



Project Title: Roadmap for the Chemical Industry in Europe towards a Bioeconomy

Acronym: RoadToBio

Grant Agreement No: 745623

Start Date: 01 May 2017

Duration of the Project: 24 Months

Deliverable No.	<i>D2.3</i>
Deliverable Title	<i>Public perception of bio-based product – qualitative analysis of stakeholders' concerns</i>
Type	<i>Report</i>
Due Date	<i>30 April 2018</i>
Date Delivered	<i>30 April 2018</i>
Prepared by	<i>Swinda Pfau (lead author) and John Vos – BTG Biomass Technology Group B.V. Christopher vom Berg - Nova-Institut für politische und ökologische Innovation GmbH</i>
Dissemination Level	<i>Public</i>

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1. Executive Publishable Summary

This report was prepared within the context of RoadToBio, which is an EU-funded project in the Horizon 2020 research and innovation programme that aims to pave the way for the European chemical industry towards a higher bio-based portfolio and competitive success based on the benefits offered by the bioeconomy. The project will deliver a roadmap for the chemical industry that will specify benefits as well as barriers towards a bioeconomy to meet the societal needs in 2030.

The visibility of bio-based products in the market and their perception by the public is key to a successful market development of these materials. In a former report, published as deliverable 2.2 (D2.2)¹, we compiled, compared and analysed currently existing research and reports about public perception of bio-based products in order to identify barriers for further market development. This resulted in an overview of consumers perceptions of bio-based products and recommendations how barriers could be tackled.

The goal of this report is to broaden these insights, taking into account not only the perception of consumers, but also additional societal stakeholders relevant for overall public perception. We conducted the research presented in this report in three steps:

- 1) Expert validation of findings on public perception
- 2) Interviews with NGOs
- 3) Interviews with policy makers

We collected feedback on our findings regarding public perception through a joint webinar with three experts and a separate feedback from a fourth expert researching communication about bio-based products. The general impression was that we identified many relevant issues and strategies to approach them. The discussion did help us to further finetune our recommended approaches. Communication about environmental benefits, for example, should be honest and with clear, specific messages based on a case-by-case analysis. Communication should further be focussed on personal benefits and the added values of products that are of personal relevance, such as improved performance or health benefits. Labels are highly appreciated by consumers, but difficult to apply because they are expensive, often unknown and unspecific. Adapting existing labels for use with bio-based products seems a realistic approach.

We then interviewed almost 20 societal stakeholders, including staff from 11 NGOs and 8 policy makers. This qualitative analysis of stakeholders' concerns provided relevant additional insights and we believe that we have achieved our goal of broadening our understanding of public perception of bio-based products.

NGOs discussed a variety of opportunities, concerns and pre-requisites for the further development of bio-based products and a bioeconomy. For example, they are concerned that bio-based products serve as an “excuse” to keep consuming just as much as before and

¹ Deliverable 2.2 can be found on www.roadtobio.eu

that they transfer a green image which does not hold up (e. g. biodegradability, land use issues). They furthermore agreed that bio-based products should have additional benefits, other than the changed resource base, like an improved environmental impact, better performance or reduced toxicity. They also find it important that bio-based products integrate well with the circular economy.

With policy makers, we discussed the importance of public perception, our previous findings and opportunities and concerns regarding bio-based products. Policy makers pointed out that consumers have little knowledge about bio-based products and that misconceptions occur regularly. Their impression was, that consumers are generally neutral – positive about bio-based products. They agreed that public perception is very important for policy making because it can point out areas that require attention, such as confusion over waste treatment options for bio-based products. Policy makers furthermore experienced a discrepancy in the perception of bio-based products by experts and the broader public, where the broader public has a lot less knowledge and experts are believed to have a more positive, but also more differentiated view of bio-based products. It was pointed out that, while good communication is considered important, consumers should not be burdened with the expectation of being sufficiently informed about bio-based products to make informed decisions. Policy makers consider it their task, together with producers, to make it easy for society to move in the right direction, for example by developing clear standards and labels and by arranging good solutions for the recycling and disposal of bio-based products.

Policy makers did not fully agree with some of the concerns described by NGOs. They experienced some of the positions as overly critical, hindering useful developments towards more sustainable products. Furthermore, they described some of the issues that NGOs pointed out as pre-requisites as opportunities. For example, they argued that creating added value can be used for communication and marketing strategies by bio-based producers.

Conclusions

The qualitative analysis of stakeholders' concerns provided a good basis for finetuning our approaches described in D2.2 and to identify additional issues and barriers.

We describe several strategies to communicate about bio-based products. For example, communication should not only focus on the fact that a product is bio-based, but highlight personal benefits, added values (like improved performance) and positive impacts. If the fact that a product is bio-based is to be the unique selling point, communication should be clear about characteristics and impacts, to avoid disappointment due to high expectations and misunderstandings.

When it comes to the knowledge level of consumers it stands out that policy makers find the broader public insufficiently informed about bio-based products. At the same time, both NGOs and policy makers feel that at the moment there is a great responsibility for consumers to be informed regarding bio-based products, which is an unrealistic expectation and leads to confusion. Issues regarding the bioeconomy and bio-based products are too

complex to expect laypeople to grasp them all, while even experts differ greatly in opinion. To tackle this, responsibility for information could be shared better between producers and consumers, not expecting consumers to understand what bio-based means exactly and what consequences this has. Consumers should not be burdened with the task of making the right decisions, both in choosing and disposing of bio-based products. Policy making and communication could focus on making it easy for society to move in the right direction.

Determination of environmental impacts of bio-based products is a debated issue. On the one hand, it is an important aspect in the attitude of consumers, NGOs state that bio-based products should always provide environmental benefits and the desire for proof of environmental impact is generally great. On the other hand, provision of proof is relatively hard to realise, especially for smaller producers, because it requires very cost-intensive analysis on a case-to-case basis. Policy makers experience it as a barrier that there is no coherent framework to assess the environmental performance of bio-based products, but it is not realistic that simple rules of thumb can be developed for the great variety of products. Finally, even though consumers are interested in environmentally friendly products, the fact that a product is bio-based and its specific environmental impact are mainly relevant to a niche market.

We discuss several approaches for the further development of bio-based products, based on some issues brought up by NGOs and policy makers. For example, to integrate bio-based products in a circular economy, producers of bio-based products could collaborate with the waste treatment sectors and policy makers to develop improved waste strategies. It should be made as easy and clear as possible for the consumer in what bin to dispose of bio-based products and packaging materials. Sometimes, societal stakeholders do not agree on concerns or issues. In such cases, policy makers, NGOs and other stakeholders could strive to jointly define goals and develop plans to reach them that are considered realistic by all sides.

