-economic impacts. While, an E-LCA will mainly focus on collecting information on (mostly) physical quantities related to the product and its production/use and disposal, an S-LCA will collect additional information on organization related aspects along the chain.

Two fold analysis of the product system (adapted from Mazjin et al. 2004)

Although S-LCA follows the ISO 14044 framework, some aspects differ, are more common or are amplified at each phase of the study. Below is a discussion of several attributes which may be present in both E-LCA and S-LCA, but for which the extent or nature of the requirement differs.
There are four major phases to the methodology:

1. **Goal and Scope of the study**
   - To specify the object and objectives of the study (including the goals, the function of the product, the product utility, the functional unit, etc.)
   - To determine the activity variable to be used and the unit processes to be included.
   - To plan data collection and specify which data will be collected and on which impact categories and subcategories.
   - To identify the stakeholders involved with each of the processes and the type of critical review required.

2. **Inventory Analysis**
   - To collect data on unit processes activity variable.
   - To collect data for hotpots’ assessment (literature, web, site specific)
To proceed to iterative refinement of system boundary based on screening and activity variable information.

- To collect primary data.

- To collect data for characterization.
- To relate data to functional unit and aggregation when applicable.

3. Impact Assessment

- To select the impact categories and subcategories, and the characterization methods and models, via weighting and prioritization of issues (very high, high, medium and low risks);
- To relate the inventory data to particular sLCIA subcategories and impact categories (classification);
- To determine and/or calculate the results for the subcategory indicators (characterization).

4. Interpretation

- Identification of the significant issues;
- Evaluation of the study (which includes considerations of completeness and consistency);
- Level of engagement with stakeholders;
- Conclusions, recommendations and reporting.

Application

Products or Services

Expected Outcome and Impact

To learn about and identify social “hotspots” and the options for reducing the potential negative impacts and risks through product development and substitution in the supply chain, establishment of purchasing procedures or specifications, marketing, reporting and labelling, strategic planning, or development of public policies.

Specifically the UNEP Guidelines on S-LCA is intended to provide the following for stakeholders engaging in the assessment of social and socio-economic impacts of products life cycle:

- a map - which describes the context, the key concepts, the broader field in which tools and techniques are getting developed and their scope of application;
- a skeleton - presents key elements to consider and provide guidance for the goal and scope, inventory, impact assessment and interpretation phases of a social life cycle assessment; and,
- a flash light - that highlights areas where further research is needed.

Target Audience

Product manufacturers and other value chain stakeholders engaging in the assessment of social and socio-economic impacts of products life cycle

Stakeholder Involvement

Stakeholders who participated in the consultation process to develop the Guidelines included:

- Accountability International (AI)
- Consumers International (CI)
- Fair Labor Association (FLA)
• Fair Trade Advocacy Office (FTAO)
• International Consumer Research & Testing Ltd (ICRT)
• International Labour Office (ILO)
• International Organization of Employers (IOE)
• International Social and Environmental Accreditation and Labelling Alliance (ISEAL)
• International Trade Union Confederation (ITUC)
• Society of Environmental Toxicology and Chemistry (SETAC)
• United Nations Environment Programme (UNEP)
• US International Bureau of Labor Affairs (ILAB)
• World Business Council for Sustainable Development (WBCSD)

Funded by

United Nations Environment Programme / Society of Environmental Toxicology and Chemistry (UNEP/SETAC)
Life Cycle Initiative at UNEP, CIRAIG, FAQDD and the Belgium Federal Public Planning Service Sustainable Development.

Other Comments

PRé Consultants have been working with 12 companies in the Roundtable for Product Social Metrics to produce a Handbook for Product Social Impact Assessment that provides a more practical approach for companies. Starting with 105 social topics and associated KPIs and managed to get it down to a much more manageable 18. The Handbook is available for download free of charge at: http://product-social-impact-assessment.com/

Reference (if Desktop Research)


DATE: 14th August 2014
VERSION #: 2

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33 Phone interview between Mark Barthel (WRAP) and Mark Goedkoop (PRé Consultants) on 6th August, 2014.
Sustainability Accounting Standards Board Materiality Map™

Information derived from:

☐ Interview
☒ Desktop Research

Summary completed by: Curtis Harnanan

Description

- Sustainability Accounting Standards Board (SASB) Materiality’s Map™ and approach complies with SEC’s view of materiality.

- Each issue’s priority is determined through a three lens approach in which SASB gathers evidence of interest (EI**) by searching for related keywords in thousands of source documents, and evidence of financial impact (EFI) to determine issues’ relative impact on traditional value drivers. For a handful of issues, SASB also performs a forward-looking adjustment (FLA) to highlight emerging interest in an issue that is not yet reflected in the two types of evidence described above.

- The Map looks at 40+ sustainability issues and analyses their importance in the context of the 80+ industries in SICS.
- Each issue is graded in the context of these three lenses and, through a proprietary algorithm, SASB transforms these grades into a “Materiality Score” (MS) which ranges from 0.5 to 5. All issues above 2.25 are then considered as material for the industry in question.

- Materiality Map test automation, as well as the data those tests access, are powered by the Bloomberg Professional service - platform for financial professionals who need real-time data, news and analytics to make smarter, faster, more informed business decisions.

