

## D1.2

# Conceptual framework of the awareness, communication and education toolkits – update

@biovoices



## D1.2

# Conceptual framework of the awareness, communication and education toolkits – update

**DELIVERABLE TYPE**

**Report**

**MONTH AND DATE OF DELIVERY**

Month 20, 31<sup>st</sup> August 2022

**WORK PACKAGE**

**WP 1**

**LEADER**

**UNIBO**

**DISSEMINATION LEVEL**

**Public**

**AUTHORS**

**Grande M., Maccaferri S., Viaggi D.**

**Programme  
H2020**

**Contract Number  
101000539**

**Duration  
24 Months**

**Start  
January 2021**

## Contributors

NAME	ORGANISATION
ALL PARTNERS	

## Peer Reviews

NAME	ORGANISATION
Lily Teitelbaum	BIOCOM
Clément Robijns	BIOCOM
Christin Boldt	BIOCOM
Jana Bielikova	PEDAL
Christina Balla	Q-PLAN
Giulia Treossi	APRE

## Revision History

VERSION	DATE	REVIEWER	MODIFICATIONS
1	21/06/2022	Marco Maria Grande, UNIBO	1st version
2	01/08/2022	ALL	Document review
3	01/09/2022	Giulia Treossi, APRE	Finalization of the document

The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the European Union. Neither the European Union institutions and bodies nor any person acting on their behalf.



## Index of Contents

Executive Summary .....	6
1. Introduction and objective.....	7
2. Methodology.....	8
3. Results .....	10
3.1.1 Beneficiaries.....	10
3.1.2 Needs and interests .....	11
3.1.3 Activities.....	13
3.1.4 Sectors .....	14
3.1.5 How to set up actions .....	14
3.2 Advisory Board survey.....	21
3.3 Additional survey .....	37
3.4 Insights from the validation workshop .....	38
4. Key dimensions of the conceptual framework .....	40
4.1 Overview of the framework.....	40
4.2 Key dimensions .....	40
4.3 Recommendations for the production of the updated version of the toolkits .....	42
5 Discussion.....	48
6. Conclusions .....	49
7. References.....	50
Annex 1.....	54
Annex 2.....	56

## Index of Tables

Table 1. DEMAND SIDE insights from the interviews.....	25
Table 2. SUPPLY SIDE insights from the interviews.....	29
Table 3. MULTIPLIERS and SUPPORTIVE ENVIRONMENT insights from the interviews. ....	34
Table 4. Summary of recommendations for the selected target groups.....	44

## Index of Figures

Figure 1. Methodology to build the conceptual framework.....	8
--	---



Figure 2. From (European Commission, 2020). The map shows the proportion of respondents in each country who mention social networks and the Internet among the main sources of information about the environment..... 16

Figure 3. Conceptual framework structure ..... 40



## Executive Summary

This document presents the conceptual framework to define the strategy for the design of awareness, communication and education toolkits planned in the project (WP1). The deliverable provides guidelines and recommendations to ensure the coverage of the different sectors of the bioeconomy and address the main types of stakeholders. At the same time, it provides suggestions on the actions to be taken (defining the channels, messages, contents, tools, and specific activities), following the needs and interests expressed by the different categories of relevant stakeholders.

The conceptual framework is the result of an analysis of the outcomes of previous projects, the review of the scientific literature and consultations with selected stakeholders. Interviews and a survey were conducted with members of the Advisory Board to validate this analysis, provide insights, new ideas and feedback on the needs and interests of the beneficiaries and suggestions about how to set up the actions. A validation workshop (T1.3.2) was conducted by ZSI to validate the first version of the toolkits, providing recommendations and suggestions for the updated version.

The results highlight the existence of several successful experiences and tools. However, while literature and experiences in traditional sectors of the bioeconomy, such as agriculture and food, is comparatively well developed, both the bioeconomy as a whole and the new bio-based sector are rather poor in both specific conceptual frameworks and specialised tools/toolkits that can be used to foster their full deployment and a meaningful engagement of the different stakeholders.

Considering the scope and objectives of Transition2BIO and the availability of materials and knowledge, for the production of the updated version of the toolkits it is recommended addressing with dedicated toolkits the following categories of stakeholders: citizens, teachers, students and trainees, communicators, policy makers and business.

For the updated version of the toolkits, it is also suggested and recommended in this document to clearly present the motivations and the goals of the toolkits. These should also use a lay language, making the messages and the contents understandable by the related target groups. To make the toolkits more appealing and user friendly, it is suggested to tell success stories and installing navigation aids. This updated conceptual framework also presents recommendations to specifically address the selected categories of stakeholders, taking into account their needs and interest, and the possible gender implications.



# 1. Introduction and objective

The general objective of WP1 is to valorise and exploit sectoral communication tools and activities developed at the national, regional, and local level by EU-funded bioeconomy projects and other relevant initiatives (SO1) for the creation of awareness, communication and education toolkits.

The overall aim of this deliverable (D1.2) is to update the conceptual framework (D1.1 Conceptual framework of the awareness, communication and education toolkits – 1st version) defining the strategy to design the update of the toolkits (T1.3) to:

- provide tailored actionable knowledge tools and contents to guide the update of the toolkits (D1.6);
- ensure the coverage of all bioeconomy sectors in WP1 activities.

This updated conceptual framework is based on the analysis of the target beneficiaries' needs, interests, and motivations, with information and insights from the outcomes of several workshops, surveys, interviews, and other activities implemented by the LIFT, BIOVOICES, BIOWAYS, BLOOM and Biobridges projects, and from the literature review. This analysis is complemented by 9 interviews (9/3 per target beneficiaries' type) with Advisory Board members. The interviews were needed to validate the literature, projects, and initiatives analysis, provide new ideas and recognise priorities and targets' needs and interests in the bioeconomy. D1.1 has been further validated with an additional survey aimed at the Advisory Board members.

D1.2 therefore provides a set of recommendations for the most suitable channels, messages, contents, tools, and activities to be used to target the different stakeholders, providing guidelines for T1.2 (collection of existing information), T1.3 (production of the toolkits), WP2 (for the awareness and public engagement activities), WP3 (for the support activities to Member States and Regions), and WP5 (for the design of the Dissemination and Communication plan and activities).

The remainder of the document is organised as follows. Section 2 illustrates the methodology used to develop the framework. Section 3 illustrates the results of the analysis and consultations. Section 4 summarises the key dimensions of the framework and recommendations for the production of the toolkits.

Section 5 provides a discussion, complemented by conclusions and the way ahead in section 6.



## 2. Methodology

The methodology to build the updated framework is illustrated in Figure 1.