2. Introduction

2.1 About RoadToBio

This report was prepared within the context of RoadToBio, which is an EU-funded project in the Horizon 2020 research and innovation programme that aims to pave the way for the European chemical industry towards a higher bio-based portfolio and competitive success based on the benefits offered by the bioeconomy. The project will deliver a roadmap for the chemical industry that will specify benefits as well as barriers towards a bio-based economy to meet the societal needs in 2030.

The roadmap developed in RoadToBio will contain two main components: first, an analysis of the most promising opportunities ('sweet spots') for the chemical industry to increase its bio-based portfolio as well as the technological and commercial barriers and the hurdles in regulations and acceptance by society, governing bodies and the industry itself, and second, a strategy, action plan and engagement guide to overcome the existing and anticipated barriers and hurdles as mentioned above.

2.2 Goal and scope of this report

The visibility of bio-based products in the market and their perception by the public is key to a successful market development of these materials. In a former report, published as deliverable 2.2 (D2.2)², we compiled, compared and analysed currently existing research and reports about public perception of bio-based products in order to identify barriers for further market development. This resulted in an overview of consumers perceptions of bio-based products and recommendations how barriers could be tackled.

The goal of this report is to broaden these insights, taking into account not only the perception of consumers, but also additional societal stakeholders relevant for overall public perception. We conducted the research presented in this report in three steps:

- 1) Expert validation: Validation of the findings of D2.2 through discussion with authors of the most relevant and recent publications reviewed
- 2) Interviews with NGOs: Identification of and interviews with NGOs involved in matters related to bio-based products
- 3) Interviews with policy makers: Identification of and interviews with policy makers working on bio-based products from different levels (European, national, local)

3. Methods

3.1 Expert validation

The findings of D2.2, and especially our conclusions regarding barriers and how to approach them, were validated through discussion with authors of important publications reviewed for D2.2. We chose the most important publications based on their relevance for our focus,

² Deliverable 2.2 can be found on www.roadtobio.eu

extensiveness and publication date. We contacted authors from five publications. Three authors participated in a joint webinar on February 13, 2018, discussing our results based on summary slides, which can be found in Annex I. A fourth author provided us with feedback separately. The slides showed the most important findings and the barriers and approaches to tackle them identified by us. We provided the slides up front and presented them during the webinar. Participants and their respective publications are shown in Table 1.

Table 1: Participants Expert validation

Participant	Publications	Feedback
Julia-Maria Blesin	Blesin J-M, Klein F (2017) Status Quo: Bevölkerungs- und Verbraucherwahrnehmung von Biokunststoffen. Vortrag bei "Herausforderungen und Chancen der Bevölkerungs- und Verbraucherkommunikation über Biokunststoffe" im Rahmen des BMBF Forschungsprojektest BiNa.	Individual
Durwin Lynch	Lynch DHJ, Klaassen P, Broerse JEW (2017) Unraveling Dutch citizens' perceptions on the bio-based economy: The case of bioplastics, bio-jetfuels and small-scale bio-refineries. <i>Ind Crops Prod</i> 106:130–137.	Webinar
Marieke Meeusen	Meeusen M, Peuckert J, Quitzow R (2015) Acceptance factors for bio-based products and related information systems Public. Part of the EU project OpenBio.	Webinar
Klaus Menrad	Kainz UW (2016) Consumers' Willingness to Pay for Durable Biobased Plastic Products: Findings from an Experimental Auction. Technische Universität München Scherer C, Emberger-Klein A, Menrad K (2017) Biogenic product alternatives for children: Consumer preferences for a set of sand toys made of bio- based plastic. <i>Sustainable Production and Consumption</i> , Volume 10, 2017, Pages 1-14	Webinar

3.2 Interviews NGOs

We identified NGOs involved in matters related to bio-based products based on their contribution to, or participation in, one or more of the following: the development of the European Bioeconomy Stakeholders Manifesto³, providing input to the review of the 2012 European bioeconomy strategy⁴, participation in the joint position paper on bioplastics in a circular economy, developed by multiple NGOs⁵, participation in the RoadToBio workshop in Brussels in July 2017 or being part of the general network of the RoadToBio consortium

³ https://ec.europa.eu/research/bioeconomy/pdf/european_bioeconomy_stakeholders_manifesto.pdf

⁴

https://ec.europa.eu/research/bioeconomy/pdf/review_of_2012_eu_bes.pdf#view=fit&pagemode=none

⁵

https://www.foeeurope.org/sites/default/files/resource_use/2017/joint_ngo_position_paper_on_bioplastics.pdf

members involved in this action. We invited these NGOs to be interviewed; Table 2 shows the NGOs who agreed to participate.

The main questions addressed in the interviews were:

- 1) Does your organisation have a position on bio-based products, separate from bioenergy or biofuels?
- 2) Which opportunities do you see for society that stem from bio-based products?
- 3) Which concerns do you have in relation to bio-based products?

During the interviews we took extensive notes and analysed them using qualitative data assessment (QDA) software to identify common themes and important arguments, which are described in Section 4.2. Due to the qualitative nature of this data, we do not refer to certain percentages of interviewees who used a certain argument. To give an impression of the occurrence, we will refer to all (100%), most (>75%), many (50-75%), some (25-50%), few (<25%) or one interviewee expressing a certain view or argument.

Table 2: Participants NGO interviews

Organisation	Date of interview
Bird Life International	March 22, 2018
European Environmental Bureau	March 14, 2018
European Environmental Citizens Organisation for Standardisation	February 28, 2018
Fern	February 16, 2018
Friends of the Earth Europe	February 6, 2018
Naturschutzbund Deutschland NABU	February 6, 2018
Natuur en Milieu Overijssel	February 12, 2018
Transport & Environment	February 15, 2018
WWF European Policy Office	February 15, 2018
WWF Germany	February 15, 2018
Zero Waste Europe	February 21, 2018

3.3 Interviews policy makers

We identified policy makers involved in matters related to bio-based products based on the general network of the RoadToBio consortium members involved in this action, supplemented by an online search on three levels: European players, national governments and governmental organisations of countries active in the bioeconomy and regional

governments. We contacted 25 policy makers from all three levels. Table 2 shows the participants who agreed to be interviewed.