- Materiality Map by numbers:

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<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>88</td>
<td>Industry Profiles</td>
</tr>
<tr>
<td>43</td>
<td>ESG issues tested</td>
</tr>
<tr>
<td>6</td>
<td>Types of source documents used for data collection (10Ks, legal news, CSR reports, general media articles, innovation news)</td>
</tr>
<tr>
<td>86</td>
<td>Sets of keywords with literally thousands of possible keyword combinations describing the ESG issues</td>
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<tr>
<td>12,500</td>
<td>U.S. publicly traded companies from which source documents are available</td>
</tr>
<tr>
<td>+45,000</td>
<td>“Evidence of interest” data points</td>
</tr>
</tbody>
</table>

The process is as follows:

1- Evidence of Interest (five part test) - This type of evidence is collected by searching tens of thousands of source documents using keywords for each sustainability issue in order to arrive at a profile of the intensity with which issues arise in each industry. The five tests are associated with unique source documents —Form 10-Ks, legal news, CSR reports, shareholder resolutions, media reports and innovation journals. These documents help to capture the sustainability concerns of different stakeholders that the reasonable investor cares about and have the potential to impact corporate performance. SASB is currently evaluating the
feasibility of including SEC comment letters in the source document search, to better understand issues of interest to the SEC in specific industries.

**2- Evidence of Financial Impact** - This type of evidence is collected by SASB’s research team during a 3-month qualitative research process for each sector. For the issues of interest, SASB evaluates whether there is current evidence that management (or mismanagement) of the issue will affect traditional corporate valuation parameters: i.e. profits (revenue and/or costs), assets and liabilities, and cost of capital. This evidence tilts the results of the five part test towards issues where there is also the potential for financial impact. We capture both anecdotal and quantitative studies as evidence of links to valuation.

**3- Forward Looking Adjustment** - In a small number of cases, SASB may make an adjustment to an issue to raise its importance (where there is evidence of emerging interest) based upon traditional sustainability concepts: management or mismanagement of the issue may create positive or negative externalities that other stakeholders, industries, or generations will deal with; and/or there is the potential for systemic disruption. In any case, the impact of the issue must be reasonably likely to occur and of significant magnitude to be deemed material.

The adjustments to the map allow us to correct for the imperfect state of sustainability reporting, particularly in Form 10-Ks and CSR reports. Material sustainability issues are often not reported in Form 10-Ks, and CSR reports contain significant amounts of immaterial information. Additionally, the media tend to focus on one or two issues that capture or reflect stakeholder attention. In the future, with a better understanding of what issues are material and the evidence that supports them, we expect to see more convergence between the “evidence of interest” and “evidence of financial impact” tests, and fewer adjustments will be needed.

**Application**

Various Sectors including:
- Healthcare
- Financials
- Technology & Communication
- Non-renewable Resources
- Transportation
- Services
- Resource Transformation
- Consumption
- Renewable Resources & Alternative Energy
- Infrastructure

**Expected Outcome and Impact**

SASB’s Materiality Map™ presents the relative priority of sustainability issues on an industry-by-industry basis, allowing users to compare and contrast the materiality of 40+ issues across industries and sectors. The results from the Map are input to the standards setting process.

**Target Audience**

**Stakeholder Involvement**

Corporations, market participants, and public interest and intermediaries. There is also a public comment
period.

Funded by
Donors and In-Kind support

Other Comments

References (if Desktop Research)
SASB Website: Determining Materiality: http://www.sasb.org/materiality/determining-materiality/
SASB Website: SASB Materiality Map: http://www.sasb.org/materiality/sasb-materiality-map/

DATE: 1st August 2014
VERSION #: 1
Sustainability Hot Spot Analysis (SHSA)

Information derived from:

☐ Interview
☒ Desktop Research

Summary completed by: Andrea Smerek

Description
The Sustainability Hot Spot Analysis (SHSA), a method developed by the Wuppertal Institute for Climate, Environment and Energy (Germany), provides a qualitative approach to identify social and environmental impacts along a value chain and highlights relevant aspects for a product or service that require management. The main objective of a SHSA is to identify the key issues of analysed categories.

A Sustainability Hot Spot Analysis is conducted in the following 5 stages:

Step 1: Defining life cycle stages and categories
Defining system boundaries (i.e., life cycle stages and the environmental and social aspects covered) is the first step of the Sustainability Hot Spot Analysis. Raw material procurement, processing, use and waste treatment, according to the product being analysed, need to be defined. SHSA only considers impacts directly connected to the product or service and does not consider indirect impacts (e.g., maintenance of machinery). The following tables show the main environmental and social categories that need to be considered along the product or service life cycle. The SHSA considers environmental and social aspects. The HSA method in general allows focusing on either social or environmental aspects and the selection or widening of aspects. However, any adaption should be documented.

<table>
<thead>
<tr>
<th>Environmental aspect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials (abiotic and biotic resources)</td>
<td>All materials used in this phase (e.g. use of pesticides, herbicides as well as fertilizers, chemicals etc in the agricultural phase).</td>
</tr>
<tr>
<td>Energy resources</td>
<td>Energy used in the phase in terms of electricity and fuel.</td>
</tr>
<tr>
<td>Water resources</td>
<td>The amount of water used in growing / cultivation as well as for cleaning during production. Soil degradation is included in the “land use” aspect and emissions to water such as nutrients are included in the “emissions to water” aspect.</td>
</tr>
<tr>
<td>Land use</td>
<td>The amount of land used. This aspect also includes the biodiversity and soil degradation.</td>
</tr>
<tr>
<td>Waste</td>
<td>These are all excess solid wastes in the different cycle phases.</td>
</tr>
<tr>
<td>Emissions to air (incl. greenhouse gas (GHG) emissions)</td>
<td>Chemicals released to air and also GHG emissions through electricity usage and transport. The GHG such as CO₂ emitted through electricity use and other sources such as livestock where relevant.</td>
</tr>
<tr>
<td>Emissions to water</td>
<td>These include chemicals and nutrients used for crop growing as well as the use of detergents during the use/consumption phase.</td>
</tr>
</tbody>
</table>
Social aspects of SHSA

