



**QUEEN'S
UNIVERSITY
BELFAST**

Is the whole more than the sum of its parts? Challenges and opportunities for a holistic consumer-friendly sustainability label on food

Futtrup, R., Tsalis, G., Pedersen, S., Dean, M., Benson, T., & Aschemann-Witzel, J. (2021). Is the whole more than the sum of its parts? Challenges and opportunities for a holistic consumer-friendly sustainability label on food. *Sustainable Production and Consumption*. Advance online publication. <https://doi.org/10.1016/j.spc.2021.08.014>

Published in:
Sustainable Production and Consumption

Document Version:
Peer reviewed version

Queen's University Belfast - Research Portal:
[Link to publication record in Queen's University Belfast Research Portal](#)

Publisher rights

Copyright 2021 Elsevier.

This manuscript is distributed under a Creative Commons Attribution-NonCommercial-NoDerivs License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits distribution and reproduction for non-commercial purposes, provided the author and source are cited.

General rights

Copyright for the publications made accessible via the Queen's University Belfast Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The Research Portal is Queen's institutional repository that provides access to Queen's research output. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact openaccess@qub.ac.uk.

Open Access

This research has been made openly available by Queen's academics and its Open Research team. We would love to hear how access to this research benefits you. – Share your feedback with us: <http://go.qub.ac.uk/oa-feedback>

Is the whole more than the sum of its parts? Challenges and opportunities for a holistic consumer-friendly sustainability label on food

Rebecca Futtrup*¹, **George Tsalis**¹, **Susanne Pedersen**¹, **Moira Dean**², **Tony Benson**², **Jessica Aschemann-Witzel**¹

¹ MAPP Centre - Research on Value Creation in the Food Sector for Consumers, Industry and Society, Department of Management, Aarhus University, Fuglesangs Allé 4, 8210 Aarhus V, Denmark.

² School of Biological Sciences - Institute for Global Food Security, Queen's University Belfast, Belfast, 19 Chlorine Gardens, United Kingdom

* Corresponding author: E-mail address: refuga@mgmt.au.dk, Phone +45 871 654 08

Keywords

Sustainability Labelling; Consumer Behaviour; Food Policy; Qualitative Expert Elicitation; Future scenarios; Interviews

Author contributions

RF, GT, SP and JAW developed the design and methodology with input from MD and TB. RF, GT, and TB conducted the interviews. RF, GT and JAW wrote the first draft. All authors contributed to the writing of the manuscript, made substantive intellectual contributions to the scientific content and approved the final manuscript.

Declaration of interests

We declare no competing financial interests.

Acknowledgements

The authors would like to thank Stine Cecilie Mangaard Sarraf for her assistance in conducting expert interviews.

Funding

The study was funded by the European EIT FOOD project 'Building a business model to enhance consumer trust and influence decision making using a sustainability transparency labelling system', 2020, grant no. 20282.

Abstract

How to enable more widespread sustainable food choice and diets is an unresolved challenge. A consumer-friendly sustainability labelling scheme ‘holistically’ encompassing all sustainability aspects ‘in one’ might be a way forward, but this idea entails both opportunities and challenges, not least given that this requires a common understanding of what sustainability is, and which sustainability dimensions need to be communicated. We address this global problem through qualitative expert elicitation, interviewing sustainability and labelling experts from academia, think tanks and non-governmental organisations, food producers, the retail sector, and governmental bodies about the steps to consider and the challenges and opportunities entailed. Our findings reveal mixed arguments for and against a holistic sustainability label. Experts suggest that consumers and food sector stakeholders appear to be ‘ready’ for and perceive such a label as a desirable tool. Nevertheless, unanticipated consequences could potentially hamper its impact, and challenges are the complexity of the issue, the lack of data, and that it is unlikely sector stakeholders can agree. We conclude that the most important aspects to improve effectiveness are the information content allowing to compare to alternatives, a consistent application on all products through mandatory labelling, and coupling implementation of a label within a broader supportive policy mix. We discuss four different policy scenarios that each show how the opportunities and challenges can play out in different potential routes from here.

1. Introduction

The sustainability domain has been receiving an increasing amount of attention from governments, organizations, and practitioners as well as academic institutions and consumers internationally. This is not least since the United Nations' sustainable development goals (SDG) have become broadly discussed in society (United Nations, 2018). This increasing focus is spurred by the growing worldwide awareness of the dire ramifications of human consumption on the planetary ecosystem (Steffen et al., 2015). Food consumption in particular constitutes an area of intense interest both due to its paramount importance for human sustenance, and to its profound impact on natural resources and the environment, as it contributes to approximately 20-35 percent of greenhouse gas emissions with approximately 3.3 gigatons of CO₂ emissions (Foley et al., 2011; Garnett, 2011; Graham-Rowe et al., 2019).

The definition of sustainability is broad and refers to a system that “*meets the needs of the present without compromising the ability of future generations to meet their own needs*” (UN Commission, 1987). However, sustainability is in continuous conceptual expansion and incorporates new dimensions across time (Ehgartner, 2018). What stakeholders consider as the implications of this definition on a product level differs both across actors in the food value chain, i.e. farmers, retailers, governmental agencies, and among consumers (Leach et al., 2016). Consequently, to translate sustainable production and product characteristics into a sustainability label, the discrepancies relating to the dimensions of sustainability have to be addressed (Garcia-Herrero et al., 2019).

Food labelling is a demand-side policy instrument supporting voluntary individual consumer behaviour change. It is typically based on standardized third-party certification and communicated with a label on the packaging. Commonly labels are presented as front of pack labels (FOP). FOPs in the health area indicate health characteristics of the final product. For environmental issues, most certifications ensure the adherence to process standards in the production. Labels can convey information on one or more dimensions of sustainability (in the following referred to as sustainability-related label(ling)), but so far no label encompasses all dimensions of sustainability, i.e. environmental, social, and economic (referred to as holistic sustainability label(-ling) in the following¹). FOP labels aim to address consumers' demand and need for transparency about

¹ Such a label has also been called a multi-level or multi-dimensional label. We chose to call it holistic in this paper to underline that ideally not only multiple but all relevant dimensions are represented.

production related characteristics (Asioli et al., 2020). Labelling is a policy well in line with the goal of consumer sovereignty, where the consumer decides his or her food choices without undue intervention from public authorities (Akenji, 2014; Giesler & Veresiu, 2014).

Application of FOP labels directed towards the individual, responds to the fact that a great share of the impact on the planetary ecosystems is due to affluent consumer lifestyles leaving a large footprint (O'Neill et al., 2018). However, it is important to point out that while sustainability is defined at the system level, labels provide information on a consumer product choice level, and a multitude of product choices as a sum ultimately determine how sustainable a person's diet is. Products are not necessarily per se sustainable or not, but can have a relative contribution. Labels have received renewed attention lately in the wake of the international climate protests that spurred discussion on whether or not a climate label should be introduced. In fact, sustainability labelling is mentioned explicitly in the current EU 'Green Deal' Policy program (European Commission, 2020). There are indications that sustainability-related labels can change consumer behaviour: information on environmental impact (Feucht & Zander, 2018; Hanss & Bohm, 2012), resource use (von Meyer-Hofer et al., 2015), place of production (Lampert et al., 2017; von Meyer-Hofer et al., 2015), as well as socially ethical and responsible behaviours, e.g. fair payment to farmers (Rousseau, 2015), have thus far proven to be effective in evoking favourable consumer responses.