The main topics addressed in the interviews were:

- 1) The familiarity of the interviewees with public perception of bio-based products
- 2) A reaction to the presented results of our review of consumer perception and NGO interviews
- 3) The relevance of public perception for policy making and the current practice of taking public perception of bio-based products into account
- 4) Additional opportunities and concerns policy makers see for society that stem from bio-based products
- 5) Whether or not there is a discrepancy in the perception of bio-based products of bioeconomy experts as opposed to the general public

During the interviews, we elaborated on the results of our review of consumer perception and NGO interviews by explaining three important issues that came up in each analysis. We then asked for a reaction, stating whether these results were recognizable or surprising (topic 2).

Consumers:

- Consumers do care about products being environmentally friendly, but do not particularly care whether they are bio-based
- Generally, consumers have a positive attitude towards bio-based products, but also high expectations (e.g. biodegradability, aiming for environmentally friendly solutions)
- Personal benefits are more important in the decision to buy a product than altruistic arguments for bio-based products

NGOs:

- NGOs are concerned that bio-based products serve as an “excuse” to keep consuming just as much as before and that they transfer a green image which does not hold up (e. g. biodegradability, land use issues)
- NGOs agree that bio-based products should have additional benefits, other than the changed resource base
- NGOs find it important that bio-based products integrate well with the circular economy

During the interviews we took extensive notes and analysed them using qualitative data assessment (QDA) software to identify common themes and important arguments, which are described in Section 4.3. Due to the qualitative nature of this data, we do not refer to certain percentages of interviewees who used a certain argument. To give an impression of the occurrence, we will refer to all (100%), most (>75%), many (50-75%), some (25-50%), few (<25%) or one interviewee expressing a certain view or argument.

Table 3: Participants policy maker interviews

Level	Organisation	Date of interview
European	European Commission, Directorate-General for Environment	April 10, 2018
National	Department of Agriculture, Food and the Marine, Ireland	April 9, 2018
	Environment Agency Austria, Industry & Energy Generation	April 13, 2018
	Innovation Norway	April 5, 2018
	Netherlands Enterprise Agency RVO	March 30, 2018
Regional	Bioeconomy Council Bavaria, Germany	April 16, 2018
	Province of Zeeland, Netherlands	April 13, 2018
	Public Waste Agency of Flanders (OVAM), Belgium	April 16, 2018

4. Results

4.1 Expert validation

The webinar with public perception experts built on the results of the literature review about consumer perception of bio-based products published in D2.2. Here, we will describe the comments and reactions of the experts per theme.

4.1.1 Awareness and knowledge

While around 50% are aware of bio-based products, a far lower percentage of consumers have actually consciously chosen to buy a bio-based product before. Looking closer at this group of consumers, it stands out that their characteristics differ from the broader group that state they are aware of bio-based products. Furthermore, there are great differences between awareness of bio-based products in different European countries. These should be taken into account when trying to address this as a barrier. The focus could lie on countries and groups with lower awareness, for example. In terms of knowledge it stands out that consumers may have an overly positive impression of their own level of knowledge, while actually a lot of misunderstandings occur.

When it comes to communication towards consumers or a broader public, it is important to avoid creating false expectations. This is especially true for communication about environmental benefits, which should be approached very carefully. Most bio-based products do not have a clear overall environmental benefit, often there are some positive and some negative points. Communicating about environmental benefits backfired in several cases in the past, where NGOs focussed on the negative points. It is very difficult to come up with

clear messages about environmental benefits and it always requires a case-by-case analysis. Communication about environmental benefits should be specific; it should not state generally that a product is environmentally friendly, but specifically mention advantages that have been found in a life cycle assessment (LCA). Sometimes it may be desirable to avoid the discussion around bio-based products. Arguments towards consumers can then include a specific, improved environmental performance, without focussing on the product being bio-based.

In general, it can be advantageous to focus on individual benefits for consumers, focussing also on different groups of consumers. Altruistic arguments are only influential on a very small group of consumers and consumer groups are very heterogenic. In some cases, the fact that a product is bio-based really is the main selling point. In these cases, the communication about additional benefits can be helpful but the promotion of the resource base remains crucial.

The promotion of bio-based packaging materials proves to be problematic – consumers buy the product itself, not the packaging. Often the green premium is then paid by the producer, not necessarily by the consumer. Often it is a combination, though, a product that has a green image or environmental advantages is often also encased in bio-based packaging materials and in these cases, consumers are willing to pay higher prices.

4.1.2 Associations and connotations

The experts confirmed that there are a wide range of associations, both negative and positive, and that negative associations often refer to a personal level, like price, lack of trust in companies or worries about greenwashing. Consumers who are willing to buy bio-based products have very high expectations regarding production, like regional resource production, organic production and no genetic manipulation. Consumers also expect that at the end of the day bio-based products should be sustainable, not only environmentally, but also socially. In the heads of people sustainability is broader than LCA results. Usually bio-based and biodegradable are linked for consumers and it feels unnatural to many that fossil-based products can be biodegradable as well.

It is very complicated to tackle these issues, because there is no one approach that can solve it all. Education is useful, but only effective on the long term. PR is challenging because it is linked to the trust in companies. Standardized methods, like independent LCAs and common industry standards (e.g. on composting), are useful methods to convey information, for example used for information on producers' websites or product packaging. Product branding as a way to tackle lack of trust is difficult as well, as consumers do not generally trust information by producers. They do, however, trust GOs, NGOs and research institutes much more. Thus, product branding as such is not a solution to lack of trust, it would have to be communicated together with the more trusted agents. Media relations are pointed out as an additional important communication channel. Although not necessarily the most trusted, media are an important source influencing public discourse and opinion.

Some consumers do see bio-based products as alternative to fossil-based products. Therefore, communication should not only focus on advantages and disadvantages of bio-based products, but also the comparison with conventional products. Context is very influential in any case, for example current societal debates, such as discussions about plastic waste. Higher prices do remain a big barrier, especially when it comes to bio-based packaging. Distinguishing between bio-based products and bio-based packaging is thus important when developing strategies to overcome barriers.

Finally, the experts pointed out that there is a big difference between what people say in studies and what they do in the real market. There is a methodological discussion on whether public perception studies reflect a real public or create a public.

4.1.3 Consumption decision and willingness to pay

The factors identified influencing the consumption decision and willingness to pay of consumers are familiar to the experts; especially the consumers' feeling that they can do something for the environment and health issues are often found to be relevant. The experts notice again and again that consumers who are willing to pay more also have high expectations, e.g. regarding reduced environmental impacts or end-of life processing options.