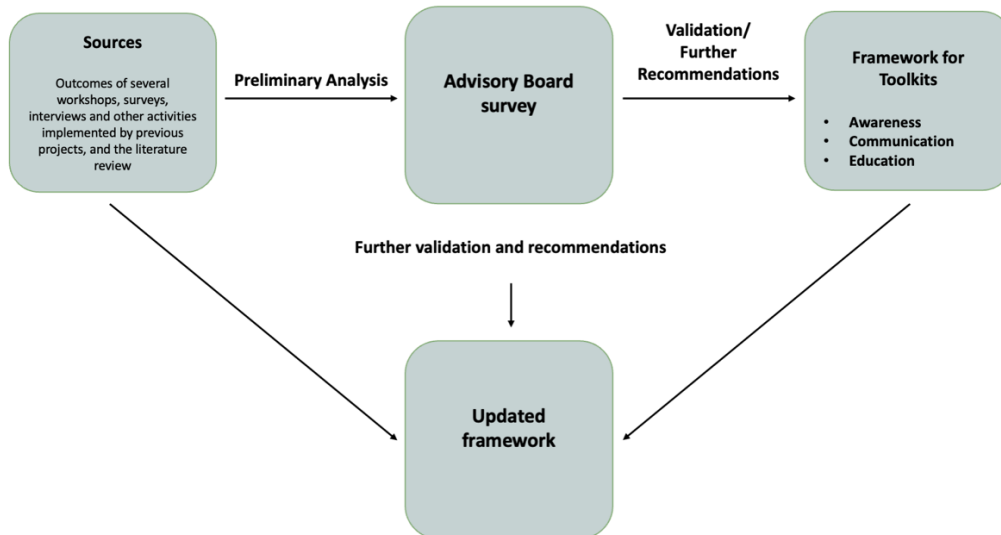


Figure 1. Methodology to build the conceptual framework.

The analysis of the target beneficiaries' needs, interests and motivations is based on the outcomes of several workshops, surveys, interviews, and other activities implemented by the LIFT, BIOVOICES, BIOWAYS, BLOOM and Biobridges H2020 projects, and insights from other CSA projects on bioeconomy and the literature review. This analysis has been conducted during M3 (March 2021).

This analysis has been complemented by 9 interviews (9/3 per target beneficiaries' type) with Advisory Board members and an additional expert.

The Advisory Board is composed of leading experts in their fields from the different bioeconomy sectors, as well as the additional experts involved. Its members have been involved through interviews in the design of the conceptual framework (T1.1), while they provide a review of the project objectives and results to ensure that the activities are sound and pertinent and have a high impact on the community.

The project considers gender as a relevant dimension by including questions addressing gender impacts in the interviews with the Advisory Board members.

The one-to-one interviews have been conducted online during M4 (April 2021) and include thorough and qualitative open-ended questions, where interviewees could express their opinions. The aim was to validate the literature, projects, and initiatives analysis, provide new ideas and recognise priorities and targets' needs and interests in the bioeconomy, guiding the production of the awareness, communication and education toolkits (T1.3).

A version of the survey template is available as Annex 1.





The results of the survey in Section 3 collect the relevant and meaningful quotes from the interviews for each item of the survey.

Given the limited number of interviews, the relevant quotes from each one were merged in tables 1, 2 and 3 without substantial elaborations. Moreover, the repetition of the same concepts provided by different experts has been avoided.

The results of these activities were publicly delivered in the Deliverable 1.1 – Conceptual framework of the awareness, communication and education toolkits – first version.

The document has been further validated during M14 (February 2022) by four members of the Advisory Board and the additional expert through a survey with qualitative open-ended questions, collecting feedback about both the conceptual framework and the toolkits (D1.5).

A version of the additional survey template is available as Annex 2.

In M12 (December 2021), ZSI organised a validation workshop (T1.3.2) with the involvement of the other partners, engaging 20 participants to validate the first version of the toolkits. Insights from the results of the workshop are presented in Section 3.

In M9 (September 2021), the first version of the toolkits (D1.5) was delivered by BIOCOM. For the update of the toolkits, coordination and alignment meetings have been arranged with BIOCOM and the other partners of Transition2BIO in M13 (January 2022), M16 (April 2022), M18 (June 2022), and M19 (July 2022). Feedback from these meetings has informed and guided the update of the conceptual framework and the concept for the update of the toolkits, also identifying and selecting a subset of stakeholders to be addressed with dedicated toolkits.

In Section 4, recommendations for the production of the updated version of the toolkits are presented and summarised, also taking into account the limitations of the available materials and knowledge and the priorities of the Transition2BIO project.



## 3. Results

### 3.1 Analysis of previous projects and initiatives and the literature review

#### 3.1.1 Beneficiaries

The transition towards the bioeconomy requires a profound transformation on different sides of the economy and involves different multipliers.

Hence, raising public awareness and knowledge about the bioeconomy and its environmental and socio-economic impacts among a wide range of stakeholders is a prominent consideration.

To provide recommendations and suggestions for the production of the first version of the toolkits, we have initially considered different target groups as described in the DoA of Transition2BIO, namely:

- **DEMAND SIDE** (consumers, citizens, B2B, public procurers, etc.; physical persons in the first two categories can further be classified according to demographic characteristics, such as age, with a focus on young people as the main target for some actions; several of these groups may also be target together under more generic labels, for example the one of general public);
- **SUPPLY SIDE** (primary production, production industries, biorefineries, etc.; the supply side actors may also be distinguished based on sector/value chain or by structural characteristics, e.g. large industry, SMEs, micro family-managed companies);
- **MULTIPLIERS** and **SUPPORTIVE ENVIRONMENT** (EUBIONET, citizens' organisations, NGOs and other associations, brands, retailers, teachers, EU-funded projects and initiatives, influencers, media, policy makers, regional authorities, initiatives, networks, clusters, etc.).

The toolkits should promote bioeconomy from different perspectives and objectives, producing the package of knowledge and supportive media (contents, info-graphic, videos, podcasts, presentations, etc.):

1) For the **DEMAND SIDE** - The objective of this toolkit is to raise awareness and educate the demand side about bioeconomy at large and its benefits for them, in particular: *What is bioeconomy? What are the bioeconomy areas? What are the benefits and impacts for the society, the environment and the economy? What is the contribution of the demand side in driving the transition towards a more sustainable consumption and lifestyle?* etc. This toolkit will provide practical and inspiring examples and stories, like the ones successfully used in the context of the Bioeconomy Village (BIOWAYS) and the BioART gallery (BIOVOICES) and the "Bioeconomy in everyday life" exhibition (BioSTEP).

2) For the **SUPPLY SIDE** - The objective of the toolkit is to raise awareness and educate about bioeconomy at large and its benefits, and highlight the economic opportunities (business,



development and jobs) for them. As an example, primary producers (farmers, fisherman, forestry owners, etc.) may benefit from income diversification opportunities that may arise from a sustainable and circular bioeconomy. Also, they might not be aware of interesting small-scale business models associated with the bioeconomy. Selected questions that could be addressed by this toolkit: *What is bioeconomy? What are the bioeconomy areas? What are the opportunities for my sector? What are promising regional business models? How can I valorise my residues? What is the contribution of the supply side in driving the transition towards a more sustainable production? What are possible financial opportunities for bioeconomy sectors?* etc. The toolkit will provide practical and inspiring examples and stories also taking up results from the European Network for Rural Development, BE-Rural, Power4Bio among others.