<table>
<thead>
<tr>
<th>Social aspect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Working conditions</td>
<td>These include working hours, legal contracts, illegal workers, general working conditions.</td>
</tr>
<tr>
<td>Social Security</td>
<td>This includes contracts and obligatory social security provisions.</td>
</tr>
<tr>
<td>Training &amp; Education</td>
<td>This includes aspects such as education on their rights as employers and also training on working with hazardous materials.</td>
</tr>
<tr>
<td>Workers health &amp; safety</td>
<td>Occupational health and safety (hygienic working conditions)</td>
</tr>
<tr>
<td>Human rights</td>
<td>Child labour and young workers, discrimination (equal pay/benefits/opportunities between temporary and permanent workers; between foreign/migrant and local workers and between men and women), forced labour including discipline (harsh and inhumane treatment), Freedom of association, sexual harassment</td>
</tr>
<tr>
<td>Living Wages</td>
<td>Minimum wage / Living wage</td>
</tr>
<tr>
<td>Consumer health &amp; safety</td>
<td>Health standards of product, product safety, information and transparency regarding health issues (allergens, nutritional value), warnings if some kind of use is restricted or hazardous, declaration of control mechanisms for health and safety</td>
</tr>
<tr>
<td>Product Quality</td>
<td>Longevity, use practicability for everyday life (quantities / portion of product offered, safe packaging, dosage and storing possibilities), transparency and information (reliable information, information adequate for main consumer group, voluntary information, e.g. complete information on ingredients), added value for society (purchase of product has positive effects on society, e.g. sponsoring of social projects, fostering of social suppliers, ethical orientation of producers)</td>
</tr>
</tbody>
</table>

**Step 2: Identifying the relevance of each life cycle aspect**

Each life cycle aspect must be identified as having a low, medium, or high relevance. The assessment is based on available literature (e.g., scientific journals, reports), further information of NGOs and companies, and can be complemented by expert consultation. The identified facts need to be structured by addressed life phase and aspect and references must be given. In the case where data is not available, or when the user of the methodology is not aware of the relevance of the aspect, it is given a low score. Scores are applied for each level of rating (i.e., low=1, high=3).

**Step 3: Identifying the relevance of each life cycle phase**

In the third step of the SHSA, life cycle phases are compared to each other. This can be done based on available life cycle information within scientific studies completed on the product or service. For this step, the life cycle phases themselves are given a score from 1 to 3.

**Step 4: Identification of Sustainability Hot Spots**

To identify Sustainability Hot Spots of a product or service, the scores from Step 2 and Step 3 are multiplied. Combining the scores from the two steps highlights relevant aspects that currently occur in relevant life cycle phases. The Hot Spots are represented by the scores “6” (e.g., aspect relevance 2 x life cycle phase relevance 3 = 6) and “9” (3x3=9).

**Step 5: Stakeholder evaluation and Verification**

As a final step, stakeholders review the various process steps and results. By including a stakeholder review, the SHSA ensures that the analysis results are robust and accurate.

**Application**

The SHSA is applied at a product or service level. Besides the application in scientific studies for many years, in recent years several companies have applied the SHSA method and conducted ecological and social HSA (Liedtke et al. 2010, Bienge et al. 2010). The Pro Planet Label translates SHSA results for consumers (REWE Group 2014). A simplified HSA has been developed for the design process (Liedtke et al. 2013).
Expected Outcome and Impact
The results of the tool are expected to encourage an improvement in the sustainability performance along the product life cycle. The expected outcome is a high level prioritization of the aspects most material to the product or service. It is expected that additional analysis (e.g., MIPS, LCA) are required to provide quantitative results (Liedtke et al. 2010, Bienge et al. 2010).

Target Audience
The target audience of the SHSA are decision makers along the product or service value chain. The SHSA identifies significant aspects of a product but can’t be used to compare various products or services. Companies looking to use the SHSA will need to have some prior knowledge of scientific literature.

Stakeholder Involvement
Stakeholders are included in the final stage of the SHSA. They review the overall process and results to verify that analysis results are robust and accurate (e.g., production process, identified literature and facts, hot spot identification).

Funded By
The Sustainability Hot Spot Analysis was developed by the Wuppertal Institute for Climate, Environment and Energy (Germany) in collaboration with triple innova, and Collaborating Centre On Sustainable Consumption and Production.

References (if Desktop Research)


DATE: 9 September 2014
VERSION #: 3
The Sustainability Consortium (TSC)

Information derived from:
☐ Interview
☒ Desktop Research

Summary completed by: Sofia Khan (UNEP Research Volunteer)

Description

The Sustainability Consortium (TSC)
The Sustainability Consortium is an independent organization of diverse global participants working together to make the world more sustainable through better products, services and consumption. The Sustainability Consortium develops and promotes science and integrated tools to improve informed decision making for product sustainability throughout the entire product lifecycle across all relevant consumer goods sectors.

The Sustainability Consortium has over one hundred member organizations from businesses, NGOs, governments and academia representing over $1.5 trillion in revenue. TSC is jointly administered by Arizona State University and University of Arkansas with additional operations at Wageningen University & Research Centre in the Netherlands and Nanjing University in China.

The Sustainability Measurement and Reporting System (SMRS)
The Sustainability Measurement & Reporting System (SMRS) is a globally-applicable standardized framework to measure and report sustainability-related impacts across the product value chain. It draws on the best available life cycle assessments (LCA) and other sustainability studies to create tools for business decision-makers and other users to drive sustainability improvements in product value chains. In the current phase of development, the tools delivered under the SMRS program are focused on manufacturer-to-retailer communication of supply chain sustainability performance and management.

With the SMRS, companies can improve the quality of decision-making about product sustainability. This enables companies to design better products, effectively manage the sustainability of upstream supplies and suppliers, and communicate product sustainability improvements to customers and other stakeholders.

SMRS covers the full breadth of consumer product categories. The research and analysis is completed at a category level, identifying a set of hotspots and improvement opportunities that apply to the products within the category. The SMRS category definitions were based on an original mapping using the GS1 GPC Brick classification system and have been combined and/or disaggregated so that each category is sufficiently homogeneous as to allow a consistent analysis.