In terms of tackling barriers, however, it is difficult to say what this means for brand owners. Until now, there are no really strong "bio-based" brands. Bio-based products are still on niche markets, and the producers also often focus on these niche markets. Bigger brands who are already using bio-based materials choose not to communicate about it, like car brands or detergent producers. There are many examples where parts of a product are bio-based, but big brands are hesitant to communicate about it. Brands such as Coca-Cola and Danone made negative experiences with communicating about bio-based and now choose other communication strategies.

A problem might also be that the green premium is not shared along a value chain, but the weaker players, e.g. packaging suppliers, are burdened. Producers are also still not very transparent in their communication about bio-based products or sustainability, they state that they are somehow improving but don't communicate about specifics. Claims about environmentally friendly products or packaging materials are often not differentiated and it is not explained what role bio-based plays in that. Producers can, however, be transparent and open about these aspects without communicating actively about their products being bio-based. It should always be possible for e.g. NGOs to gather information, to allow for a discussion or dialogue.

4.1.4 Information and labels

When it comes to the information requirements of consumers, experts have the impression that the willingness of consumers to look for information is small. If asked in a study, people generally say they want more information, but in practice they go for convenience and only very few people actually invest time in looking for more information. The impression is that

consumers are generally honestly interested (and that this is not just an artefact of studies), but only if they can get it effortlessly. At the moment there is a great responsibility for consumers to be informed regarding bio-based products. The experts pointed out that the dialogue should be broader, also including producers and policy makers. If the whole market moves in a better direction, the responsibility is not only put on the consumers. Responsibility should be shared between producers and consumers.

Labels for bio-based products are difficult, because the message is not always clear enough to be communicated with a label. Labels require clear evaluation criteria and for many bio-based products the value chains are not clear cut enough. A barrier for the introduction of labels is also that for the certification industry the bio-based market is not very interesting – it is small and complicated. In general, there are too many labels already and it is very expensive, difficult and time consuming to establish a label. Adapting existing labels, to include the positive impacts of bio-based resources, is a good strategy if one would want to communicate using labels.

4.2 Perception of NGOs

To broaden the insights gained in the review of public perception, we interviewed staff of relevant NGOs, inquiring about their position about bio-based products, their view on opportunities that these products might offer, and concerns they have regarding the further market development of bio-based products. The remarks of the employees are not to be considered official statements of the organisations and we will not quote interviewees separately; rather, we will describe their answers jointly.

Of the 11 interviewed NGOs, only few have an official position on bio-based products in general (separate from bioenergy & biofuels) yet. Some indicated that a position on bio-based products might or will be developed in the future, and others have positions on specific products or sectors, such as bioplastics, but not bio-based products in general. Some consider the development of such a position unlikely. This is partly due to NGOs working on rather specific topics, while the bioeconomy as a whole covers a wide field. One interviewee stated that the bio-based economy is for the moment mostly dominated by industry and research & development. The lack of legislation leads to NGOs not focussing overly much on the topic, because they expect to have more impact when focussing on topics with clear legislation.

During the interviews, several opportunities and concerns were addressed, but interviewees also addressed prerequisites that bio-based products should fulfil in their opinion. In the following, we will present the different arguments per topic.

4.2.1 Opportunities

Avoid fossil resources and contribute to climate mitigation

In accordance with the traditionally described drivers for a bioeconomy, some interviewees stated that bio-based products offer the opportunity to switch away from fossil to more sustainable, renewable resources. Furthermore, certain bio-based products may contribute

to climate change mitigation, either through reducing emissions or serving as a carbon sink. However, interviewees argued that this depends strongly on the product and the resource base.

Use of residual biomass and biowaste

Specifically, residual biomass was pointed out as sustainable resource by some interviewees. They stressed that biomass resources should be limited to residues and biowastes, e.g. agricultural waste, avoiding cultivated biomass and therefore land use and associated consequences. However, some pointed out that also the current use of residues should be taken into account. Some interviewees argued that if implemented cautiously, the bioeconomy could deliver on rural and social aspects where biomass resources are locally abundant.

Importance for chemical industry

Some interviewees acknowledged that bio-based resources are an important route for the chemical industry to become more sustainable, because, in contrast to the renewable energy sector, there is no other alternative to fossil resources. Some furthermore pointed out that it could offer opportunities for the sector to think about how their products fit, not only in a bioeconomy, but in a circular economy, thinking about the post-use phase up front.

4.2.2 Concerns

Technological fix instead of societal change

The biggest concerns appeared to be that bio-based products often present a technological fix to problems that actually require societal change. Most interviewees criticised that in many cases bio-based products simply replace fossil-based products without solving any of the problems related to them, other than changing the resource base. They argued that some products, such as single use plastics, should be banished altogether, and that in general reduction of overall consumption and reuse & recycling should be the first priority. Simply making the same number of products with the same problems (consumption and waste management) from other resources falls short in the opinion of the interviewees. Also, some interviewees noted that biodegradability itself could further promote our “throw-away” culture and undermine a “reduction-first” strategy that also includes optimisation of production processes and usage patterns.

One interviewee stated that only switching resource base would improve the consumers’ conscious but essentially only justify continuing the same consumption behaviour. Another interviewee pointed out that the actors of the bio-based sector should think about the whole life cycle, considering recycling and waste management options, and not blindly produce every type of material they can come up with, regardless of its end-of-life options.

Misunderstandings and communication

As described in our literature review, published as D2.2 of RoadToBio, there are several common misconceptions of consumers about bio-based products, one of which is the assumption that all bio-based products are biodegradable. Some interviewees described this misunderstanding as a concern and argued that the responsibility to overcome this problem lies with the producers. They described that producers have to think about ways to not create wrong expectations, which are well-known to be a problem: in practice, consumers generally assume that bio-based means biodegradable. Some NGOs also see issues with greenwashing in the bioeconomy, with products getting marketed and sold as more sustainable than they might actually be.

Some interviewees furthermore pointed out that, apart from communication, producers should also get more involved in the whole product life cycle: they should discuss issues such as compostability and recyclability with waste treatment organisations and include consumers in the development of new products and value chains. It was described a pitfall to only think about consumers and consumer behaviour during marketing, expecting to be able to explain correct end-of life behaviour but not considering the consequences of incorrect behaviour.

Resource availability

Many interviewees pointed out that they are concerned that goals and plans do not consider potential biomass supply sufficiently and that fossil oil cannot be entirely replaced by biomass. They recommended researching the balance between demand and supply and take the conclusions into account for further development of goals and strategic planning. This includes taking into account not only the demands of the own sector, but also those of other sectors. Biomass production was considered potentially more sustainable if it occurs in the EU, but then it is especially important to understand the regional balance between demand and supply. Finally, it is considered important to make responsible estimates of potentials, that do not exceed the carrying capacity of the earth deplete natural resources.