However, there is a profusion of sustainability-related labels and on-pack claims in the food sector (Grunert et al., 2014). A product such as a chocolate bar might exhibit various organic labels, a Fair Trade label, and a palm oil-free label, all at once. A package of fish might carry an MSC or an ASC label, or claim that it is dolphin safe, and a milk container might address animal welfare, fair pay to farmers, and the climate impact of the packaging. This indicates that food sector stakeholders invest in communicating their product on those sustainability dimensions that they consider particularly relevant. Consumers, in turn, exhibit differential preferences to sustainability-related labels not only in accordance with their individual values, beliefs and priorities, but also depending on the type of information these labels convey, the manner in which they do so, and even on the labels' visual configuration (Emberger-Klein & Menrad, 2018; Feucht & Zander, 2018; Li et al., 2018). To reduce consumer confusion, increase harmonization, and improve the impact of labelling, the next step in sustainability labelling might be to convey the various aspects of 'sustainability' in one label. Despite repeated calls for the development of such a holistic label, to date no label represents sustainability holistically with all of its relevant dimensions. The broadest label appears to be organic given that the

principles of organic agriculture and agro-ecology are not only the basis for responsible use of natural resources, but also for amongst others better animal welfare and improved farmers livelihoods (Halberg et al., 2015; IFOAM Organics International, 2020). However, in the market, consumers nevertheless find organic labels combined with many other labels, and tend to narrowly interpret it (as e.g. ‘no use of pesticides’) (Hughner et al., 2007; McEachern et al., 2005), and only a share of organic consumers is aware of the breadth of the concept (Hjelmar, 2011).

We focus on consumer friendly labelling in the sense that it is easy to understand and use, as well as holistic in the sense of reflecting all dimensions of sustainability. We aim to identify points of discrepancy in the application of sustainability labelling that can hinder progress towards more sustainable consumer choices, as well as commonalities that can facilitate such choices. We do so through expert interviews with actors from the retail trade, academia, and organizations such as think tanks. We finalize with a discussion of the alternative policy scenarios that result from our findings. Before describing our methodological approach, the results and their discussion, we draw on the state of consumer research on sustainability-related labels to extract what ‘consumer friendly’ means and which factors influence consumer response to sustainability-related labels. Then, we outline the definitions and dimensions of sustainability to highlight the potential content of a holistic sustainability label.

The paper contributes to the sustainability literature with an in-depth understanding of the role that sustainability labelling can play in meeting global environmental and social sustainability challenges. Furthermore, the paper aims to add insights for policy makers evaluating the options, potentials and pitfalls that can be associated with implementing sustainability labelling that seeks to promote more sustainable consumption patterns in the food area, given its complexity. In this context of international renewed consumer and food sector interest in ‘sustainability labelling’, the aim of this paper is to *‘explore the challenges and opportunities for the creation of a holistic sustainability label’*.

2. Literature Review

2.1 Consumer friendliness according to research on consumer reaction to sustainability-related labels

Research has shown that consumers prefer food labels that combine scientifically-based information (Li et al., 2018) but also reinforce existing beliefs about the products they are placed on (Shewmake et al., 2015). Moreover, consumers prefer accessible labels (Vlaeminck et al., 2014) that communicate

their message effectively (Emberger-Klein & Menrad, 2018), in a simple and easily interpretable manner (Vlaeminck et al., 2014). Nonetheless, simplicity in the configuration of labels can undermine their efficacy (Leach et al., 2016). The visual configuration of sustainability labels can play a role that facilitates information communication. Graded, traffic light, increasing number of stars, horizontally formatted labels provide a visual representation of the degree of the product's ecosystem services, and they appear to be more easily understood by consumers (Feucht & Zander, 2018; Li et al., 2018). However, the simultaneous presence of an array of other visual information on food products, e.g. other labels or nutrition information, creates a cluttered visual environment that can inhibit consumers' attention on sustainability labels and reduce their efficacy (Song et al., 2019). Moreover, consumers favour regulated labels issued by a trustworthy authority (Wakamatsu et al., 2017; Zander et al., 2015; Zepeda et al., 2013). Finally, research identifies more abstract qualities that consumers appear to favour on sustainability labels, such as trendy, appealing and believable (Zepeda et al., 2013).

An array of consumer psychographic characteristics influences their behavioural responses to food products that carry sustainability labels. The degree of consumers' knowledgeability and familiarity with these labels (Cavallo & Piqueras-Fiszman, 2017; Sirieix et al., 2013), as well as their level of awareness of and involvement with environmental issues (Bernard et al., 2015) appear to facilitate favourable behavioural outcomes. Moreover, consumers' social consciousness and concern about societal benefits of climate-friendly consumption (Plank & Teichmann, 2018), their personal value orientation (Zepeda et al., 2013), as well as their degree of scepticism towards sustainability claims (Cho & Baskin, 2018) appear to be factors in their purchase decisions. Some consumers appear to trust any kind of labelling, and therefore exhibit label-seeking behaviour (Janssen & Langen, 2017), whereas others appear to be 'label negators' and express scepticism over labels (Weinrich & Spiller, 2016). Additionally, consumers' attitudes and the associations they make in connection with sustainability-related labels influence their behaviour. Consumers associate sustainability with healthy foods (Cho & Baskin, 2018) as well as with certain brands (Sirieix et al., 2013), and the CSR motives of the brands (Gosselt et al., 2019). Furthermore, consumers appear to associate eco-friendliness with ethicality (Feucht & Zander, 2018). Some researchers note that some consumers pay more attention to the ingredients and nutritional value of the foods they purchase rather than sustainability labels (Mancini et al., 2017) and that they are generally more inclined to react to messages with a social responsibility content than environmental content (Plank & Teichmann, 2018). Moreover, consumers' reaction to labels can be influenced by their degree of price sensitivity

(Bernard et al., 2015; Janssen & Langen, 2017; Xu et al., 2012). Finally, an array of socio-demographic factors play a role in consumer behaviour in the presence of sustainability labels, such as e.g. household income (Van Loo et al., 2014; Vlaeminck et al., 2014), education (Rees et al., 2019), gender (Xu et al., 2012), age (Rees et al., 2019), and degree of urbanism (Pomarici & Vecchio, 2014).

In summary, research on consumer reactions to sustainability-related labels shows that the visual design, the product context and its perception, as well as the legislative basis for the label, influence how consumers perceive it or react to it in terms of purchase. In addition, psychographic and socio-demographic differences in consumer characteristics determine how and which consumers respond to a sustainability-related label.

2.2 The concept of sustainability and dimensions of a holistic sustainability label

The concept of sustainability is defined through the sustainable development definition from 1987 (UN Commission, 1987). This definition notes both the limitations of the planet and the needs of the impoverished, thus explicitly mentions both an environmental and a social dimension. The so-called ‘triple bottom line’ definition introduced in the 1990s (Elkington, 2018) highlighted a third, economic dimension, which is why sustainability is often portrayed as balancing ‘planet, people, profit’. Aspects related to the planet’s ecosystem on the one hand and human needs on the other are also reflected in the 17 UN sustainable development goals decided on in 2015. Within these, there are also goals that address innovation and economic growth (United Nations, 2018) that illustrate the existence of the environmental, social and economic aspects of sustainability.

However, these very broad dimensions entail many aspects, as can be seen from the 17 goals and their sub-targets of the UN SDGs, but also in the well-acknowledged planetary boundaries concept with its nine sub-systems of the earth (Steffen et al., 2015), as well as the eleven social thresholds presented in the safe and just space concept (O’Neill et al., 2018; Raworth, 2017). Given these categorizations are widely acknowledged as important, the question that arises is whether a sustainability label holistically informing on ‘all there is to know’ about sustainability aspects of a product at the point of sale, should convey all of these elements. For food products in particular, however, it could also be the aspects mentioned in the Food and Agricultural Organization’s definition of sustainable diets that could be conveyed. This definition states that sustainable diets “are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resource” (Gold & McBurney, 2010).