Because SMRS operates at a category-level, it does not support direct comparison between individual products (e.g. can of Coke versus can of Pepsi) but it helps business and other decision-makers target the main sustainability hotspots in a category with targeted improvement efforts (e.g. packaging recycling and water consumption in carbonated beverages).

SMRS covers a broad basket of social and environmental impacts across the full product lifecycle with a stakeholder-developed impact classification system that draws on life cycle assessment and other disciplines. The classification system uses a three-level structure with specific impact categories (e.g., eco-toxicity, particulate matter) that may occur in one or more domains (e.g., freshwater, workers) under general impact groups (e.g., ecosystems and biodiversity, health and safety). For the convenience of business decision-makers, there is also a linked secondary simplified classification that allows for high level summaries ("Snapshots") of impacts and opportunities (e.g. climate and energy, water).
SMRS is TSC’s primary project to fulfil its mission to:

*Design and implement credible, transparent and scalable science-based measurement and reporting systems that will drive a new generation of innovative products and supply networks that address environmental, social and economic imperatives*

SMRS is governed by its Charter. This sets out the major requirements of SMRS:

**Opportunity Statement**

*Business decision-makers often do not have a common understanding of the critical sustainability issues at the product category level. There is often a lack of knowledge of which best practices are most relevant and actionable and there is no consistent process for self-assessment and communication of progress along the supply chain.*

**Programme Goal**

*Develop tools to support informed decision-making by businesses and other organizations so they can measure, communicate and improve the sustainability performance of consumer products consistently across all categories and right across the value chain.*

**Programme Requirements**

*TSC program requirements are based on the general principles from ISO 14020 - Environmental Labels and Declarations. The SMRS program and outputs must:*

- Be scientifically-based and sufficiently thorough and complete;
- Be based on evidence that is accurate, verifiable, and relevant;
- Cover all relevant aspects of a product life cycle and all relevant sustainability impacts;
- Not obstruct innovation or international trade; and
- Be developed using a transparent, participatory multi-stakeholder process that strives for consensus; and
- Outputs must be accessible and usable by non-scientific audiences and be easy to implement by retailers and manufacturers.

The SMRS has four main outputs. TSC is exploring how SMRS can be expanded to deliver other outputs & tools for different audiences and purposes. The four outputs can be summarized as follows:

<table>
<thead>
<tr>
<th>Output / Tool</th>
<th>Short Description</th>
<th>Audience</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dossier</td>
<td>An online library of all the relevant published research and expert input on hotspots and improvement opportunities in a product category.</td>
<td>Sustainability experts in business, NGOs, governments and other organizations</td>
<td>To act as a reference guide and research resource for sustainability experts</td>
</tr>
<tr>
<td>Category Sustainability Profile (“CSP”)</td>
<td>An online reference document that categorizes the hotspots</td>
<td>Sustainability experts in business, NGOs, governments and other</td>
<td>To act as a reference guide and research resource for sustainability experts</td>
</tr>
</tbody>
</table>
The SMRS methodology includes the following steps:

- Once the product category has been defined, TSC researchers complete a literature review to gather published scientific studies on product sustainability impacts in the lifecycle of the product category. This could include product life cycle assessment or foot-printing studies, environmental product declarations, factory audit reports/certifications, other scientific research, etc. Each study is scored for quality and coverage of geographies, processes and sustainability impacts. The literature review is augmented by expert input from TSC members and other invited experts through webinars and online wiki-style contributions. This content forms the basis of the Dossier.

- Once the literature review is complete, TSC researchers run a semi-automated “decision tree” process. This process considers the volume and quality of evidence, along with the strength of any conflicting evidence, to produce a long list of social & environmental hotspots for the category.

- The long-list of product category hotspots is then passed through a materiality filter. Hotspots that are known to make up less than 10% of the total impact in a given impact category are excluded.

- [Note: TSC has explored 2 other prioritization methods but has discounted both at present:

  - Introducing a materiality cut-off across all product categories for a particular impact. The data coverage is insufficient to do this for all impact categories e.g. it is not possible to make a consistent scientific evaluation of the relative importance of worker rights issues in e.g. cotton T-shirts versus plastic toys.

  - Introducing a materiality cut-off across all impact categories within a product category e.g. in carbonated drinks, determining whether GHGs from packaging production is more/less important than water consumption in beverage-making. LCA and other methods often make trade-offs between these sorts of impacts but these are typically based on expert judgment or stakeholder consensus rather than being empirically derived. These are often valuable but TSC’s view is that it is better to leave this sort of prioritization to the implementation phase of the work. Other methods are being developed elsewhere.]
to do this (e.g. analyses of remediation cost) but these are not yet sufficiently developed to be ready for implementation at TSC’s scale.]

- The hotspots, plus any associated improvement opportunities, issues and guidance are collated, ready for development of the 3 other outputs by TSC researchers:
  1. The Snapshot is developed, using hotspot and improvement opportunity information, re-written for non-scientific audiences
  2. The list of 10-15 KPIs is developed, according to the following 5 criteria:
     o **Answerable and actionable**: KPIs must be answerable and actionable by tier 1 suppliers of the retailers. This criterion can be used to further prioritize hotspots, if required
     o **Linked to key initiatives**: Where there’s a widely-accepted initiative already targeting a particular hotspot, TSC will adopt that KPI where feasible
     o **Outcome-oriented**: KPIs should drive action and should therefore focus on measuring outcomes. In some cases, this means using quantified metrics to measure actual impacts and in others it means using qualitative metrics to assess management systems e.g. manufacturing GHGs, water and worker health & safety typically use quantified metrics but worker rights and upstream activities typically assess management practices
     o **Consistent**: TSC takes a product category by category approach in SMRS but will use the same KPI for similar hotspots in different product categories e.g. the KPI for GHG emissions from manufacturing can be used in different categories, even though the underlying manufacturing processes may be different. This improves consistency and answerability for larger organizations with diverse product sets
     o **Differentiating**: KPIs are written to differentiate between best practice, average performance and poor performance
  3. Finally, the CSP is developed by collating hotspots, improvement opportunities, issues, guidance, KPIs and references into a single document