3) For the **MULTIPLIERS** and **SUPPORTIVE ENVIRONMENT** – The objective of the toolkit is to raise awareness and engage this target group in education activities about bioeconomy at large and its benefits for different stakeholders, providing skills, methodologies, knowledge, and tools. In particular, the toolkit will support multipliers in developing a bioeconomy communication strategy and communicating research results. A selected question that could be addressed by this toolkit is *How to communicate and support bioeconomy?* This toolkit will present practical and inspiring examples and stories, also providing useful insights from the results of BLOOM, SHERPA, DANDELION, Biobridges, and BIOVOICES among others.

### 3.1.2 Needs and interests

To raise awareness and engage beneficiaries in education activities, first of all, it is necessary to remove any obstacles to clear and correct information, addressing their needs and issues. After that, it is useful to understand and stimulate their interests and motivations.

- Target beneficiaries' needs

**EU population** finds information about bioeconomy and bio-based products (BBPs) with difficulties (BIOWAYS, 2017a), and, even if **consumers** usually have positive impressions of these products, they need access to more information. There are also misunderstandings about some concepts, one of which is the confusion between "bio-based" and "organic", due to the use of "bio" for some organic products (BIOWAYS, 2017a; Dallendörfer, et al., 2022). Moreover, the "bio" confusion is also related to the difference between BBPs and biodegradable products (Biobridges, 2020d).

To address these misconceptions, the Biobridges project proposes to "create a 'Glossary of the Bioeconomy', presenting scientific and standard definitions using a comprehensible language to be disseminated among **the large public**" (Biobridges, 2020a). An example of glossary table can be found in AllThings.Bio (BioCannDo, b), while a more policy-oriented glossary is provided by the Knowledge Centre for Bioeconomy (Knowledge Centre for Bioeconomy, s.d.).

Biobridges identifies (Biobridges, 2020c) also the communication needs in the bio-based economy, mainly summarized: the promotion of business opportunities, growth of the market,



awareness of bio-based applications and opportunities, need for skilled workers and trust in BBPs; the communication of environmental and socio-economic benefits of bioeconomy and its circularity aspects.

Furthermore, in Europe there are just a few academic bioeconomy courses covering the social-scientific perspective, limiting the **transdisciplinarity of education** (Masiero, et al., 2020).

- Interests and motivations

The vast majority of European citizens seem concerned about protecting the environment, and one-third of them would support a change in consumption, at the same time one in four would like more information and education (European Commission, 2020).

There is a growing and positive interest of **multipliers and supportive environment stakeholders** in BBPs and bioeconomy (BIOVOICES, 2018; BIOWAYS, 2018c; Stern, et al., 2018), but the level of public knowledge and engagement struggles to grow (BIOWAYS, 2018c).

**Consumers** usually prefer BBPs over their conventional equivalents, though high costs and the lack of available and proper labelling hinder this choice (BIOWAYS, 2018c; Mehta, et al., 2021).

**Multipliers and supportive environment stakeholders** usually believe that BBPs can lead to environmental benefits, particularly the decrease of the use of fossil fuels and waste and greenhouse gases production, and the increase of sustainable economics and job opportunities (BIOWAYS, 2018c).

Alongside environmental issues, a study about **bioeconomy perceptions** shows that for some stakeholders' categories in Austria there are some doubts about the feasibility of a future bioeconomy (Stern, et al., 2018). In detail, **students** seem to be more curious and interested in bioeconomy than others, while **pensioners** are positive and more interested in "back to nature" and "quality of life" aspects. **Farmers** focus on "back to nature" aspect too, but they are also more critical and doubtful about the sustainability and effectiveness of the bioeconomy, believing it could lead to more inequity. As the authors of the study suggest, to address these fears and doubts it could be useful to provide concrete examples about the possibilities of bioeconomy.

However, in Sweden, a positive perception of bioeconomy seems to not change among different stakeholders in the forestry sector, like **Environmental Non-Governmental Organizations, industry, and forest owners** (Hodge, Brukas, & Giurca, 2017).

A study focused on German people found that there is a high support level in the **population** for the bioeconomy regarding the possible positive impacts on the environment and economy, but there are some concerns related to the use of genetic engineering in agriculture (Dallendörfer, et al., 2022).

A consultation of the Biobridges project (Biobridges, 2020d) also showed that **young people** are more interested in BBPs' end-of-life information, while **elders** are more interested in BBPs' biodegradability.



### 3.1.3 Activities

The conceptual framework provides guidelines for the collection of contents, tools, databases, platforms, and good practices (T1.2), and for the production of the awareness, communication and education toolkits (T1.3).

Awareness, communication and education are different kinds of activities, each with a different role in the Bioeconomy.

Each of these fields requires different approaches and tools. At the same time, however, they are related to each other, for two different reasons:

- they are complementary in mobilising a behavioural change;
- there may be a need for a specific combination of the different types of activities depending on the context and starting point of Bioeconomy knowledge.

**Awareness** is intended as the knowledge or perception of a situation, and related actions are aiming at increasing such knowledge about the Bioeconomy (awareness-rising activities). The development of the bioeconomy and the increase of more sustainable consumption need to raise awareness and knowledge sharing of the environmental and socio-economic impacts of the bioeconomy, both in detail and at large, and of BBPs (European Commission, 2018; LIFT, 2020a).

Stakeholders' engagement in these activities is a primary step (LIFT, 2020c) to be carried out mainly at the regional and local levels with various messages, tools, and points of view (LIFT, 2020a).

**Communication** involves the exchange of information in a rather general way (though it usually requires a clear identification of targets). Bioeconomy holds some concepts that are difficult to understand and communicate, with complex terminology that can lead to misunderstandings and concerns (LIFT, 2020a). Moreover, not every type of stakeholder is engaged in all contexts and initiatives, with the consequent lack of responses to their needs in the agenda-setting. It is therefore useful to create connections with less reached stakeholders, creating a framework to engage each type of target at different levels (LIFT, 2020c).

**Education** involves the process of systematic instruction, especially (but not only) provided through formal institutions. According to the Updated Bioeconomy Strategy of the European Commission (2018), "The systemic and cross-cutting nature of new and emerging bioeconomy approaches and new value chains will need new education and skills". Education, indeed, is pivotal to address the challenges and exploit the opportunities of the bioeconomy (LIFT, 2020b). Education needs could be fulfilled by different educational institutions, as schools and universities courses, vocational training, and life-long learning programmes, with the need to increase the offer of the programmes, covering all the sectors and skills related to the bioeconomy (European Commission, 2018; LIFT, 2020b).



Skills needed in the bioeconomy include more and more **transversal skills** and competences (LIFT, 2020b; Pubule, et al., 2020), and the Transition2BIO project will cover the topic in a specific policy brief (D3.7). To develop these skills, formal, non-formal and informal education platforms can be promoted, responding to different generational and regional needs and preferences (Hakovirta & Lucia, 2019). Wensing et al. (2021) argued that “**systems thinking** could potentially be considered as a subject taught in schools and universities (Urmetzer, et al., 2020), for instance in a role similar to that of civics education, in order to facilitate a broader cultural transition”.