An important issue to consider is not only which dimensions and aspects a sustainability label should convey and in which way, but also whether or not and how these should relate to each other, or be given different priority. In discussing sustainability, there has been a debate about whether dimensions can be traded-off against each other or not – also called ‘weak’ versus ‘strong’ sustainability (Beltz & Peattie, 2012). For example, can more social sustainability offset a decrease in environmental sustainability? A common visualization – a triple bottom line with three pillars – has been criticized to suggest just that. Therefore, other visualizations of these three dimensions such as embedded in the so-called ‘wedding cake’ image of the SDGs presented by the Stockholm Resilience Center (Stockholm Resilience Center, 2019) represent economy as based within society, which in turn rests on the biosphere of the planet. This raises the question of whether or not a sustainability label should put higher weight or attention to the latter versus the former dimensions.

3. Methods

3.1 Qualitative expert elicitation

The research presented in this paper is based on a qualitative expert elicitation using a semi-structured design interviewing 24 different experts. Interviewing of experts enables the assessment of experts’ various judgments at a given point in time, aiding decision-making. Gaining understanding of these various judgments allows insights to the viewpoints and nuances that tend to be unavailable in more public forums (Kandlikar et al., 2007; Morgan et al., 1990; Morgan & Keith, 1995). In spite of the sustainability agenda becoming more prominent in the research landscape in the recent decade, there is still much uncertainty related to how sustainability in the food sector is addressed, and how sustainable food consumption is further promoted in the future. With this method, we contribute with nuanced insights into the challenges, uncertainties and potential opportunities for promoting sustainable food choices through a sustainability FOP label.

3.2 Selection of participants

Based on the principles of purposive sampling (Creswell & Clark, 2017), we sought experts with specialized knowledge and experience on the subject of sustainability of food or labelling of food, either through academic work or through their position in relevant NGO’s, businesses, think tanks or as policymakers. Examples of indicators of their expertise are academic publications, involvement in initiatives that seek to promote sustainability in the food sector, or involvement in policy development

related to the subject. The experts were identified through a review of existing grey literature on sustainable food consumption, label development, and on specialized initiatives that seek to promote sustainable food consumption, as well as through the network of the authors. We contacted 30 Danish and European-based experts. Six of the experts declined, resulting in 24 experts accepting the invitation. For a list of the participating experts and their affiliations, see Table 1.

Table 1: Experts participating in semi-structured interviews

Reference code	Affiliation
<u>Academics</u>	
A1	Aarhus University (DK)
A2	Aarhus University (DK)
A3	Aarhus University (DK)
A4	Wageningen University (GE)
A5	Thünen Institute (GE)
A6	University of Oxford (UK)
A7	Anonymous (UK)
A8	Anonymous (UK)
<u>NGO's and think tanks</u>	
O1	CONCITO (DK)
O2	Frej (DK)
O3	Frej (DK)
O4	Danish Agriculture & Food Council (DK)
O5	Organic Denmark (DK)
O6	Organic Denmark (DK)
O7	Barilla Institute (IT)
O8	Anonymous (UK)
O9	Anonymous (UK)
<u>Policymakers</u>	
P1	The Danish Food Administration (DK)
P2	The Danish Food Administration (DK)
<u>Industry</u>	
I1	Arla (DK)
I2	Arla (DK)
I3	Orkla (DK)
I4	Anonymous (BE)
I5	Anonymous (BE)

Note: The organisation is anonymous in cases where the interviewee wished full anonymity.

3.3 Ethical considerations

Ethical approval was obtained prior to the interviews. Furthermore, the experts were informed of the procedure and gave their informed consent to participate before beginning the interview. Experts were offered to read the transcription of their interview, giving them the option either to add comments or to correct potential misunderstandings. Feedback from the experts did not alter our analysis and results. All participants were ensured personal anonymity, as the experts were not participating as individuals instead representing their institutional and organizational context. We accommodated full anonymity – that is, also for the organisation they represented - for the experts requesting it.

As the study took place in March through May 2020 concurrent with the Covid-19 outbreak, all interviews were conducted using either Skype or telephone.

3.4 Interview protocol and analysis

The semi-structured interview guide was developed and reviewed by all authors (see 7. Appendix 1). The interview guide consisted of open-ended questions formulated based on the literature reviewed (see section 1), highlighting several issues of discrepancy related to sustainability and FOP labelling. These include, among others, uncertainties related to potential trade-offs in defining food-related sustainability, the prominent and less prominent dimensions of sustainability, and of what is more or less consumer friendly given the already existing challenges related to the current labelling landscape. These discrepancies ultimately led to a question on whether the challenges can be accommodated, and a question on whether sustainability-related labelling is a desirable and feasible option for promoting sustainable food consumption.

The first two interviews were with two researchers (A1 and A2) and functioned as a pilot test. In extension of this, we changed the order of questions to obtain a better flow. These interviews were retained for analysis given the change in flow did not impact the content. Three of the authors conducted the interviews with a duration from 30 to 90 minutes. The interviews were audio recorded and transcribed verbatim.

We approached the data with the scope of condensation of meaning based on a systematic coding and formulation of themes. For the analysis, we worked with predetermined themes structured by the interview guide, as this is an option for this strategy (Brinkmann & Kvale, 2014). The predetermined themes are as follows 1) perceptions of what is sustainable food and sustainable food consumption, 2) the potential opportunities and challenges entailed in promoting sustainable food with a holistic

sustainability label, 3) deciding on the information conveyed in a sustainability labelling scheme, 4) designing the visual properties of the label, 5) the policy mix and implementation of a sustainability label, and 6) the challenge of unanticipated consequences of a holistic sustainability label (see also Figure).

In line with the common strategy for thematic analysis (see Braun & Clarke, 2006; Brinkmann & Kvale, 2014), all authors read and re-read the transcribed data. This was followed by a common discussion on the patterns each author identified. After this common familiarization with the data, the first author did an in-depth reading of each interview, developing codes. Each code was indicated by up to a few words and given a number to indicate the code across the data and its coherence with the themes included. Focusing on condensation of meaning in the analysis, it is sufficient to only code the passages that can add meaning to the predetermined themes (Brinkmann & Kvale, 2014). Following this process, the coded material was accessible to the rest of the authors for triangulation to promote rigor, comparing the author’s interpretations of the expert viewpoints through discussing how they could optionally cohere with the themes. We sought to obtain validation in the reporting of the findings using expert citations. In terms of saturation, each interview held some unique perspectives. However, after having interviewed the 24 experts, the majority of viewpoints had many regularities and thus we ceased to recruit and interview more experts, in line with Charmaz (2006) notions on data saturation. It is important to note that although experts might differ in the extent of their expertise to one or the other of the topics that were discussed, we treated and weighed all expert contributions equally in the analysis.

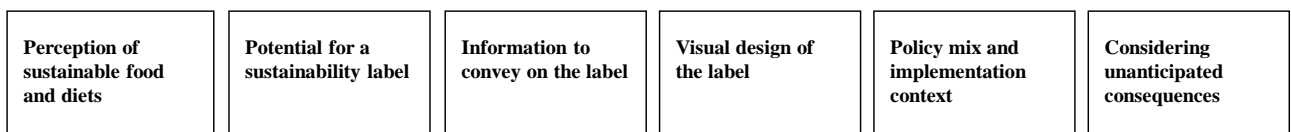


Figure 1: Predetermined themes illustrating the structure of the analysis of expert interviews

4. Findings

4.1 Perception of sustainable food and diets

Common to the experts is that they all endorse the FAO sustainable food definition: *“The best definition I have read and that I can agree with is the FAO definition”* (I1). Yet, this definition is broad, and in terms of addressing global sustainability issues, the lack of a more specific and practical definition is problematic: *“This issue covers many challenges – we don’t have the kind of definition, and we would need that”* (O1). Discussing what sustainable food consumption is, multiple aspects come into play. It emerges as clear that sustainable food consumption is perceived as a manifold and complex issue, as one puts it *“It is a collection box”* (I3), concerning both how food is consumed by the individual and how food is produced and distributed.