- The Snapshot, KPIs and CSP go through a review process with multi-stakeholder working groups of TSC Members and other invited experts. These working groups check for comprehensiveness, robustness, understandability, errors and against the other requirements of the system. Working groups always strive for consensus decision-making with TSC COO and then TSC Board having resolution and decision-making rights in the event of a lack of consensus

- The production process ends with a final quality assurance and sign-off step, led by the TSC COO. Once approved, final versions are released to Members and other users

- TSC has a commitment to continual improvement of SMRS. A change control process is used to correct any minor errors as they are identified. Additionally, a new product category goes through a full review and update process within 12 months of first publication and then every 2-3 years thereafter.

**Application**

TSC’s work covers 100+ product categories across 9 industry sectors namely: Clothing Footwear and Textiles, Electronics, Food Beverage and Agriculture, General Merchandise, Home and Personal care, Paper Pulp and Forestry, Packaging, Logistics and Toys.

A full list of completed categories can be found here: [http://www.sustainabilityconsortium.org/product-categories/](http://www.sustainabilityconsortium.org/product-categories/)
Target Audience and Expected Outcomes

There are a wide range of potential audiences for the SMRS tools. The main audiences can be summarized as follows:
<table>
<thead>
<tr>
<th>Target Audience</th>
<th>Target Outcomes</th>
</tr>
</thead>
</table>
| Sustainability Teams in Retailers, Brands and other Supply Chain Participants   | • Use the portfolio of SMRS tools to develop a consistent understanding sustainability issues across their entire product portfolio to set strategy, understand supply chain risks, find supply chain savings opportunities and identify new markets for sustainable products  
  • Provide support other business functions, including information from Snapshots, CSPs and KPIs                                                                 |
| Retailer Buyers / Merchants                                                    | • Use Snapshots to understand sustainability issues in the supply chains of the products they buy & sell  
  • Use KPI information from suppliers to identify best practices, to work with suppliers to set targets, to track improvements over time and to report success stories |
| Supplier Sales Teams                                                           | • Use Snapshots to understand sustainability issues in the supply chains of the products they sell  
  • Use KPIs to self-assess performance and to identify improvement opportunities in their own organization and in upstream suppliers  
  • Use KPIs to report performance, plans and improvements to corporate customers and other stakeholders |
| Other Business Audiences e.g. product design, operations, logistics, etc.       | • Use CSPs, Snapshots and KPIs to identify, prioritize and implement sustainability improvements                                                                                                                                 |
| NGOs / Civil Society                                                            | • Use the portfolio of SMRS tools to identify campaigning and corporate-partnership opportunities                                                                                                                                 |
| Governments / Regulatory Bodies                                                | • Use the CSPs and Snapshots to prioritize government initiatives, funding opportunities, fiscal incentives and other programs                                                                                                                                 |
| Academics / Research Organizations                                             | • Use the portfolio of SMRS tools to collaborate with TSC on related research into company and industry progress and other tools to support sustainability improvements                                                                 |

**Stakeholder Involvement**

The SMRS is a multi-stakeholder initiative managed by TSC researchers. Researchers facilitate multi-stakeholder working groups of TSC’s Members and other invited experts to review and agree outputs. These groups include representatives from business, NGOs/civil society, governments and academia. Working groups always strive for consensus decision-making with TSC COO and then TSC Board having resolution and decision-making rights in the event of a lack of consensus.

The SMRS process us ultimately governed by TSC’s Board. The make-up of the board reflects TSC’s multi-stakeholder approach. Current Board Members come from the following organizations:

- **Business (5 seats):** Walmart, Mars, Unilever, BASF, MillerCoors
- **NGO/Civil Society (2 seats):** Care International, Environmental Defense Fund
- **Academic (4 seats):** University of Arkansas, Arizona State University, Wageningen University & Research Centre, Nanjing University
Other stakeholders are listed on TSC’s website (http://www.sustainabilityconsortium.org/members) and include:

- Retailers: M&S, Kroger, Ahold, McDonalds, Disney, Delhaize, Darden, Walmart
- Suppliers: P&G, Coca Cola, PepsiCo, Unilever, Mars, BASF, MillerCoors,
- Service Providers: GS1, SAP, PE International, PRé Consulting, Quantis
- NGO/Civil Society: WWF, World Resources Institute, NRDC, CDP, The Nature Conservancy, Care International, Environmental Defense Fund
- Government/Regulatory: US EPA, UK Defra
- Academic/Research: SIK, Fundación Chile, University of Arkansas, Arizona State University, Wageningen University & Research Centre, Nanjing University

Funded by

The SMRS program is funded through a mix of sources:

- Annual Membership Fees paid by Members (NGOs typically make in-kind contributions of time and expertise)
- Government and Foundation Grants
- Licensing income through content-licensing partnerships

References (if Desktop Research)
http://www.sustainabilityconsortium.org/

DATE: 19th August 2014
VERSION #: 3.0
US EPA Hotspots Project

Information derived from:
☒ Interview
☐ Desktop Research

Date of Interview: 1st August 2014

☒ Methodology Developer / Owner
☐ Methodology User
☐ Interested Observer

Interviewed by: Curtis Harnanan, Andrea Smerek, and Sofia Khan

Summary completed by: Andrea Smerek

Description

The United States Environmental Protection Agency is attempting to shift towards managing materials rather than managing waste. In order to create the demand for this shift, there is a need to demonstrate the benefits of addressing all impacts as opposed to compartmentalizing environmental efforts.