Uncertainty of climate impact and other environmental impacts

Some interviewees expressed concerns regarding the assumption that bio-based products contribute to climate change mitigation. They argued out that bio-based products are not necessarily climate neutral and often only offers advantages on the long term (past 2050), which is undesirable in the efforts to mitigate climate change. They argued that even under ideal, sustainable production conditions climate benefits on the short term are not self-evident. Bio-based products in their opinion should always offer a greenhouse gas benefit in comparison with their fossil benchmarks, and issues such as indirect land use change (iLUC) should never result in worse greenhouse gas impacts than what would have been caused by conventional products. One participant specifically mentioned bioplastics (considered problematic in terms of the current recycling systems) and biocomposites (often lack recyclability and/or compostability) as critical materials. Next to the climate concerns, some interviewees also mentioned other potential environmental impacts they are concerned

about: the over use of land and water and potentially negative circumstances of resource production and processing.

4.2.3 Prerequisites

Added value of bio-based products

It stood out that most interviewees agreed that bio-based products should have an added value other than the biomass resource base. The simple fact that the product is bio-based is not sufficient to make it better or worthwhile in the eyes of the interviewees. The added value of bio-based products should contribute to overcoming one or more of the problems with conventional products, other than the need for fossil resources. Aspects mentioned were completely new functionalities, an improved environmental impact (reduction of greenhouse gas emissions, reduced toxicity and reduction of other impacts), better end-of-life options (reduced impact, biodegradability, compostability, integration in the circular economy), improved resource efficiency and improved quality.

Integration into circular economy

As described above, better end-of-life options promoting a circular economy were valued as an added value of bio-based products. Most interviewees argued that integration in a circular economy is a prerequisite that bio-based products should fulfil. They stated that the bioeconomy and circular economy should go together and, in this regard, the bioeconomy can create incentives for increased resource efficiency and sustainability. In such a system, preferably nothing should be wasted and carbon should not leave the system. It was argued that renewable materials, such as packaging materials, that cannot be recycled do not contribute to a circular economy and are not worthwhile. Again, the argumentation is that just shifting the resource base is not sufficient, the transition to a circular economy is more important than just making a product bio-based without additional benefits. Finally, it was stated that now is the time to think about the integration in a circular economy, as bio-based products are still under development.

Cascading

Many interviewees stated that biomass should be used following the cascading principle. They generally argued that material applications are of higher value than energy recovery, and that biomass should thus be used for material uses first and energy last. Here, it was pointed out that the benefits of higher value bio-based products are often not credited sufficiently in comparison to the current subsidies for bioenergy & biofuel. Expected advantages of increasing cascading use described were increased resource efficiency, larger overall impact and sequestration of carbon. One interviewee pointed out that collection systems would have to be adapted to allow for cascading use.

Prioritization between sectors and products

Regarding the most important use of biomass, many interviewees pointed out that a prioritization between sectors and products would be useful, though very difficult to achieve.

They argued that it should be analysed in which sectors the biggest improvements could be made through the use of biomass. The plans of various sectors may overlap but also result in an overly large demand for biomass that cannot be met sustainably. It seems impossible that sectors decide amongst one another which demands should be met, and competition on the free market may not result in reasonable and efficient allocation. Policy making and coherence was mentioned as a possible, for some even crucial, approach, but in general the feeling prevailed that a prioritization is very difficult to realize. One interviewee mentioned to consider lessons that can be learned from the biofuel push in the past: Here, largely due to the food vs. feed debate, mistrust and confusion slowed the overall progress. Consequently, similar incentives in the bio-based economy should focus on and be streamlined around the most promising applications that combine bio-based and circular economy principles. In regards to this point, another interviewee pointed out that public promotion must be done transparently and avoid greenwashing.

Environmental and social sustainability

Some interviewees discussed that aspects of sustainability other than climate change mitigation should be taken into account, as well. They argued that bio-based products should also contribute to social sustainability, taking into account e.g. land rights, effects on local communities and fair working environments. Few interviewees elaborated that in terms of environmental sustainability, bio-based products should not only achieve a reduced impact on greenhouse gas emissions, but also avoid other environmental impacts, such as reduction of biodiversity and negative effects of fertilizers and pesticides. Another interviewee mentioned an ongoing discussion whether a certification for all biomass used might be helpful or necessary.

4.3 Perception of policy makers

After talking to staff of relevant NGOs, we interviewed several policy makers from different levels (European, national and regional) to gain insights on their views on the importance of public perception for policy making, their experience with it and their own perception of bio-based products, based on their expertise. The background of the interviewees is a mix of people involved with research funding and grants, developing or consulting on regulations, strategies and policies, and supporting national or regional networks of public and private parties. We will first discuss their views on the topics raised by us during the interviews. In addition, interviewees also commented on some barriers for bio-based products and strategies to deal with them, which will be described in Section 4.3.6.

4.3.1 Familiarity with public perception of bio-based products

The level of knowledge about public perception of bio-based products differed between interviewees. Some reported to have little knowledge or just a general feeling, many others had a better impression, either through being in regular contact with consumers or by being familiar with studies on public perception. It stood out that many interviewees had the impression that the public perception is rather positive or neutral, especially when

considering green issues. They described that people see the opportunities bio-based products offer and that bio-based products appeal to them. However, they have the impression that people are also concerned about potential issues, such as plastic pollution, about the general quality of bio-based products compared to conventional products. One interviewee mentioned that the willingness to pay a green premium for bio-based products is not very high. Many pointed out that consumers have little knowledge about bio-based products and that public perception can differ greatly between individuals. According to the interviewees, this lack of knowledge is to some degree caused by a general lack of information about the bioeconomy. Products marketed as bio-based can, furthermore, be misleading or cause confusion, for example in regards to biodegradability.

4.3.2 Reaction to our previous findings

All interviewees recognised at least part of the results presented by us (see Section 3.3). They did not find any results surprising, but overall very interesting. It stood out that most reported some discontent with some of the NGOs positions. While they find it understandable that NGOs take a rather strong position, they described that it is problematic that NGOs are not more nuanced, because their concerns regarding bio-based products may hinder further development of good solutions and indirectly promote current (fossil) benchmarks. That said, one interviewee mentioned that NGOs should be considered as critical agents to spread knowledge to the public. Opinions differed regarding the NGOs concern that bio-based products may provide an excuse to keep consuming at the same rate. While few found this a very relevant concern, some others stated that this discussion has to be led on a much broader basis and not be used as an argument against more sustainable (bio-based) production. Instead, they think that bio-based products could also support the reduce, reuse and recycle approach. Only one interviewee completely agreed with the points brought up by the NGOs.