In terms of how consumers can consume foods sustainably, besides avoiding food waste, the main objective pointed out by experts relates to diet composition. Diets should be composed of nutritious foods that have lesser impact on the environment:

“Certain product categories are likely to be sustainable, whereas others are less sustainable. If you want to know how to make a diet sustainable, it is eat less meat and more grains and lentils and beans. I mean that’s basically it, on a diet level” (A2).

Experts also emphasize that sustainable composition of diets does not only relate to the environmental impact of the individual food products a diet is composed of, but that the diet sustains human health: *“One cannot really derive neither health nor sustainability from a single product without considering the whole diet – how it adds to health and sustainability. One cannot live off of carrots, just because carrot production does not weigh on the environment”* (I2).

However, according to all of the experts, how the individual composes diets is only a fraction of what eating sustainably is about. Enabling more sustainable food consumption, attention must be directed towards the production and supply chain of foods. Many and diverse factors in the food system determine more or less sustainable products. As the experts pointed out, this is difficult to make sense of for the end-consumer: *“Some (products) are produced using a lot of energy, some with a lot of additives, some result in a lot of waste, some have to be transported by airplane. As a consumer you are lost here”* (A3).

Every food product, and even the same type of product but produced in a different context, creates a distinct impact from manufacturing, production and distribution; and all have different implications for the level of economic, social, and environmental hazard. This makes sustainable food consumption a matter that reaches beyond the individual – it is a food system issue:

“It’s about behaviour where everyone is involved; everyone eats every day, consuming agriculturally-produced products ... There is more to it. It is a huge dilemma about how the whole structure of the food system” (O5)

4.2 Opportunities and challenges entailed in a sustainability label

From the interviews, it appears that the amount of sustainability-related information is overwhelming yet incomprehensible, limiting the majority of individuals in their ability to make efficient choices. Experts believe that the greater majority of consumers are not motivated to an extent that will make them seek sufficient information to delineate this complexity: *“The mainstream consumer won’t care about everything... Nobody knows what is actually the best way to go forward as an individual – a lot of these things are global issues” (A8)*. In this context, a label could be a solution in informing consumers about sustainability aspects at the point of purchase: *“You don’t really have other measures to create the effect, helping people make the decision in the purchase situation” (A1)*. Overall, a common finding is that all experts are in favour of a holistic label, seeing it as a relevant policy measure for delineating this complexity.

One important argument is that in the current renewed societal discussion on climate change, consumers are interested in sustainability and are perceived to be ‘ready’ for such a label: *“If doable, I think a sustainability label would be really good, because consumers really need it” (I2)*. Experts adhere to the idea of developing a holistic sustainability label because they perceive consumers to both want and need a tool that supports sustainable food choices:

“The majority is relatively uninformed of the consequences of food production even though consumers seem to want to act more sustainably... It is important to inform consumers of the environmental impact of their food and drink choices as part of the bigger picture of sustainable behaviour” (A6).

One expert suggests that instead of informing about all sustainability dimensions, an alternative would be to add the most called-for aspect alone – climate impact, thus adding this aspect of

sustainability to the current landscape of labels: *“Climate is a high priority on the sustainability agenda. There is a need for an extra layer adding to the existing claims and labels”* (O1). A recent focus on climate is thought to drive consumers’ readiness for a further and broader label.

4.3 Deciding on the information to be conveyed in a sustainability label

For a label to work intentionally – to help consumers understand which is the sustainable as well as the less sustainable choice in the purchase situation – many experts deemed it as crucial that a label can be found on all products: *“If we do not label all products, then consumers will not have sufficient information to make informed choices when shopping”* (A6). A further point of discussion was which comparison the label should allow consumers to make, related to the question of at which point of the consumption consideration and shopping trip the label should exert an effect. A prominent opinion voiced by the experts was, at it emerged, that the label should allow to find a more sustainable alternative within the category or product type the consumer is looking for, in particular during choice at the point of sale:

“I suppose the fundamental thing is to somehow communicate how sustainable something actually is in comparison to alternatives. Because it is difficult to replace one product with another if it doesn't have the same function in the food system” (A2).

However, even though experts expressed that they would favour a sustainability label, most also expressed doubts, wondering if a holistic label that informs cross-product differences, is realistic:

“Doing this [making calculations and algorithms that allow cross-product comparison] would be so complicated and resource heavy... I believe it is hard and there is conflict of goals, both in terms of science and different interests” (O1).

Experts further raised the question of what knowledge and information to include in a label. There are numerous proxies for sustainability in foods, where some are counterparts and some enhance and reinforce each other:

“So, we have that complexity in terms of methodology development and any product labelling ideally should be founded in science. Right now science is still immature, which makes me quite hesitant to put things on pack, because of course you can always argue that we go for roughly right, but as you go for roughly right, you can end up precisely wrong” (I1).

The common view across the interviews is that the idea of a holistic label is, in spite of being deemed needed and good in theory, also premature and far from specific enough to be practically implemented, and that the trade-offs and the potential consequences are not well assessed yet.

4.4 Visual design of a sustainability label

A general notion is that it is important to consider the options for communicating the message of scope in a simple and intuitive way:

“The logo must be intuitive. For consumers who are making quick purchasing decisions in a supermarket, for example, the logo must be able to be understood very quickly. This is where one of the problems lies: how do we convey complex environmental impact information in a small, intuitive label” (A6)

In this regard, several experts point to well-known and well-functioning labels such as the EU organic label, the keyhole label and the Nordic swan, underlining that these are labels that are successful in getting consumer attention. These are simple visuals and directive labels – they indicate whether a product or its production process is in line with the standard or not, but they do not visually inform about various dimensions, nor the degree to which a dimension is met.

Various experts suggest that a holistic sustainability label should ‘quantify’ the message more: *“A quantitative label visualized on a scale might be more efficient” (A3)*. In favour of this viewpoint, another expert suggests learning from the experience with the EU Energy Label, as it enables comparison across products and embraces a level of complexity, while still deemed intuitive enough:

“A label can only serve its function if people notice it. The tweak is how clear and unambiguous the design is in terms of communicating its message, and that is what can be problematic. Traffic light colours, such as the EU Energy Label, allow more content ranging both negatives and positives on a scale. I would suggest sticking to this, as traffic light colours have shown to be efficient, but make it simpler with fewer levels” (A1).

4.5 Policy mix and implementation context of a label

A majority of experts suggest a mandatory scheme given that full disclosure would support consumers’ ability to compare across products. However, this would not be in the interest of the producers whose products then appear less sustainable. As a result, there are potential conflicts of

interests and opposition among food sector stakeholders towards introducing a mandatory sustainability label:

“Another potential issue with eco-labelling would be in not making it mandatory for all producers.... If it were optional, then it is likely that only the companies whose products already have a relatively low environmental impact would opt to label their products (because it is an additional selling point for their product) and those whose products have a high impact would opt out” (A6).

A mandatory scheme would have the advantage that ‘negative information’ is more effective in terms of consumer reaction and that it enhances exposure and thus familiarity, again supporting label efficiency:

“The advantage that mandatory labelling offers is that both good and bad products are labelled... People react more when labels are also negative... If you want to reach that effect, the label must be mandatory because you won’t get any corporation to voluntarily display a negative label... But if it is mandatory, consumers will be more exposed and familiar” (A1).