The purpose of work is to create demand for life cycle information and to be able to rank all materials, products, and services that are being consumed in the United States by their overall environmental impact. This includes the materials that are being used and the waste being generated throughout the lifecycle.

To move toward life cycle materials management, the Workgroup chose to recommend conducting a few well-chosen demonstration projects to show the value of life cycle materials management and gain greater insight on integrating policies and programs around materials management.

To help identify potential candidates for these demonstration projects, the 2020 Vision Relative Ranking of Materials, Products, and Services Using Selected Environmental Criteria (referred to as the “Relative Ranking Analysis” herein) used the best available data and a multi-factor analytical approach to relatively rank 480 materials, products, and services consumed in the U.S. economy along five environmental aspects:

- Environmental impact (13 different measures)
- Energy use
- Material use
- Material waste
- Water use

These 480 materials included in the analysis were those materials, products, and services (commodities) included in the U.S. Bureau of Economic Analysis’ (BEA) 1998 input–output (I-O) tables as the baseline list.
IO LCA was used in three different ways:

- **Direct impact/resource use/waste** – environmental aspects directly associated with each stage of the life cycle: extraction of raw materials, production, and consumption of products and services. This perspective does not include environmental aspects embedded in a material, product, or service. Using the fluid milk example above, direct water use associated with raw milk would include water used directly to produce raw milk but would not include water used to grow feed grains.

- **Intermediate consumption** – environmental aspects directly associated with materials, products, and services plus embedded environmental aspects at each stage of the life cycle. This perspective provides insights into the environmental aspects that have “accumulated” to a certain point in the life cycle, regardless of whether it is the point of consumption by end consumers (e.g., households) or intermediate consumers (e.g., manufacturers). Using the fluid milk example above, water use associated with raw milk from the intermediate consumption perspective would include water used directly in producing raw milk plus water embedded in the raw milk from sources such as feed grains.

- **Final consumption** – environmental aspects directly associated with materials, products, and services plus “embedded” environmental aspects at the point of final consumption. Unlike the intermediate perspective, the final consumption perspective does not “accumulate” environmental aspects at stages prior to final consumption. Rather, all aspects not associated with final consumption are “passed through” to downstream materials, products, and services. Using the example above, water use associated with fluid milk would include water embedded in that percentage of fluid milk consumed by households. From the final consumption perspective, water use associated with fluid milk that is an intermediate product (e.g., used in the production of cheese) is not counted in the life cycle water use for fluid milk but, rather, is counted as embedded water in the downstream products (e.g., in the life cycle water use for cheese directly consumed by households).

After the initial review was completed, the US GSA talked to the EPA to suggest that they look at where the US government could reduce their procurement impacts. All data acquired from the studies was put into a tool for easier analysis. Currently in the process of converting the tool into open LCA so that it has more flexibility (e.g., so that the end user can put in their own data). A contribution analysis looked at specific sectors to identify what they were buying, and the impacts of those purchases.

This effort is driving how the government can take action to address hotspots. This isn’t just about taking action, but about convening the correct stakeholders.

**Application**
This methodology is applied on a national level.

**Expected Outcome and Impact**
It is expected that this effort will drive a change in procurement through the US government.

**Target Audience**
The target audience for this hotspots analysis is the procurement department of the United States Environmental Protection Agency.
Stakeholder Involvement
One of the hidden goals of this work is to develop a single methodology. After the methodology was peer reviewed, it was used by US General Service Administration. The tool was externally peer reviewed.

Funded by
This effort was funded by the US EPA.

Other Comments
- There is a need to focus on items that come out of analysis.
- There are some issues with data as it is difficult to update it on a regular basis. Currently, data is only being updated every 5 years.
- A hybrid approach works well (i.e., IO LCA with process).

DATE: August 6th
VERSION #: 1
US GSA Supply Chain Hotspots Project

Description

This methodology was driven by Executive Order 13514 and GSA green purchasing goals. EPA prompted the study by pointing out their work on the 2020 report and its applications to GSA. The approach uses EPA’s methodology to focus on the hotspots of green procurement within the U.S. General Services Administration.

The GSA Supply Chain Hotspots project started as a collaboration with the EPA. An Excel spreadsheet tool, developed using an extended environmental input/output (EE I/O) LCA, provides an overview of the top 50 agencies by dollar value of spend. This tool allowed the user to select different agencies and government views to highlight relevant hotspots of green procurement.

For the second stage of this methodology, an I/O LCA was applied to six high impact service/product categories (computer, office furniture, waste management, professional services – management consulting, electronic computer design and services to building and dwellings). GSA evaluated the hotspots for each of these six areas to determine what could be applied to manage them (e.g. standards, ecolabels, switch sector, etc.). The second study used contribution analysis, structural path analysis and also utilized Sangwon Suh’s Comprehensive Environmental Data Archive (CEDA) which used specific GSA purchasing data (turning CEDA to GSA specific tool) this also solved data rights issue which occurred in first study with Carnegie Mellon where GSA was not able to share data (became proprietary to Carnegie Mellon).

Application

National application.

Expected Outcome and Impact

There are several challenges that make it difficult to implement the results of the US GSA Supply Chain Hotspots Project. Challenges include:

- The government has a federal procurement data system. Data is used for many purposes and there are often issues with quality within certain categories.
- Specificity of data can be limiting.
- The list of sectors is broad and it is not always clear what falls under a specific sector.
It is the intention that future revisions to the Hotspots project will utilize a process level (hybrid) LCA. This has yet to occur due to lack of funding.

**Target Audience**

The target audience for this work is the Sustainable Purchasing Subject Matter Experts within GSA. When the methodology was first being developed, it was not clear who would be able to use the resulting method as it wasn’t clear what this method would look like. However, the optimistic intention was for the results to be used by contracting offers and procurement officials.