4.3.3 Relevance of public perception for policy making

All interviewees agreed that public perception is very important for policy making, because many political actions would not be accepted without it and could not be properly implemented. It was pointed out that signals from the broader public should always be taken into account, for example a lack of clarity what bio-based products are and what advantages they offer, but also the impression that bio-based products are only part of the solution. Such issues may inform how policies should be developed and communicated about in order to match social stakeholder perspectives. Furthermore, some pointed out that early engagement of citizens and private parties is important to make policies more relevant and successful. According to interviewees, politics need to support the bioeconomy in general, but also have to facilitate demand factors for products to sell. For this, integrating the participation of the civil society is important and thus there should be a higher focus on the concerns of the general public and NGOs, as early communicators of critical issues, in particular. One participant mentioned this is happening to a larger extent on EU and national level but seems also to be picked up on regional levels.

4.3.4 Opportunities and concerns

Many of the issues brought up as prerequisites by NGOs were described as opportunities by policy makers. Many of them agreed that bio-based products should have an added value, additional to the changed resource base. For example, it was expressed that bio-based products can offer new characteristics and improved quality for consumers and the environment, like a reduced need for hazardous additives or climate benefits. Increased efficiency through cascading use of biomass resources and the application of residual biomass were mentioned as additional opportunities by some interviewees. Here, especially the possibility to turn biogenic waste and residues into new products was highlighted. One interviewee stressed that the development of a bio-based circular economy offers the opportunity to evaluate whole value chains of and improve the whole system, because there are new economic opportunities for bio-based products. Few interviewees mentioned that the bioeconomy can stimulate rural development and create circularity in regional economies, which is especially important for countries with a strong agricultural sector. Many pointed out that bio-based products can play a very important role in a circular economy, providing a sustainable source of resources where recycling is not possible and creating the opportunity to move from linear value chains to value chain networks. Though the impact and ideal circulation of both fossil and bio-based products should be evaluated, bio-based products do offer a chance to keep resources in use and contribute to decarbonizing the economy. As a general remark, one interviewee noted that the bio-based economy causes a transition phase, which always brings business opportunities and thus benefits for society.

Some interviewees stressed the concern that some bio-based production systems may have already stressed the sustainability of resource supply. They elaborated that resource production can cause issues with biodiversity, land use change and reduce availability of arable land. This in turn might also create social risks in different regions of the world. Few interviewees warned that simply increasing demand for agricultural produce might refuel the food vs. fuel debate and risk competition with food system, although proper communication should solve the issue rather sooner than later. In this regard, it was noted that the debate mostly takes place in the bioeconomy and less so for food production, where large monocultures are widespread and mostly accepted. Another policy maker noted that the bioeconomy might cut jobs in more conventional sectors. Further development should integrate bio-based and circular systems and where necessary revert negative impacts.

4.3.5 Discrepancy in the perception of bio-based products

When asked whether or not there is a discrepancy in the perception of bio-based products of bioeconomy experts as opposed to the general public, most interviewees elaborated that the general public has less knowledge and less opportunities or interest to be informed about bio-based products, which may result in a different perception. A few also mentioned that discrepancies exist even between experts, caused by a lack of knowledge and research. Experts are generally believed to be more positive, but also have a more differentiated view of bio-based products. One interviewee noted that experts may sometimes have a less reasonable view of bio-based products, caused partly by vested interests of experts who

have worked for years on specific topics. Contrastingly, another interviewee described that in their direct experience with (interested) citizens, these seem to be more positive, even demanding policy makers to increase their efforts in promoting bio-based products.

Most interviewees described the experience that consumers do not know the difference between concepts like bio-based, organic, biodegradable and compostable and connections between the bioeconomy and the circular economy. Additionally, it was expressed that the topic of bio-based products, their impact and specific characteristics, is too complex to expect consumers to be informed about and understand. As a consequence, it was mentioned that the ongoing transition towards a bioeconomy is often not recognized by the public, or that they are already a part of it. Communication is considered important, but some interviewees shared the view that consumers should not be burdened with the task of making the right decisions (both in choosing and disposing of products), considering the great differences of characteristics and impacts of bio-based products. Because the bioeconomy is such a wide topic, input and discussions from as many experts and people as possible should be welcomed. Both policy making and communication should therefore focus on making it easy for society to move in the right direction. For example, by developing clear standards and labels and by arranging for good solutions for the recycling and disposal of different bio-based products.

4.3.6 Barriers and strategies

In addition to the topics raised by us, the interviewees also commented on some barriers for bio-based products and strategies to deal with them. They address market barriers, frameworks to ensure sustainability and communication strategies.

An important market barrier that was pointed out by some is the price difference between bio-based products and their fossil competitors. The interviewees pointed out that this difference is caused by a combination of, on the one hand, small market volumes of bio-based products and the need to develop them further and, on the other hand, the fact that in the price of conventional products the costs of negative impacts are not included. These barriers could be addressed, in their opinion, by creating a level playing field, increasing the burden on polluting products and stimulating the development of more sustainable alternatives, for example through public procurement as a launching customer.

A few interviewees elaborated that they conceive it as a barrier that there is no coherent framework to assess the environmental performance of bio-based products and compare their impact to conventional products. Increased research, especially in regards to sustainability, and an urgent need for knowledge transfer were mentioned. This would, in their opinion, be very helpful for both policy makers and the bio-based sector.

Communication strategies were addressed by some interviewees. One pointed out that bio-based producers can emphasise their communication either on the fact that they are focussing on sustainability, that their products are bio-based and offer specific added value, or alternatively avoid the term bio-based and just pointing out the improved characteristics of their products. They stressed the importance of focussing target-oriented communication on

the added value for consumers personally. Another interviewee stressed that producers and distributors should be very clear, transparent and honest in their communication, making sure that whatever advantages (e.g. biodegradability) they are promising are actually true for the situation in which their products are applied.