In terms of implementing a mandatory scheme, one expert notes that it would take a common EU-based agreement: *“For it to be mandatory, it has to be decided on the EU level” (P2).* Developing a label for the whole European Union can be difficult as e.g. food industry branches in different regions differ in the production systems used, the regulations under which they produce, and their economic importance for the regions, as well as the role that their products play in the dietary composition of the population. : *“The level of CO₂ emissions differ between foods and foods are produced differently in the different regions” (I2).*

Regardless of the regulatory aspects of a labelling scheme, experts underlined that it is important to ensure that there is a common understanding of sustainability across consumers, regardless of the consumer’s individual interest level and as to whether they pay attention to sustainability labels or not. This implies that, as part of the policy mix, education about sustainability needs to accompany potential implementation of a label, as one expert explains:

“Indeed some consumers do not even recognize sustainability logos, but we believe that if consumers are correctly informed about them, that could be a good measure for shaping sustainable consumption. Importantly, pushing the consumer towards healthier and sustainable food choices can only be achieved through a process that encompasses a number of interventions – not only the

establishment and adoption of a logo. This includes education, i.e. bringing knowledge and skills to citizens/consumers, not only information” (O7).

4.6 Considering the unanticipated consequences of a sustainability label

As previously established under the first theme, sustainable food consumption is perceived as manifold, complex phenomenon. At present, experts cautioned that with the knowledge and measures developed, sustainable food consumption and product impact might be too heterogeneous to compile into one label with nevertheless a meaningful effect – not only in terms of consumers actually shifting to buying products with a label, but in terms of measurable overall transition to more sustainable consumption. The interviews indicate a general respect towards the complexity of the issue, making the experts wonder if it is feasible to formulate any essence of the subject into a label that sufficiently supports choice, without it being reductionist, and yet still fact-based:

“You can argue that it [a label] is something desirable, but I am concerned, because science is lacking. So, I think it is an unfortunate reductionist way we risk taking if we start targeting food consumption with labelling that is based on a very reductionist perspective... if we start to label products based on mere assumptions” (I1).

Given what is known about consumer decision-making, a holistic label might not have the desired impact and instead increasing confusion: *“Most of the decisions we make in the supermarket are habitual. They are routine and the amount of information can simply be overkill relative to how planned our decisions are” (O1).* In the current landscape of labels in the market and the number of labels already existing, adding a sustainability label might increase consumer difficulties:

“Well, I think the big problem is that there are so many of them. There is so much information that it's difficult for consumers to find out what is the relevant information and how to interpret that information, so one actually puts quite high pressure on consumers coming up with things that they should be aware of” (A2).

An unanticipated consequence is that the effect may be consumer dependent and thereby might have crude effects, due to various consumer segments. Some consumers are more interested and attentive, and some have more time, money, knowledge, and cognitive resources to look for, understand, and buy labelled foods. Ultimately this might mean that only more resourceful consumer segments will be receptive to such labels, limiting the overall effectiveness:

“Often, labels reach only resourceful people and often they are the ones that already know the most and have resources to consider what products to buy, choose from and pay for. You risk losing the ones that can’t pay for or can’t navigate these labels” (O2).

Therefore, a sustainability label might only work for consumers that are already interested and that already try to consume sustainably. As sustainability labelling might not work efficiently for all and not reach the least resourceful consumer segments, it is crucial to consider alternative interventions:

“Although I think eco-labelling should be mandatory on all food and drink products, and the research and methods to get us to that point are important, I do not think that eco-labelling is the answer to promoting sustainable consumption. I think that other policies will need to be implemented alongside the consumer-facing interventions. For example, availability interventions are extremely effective. Positioning interventions, moving more plant-based products to more prominent places in a supermarket, are also promising. Finally, the most effective intervention would likely be to have all foods reflect their true environmental cost. In this scenario, more environmentally destructive products would cost much more. Much like the health literature, putting the onus on consumers to purchase healthy food while maintaining an unhealthy food environment is not effective” (A6).

A related but positive consequence is that a sustainability food label can have a reinforcing effect that promotes public sustainability discourse and advances consumers’ understanding:

“Some consumers become more attentive and from that attention learn something new. It can lead attention to elements of sustainability they did not consider before and from that, it can function as education too. It’s not the primary goal, rather it’s an unanticipated effect” (A1).

Lastly, the experts emphasized that labelling of products as sustainable can affect sales of certain types of products if the motives behind the purchase are more hedonic. Claiming sustainability can change consumers’ perceptions in a negative direction:

“We have to be careful using such claims. In our category, taste and sustainability do not go well together, and people do not want to compromise taste... It removes what is good in the products” (I3).

Another perspective mentioned by experts is that a sustainability label can result in unjust shunning of categories that, in spite of not being the most environmentally friendly to produce, still can play a certain role in diets:

“A label becomes sort of a double-edged sword if you like. There is an opportunity in terms of recognizing nutritious products but also a risk in terms of animal foods being almost demonized in the debate because it has been very simplified that plant-based is always better. Again, if you eat more vegetables, maybe the dairy in your diet will be even more important” (I1).

In spite of this, a positive effect is that a label can also create incentives for manufacturers to produce more sustainably and thereby promote sustainable development on a wider spectrum of the value chain: *“We also want labels to incentivize us to, or at least to enable us to, convey any re-formulation in what we do” (I4).*

5. Discussion

5.1 Main findings in the light of previous literature

We aimed to explore the challenges and opportunities for the creation of a holistic sustainability label. We discuss these below, turning first to the opportunities in terms of drivers and requirements for effectiveness, and then to the potential challenges and trade-offs that need to be solved.

5.1.1 Opportunities: drivers and factors needed for effectiveness

The presented results show that experts highlight that a more holistic, all-encompassing sustainability label could be beneficial, given that consumers as well as stakeholders in the food supply chain see a need and use for it. This proposition is supported by existing literature that acknowledges the multifaceted nature of the concept of sustainability calling for initiatives that address this discrepant understanding and bridge this gap across actors in the food value chain (Garcia-Herrero et al., 2019). Furthermore, the literature points out that the implementation of such a sustainability label may be well received and potentially increase positive outcomes for a broader consumer spectrum by reducing the interplay between different labels that focus on individual sustainability elements (Janssen & Langen, 2017), and additionally inhibit consumers' visual attention (Song et al., 2019).

Experts point to a number of requirements for a sustainability label to be effective and consumer friendly, among others, that the label should be consistently applied to increase familiarity and support learning and integration into habits. Moreover, it should facilitate comparison between alternative products – meaning products that can function as substitutes. Furthermore such a label should be embedded in the broader combination of various policies used to improve the food system and sustainable food consumption, as for example education and taxation. The results are in unison

with findings from the existing literature that point to the above elements as facilitators of consumer choice by activating heuristics (Valor et al., 2014), and promote understanding and trust (Annunziata et al., 2019; Garcia-Herrero et al., 2019; Samant & Seo, 2016).

5.1.2 Challenges: difficulties and trade-offs

However, there are also challenges that emerge from the expert interviews. Primarily, it is challenging to convey complex information in an easy fashion to consumers. There are many aspects of sustainability and their relevance as well as impact can vary between products, producers, supply chains, and even from one product batch to the next. This is further complicated by the vested interests of different parties in the food system and diverging strategic decisions already made by governments, food producers, or interest organizations. Experts suggest that it is difficult to foresee agreement when there is no one ‘universal’ sustainability assessment, and there is a lot at stake for stakeholders. This was not pointed out in previous literature, which can be explained by the fact that this research has mostly looked at consumer reaction or label design questions, but not at barriers to implementation. The findings reflect a discussion in a related field – that of nutrition labelling of foods. For the past decades, a growing body of research has explored which nutrition label formats can best support informed consumer choice, and to which extent FOP nutrition labels can efficiently capture attention, increase motivation, and shift consumer choice (Balasubramanian & Cole, 2002; Ikonen et al., 2020). However, it appears that favourable effects are only minor or are yet to be seen; In addition, there is a diversity of nutrition label schemes and designs on the market. This is not least due to country differences in consumer needs and behaviour, divergent stakeholder power and the fact that stakeholders differ in which labelling scheme they primarily support.