**Stakeholder Involvement**

There were several challenges that may have been solved with additional stakeholder involvement. These include:
- Clarity at the beginning of the project implementation would have been improved had someone from the EPA been involved from the beginning.
- Procurement officers were not always available during development as it wasn’t the right level of information for them to be reviewing.

**Funded by**

Funded by the United State Federal Government

**Other Comments**

Suggestions for development of Hotspots Methodologies:
- Think about what your goals are. In the private sector, this is often looked at from a risk base. This was purely from a perspective of sustainability.
- Base actions on your goals.
- It is a challenge to determine how to weight impact categories. Guidance in this area is helpful.

*DATE: August 7th 2014*

*VERSION #: 1*
The Water Footprint Assessment Manual

Information derived from:

☐ Interview
☒ Desktop Research

Summary completed by: Keith James

Description

“The water footprint can be regarded as a comprehensive indicator of freshwater resources appropriation, next to the traditional and restricted measure of water withdrawal. The water footprint of a product is the volume of freshwater used to produce the product, measured over the full supply chain. It is a multidimensional indicator, showing water consumption volumes by source and polluted volumes by type of pollution; all components of a total water footprint are specified geographically and temporally. The blue water footprint refers to consumption of blue water resources (surface and groundwater) along the supply chain of a product. ‘Consumption’ refers to loss of water from the available ground-surface water body in a catchment area. Losses occur when water evaporates, returns to another catchment area or the sea or is incorporated into a product. The green water footprint refers to consumption of green water resources (rainwater insofar as it does not become run-off). The grey water footprint refers to pollution and is defined as the volume of freshwater that is required to assimilate the load of pollutants given natural background concentrations and existing ambient water quality standards.” Hoekstra et al (2011).

The Water Footprint Assessment Manual provides a comprehensive set of methods for water footprint assessment. It shows how water footprints can be calculated for individual processes and products, as well as for consumers, nations and businesses, and contains detailed worked examples of how to calculate green, blue and grey water footprints. The manual describes how to assess the sustainability of the aggregated water footprint within a river basin or the water footprint of a specific product and includes an extensive library of possible measures that can contribute to water footprint reduction.

The phases in a water footprint assessment are shown in figure 1, and follow a conventional Deming Cycle.

**Figure 1** Phases in Water Footprint Assessment

Application

Water footprint studies may have various purposes and be applied in different contexts. They may be carried out for the purposes of awareness-raising, hotspot identification, policy formulation or quantitative target setting. A water footprint can also be carried out at different scales for different entities. Common uses for
different groups are as follows:

**Food and agriculture enterprises (individual or associations in the crop, livestock, fisheries, aquaculture and forestry sub-sectors):**

- Understanding a product water footprint (stock-keeping unit, product category, specific market etc.);
- Understanding the water footprint of a process, company unit, whole company or a whole sector;
- Understand business risk;
- Provide product transparency;
- Enable corporate environmental reporting, product labelling, benchmarking, business certification;
- Allow identification of critical water footprint components;
- Enable formulation of quantitative reduction targets.

**Governments, investors and policy-makers:**

- Assess national water scarcity, sustainability of national production, export of scarce water resources in virtual form,
- Understand national water saving by import of water in virtual form, sustainability of national consumption,
- Understand impacts of the water footprint of national consumption in other countries and/or dependency on foreign water resources
- Inform management of water resources at a catchment / regional / national level

**Expected Outcome and Impact**


Over this time there have been a significant number of publications and the concept has been utilised by businesses to inform action. Business users (who are also Water Footprint Network members) include C&A, Coca-Cola, Dole Food Company, McCain, Nestle, SAB Miller, and Unilever.

**Target Audience**

The target audience of a water footprint can be the general public, internal stakeholders, supply chain members, governments or NGOs. This is dependent upon the purpose of the application, summarised above.

**Stakeholder Involvement**

The methodology was developed through utilisation of working groups and a scientific peer review Committee. Following publication of the *Water Footprint Manual* in 2009, all partners of the Water Footprint Network were invited to provide feedback on the manual. In addition, two working groups were formed, consisting of individuals from partners of the Network and invited experts. These focussed on questions around the grey water footprint and water footprint sustainability assessment. Pilot studies were carried out by partners, and the methodology subsequently developed was reviewed by the Scientific Peer Review Committee of the Water Footprint Network.

**Funded by**

The development was initially funded via UNESCO-IHE. Subsequent funding is through the Water Footprint Network, a non-profit international network.
Other Comments

The methodology is publicly available alongside a range of raw data and tools which enable users to identify the water footprint of different entities, including the WATERSTAT database, which includes information on water footprint statistics for products and nations and statistics on water scarcity, international water flows and water pollution. These are available at http://www.waterfootprint.org/?page=files/home

References (if Desktop Research)


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VERSION #: 2
Water Quality Association (WQA)

Information derived from:
☐ Interview
☒ Desktop Research

Summary completed by: Curtis Harnanan

Description

WQA assembled a Working Group of manufacturers and other key stakeholders. This Working Group utilized the following approach (initially developed for WQA) to identify and prioritize attributes for inclusion within drinking water treatment systems (including activated carbon filters) as well as other WQA product focused sustainability standards. While drinking water treatment products (e.g. activated carbon filters) are used to illustrate some of the steps below, the process is analogous for other WQA product categories.

(a) Develop preliminary insights on value chain heat map to be used in a hot spot analysis via a review of existing literature, manufacturer interviews, as well as a review of existing standards.

(b) Evaluate preliminary results of hot spots to determine whether or not additional information is required for the preliminary insights on value chain heat map before moving on the decision point to achieve agreement on the hot spot priorities. If there is insufficient information and no agreement on the hot spot priorities from the review of existing literature, manufacturer interviews, and existing standards, then

(i) collect primary data; and
(ii) conduct and scoping level LCA to re-evaluate, weight, and prioritize the hot spots on the value chain “heat map”.