The H2020 LIFT project (2020a) – *Boosting bioeconomy by maximizing CSAs results* collected on the European Bioeconomy Library awareness-raising materials and tools developed by several Coordination and Support Actions projects.

### 3.1.4 Sectors

The project accounts for bioeconomy at large and the related environmental and socio-economic impacts for European citizens.

At the international level, however, there is neither a clear definition of bioeconomy, a concept that has changed over time to address new challenges, nor a clear classification of its key sectors (Beluhova-Uzunova, Shishkova, & Ivanova, 2019). Even if there are some definitions provided by international institutions and organisations, there is no agreed definition implying a common policy framework and hence with normative strength for each single state or with a unique reference.

Following classifications elaborated by the JRC (2017), the Updated Bioeconomy Strategy (2018), and Ronzon & M'Barek (2018), all bioeconomy sectors are covered by the WP1 activities, namely:

- a. land and marine ecosystems, including the services they provide;
- b. all primary production sectors using and producing natural resources (agriculture, forestry, fisheries and aquaculture);
- c. all economic and industrial sectors using natural resources and processes to produce food, feed, BBPs (bio-based textiles, chemicals, pharmaceuticals, plastics and rubber), wood products and furniture, paper, bioelectricity and liquid biofuels;
- d. bio-based services and all support sectors relevant to unlock the full deployment of bioeconomy (regulatory, normative, risk assessment, technology transfer, investment, IPR, dissemination, etc.).

### 3.1.5 How to set up actions

Here are listed recommendations and guidelines about how to engage beneficiaries and communicate knowledge and information. Evidence and suggestions were collected from other projects and the literature review, suggesting the most suitable *channels* to reach the target



groups, *messages* to frame the *contents* to communicate, usable *tools*, also proposing *specific activities*.

- Channels

Different channels make it possible to reach different types of stakeholders. Furthermore, each channel allows only certain types of tools. The messages and contents should be specifically tailored to the channels as well, due to the different targets that can be intercepted with each channel and the allowed formats.

Among the press and technical and policy documents, the word "bioeconomy" is already spreading (Masiero, et al., 2020), though there are some **limitations for citizens** (BIOWAYS, 2017a).

For **students of forestry programmes** in Europe, for example, the principal sources of information about bioeconomy are, in order, university courses, news, scientific papers, social media, colleagues and conferences (Masiero, et al., 2020).

The consultation conducted by the Biobridges project (Biobridges, 2020d) showed that European **consumers** of different ages prefer to receive information about BBPs from researchers and brands, through TV and social media. To target **young people**, Biobridges especially suggests using social media (Biobridges, 2020a).

**Teachers** enjoy mass media and social media, usually in their native language (DESIRE, 2013). Twitter seems to be more appreciated by them among social media, while other useful professional social media to engage educators are national platforms for teachers and educational blogs. Nevertheless, this could apply more to western countries of Europe, since this social media seems less popular in central and eastern Europe (Lenormand, Tugores, Colet, & Ramasco, 2014). When possible, face-to-face activities could be preferred as they are very effective (DESIRE, 2013).

Considering the **EU population**, the Special Eurobarometer Report "*Attitudes of Europeans towards the Environment*" (European Commission, 2020) shows that the main sources of information about the environment are, in order, 'Television News', 'Social Networks and the Internet', and 'Newspapers'. In particular, with the increasing age of citizens, there is an increase in the use of television and newspapers, while social media and the internet are more used by young people. Furthermore, social media use is different at a geographical level, as shown in Figure 2.



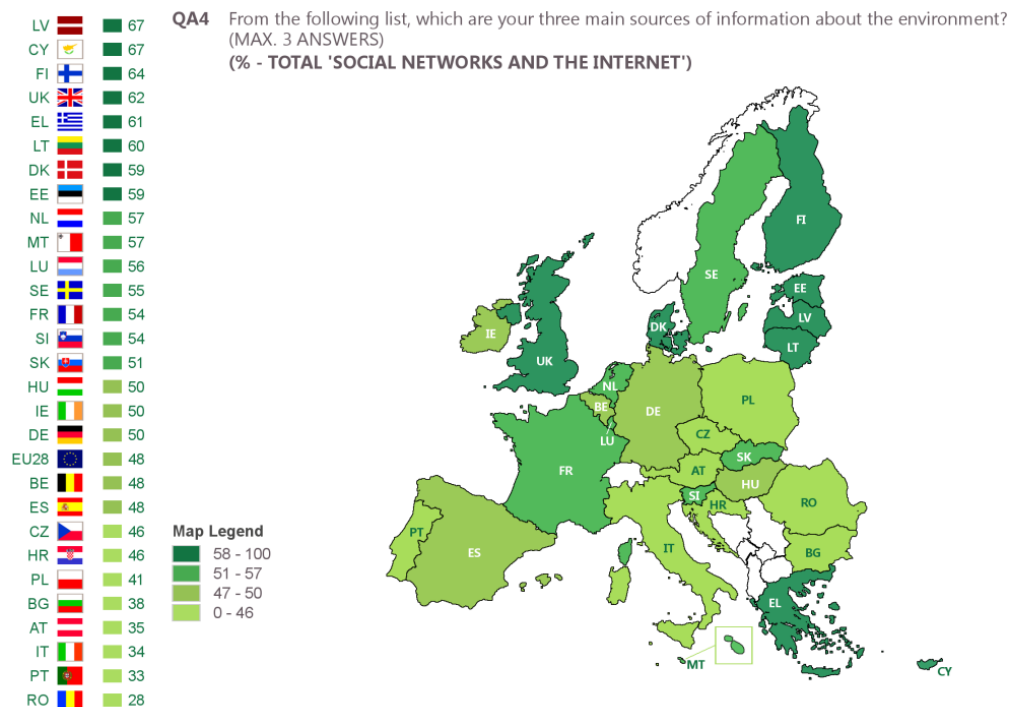


Figure 2. From (European Commission, 2020). The map shows the proportion of respondents in each country who mention social networks and the Internet among the main sources of information about the environment.

Communication activities should be tailored also to the chosen channels, otherwise running the risk of not fully exploiting their potential and not reaching the targets of interest (CommFABnet, 2014). LIFT insights (2020a) about the design of impactful awareness and communication strategies recommend the use of innovative channels (large scale events, science festivals, workshops, fairs, social media), but innovative formats are not seen as a positive aspect by people (BIOWAYS, 2017b; BioCannDo, 2020). Instead, traditional formats are preferred, but with innovative content easily redistributable through the compatible channels (BioCannDo, 2020). Indeed, **the general public** usually prefers formats they are familiar with, and innovative formats could be mistaken for other traditional formats or not be technically properly embedded or shared through external partners' and supporters' channels (BIOWAYS, 2017b; BioCannDo, 2020).