5.2 Limitations and future research

As a limitation, it has to be noted that the expert sample is composed of interviewees mainly from North and Central Europe. This covers, however, European countries in which discussions on sustainability-related labels such as organic or climate, are particularly prominent – Denmark and the UK. The overall challenges and opportunities identified, however, appear to be relevant in other country contexts as well, although the relative importance might differ. Future research might expand the scope to what and how different context requires different considerations. Further, research might distinguish the arguments according to type of stakeholder, as for example through a quantitative

survey. This will help refine the discussion about sustainability labelling schemes and what is needed to reach a cross-European agreement on whether or not this should be considered.

Methodologically, interviewing via Skype or telephone rather than a personal face-to-face interview might have disadvantages such as, for instance, a lower degree of trust and openness, or less depth and length in responding to questions. The interplay between the informant and interviewee can hold important information, also via non-verbal cues that are only truly accessible in real life settings (Brinkmann & Kvale, 2014). However, due to the Covid-19 pandemic, interviewing through Skype or telephone was deemed the best solution.

5.3 Policy implications

The emerging challenges and opportunities appear to paint a mixed picture of the opportunities and challenges of deciding on, designing, and implementing a sustainability label that holistically conveys all needed aspects of sustainability on food products to consumers. In such a situation, different alternative policy options appear to have both advantages and disadvantages.

In order to show the advantages and disadvantages of different choices, we use the experts' considerations from the findings and transfer them to four potential scenarios. The four scenarios are chosen to represent four options along the continuum of 'doing nothing' to 'doing everything' in terms of introducing a holistic sustainability labelling scheme. This serves as an exercise to map out and discuss the potential implications of the findings from the expert interviews.

5.3.1 Scenario 1 – no sustainability label

One policy option is to decide *not* to pursue a holistic sustainability labelling at all. This would have the advantage of not having to solve the trade-offs entailed in having to weigh different dimensions against each other, not having to develop the systems that gather sufficient and timely data in order to obtain satisfactory indicators, and avoiding conflicts between stakeholders with divergent interests. It thus saves resources and time, which in turn could be invested in the potential alternative of improving consumer awareness and knowledge about sustainable dietary choice in general – for example, communicating the advice that a vegetable stew tends to both healthier and more sustainable than a meat-based dish. However, such a policy option would omit using one potential tool to impact consumer choice at the point of sale when comparing seemingly rather similar products on aspects about which the average consumer cannot be expected to be knowledgeable – for example, if the consumer then wants to purchase vegetables for the dish, he or she might wonder if a tomato from Spain is more or less sustainable than one from local Northern European greenhouses. It would

also mean that the current situation of a profusion of labels confusing consumers remains similarly problematic, because there is no overarching sustainability label consumers can turn to instead.

5.3.2 Scenario 2 – a climate related sustainability label

An alternative to the above would be to introduce a sustainability-related label that covers aspects of sustainability that are not yet represented by the sustainability-related labels that consumers are well aware of today. This would have the advantage of filling a gap in the information currently conveyed to consumers, while it would keep using the already established and trusted labels that consumers are familiar with, and the labelling schemes that sector stakeholders have invested in. The potential gap could be a climate label, which is an aspect high on the agenda of consumers, sector stakeholders and governments, supporting faster agreement. A climate label might have better chances of being agreed on in terms of baseline indicators. The disadvantage would be that this strategic choice would not reduce label profusion, but add a label. In addition, this option would not cover all relevant dimensions of sustainability. For example, a consumer might still wonder what the water footprint of the tomato is, and whether the work conditions of the employees in Spain are good enough.

5.3.3 Scenario 3 – a simple ‘either or’ holistic sustainability label

Instead of no sustainability label at all or only adding a label on a particularly called-for dimension such as climate, a further scenario could be to indeed introduce a holistic sustainability label – but a simple and directive one, similar to the successful labels pointed out by the experts. Such a label would be easier to understand for consumers, and they would not need to understand or think about the complex set of sustainability dimensions. Such a logo would also circumvent at least a share of the discussion on how to convey the information visually – it would need no decision as to the number of dimensions, how they relate to each other, or which visual design should show the degree of it being met. However, such a directive logo would be less consumer friendly in the sense of lacking transparency. For example, a consumer could compare different tomatoes in the shop and choose the one with the sustainability logo, but would not know which reasons are behind this tomato being singled out as relatively more sustainable than other alternatives. In addition, this policy option would entail that the trade-offs between and conflicts about the choice of dimensions, their relative weight, and the type of data and indicators used, would still need to be solved by experts.

5.3.4 Scenario 4 – an all embracing holistic sustainability label

Finally, an option would be to go ‘all in’ and introduce a holistic sustainability labelling scheme conveying the different dimensions. This last policy option would, compared to the above, allow a more informed choice, in particular if consumers can access even further information by other means than the FOP on the product package - for instance by incorporating a QR code, a measure some of the experts suggested. While this policy option would allow all the potential opportunities to materialize, it would also be hampered by all the challenges and the unanticipated effects identified through the expert interviews, and likely require time and resources to be established.

6. Conclusions

Sustainability labelling is a very topical and globally relevant issue to consider in meeting the global environmental challenges caused by human activity in the planetary ecosystems. In relation to the aim of this paper – to provide insights on the possibilities and challenges for creating a consumer friendly sustainability label, we have found many arguments and aspects in considering this issue. Our main conclusions are based on what emerges as particularly important across the interviews.

Firstly, we conclude that sustainability labelling of food is regarded as a currently desired policy tool due to the fact that there is both consumer interest and food sector stakeholder support. Secondly, we conclude that the most important aspects that will enhance the effectiveness of this tool are if a) the label conveys information that allows comparing alternative, substitutable products, b) the label is consistently applied on all products, thus mandatory both for products that are relatively more and less sustainable, and c) the label implementation is coupled with other policy instruments in order to improve its efficacy by e.g. educating consumers on sustainable diets and make an impact where the label effect is limited, as e.g. through taxation.

Thirdly, we conclude that even though experts agree that a holistic sustainability label is favourable in principal, they also agree that it is hampered by a range of practical obstacles. These challenges are in particular that a) the complexity of the information to be disclosed is in conflict with a consumer friendly intuitive and simple design, b) the lack of data on sustainability indicators and the variation in the impact between products and supply chains make it too complex to provide correct and updated information to guide consumers, and c) it is unlikely that stakeholders can agree, due to divergent priorities to certain dimensions compared to others and the fact that there are already established labels which various stakeholders have invested in.

Overall, the research shows that there are important arguments that favour as well as oppose the creation of a holistic sustainability label. The findings point to considerations of the labels' potential impact on consumer behaviour, the question of its content, design and implementation, as well as to potential positive and negative unanticipated effects and thoughts on alternative policies. We discuss which policy options could be likely future scenarios. By mapping the advantages and disadvantages of four policy scenarios, we exemplify the implications of the considerations on a potential consumer-friendly and holistic sustainability labelling scheme that emerged from the interviews. The study does not allow conclusions on which policy options are more or less favourable. However, we suggest that the effect of these different policy scenarios likely depends on how they are executed.