(c) Draft the scoping document from the final selection of attributes for inclusion in the standard.

(d) Engage stakeholders to evaluate the scope for the standard.

(e) Draft the standard based on stakeholder input and final selection of attributes from the value chain heat map.
(f) Engage stakeholders to evaluate the contents of the draft Standard.

(g) Pilot the resulting draft Standard to determine if it reflects the intent of the scope:

(i) If the draft Standard does not reflect the intent of the scope, then re-evaluate and adjust the Standard.

(ii) If the draft Standard does reflect the intent of the Standard, then finalize then publish the Standard for use.

Additional details of the hot spot analysis steps are provided below.

**Literature review to identify preliminary hot spots**

A first set in identifying attributes drinking water treatment products involved a review of existing life cycle-based studies/reports in the public domain and insights from PE INTERNATIONAL’s Life Cycle Assessment (LCA) experts supported with information from the company’s GaBi database and an examination of internal (confidential) LCAs and other reports/studies/data commissioned by the manufacturers and component suppliers on the Working Group. Some of the literature reviewed for the WQA’s point of use (POU) activated carbon filters included:


**Manufacturer interviews to identify preliminary hot spots**

Another key contribution to the hot spot analysis involved interviews with selected manufacturers. Each manufacturer was asked to rank the level of importance (i.e., high, medium, or low) of addressing each of impact across the five life-cycle stages of the product category. The results of the literature review, stakeholder interviews, as well as review of other existing standards were aggregated into a heat map to graphically provide a preliminary view into priority environmental impacts and stakeholder concerns.

**Summary of Preliminary Results in Heat Map**

A score (i.e., high=3; medium=2; low=1) was then assigned to each of the sustainability issues discussed in the reports/studies/interviews to assess the urgency, magnitude, materiality, and breadth of the issue to the product’s value chain and stakeholders. The average scores from each source were used to produce three separate value chain heat maps representing each of the different types of information listed above. Finally, a summative heat map including data from all sources was created to demonstrate the product’s overall life cycle hot spots.

In an effort to improve the quality and relevancy of the information used in the standard, internal life cycle assessment (LCA) experts at PE INTERNATIONAL Inc. reviewed the heat map containing the aggregated results from the hotspot analysis. In addition, the Working Group discussed and further prioritized and identified impacts to be included and addressed within the scope of the sustainability standard.

**Evaluation of preliminary results of hot spots to determine whether additional information is required**

The Working Group then reviewed these results to assess whether or not there was sufficient information and agreement in order to prioritize the hot spots and select attributes for the standard. Upon review of the literature, the Working Group determined that a separate LCA, as defined by ISO 14040 and ISO 14044, was warranted for activated carbon production, since this contributed to be the most significant impact for
activated carbon filters.

**Life cycle assessment to validate and supplement preliminary results of hot spots**

PE INTERNATIONAL conducted a screening-level life cycle assessment (LCA) on activated carbon in order to obtain the necessary information to validate and supplement preliminary results of the hot spots analysis. The LCA research involved collecting primary data as well as literature on activated carbon in several jurisdictions. This data was then input into advanced LCA modelling software to determine how each life cycle phase influences various environmental impact categories. Potential environmental impacts arising from the life cycle of activated carbon under the various scenarios were considered.

The results of the LCA were used to validate the preliminary results from the hot spot analysis, to adjust ranking/prioritization of impacts, and to identify additional impacts. The results of this LCA was also used to develop a separate WQA sustainability standard for activated carbon (WQA S-802). It is important to note that this LCA was high-level and the intent of it was to inform the scoping and weighting of this Standard and was not intended to be a full activated carbon industry wide ISO 14044 compliant LCA study. To date, WQA has not conducted additional LCA as hotspots analyses conducted on other product categories sufficed to provide the necessary information to identify, prioritize and select attributes for other modules (sections) of the sustainability standards.

**Re-evaluation, weighting, and prioritization of hot spots**

The Working Group acknowledges that the methodology in determining the weighting of the Standard, while rooted in science, required some level of subjectivity. Where necessary, value judgments were informed by input from a broad spectrum of key stakeholders. In the development of this Standard, the Working Group also sought out input from a broad spectrum of key stakeholders. These stakeholder groups included representatives from the following sectors: manufacturers, suppliers, retailers, academia, government agencies, and non-governmental organizations.

**Selection of final set of attributes for the Standard**

The final set of attributes for the sustainability standard were derived from the overall life cycle screening (including the hot spot analysis, weighting) stakeholder input, agreed-upon principles, as well as discussion and professional judgment of the Working Group.
Application

Product Category: drinking water treatment units (including: activated carbon filters, activated carbon, ultraviolet filters, dispensers and drinking fountains...it will also include reverse osmosis systems, ion exchange, resins, etc.)

Expected Outcome and Impact

To identify and prioritize life cycle sustainability impacts of WQA’s product categories as a means to select appropriate attributes and criteria that would form the core of WQA sustainability standards.

Target Audience

WQA’s sustainability standards Working Group members as well as key value chain stakeholders (see Stakeholder section below)

Stakeholder Involvement

Working Group: WQA, PE INTERNATIONAL and several drinking water treatment product manufacturers. More recently the American Society of Plumbing Engineers (ASPE) has become a stakeholder to help with the ANSI accreditation process for the WQA sustainability standards.

The Working Group also sought out input from a broad spectrum of key stakeholders. These stakeholder groups included representatives from the following sectors: manufacturers, suppliers, retailers, academia, government agencies, and non-governmental organizations.

Participant stakeholders included: Iowa Department of Public Health, American Water Works Association (AWWA), School of Packaging, Michigan State University, USDA BioPreferred Program, Pentair, Target, Canadian Tire, 3M, Amway, Multipure and Carbon Resources.

Funded by

WQA

References (if Desktop Research)

PE INTERNATIONAL and internal documentation of methodology

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