The BLOOM project published an outreach and engagement guidebook (BLOOM, 2020a), which provides useful information on different channels and tools to be used based on the objectives to be achieved and the desired level of stakeholders' engagement:

- Informing stakeholders (public exhibitions, local TV discussions, short animation videos, newsletters, co-created monographs, lecture series, interviews);
- Consulting stakeholders ("real life examples" brochures, podium discussions, gallery walks, participation in conferences);
- Involving stakeholders (social media campaigns, science cafés, online conferences, webinars, multi-sensory exhibitions and experiences);
- Collaborating with stakeholders (civic dialogues, *Open Space Technology* events, study and ambassador study trips, outdoor games for families, innovation bus tour, escape rooms, MOOCs);





- Empowering stakeholders (collections of teaching resources, challenge prizes, deliberative workshops, round tables, workshops, *world cafés*).

- Messages

The core messages of the toolkits will concern the specific interests of the stakeholders of the DEMAND SIDE (*What is bioeconomy?*), of the SUPPLY SIDE (*What are the bioeconomy opportunities for you?*) and of the MULTIPLIERS / SUPPORTIVE ENVIRONMENT (*How to communicate and support bioeconomy?*).

To address these interests, it is essential to decide how to frame the key messages, taking into account the needs and motivations of the target groups.

The demand for environmentally friendly and sustainable products is growing (BioCannDo, 2020), as well as "green" advertising claims are increasing. At the same time, however, there is not enough awareness and clarity about BBPs, and the origin of the raw materials and information on innovative biobased processes alone are not enough to convince many consumers. In fact, communication about these products risks creating suspicion and being considered greenwashing (BioCannDo, 2020). The choice of key messages and how to convey them to the target groups to raise awareness, communicate and educate about bioeconomy is therefore a difficult and delicate action.

To address suspicions and reluctances of **consumers**, messages should be based on a solid scientific background made understandable with a lay language, avoiding jargon and technical languages (LIFT, 2020a). They should also be presented in an honest and transparent way, showing practical and concrete applications of interest to the target groups (BioCannDo, 2020). Communication should be based also "on robust and rigorous sustainability studies that consider social and environmental issues across the entire life cycle" (Fletcher, et al., 2021).

The key messages then should be adapted to the target audience (BioCannDo, 2019), facilitating its involvement.

Addressing **consumers**, the engagement can be stimulated by letting them share their stories and opinions about the message, while, addressing **experts**, it is needed to ensure representativeness and avoid biases (BioCannDo, 2020). It may also be useful to underline the incentives for stakeholders' engagement, which may be financial or networking and information sharing opportunities.

Furthermore, the Road To Bio project suggests (Road To Bio, 2019) to set the messages to be concise, relevant, compelling, memorable, real, and tailored. In particular, the messages to be communicated should be few and briefly presented, showing the benefits, responding to audience needs and stimulating actions.

It may be useful to choose messages that show the uses and benefits of BBPs, going into the details of their environmental, social and personal performances and impacts (BioCannDo, 2019; 2020; Biobridges, 2020a; Wensing, et al., 2021), as well as economic information. The



biodegradability and disposal of these products are other important elements of interest for **consumers**, that should be communicated in a clear and transparent manner, coherently with the provisions and possibilities of regional and local authorities (BioCannDo, 2020; Mehta, et al., 2021).

To improve the perception of the positive impacts of the bioeconomy, the Biobridges project (2020a) recommends explaining specific potential benefits to different stakeholders, as:

- **Primary producers** – “to explain how to valorise unexploited resources that could enable them to increase their incomes”;
- **Policymakers** – “to stimulate them to boost the rural development through the definition of strategies and the investment of public resources”;
- **Unemployed people** – “to explain new possible opportunities”;
- **Young generations** – “to guide them towards educational and career paths that could develop their skills for future jobs in the sector”.

Road To Bio (2019) and BLOOM (2020b) projects propose some key messages about bioeconomy, that could be summarised as:

- BBPs can replace fossil fuels by using new renewable raw materials, reducing pollution, greenhouse gases emissions and the damage to the environment;
- The use of reusable and transformable raw materials allows the development of a circular economy, more efficient than a linear economy based on fossil sources;
- Careful management is required in order to avoid goal conflicts, e.g. problems for food production and safety, improving the efficiency of biomass use;
- Sustainable bioeconomy can help achieve several SDGs;
- Bioeconomy includes and involves different types of processes and industries, stimulating economic opportunities for farmers;
- Biomass resources are region-specific;
- To change purchasing choices, more information about bioeconomy and BBPs is needed;
- Bioeconomy can lead to job creation, and specific educational programmes will train the new workforce.

**Consumer** surveys conducted by BioCannDo (2019) have shown that topics such as innovativeness, biomass cropping issues and ethical issues, like competition with food and genetic modification, seem to be less important in purchasing decisions.

Communicating the scientific aspects of the bioeconomy, it is necessary to show the extent of our actual knowledge and the transparency and inherent uncertainty of research outcomes (Druckman, 2015).



- Contents

Awareness, communication and education activities should communicate objective and complete information and knowledge, which should be scientifically correct but at the same time relevant and in an understandable language for the target group (BioCannDo, 2020; LIFT, 2020a).

In general, using stories and storytelling helps create a framework for the interpretation of the contents, combining data and information with the values, emotions and personal experiences of the target groups (LIFT, 2020a). If stories show positive examples, especially concerning topics widely debated among the stakeholders, raising awareness and motivations is favoured (CommFABnet, 2014; Biobridges, 2020a; LIFT, 2020c).

Stories make contents more appealing, and they should be “unique, exploiting some details that catch the eye, that have a special and striking twist”, as suggested by the DESIRE Reach Out Toolkit (DESIRE, 2013).

Examples of stories are provided by BioCannDo with storytelling kits about specific categories of BBPs (BioCannDo, c).

To increase awareness and acceptance, it is also useful to show the impacts and benefits of BBPs to **consumers** (BioCannDo, 2020; LIFT, 2020a). In particular, it is important to emphasize the additional benefits for **consumers**, especially when they are not immediate and easily understandable, even going beyond the mere difference in the origin of the raw materials (BioCannDo, 2020). Furthermore, when communicating to **industry** and **policymakers**, it is advisable to make information understandable and relevant from a business or policy point of view (CommFABnet, 2014).

BioCannDo project insights (2020) suggest using “Q&A” formats to address the shared doubts and knowledge needs of the audience.

To maintain the support of the population for the bioeconomy, Dallendörfer et al. (2022) suggested communicating “about the bioeconomy not just in terms of an abstract concept, but also in terms of concrete projects and their specific benefits, limitations and tradeoffs.”

- Tools

Tools allow conveying messages and contents through compatible channels, and should also be used according to the objectives, the type of stakeholders and the age of the audience.

For example, exhibitions can be used to show relevant and current aspects of the bioeconomy and BBPs, while "hands-on" activities can help engage **younger people** by showing them the bioeconomy and its processes (LIFT, 2020a). Moreover, webinars can also combine the dissemination of project results with external contributions from different points of view (BioCannDo, 2020).