6. References

- Akenji, L. (2014). Consumer scapegoatism and limits to green consumerism. *Journal of Cleaner Production*, 63, 13-23.
- Annunziata, A., Mariani, A., & Vecchio, R. (2019). Effectiveness of sustainability labels in guiding food choices: Analysis of visibility and understanding among young adults. *Sustainable Production and Consumption*, 17, 108-115. doi:<https://doi.org/10.1016/j.spc.2018.09.005>
- Asioli, D., Aschemann-Witzel, J., & Nayga Jr, R. M. (2020). Sustainability-related food labels. *Annual Review of Resource Economics*, 12:171-185.
- Balasubramanian, S. K., & Cole, C. (2002). Consumers' search and use of nutrition information: The challenge and promise of the nutrition labeling and education act. *Journal of Marketing*, 66(3), 112-127.
- Beltz, F., & Peattie, K. (2012). *Sustainability Marketing: A global perspective* (2nd ed.): Wiley.
- Bernard, Y., Bertrandias, L., & Elgaaied, L. (2015). Shoppers' grocery choices in the presence of generalized eco-labelling. *International Journal of Retail & Distribution Management*(4/5), 448-468.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Brinkmann, S., & Kvale, S. (2014). *InterViews – Learning the Craft of Qualitative Research Interviewing*: Sage Publications Ltd., Thousand Oaks, California.
- Cavallo, C., & Piqueras-Fiszman, B. (2017). Visual elements of packaging shaping healthiness evaluations of consumers: The case of olive oil. *Journal of Sensory Studies*, 32(1), 9. doi:10.1111/joss.12246
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*: Sage.
- Cho, Y.-N., & Baskin, E. (2018). It's a match when green meets healthy in sustainability labeling. *Journal of Business research*, 86, 119-129. doi:10.1016/j.jbusres.2018.01.050
- Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*: Sage publications.
- Ehgartner, U. (2018). Discourses of the food retail industry: Changing understandings of 'the consumer' and strategies for sustainability. *Sustainable Production and Consumption*, 16, 154-161. doi:<https://doi.org/10.1016/j.spc.2018.08.002>
- Elkington, J. (2018). 25 years ago I coined the phrase "triple bottom line." Here's why it's time to rethink it. *Harvard Business Review*, 25, 2-5.

- Emberger-Klein, A., & Menrad, K. (2018). The effect of information provision on supermarket consumers' use of and preferences for carbon labels in Germany. *Journal of Cleaner Production*, *172*, 253-263. doi:10.1016/j.jclepro.2017.10.105
- European Commission. (2020). A European Green Deal. Striving to be the first climate-neutral continent. Retrieved from https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
- Feucht, Y., & Zander, K. (2018). Consumers' preferences for carbon labels and the underlying reasoning. A mixed methods approach in 6 European countries. *Journal of Cleaner Production*, *178*, 740-748. doi:10.1016/j.jclepro.2017.12.236
- Foley, J. A., Ramankutty, N., Brauman, K. A., Cassidy, E. S., Gerber, J. S., Johnston, M., Mueller, N. D., O'Connell, C., Ray, D. K., & West, P. C. (2011). Solutions for a cultivated planet. *Nature*, *478*(7369), 337-342.
- Garcia-Herrero, L., De Menna, F., & Vittuari, M. (2019). Sustainability concerns and practices in the chocolate life cycle: Integrating consumers' perceptions and experts' knowledge. *Sustainable Production and Consumption*, *20*, 117-127. doi:10.1016/j.spc.2019.06.003
- Garnett, T. (2011). Where are the best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)? *Food Policy*, *36*, S23-S32.
- Giesler, M., & Veresiu, E. (2014). Creating the responsible consumer: Moralistic governance regimes and consumer subjectivity. *Journal of Consumer Research*, *41*(3), 840-857.
- Gold, K., & McBurney, R. (2010). Sustainable diets and biodiversity: Directions and solutions for policy, research and action. *Food and Agriculture Organization of the United Nations, Rome, Italy*, 108-114.
- Gosselt, J. F., van Rompay, T., & Haske, L. (2019). Won't get fooled again: The effects of internal and external CSR ECO-labeling. *Journal of business ethics*, *155*(2), 413-424. doi:10.1007/s10551-017-3512-8
- Graham-Rowe, E., Jessop, D. C., & Sparks, P. (2019). Self-affirmation theory and pro-environmental behaviour: Promoting a reduction in household food waste. *Journal of Environmental Psychology*, *62*, 124-132. doi:<https://doi.org/10.1016/j.jenvp.2019.02.003>
- Grunert, K. G., Hieke, S., & Wills, J. (2014). Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy*, *44*, 177-189.
- Halberg, N., Panneerselvam, P., & Treyer, S. (2015). Eco-functional intensification and food security: Synergy or compromise? *Sustainable Agriculture Research*, *4*(526-2016-37935).
- Hanss, D., & Bohm, G. (2012). Sustainability seen from the perspective of consumers. *International Journal of Consumer Studies*, *36*(6), 678-687. doi:10.1111/j.1470-6431.2011.01045.x
- Hjelmar, U. (2011). Consumers' purchase of organic food products. A matter of convenience and reflexive practices. *Appetite*, *56*(2), 336-344.

- Hughner, R. S., McDonagh, P., Prothero, A., Shultz, C. J., & Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour: An International Research Review*, 6(2-3), 94-110.
- IFOAM Organics International. (2020). The four principles of organic agriculture. Retrieved from <https://www.ifoam.bio/>
- Ikonen, I., Sotgiu, F., Aydinli, A., & Verlegh, P. W. (2020). Consumer effects of front-of-package nutrition labeling: an interdisciplinary meta-analysis. *Journal of the Academy of Marketing Science*, 48(3), 360-383.
- Janssen, D., & Langen, N. (2017). The bunch of sustainability labels - Do consumers differentiate? *Journal of Cleaner Production*, 143, 1233-1245. doi:10.1016/j.jclepro.2016.11.171
- Kandlikar, M., Ramachandran, G., Maynard, A., Murdock, B., & Toscano, W. A. (2007). Health risk assessment for nanoparticles: A case for using expert judgment. *Journal of Nanoparticle Research*, 9(1), 137-156.
- Lampert, P., Menrad, K., & Emberger-Klein, A. (2017). Carbon information on vegetables: How does it affect the buying process? *International Journal of Consumer Studies*, 41(6), 618-626. doi:10.1111/ijcs.12375
- Leach, A. M., Emery, K. A., Gephart, J., Davis, K. F., Erisman, J. W., Leip, A., Pace, M. L., D'Odorico, P., Carr, J., Noll, L. C., Castner, E., & Galloway, J. N. (2016). Environmental impact food labels combining carbon, nitrogen, and water footprints. *Food Policy*, 61, 213-223. doi:10.1016/j.foodpol.2016.03.006
- Li, T., Kecinski, M., & Messer, K. D. (2018). Behavioural responses to science-based eco-labelling: gold, silver, or bronze. *Applied Economics*, 50(39), 4250-4263. doi:10.1080/00036846.2018.1441522
- Mancini, P., Marchini, A., & Simeone, M. (2017). Which are the sustainable attributes affecting the real consumption behaviour? Consumer understanding and choices. *British Food Journal*, 119(8), 1839-1853. doi:10.1108/bfj-11-2016-0574
- McEachern, M., Seaman, C., Padel, S., & Foster, C. (2005). Exploring the gap between attitudes and behaviour. *British Food Journal*(107), 606-625.
- Morgan, M. G., Henrion, M., & Small, M. (1990). *Uncertainty: a guide to dealing with uncertainty in quantitative risk and policy analysis*: Cambridge University Press.
- Morgan, M. G., & Keith, D. W. (1995). Subjective judgments by climate experts. *Environmental Science & Technology*, 29(10), 468A-476A.
- O'Neill, D. W., Fanning, A. L., Lamb, W. F., & Steinberger, J. K. (2018). A good life for all within planetary boundaries. *Nature sustainability*, 1(2), 88-95.
- Plank, A., & Teichmann, K. (2018). A facts panel on corporate social and environmental behavior: Decreasing information asymmetries between producers and consumers through product labeling. *Journal of Cleaner Production*, 177, 868-877. doi:10.1016/j.jclepro.2017.12.195