5. Overarching insights

We identified various issues that influence the acceptance of bio-based products of societal stakeholders from the review of consumer perception (published as D2.2), evaluated together with communication experts, and from interviews with NGOs and policy makers. Some of these issues may prove to be barriers for further market uptake of bio-based products. Combining the results of both D2.2 and the current D2.3, we suggest approaches to tackle some of these barriers. Issues, barriers and suggested approaches are shown in Table 4. Regarding the representativeness of our results it has to be pointed out that we talked to a limited number of NGOs and policy makers. However, we believe that interviewing almost 20 societal stakeholders altogether, providing relevant additional insights, has achieved our goal of broadening our understanding of public perception of bio-based products.

Table 4: Issues and barriers identified and approaches to tackle them

Issues and barriers identified in D2.2 and D2.3	Suggested approach
<i>Information and knowledge level of consumers</i>	
<p>Policy makers find the broader public insufficiently informed about bio-based products. At the same time, both NGOs and policy makers feel that at the moment there is a great responsibility for consumers to be informed regarding bio-based products, which is an unrealistic expectation and leads to confusion. Issues regarding the bioeconomy and bio-based products are too complex to expect laypeople to understand, while even experts differ greatly in opinion</p>	<p>Responsibility for information could be shared better between producers and consumers, not expecting consumers to understand what bio-based means exactly and what consequences this has. Consumers should not be burdened with the task of making the right decisions, both in choosing and disposing of bio-based products. Policy making and communication could focus on making it easy for society to move in the right direction</p>
<p>Information on bio-based products is often not easily accessible for consumers. Consumers are interested, but not prepared to invest time in looking for additional information</p>	<p>Labels are highly appreciated by consumers for their ease, but expensive, manifold and not always transparent. Adapting existing labels for use with bio-based products seems a realistic approach</p> <p>Bio-based is only part of the story of a product; labels or alternative communication media should tell the whole story, give information about attributes of personal benefit for the consumer, altruistic motives and the origin of the raw material</p> <p>Trusted sources, like GOs, NGOs and research institutes as well as media are additional potentially valuable communication channels</p>

Issues and barriers identified in D2.2 and D2.3	Suggested approach
<i>Communication about bio-based products</i>	
Consumers have a low level of awareness and little specific knowledge about bio-based products, which leads to misunderstandings	<p>Communication should not focus on the fact that a product is bio-based (only), but highlight personal benefits, added value and positive impacts</p> <p>Option A: address niche market; inform consumer that product is bio-based and what impact that has</p> <p>Option B: address broader public; don't mention bio-based but inform about improved characteristics and/or personal benefits</p>
Level of awareness differs greatly between countries	Communication efforts of European policy makers could be focussed on countries with lower awareness. Research effort to understand acceptance could be focussed on countries with higher awareness, to receive overall more robust results. Insights could then be transferred to countries with lower awareness
High expectations and misunderstandings can lead to disappointment and negative consumption decision	Only relevant if the fact that a product is bio-based is the unique selling point. Then, it requires clear communication about characteristics and impacts. Positive connotations may serve as inspiration. Environmental performance should be communicated honestly and with clear, specific messages, based on a case-by-case analysis
Opinions about how to approach misunderstandings differ: NGOs generally put the responsibility of not creating wrong expectations on producers, while policy makers see a shared responsibility of societal actors and producers	<p>Clearly communicating about characteristics, while also making information easily accessible to consumers is important but challenging</p> <p>Further research regarding what and how to communicate to avoid misunderstandings is required</p>
Personal benefits are more influential on perception and consumption decision than altruistic arguments for bio-based products	Focus communication on personal benefits and added value that is of personal relevance (e.g. improved performance or health benefits)
<i>Environmental impacts</i>	
Factual environmental impact of bio-based products is an important aspect in the attitude of consumers. NGOs also state that bio-based products should always provide environmental benefits	<p>The desire for proof of environmental benefits is great and wherever possible, it can be advantageous to inform consumers about the environmental impact in comparison to conventional products at the product level</p> <p>But provision of proof is really hard to realise, especially for smaller producers. It requires very cost-intensive analyses that are not realistic for SMEs</p>
Policy makers experience it as a barrier that there is no coherent framework to assess the environmental performance of bio-based products	Better frameworks could be helpful to address the desire for proof of environmental benefits, but it requires more research. It seems unrealistic that simple rules of thumb can be found that apply for the great variety of bio-based products, so some case-by-case analysis will probably remain necessary
Consumers are relatively unaffected by the fact that a product is bio-based. This fact is only relevant to a niche market, where it results in a (slightly) increased willingness to pay more, but also raises very high expectations, e.g. regional resource	If brand owners or retailers are not prepared to focus on a niche market, they should focus on the personal benefits that bio-based products bring and be aware that most consumers are willing to pay only little more for bio-based products

Issues and barriers identified in D2.2 and D2.3	Suggested approach
production, organic production or better end-of-life processing options	If the consumer is not prepared to pay the green premium for a bio-based product, brand owners may strive to carry the burden within the value chain, focussing on image and branding
<i>Further development of bio-based products</i>	
Both NGOs and policy makers agree that bio-based products should have additional benefits, other than the changed resource base. For example, they should have better properties, improved environmental impacts, or tackle a problem with conventional products, such as providing better end-of-life options.	Creating added value (and proving it) can be challenge for bio-based products, but also an opportunity: it can be used for communication and marketing strategies. Producers can strive for added value in the design of bio-based products and use this as a selling point, rather than just focussing on the fact that the product is bio-based
Both NGOs and policy makers find it important that bio-based products integrate well with the circular economy. This also requires good collection and recycling options for bio-based products	Producers of bio-based products could collaborate with the waste treatment sectors and policy makers to develop improved waste strategies. It should be made as easy and clear as possible for the consumer in what bin to dispose of bio-based products and packaging materials Bio-based products from residual biomass streams are gaining importance in a circular economy and are favoured by NGOs. Communication about the impact of purchasing products made from waste streams could further pave the way to an integration of the bioeconomy and circular economy
NGOs perceive bio-based products to be more useful in some sectors than in others. They would favour a prioritisation	Prioritisation of certain sectors is very difficult. Different markets are expected to increasingly compete for biomass resources and “usefulness” is rather difficult to define. A prioritisation could only be achieved by policy making, for example providing incentives based on a defined maximisation of societal relevance
Policy makers experience some NGO positions to be overly critical, hindering useful developments towards more sustainable products. For example, there is a discrepancy between the view of NGOs and policy makers regarding the effects of bio-based products on consumption: while NGOs are concerned that bio-based products may serve as an “excuse” to keep consuming just as much as before, policy makers argue that the consumption debate should be led separately from sustainable production	Policy makers, NGOs and other societal stakeholders could strive to jointly define goals and develop plans to reach them that are considered realistic by all sides
Bio-based products are for a large part still more expensive than conventional products. Reasons lie with the early developmental stage and small market volumes of the bio-based sector, but also with the low price of conventional products, not considering their environmental impact	Policy makers could strive for a level playing field for new products that are aiming to improve environmental performance. Increasing the burden on pollution has been discussed for years but remains a great political challenge

This study provides an improved overview of the acceptance of bio-based products by consumers and societal stakeholders. Having talked to societal stakeholders, we were able to identify additional barriers but also possible strategies to approach them. These approaches will be discussed further in the forthcoming RoadToBio deliverable 2.4, where

insights from D2.1⁶, D2.2⁷ and the current D2.3 will be combined. These approaches will then be used as a basis to develop key communication messages for bio-based products, which will in turn contribute to the development of the roadmap – the main product of RoadToBio.