Comics, animations and other visual narratives can be used to allow **general audiences** to understand bioeconomy science (Farinella, 2018), while serious games can be used to effectively make the audiences aware (Wendler & Shuttleworth, 2019) and to engage **teachers and students** even if the game is developed in an elementary way (Affatato, et al., 2021). Examples of cartoon visual communications about the bioeconomy can be found on the Global Bioeconomy Summit website (2020a; 2020b).

Examples of tools for the bioeconomy and BBPs have been collected by BIOWAYS (BIOWAYS, s.d.) in a toolkit that presents serious games, quizzes, educational videos, factsheets, and presentations. An online platform was created by BioCannDo with promotional communication tools (BioCannDo, a; LIFT, 2020a).

Other examples of tools, to be used based on the objectives to be achieved and the desired level of stakeholders' engagement, can be found on BLOOM outreach and engagement guidebook (BLOOM, 2020a).

- Specific activities

To involve the target groups of the Transition2BIO project, different kinds of activities can be useful.

Extensive and comprehensive lists and descriptions of activities aimed at different types of stakeholders were collected by the BLOOM project in its *Guidebook on engagement and co-creation methodologies* (BLOOM, 2018).

In particular, the Guidebook explains that co-creation workshops could be used to empower stakeholders by helping them to “design and deliver services themselves”.

As the LIFT project pointed out in the factsheet *Stakeholder Engagement and Co-creation* (LIFT, 2020c), “Co-creation, e.g., through Mobilisation and Mutual Learning (MML), is a process which ensures that all stakeholders are involved in the design of future industrial and policy agendas, integrating their ideas and concerns to jointly identify and address opportunities, challenges and risks. This approach contributes to responsible policy making and strategic agenda setting, which takes into consideration mutual perspectives, including ‘citizens’ views of the challenges and opportunities.”

This is coherent with what emerged from BIOVOICES quadruple-helix stakeholders interviews (BIOVOICES, 2018), which shows that “MML events are a powerful and extremely useful forum for approaching the challenges of implementing bio-based industries and agriculture, by bringing together representatives of the 4-helix stakeholders groups (business, civil society/users, research, government/policy making).”

Based on previous experience, Biobridges (2020b) provided detailed information and recommendations on how to design and implement co-creation and MML workshops.



Another kind of activities that could be used to provide more learning opportunities to **children** and **young people** is informal education (Hakovirta & Lucia, 2019), which is usually provided by museums, libraries, nature centres, and other types of organisations.

### 3.2 Advisory Board survey

Advisory Board members and an additional expert representing quadruple-helix stakeholders have been interviewed, providing recommendations and suggestions for the improvement of the conceptual framework.

The survey template of the interview is available as annex 1.

#### **How to ensure the coverage of all bioeconomy sectors**

Interviewed experts confirmed the validity of the bioeconomy sectors' classification listed in Section 4.5 of D1.1. They argued that it is coherent with the usual classification criteria used by bioeconomy institutions and allows to cover the bioeconomy at large.

Nevertheless, most of the involved experts recommended including specific sub-sectors, going into more detail in the listed categories:

- The bio-based building sector should be included in the category “c. all economic and industrial sectors using natural resources and processes to produce food, feed, BBPs (bio-based textiles, chemicals, pharmaceuticals, plastics and rubber), wood products and furniture, paper, bioelectricity and liquid biofuels.”
- Biochemicals and bio-based green chemistry sectors should be better detailed.
- Bio-based packaging producers (polymers producers and producers that use polymers) should be included, as well as the biomaterials sector.
- Sustainable production systems, which include the sustainable input part and sustainable use of natural resources in the bioeconomy (caring of the soil, water and air), should be mentioned under a different category or in more detail under the category “b. all primary production sectors using and producing natural resources (agriculture, forestry, fisheries and aquaculture.”
- Institutions addressing biodiversity conservation, valorisation, and research should be present in the category “a. land and marine ecosystems, including the services they provide.”
- An important aspect that should be included also in the category “b. all primary production sectors using and producing natural resources (agriculture, forestry, fisheries and aquaculture)” is the role of microorganisms. In the near future, microbial biomass (bacteria, fungi, algae) will be a pivotal primary source of different resources,



including food and feed, using by-products of other production chains in a circular approach.

- In the category “d. bio-based services and all support sectors relevant to unlock the full deployment of bioeconomy (regulatory, normative, risk assessment, technology transfer, investment, IPR, dissemination, etc.)” the linkages to the European research infrastructures which provide this kind of services (e.g., MIRRI, EMBRC, BBMRI, ELIXIR, OPENSREEN, etc.) and their national nodes should be also outlined.
- It may be useful to consider, from a circular economy perspective, the recovery of waste from the agri-food sector to create added value in the food, agriculture, pharmaceutical and cosmetic, and energy sectors.
- It could also be useful to consider the points of contact with the circular economy sectors related to plastics and metals.

One member of the Advisory Board suggested that another possible classification criterion could take into account a census of the fluxes of raw materials and secondary raw materials, considering which materials are potentially bio-available with a mapping of the fluxes, seasonality and availability of materials. This affects suppliers, manufacturers, and application sectors across the board.

Some of the experts suggested to also consider industries and SMEs as part of the DEMAND SIDE and not only of the SUPPLY one.

Another one took into account how to properly communicate bioeconomy extent and diversity. She suggested tailoring sectors classification to the different audiences by making it understandable and showing the extension of the bioeconomy.

In particular, according to her the economic sectors classification (e.g., “primary, secondary, tertiary” classification criterion) is easier to understand for consumers, while the conceptual framework’s sectors classification is more technical and understandable by those who already know the bioeconomy. Furthermore, it was recommended that science advice to policymakers about the bioeconomy sectors extension should be particularly cared of, in order to avoid possible policy issues of not taking into account the bioeconomy at large.

### **How to properly divide and define the target groups**

The different target groups were identified in a proper way in Section 4.2 of D1.1, especially for the MULTIPLIERS and SUPPORTIVE ENVIRONMENT SIDE; experts reported.

All the respondents recommended paying particular attention to the engagement of different specific stakeholders of the target groups, as well as reflecting on the specificities within the same stakeholders:

- Teachers, as the whole education sector are considered very important to address a change. It was also suggested to consider the vocational training sector, as it can help fill the gap of the required skills for the workforce.



It was pointed out that teachers' perception and engagement could be different, as it could depend on the subject they teach.

- It is fundamental to interface and involve the university and research systems.
- Bankers and investors are considered another important type of stakeholders, as investments are needed for the transition to the bioeconomy, and investors need to know bioeconomy to know the extent of the risk they take in financing start-ups and other innovators.
- Farm-to-fork stakeholders involved in the bioeconomy chain or systems should also be considered.
- Green procurers should know more about how to do green bio-based materials procurement.
- Consumer's organisations could be engaged for making understand and promoting bioeconomy.
- Primary production cooperatives, big farms, or farmers organisations, like the chambers of agriculture, could be approached to connect them with the modern bioeconomy concepts and with other sectors.
- Involving environmental NGOs and stakeholders of the social sectors could help achieve good results in communication activities.