- Pomarici, E., & Vecchio, R. (2014). Millennial generation attitudes to sustainable wine: an exploratory study on Italian consumers. *Journal of Cleaner Production*, 66, 537-545. doi:10.1016/j.jclepro.2013.10.058
- Raworth, K. (2017). *Doughnut economics: seven ways to think like a 21st-century economist*: Chelsea Green Publishing.
- Rees, W., Tremma, O., & Manning, L. (2019). Sustainability cues on packaging: The influence of recognition on purchasing behavior. *Journal of Cleaner Production*, 235, 841-853. doi:10.1016/j.jclepro.2019.06.217
- Rousseau, S. (2015). The role of organic and fair trade labels when choosing chocolate. *Food Quality and Preference*, 44, 92-100. doi:10.1016/j.foodqual.2015.04.002
- Samant, S. S., & Seo, H. S. (2016). Effects of label understanding level on consumers' visual attention toward sustainability and process-related label claims found on chicken meat products. *Food Quality and Preference*, 50, 48-56. doi:10.1016/j.foodqual.2016.01.002
- Shewmake, S., Okrent, A., Thabrew, L., & Vandenberg, M. (2015). Predicting consumer demand responses to carbon labels. *Ecological Economics*, 119, 168-180.
- Sirieix, L., Delanchy, M., Remaud, H., Zepeda, L., & Gurviez, P. (2013). Consumers' perceptions of individual and combined sustainable food labels: a UK pilot investigation. *International Journal of Consumer Studies*, 37(2), 143-151. doi:10.1111/j.1470-6431.2012.01109.x
- Song, L., Lim, Y., Chang, P., Guo, Y., Zhang, M., Wang, X., Yu, X., Lehto, M. R., & Cai, H. (2019). Ecolabel's role in informing sustainable consumption: A naturalistic decision making study using eye tracking glasses. *Journal of Cleaner Production*, 218, 685-695. doi:10.1016/j.jclepro.2019.01.283
- Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., de Vries, W., & de Wit, C. A. (2015). Sustainability. Planetary boundaries: Guiding human development on a changing planet. *Science (New York, NY)*, 347(6223), 1259855.
- Stockholm Resilience Center. (2019). How food connects all the SDGs. Retrieved from <https://stockholmresilience.org/research/research-news/2016-06-14-how-food-connects-all-the-sdgs.html>
- UN Commission. (1987). Report of the World Commission on Environment and Development: Our common future. *Accessed Feb, 10*.
- United Nations. (2018). Sustainable development goals. 17 goals to transform our world. Retrieved from <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>
- Valor, C., Carrero, I., & Redondo, R. (2014). The Influence of Knowledge and Motivation on Sustainable Label Use. *Journal of Agricultural & Environmental Ethics*, 27(4), 591-607. doi:10.1007/s10806-013-9478-3

- Van Loo, E. J., Caputo, V., Nayga, R. M. N., & Verbeke, W. (2014). Consumers' valuation of sustainability labels on meat. *Food Policy*, *49*, 137-150. doi:10.1016/j.foodpol.2014.07.002
- Vlaeminck, P., Jiang, T., & Vranken, L. (2014). Food labeling and eco-friendly consumption: Experimental evidence from a Belgian supermarket. *Ecological Economics*, *108*, 180-190. doi:10.1016/j.ecolecon.2014.10.019
- von Meyer-Hofer, M., Nitzko, S., & Spiller, A. (2015). Is there an expectation gap? Consumers' expectations towards organic An exploratory survey in mature and emerging European organic food markets. *British Food Journal*, *117*(5), 1527-1546. doi:10.1108/bfj-07-2014-0252
- Wakamatsu, H., Anderson, C. M., Uchida, H., & Roheim, C. A. (2017). Pricing ecolabeled seafood products with heterogeneous preferences: An auction experiment in Japan. *Marine Resource Economics*, *32*(3), 277-294. doi:10.1086/692029
- Weinrich, R., & Spiller, A. (2016). Developing food labelling strategies: Multi-level labelling. *Journal of Cleaner Production*, *137*, 1138-1148. doi:10.1016/j.jclepro.2016.07.156
- Xu, P., Zeng, Y. C., Fong, Q. T., Lone, T., & Liu, Y. Y. (2012). Chinese consumers' willingness to pay for green- and eco-labeled seafood. *Food Control*, *28*(1), 74-82. doi:10.1016/j.foodcont.2012.04.008
- Zander, K., Padel, S., & Zanolli, R. (2015). EU organic logo and its perception by consumers. *British Food Journal*, *117*(5), 1506-1526. doi:10.1108/bfj-08-2014-0298
- Zepeda, L., Sirieix, L., Pizarro, A., Corderre, F., & Rodier, F. (2013). A conceptual framework for analyzing consumers' food label preferences: An exploratory study of sustainability labels in France, Quebec, Spain and the US. *International Journal of Consumer Studies*, *37*(6), 605-616. doi:10.1111/ijcs.12041

7. Appendix 1

Semi-structured interview guide

Part 1: Sustainable consumption and consumer friendliness

Q1.1

From your previous experience, how do you define ‘sustainable food consumption’? If you could mention a few elements, which would you say are essential that consumers consider when shopping for foods?

Q1.2

In extension of the above, what do you think consumers’ understanding of sustainable consumption is, compared to yours as an expert? Aligned or different?

Q1.3

In extension of this, do you find it feasible to transfer this understanding into a label that is consumer friendly, yet complex and multi-dimensional?

Q1.4

Could there be any trade-offs in relation to covering different sustainable aspects as regards a label that is consumer friendly? – if yes, elaborate

Q1.5 – if applicable (expertise dependent)

In your mind, what have we learnt about communicating health and nutrition information to consumers using labels on packaging? Can this experience add to how complex and multidimensional information is communicated in a consumer friendly way?

Q1.6 – if applicable (expertise dependent)

In your mind, what have we learnt about communicating organic/ecological information to consumers using labels on packaging? Can this experience add to how complex and multidimensional information is communicated in a consumer friendly way?

Part 2: labels and their strengths and limitations

Q2.1

What do you think labels should be used for – to remind, inform, nudge, prime, etc.?

Q2.2

Do you have experience developing and/or implementing labels and sustainability labels? If yes – how?

Q2.3

In relation to how you perceive label functions, which role do you find that labels can play in influencing sustainable consumption? Do you find it an important strategy (relatively compared to other policies and measures)?

Q2.4

Do you know if any labels have proved to be more efficient than others?

Q2.5

Have you ever thought whether multi-dimensional labels can be more efficient than several different labels addressing different aspects of sustainability?

Q2.6

Do you find there could be any challenges in adding a sustainability label to packaging and informing through this? If yes – which ones? (negative effects and consequences)

Q.2.7

In a practical view – do you see any possible digital solutions that allow customized personalisation of a label for each kind of consumer (segment) and their various interests and needs?

Q2.8 – if applicable (for industry stakeholders)

What could make a label implementation attractive for your business and how do you think a label can affect your business in terms of sales, consumer relations, strategy etc.?

Part 3: final

Q3.1

To sum up, what do you suggest can be done when designing and implementing a multi-dimensional sustainability label for food packaging?

Q3.2

If you had all the money and power, what would you do to promote consumer choice of sustainable diets?