⁶ RoadToBio D2.1: Report on regulatory barriers, April 2018

⁷ RoadToBio D2.2: Public perception of bio-based products, November 2017

Annex I: slides summarising D2.2 results for the expert validation



Expert discussion: Public perception of bio-based products

13 February 2018, 13:00

Part of BBI project Road To Bio

Involved partners: BTG and nova-Institute

Contact: Swinda Pfau, pfau@btgworld.com

Public perception of bio-based products



Background: Literature review on consumer perception of bio-based products

- 17 studies (2009-2017) on consumer perception reviewed
- Goals:
 - Create a comprehensive overview of current knowledge
 - Identify potential barriers for further market uptake of bio-based products
- Four common themes:
 - (1) Awareness and Knowledge
 - (2) Associations and Connotations
 - (3) Consumption decision and willingness to pay
 - (4) Information and Labels
- Today: reflection on conclusions with authors of key studies reviewed
- Next step: interviews with NGOs and policy makers on their views and concerns

Common Theme 1: Awareness and Knowledge



Important issues

- **Awareness** of the existence of bio-based products seems to lie **around 50%**. There is general understanding of what BB products are, but specific knowledge about product characteristics is missing and misconceptions occur.
- It appears that **consumers** generally do **care about** products being **environmentally-friendly**, but do **not** particularly care whether a product is **bio-based** or not.

Barriers

- The relatively **low level of awareness and lack of knowledge** about advantages of bio-based products can be a barrier if the fact that products are **bio-based is to be the unique selling point**
- Awareness is **more important** if producers want to **market** their products as **bio-based** than if they choose to advertise a lower price or better properties



Common Theme 1: Awareness and Knowledge



How could these barriers be tackled

- **Communication** should not focus on the fact that a product is bio-based only, but especially **highlight the direct advantages** for the consumers and **positive impacts** of the renewable resource base
- It seems best to go for one of two options when communicating about bio-based products:
 - Option A: informing the consumer that the product is **bio-based**, and providing information what **impacts** this has (in comparison to conventional processes)
 - Option B: inform the consumer that the product is **better and nice to have**, using other arguments while **not mentioning bio-based** at all



Common Theme 2: Associations and Connotations



Important Issues

- Associations are related to **environmental aspects, personal benefits and product properties**.
- Common **misconceptions** (“organic”, “biodegradable or recyclable”)
- Generally **positive attitude but high expectations** (bio-based production aiming for environmentally friendly solutions)
- Economic connotations: **positive** ones are related to rather **global** advantages, while **negative** ones are on a **personal** scale
- Other positive connotations: health benefits and innovativeness
- Other negative connotations: lack of trust (e.g. greenwashing) and ethical issues (competition with food production; GM)

Barriers

- High expectations and misconceptions bring with it the **danger of disappointment**, and consequentially a negative consumption decision
- **Negative** connotations (especially on a personal scale) could prove barriers



Common Theme 2: Associations and Connotations



How could these barriers be tackled

- Unrealistic to overcome the multiple negative connotations with a single instrument, so a **diversified approach** focussing on multiple aspects would be needed
- **Misconceptions** and valid **concerns** can be addressed
 - through **education**
 - through **promotional** and public relations activities of the industry, e.g. using positive connotations for inspiration
- **Environmental connotations** may be addressed through informing the consumer about the results of a life cycle assessment (LCA)
- Lack of **trust** may be tackled through **product branding**



Common Theme 3: Consumption decision and WTP



Important issues

- Consumers generally drawn to environmentally friendly products have a more **positive attitude** towards bio-based products and are willing to pay more for them.
- Most consumers, however, are relatively **unaffected** by the fact that a product is **bio-based**. It counts as an **additional benefit**, but **personal benefits** are far more important in the consumption decision.
- In choice experiments participants seem to prefer **locally produced** materials and products from **non-food crops**
- Willingness to pay more for the fact that a product is bio-based is often linked to clear **communication** (or even proof) about the **benefits** of the resource base

Barriers

- The fact that a product is **bio-based** is only of real importance to a **niche market**
- Most consumers are prepared to pay little or nothing more for a bio-based product



Common Theme 3: Consumption decision and WTP



How could these barriers be tackled

- Brand owners may focus on a **niche market**
- If they want to address a larger market, they should focus **communication on the personal benefits** that bio-based products bring (potentially communicated through a label) and be aware that most consumers are only willing to pay little or no more for bio-based products.
- In some cases no higher price can be charged to the consumer of a bio-based product; in this case brand owners may take the initiative that **actors along the value chain carry the burden** and absorb the higher product costs



Common Theme 4: Information and Labels



Important Issues

- Consumers are **interested in details** about bio-based products that in turn influence their buying decision.
- Info on the benefits of bio-based products is **not readily available**.
- **Labels** might help to fulfil info needs, but are not undisputed.
- A **multitude of ecolabels** exists in Europe, but few of them are specific enough for most bio-based products.

Barriers

- Participants mentioned the **lack of information** as a barrier for not consuming more bio-based products
- A **label** focusing on the fact that a product is **bio-based** would probably **not be convincing** for a general public



Common Theme 4: Information and Labels



How could this barrier be tackled

- A product **being bio-based is just part of the story**, but telling the story works **better with a label than with a text**
- A label presenting information about the product must **not** be a label **for bio-based only**, but tell the entire story. The label should give information about the attributes that are of **personal benefit** for the consumer, about **altruistic motives** like environmental protection or resource conservation, and about the **origin of the raw materials**.
- It is **contradictory**, and therefore a challenge, that consumers indicate they **want to be informed**, but when it comes to putting effort in to informing themselves this switches to **easily available information**, such as a (“simple”) label.