One of the experts also pointed out that other possible classifications are possible:

- dividing the private side (primary production and processing) and the public side (society). Within the society side, consumers, multipliers and supportive environment could be also differentiated.
- Taking into account that teachers and organisations are intermediate steps to reach other target groups.

### **How to set up actions**

Interviews went into detail of the specificities of the different target groups for each activity, focusing on target group's needs and interests, the core message(s) to be conveyed, the most suitable tools and good practices to better communicate and engage, and the possible impacts on the social and gender dimensions.

### **DEMAND SIDE**

According to the consulted experts, consumers are interested in sustainability and bioeconomy, but they need clear and reliable information about bioeconomy and BBPs. So, they can compare BBPs and traditional fossil-based products about their impacts, performances, and cost reasons.



It was pointed out that the general public usually enjoys information materials in its mother tongue, and that permanent institutional web sites should be created to provide useful information for each target groups.

Using practical activities and telling successful stories were indicated as a good way to communicate and engage this target group. Different kind of professional can provide them useful advice for purchasing bio-based alternatives. To show the bioeconomy in a practical way, BBPs exhibits in big fairs were suggested as a useful tool, as well as web and social media opportunities, and of traditional media too. Furthermore, public authorities should be involved to help disseminate information on the bioeconomy, and training courses providing credits could foster education activities.

Addressing citizens, families and students, challenge-based activities should be used, as they are very useful for the empowerment of these categories, leading to find solutions from below.

It was underlined the real importance to take into account social and gender aspects and impacts. Given that some BBPs are aimed at a specific gender, it is needed to keep in mind the needs of that gender.

Furthermore, since women are very often involved in purchasing decision or in influencing purchasing decision, they can play an important role in the transition to bioeconomy.

The need to involve and depict women and girls in events and graphic materials was also pointed out, so that especially young women can be inspired to pursue certain choices or career paths.

Another aspect of the social dimension is the important social value bioeconomy can have since some sectors could involve disadvantaged people in different activities.

In Table 1, the insights from the interviews for the DEMAND SIDE are listed.



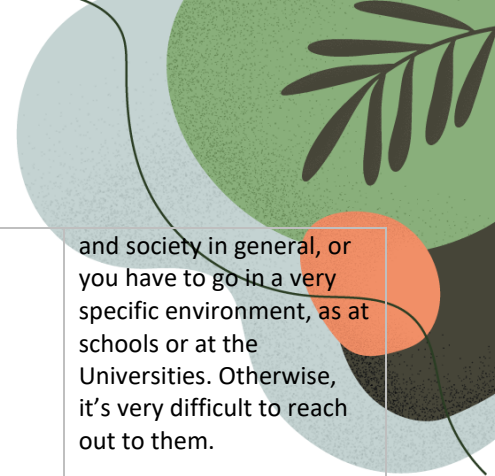


Table 1. DEMAND SIDE insights from the interviews.

Activities	Needs and interests	Core message(s)	Gender impacts	Most suitable tools	Good practices
Awareness	<p>-“Ordinary” people are very interested in actively participating in the development of the society, reducing the CO2 concentration, etc.</p> <p>-This side’s stakeholders may prefer greener and, especially for the companies in the demand side, affordable products for a cleaner future.</p> <p>-If consumers know the different socio-economic and environmental impacts of BBPs, they would accept a price increase.</p> <p>-It could be argued that, at this stage, raising awareness is far more important than educating people, though the three different Activities are related.</p>	<p>-If you come as a kind of an expert, you could convince them that there is no danger in using BBPs, but you must be able to document that they work as well as conventional ones and can compete in the price as well or what are the reasons for the difference in costs.</p> <p>-We need to provide practical examples of what areas we can act in and why it has not yet been done.</p> <p>-We must also show how we can recover this lack of action, also considering that in some sectors it is easier to recover while in others it is more difficult.</p> <p>-It could be useful to explain to families and</p>	<p>-Many of the innovations in the bioeconomy come from women, and women are who usually make purchasing decisions as consumers or procurement officers. So, they can greatly support the transition to bioeconomy, if properly informed.</p> <p>-Women and girls should be represented and depicted in bioeconomy events and graphic materials, so that they can identify themselves with them and understand that they can play a role in the bioeconomy.</p> <p>-It should be considered that there</p>	<p>-Exhibit of BBPs in fairs, showing the bioeconomy in a practical way. It works really well.</p>	<p>-Using practical and creative activities.</p> <p>-Aware architects and other professionals could provide important advice in purchasing decisions.</p> <p>-Exhibit of BBPs in fairs.</p> <p>-Take action to correct the perception of the role of all biodiversity, including the conservation of microorganisms whose perception is not always positive.</p> <p>-Addressing citizens, families and students, challenge-based activities are very useful for the empowerment of these categories, finding solutions from below.</p>



		<p>restaurateurs the impact of food waste, as well as the importance of recycling, mainly showing the opportunities offered by waste recovery from a circular economy perspective.</p>	<p>is gender imbalance at the management level.</p> <p>-The bioeconomy can have an important social value, involving disadvantaged people in raising awareness activities and in the creation of jobs (e.g., in urban gardens and in the conservation and valorisation of biodiversity).</p> <p>-Contents should be gender neutral.</p>		
Communication	<p>-Consumers need transparent and reliable information about BBPs and their environmental performances. A proper labelling system could help.</p> <p>-How to approach the target groups can vary very much based on the country and the region of interest.</p> <p>-Most of the general public usually enjoy information</p>	<p>-Bioeconomy sectors should be shown in a simple and understandable way, making the audience understand the extension of the bioeconomy.</p>	<p>-It could be useful to keep in mind gender specific needs and the peculiarity of BBPs aimed at a specific gender, e.g., personal hygiene products.</p>	<p>-Communication campaigns, especially using web tools and social media, as they work well, particularly for wider publics.</p> <p>-Also, TV and TV broadcasts could be useful, as a lot of people continues watching them.</p>	<p>-Using good stories and good examples, the most convincing.</p> <p>-To effectively engage public procurers, you have to do in advance a kind of prep meeting with them, where you can investigate what they do need, how they need it and then you can approach them.</p> <p>-Public authorities can help you engage citizens</p>



	<p>materials in its mother tongue.</p> <p>-You have to identify their main source of information: public authorities can help disseminate information on the bioeconomy, so they should be involved. Permanent institutional sites that are easily accessible by everyone are needed. There you should find updated information and data, and legislative and dissemination documents made available with a fair approach. Information should then be tailored at a national and regional level.</p>				<p>and society in general, or you have to go in a very specific environment, as at schools or at the Universities. Otherwise, it's very difficult to reach out to them.</p>
Education	<p>-Ageing issue: those who are linked with the primary production are ageing. Society at large still considers agriculture as a traditional and old-fashioned sector. It is needed to change this perception.</p>		<p>-Women and girls should be represented and depicted in bioeconomy events and graphic materials, so that they can identify themselves with them and understand that they can play a role in the bioeconomy.</p>	<p>-Training courses providing credits.</p>	

## **SUPPLY SIDE**

Bioeconomy sectors need more skilled workers, most of the experts reported. Producers also need to be accountable for the sustainability of the production chain.

Interviews also showed that the transition to bioeconomy could be different among sectors, with a change in the labour market in purchasing decisions and in costs. Hence, it is considered important to communicate the need for a fair transition and to take into account that different sides could perceive an alleged decrease in wellbeing.

It was also pointed out that different stakeholders of the same sector could be differently aware of the bioeconomy and use a different technical language. Encouraging cross-sectoriality should be done, contextualizing information at a local level.

One of the experts explained that it is really necessary to provide practical and useful information about waste opportunities and the circular approach in the bioeconomy.

Another one of the respondents underlined that to disseminate information about bioeconomy opportunities, professionals networking and technical advice could be useful. Among tools, he also suggested preferring short videos to paper documents. At the same time, face-to-face meetings have to be preferred.

In Table 2, the insights from the interviews for the SUPPLY SIDE are listed.

Table 2. SUPPLY SIDE insights from the interviews.

Activities	Needs and interests	Core message(s)	Gender impacts	Most suitable tools	Good practices
Awareness	<p>-The Supply side has to show the sustainability of the entire production chain in a transparent way.</p> <p>-Stakeholders of this side usually produce a lot of waste, but they do not know its environmental impacts or how to use it to add value.</p>	<p>-The message should be differentiated for the awareness, communication and education activities. (Also valid for the other target groups and activities).</p> <p>-Help making sense of waste's opportunities in a circular bioeconomy.</p> <p>-We need to provide practical examples of what areas we can act in and why it has not yet been done. We must also show how we can recover this lack of action, also considering that in some sectors it is easier to recover while in others it is more difficult.</p> <p>-Cross-sectoriality among the production</p>	<p>-Social impacts also valid for consumers: it is necessary to pay close attention to aspects related to a fair transition. Indeed, in the transition to a sustainable bioeconomy, the demand for products and workforce may increase in certain sectors and decrease in others. A change in consumerism and in the production systems could then create imbalances in the labour market, with also an increase in the products prices due to an internalisation of negative externalities costs. It is therefore important to take into account that consumers could perceive an alleged</p>	<p>-Not many paper documents should be used.</p> <p>-You should prefer short videos about specific problems, as they are easier to remember. Short videos are a very good tool in this sense. (Also valid for the other target groups and activities)</p> <p>-Face-to-face meetings are pivotal to foster cross-sectoriality.</p>	<p>-Networking of professionals could help disseminate information about bioeconomy opportunities.</p> <p>-Use more active and engaging campaigns.</p> <p>-Show reality in practice.</p> <p>-Take action to correct the perception of the role of biodiversity at large, including the conservation of microorganisms whose perception is not always positive.</p> <p>-Make SMEs understand that adopting different business models can have economic benefits, together with the impacts on the environment and health. This can be done by showing them examples of best practices in the bioeconomy.</p>



		sectors must be encouraged. To raise awareness on cross-sectoral activities, contextualizing with local needs and opportunities.	decrease in wellbeing.  -It should be considered that there is gender imbalance at the management level.  -The bioeconomy can have an important social value, involving disadvantaged people in raising awareness activities and in the creation of jobs (e.g., in urban gardens and in the conservation and valorisation of biodiversity).		
Communication	-Considering farm-to-fork stakeholders, you have to dedicate specific tools and communication activities for each of them, as they don't speak the same "languages" and are not at the same level of awareness about bioeconomy. So, it's important to distinguish these different kinds of stakeholder and tailor special tools for them.			-Communication campaigns, especially using web tools and social media, as they work well, particularly for wider publics.  -Also, TV and TV broadcasts could be useful, as a lot of people continues watching them.	-Create information material on general contents, which must then be contextualized at the local level.



	<p>-Considering packaging producers category as divided in polymers producers and producers that use polymers, you have to consider them as different kinds of stakeholder, and you have to identify good tools to communicate to each of them.</p> <p>-How to approach the target groups can vary very much based on the country and the region of interest. You have to identify their main source of information: for example, private companies from chambers or entities gathering them.</p>				
Education	<p>-It is needed an update of the skills of the workforce.</p> <p>-It is also necessary to provide education to the categories that are thought to be already trained, providing them with new cross-sectoral skills even outside the school curricula.</p>			-Training courses providing credits.	-In the private sector, you have to consider that some people may already know that they want to learn how to build up a business case, while at a very general level you have to raise awareness by gathering them multiple times and explaining to them what their

					<p>opportunities are.</p> <p>-An important aspect is that teaching them would be a kind of brokerage activity, through which you are able to show them interlinkages between different sectors, and between business models which they were not considering before. You have to be credible, or at least transparent, that you are providing a very general introduction, or you are able to provide a more precise and deep education for them.</p>
--	--	--	--	--	--





### **MULTIPLIERS and SUPPORTIVE ENVIRONMENT**

Interviewees agreed on the importance of education to provide knowledge and skills of the bioeconomy. Young people are interested and should be engaged in raising awareness and education activities. Furthermore, next to schools and university courses, vocational training could be helpful to provide the proper skills for the transition to the bioeconomy.

Each target group then has to be properly trained to better play its role for the transition to the bioeconomy.

The involved experts also reported that different stakeholders need to know better what bioeconomy is:

- Teachers could already know some aspects or sectors of the bioeconomy and not know others, depending on the subject they teach.
- Bankers and investors usually don't know bioeconomy in detail, so they could consider investments to be riskier than they are.
- Policymakers need to know the bioeconomy at large to properly address policy issues.

Moreover, it was said that also multipliers need to know the differences between BBPs and fossil-based products, in order to intervene in the correct way.

Considering social and gender impacts, it was deemed fundamental to avoid greenwashing and ensure women involvement, promoting them to speak.

Among the suitable tools that could be used, workshops and informative seminars were recommended for this type of stakeholders.

In Table 3, the insights from the interviews for the MULTIPLIERS and SUPPORTIVE ENVIRONMENT are listed.

Table 3. MULTIPLIERS and SUPPORTIVE ENVIRONMENT insights from the interviews.

Activities	Needs and interests	Core message(s)	Gender impacts	Most suitable tools	Good practices
Awareness	<p>-Teachers' perception and engagement could be different, as it could depend on the subject they teach.</p> <p>-Bankers and investors need to know bioeconomy in order to know the extent of the risk they take in financing start-ups and other innovators.</p> <p>-Multipliers may be concerned and interested in improving the added value to the common good and: -their investments; -their members (clusters and networks); -society (NGOs).</p> <p>-Regional authorities usually want to hear something more solid and concrete and deal with legislative issues. Permanent institutional sites that are easily accessible by everyone are needed. There you should find updated information and data, and legislative and</p>	<p>-It is necessary to make understand the difference between BBPs and traditional products in terms of performance and the reasons for the difference in costs. Therefore, purchasing decisions must be addressed with the proper incentives.</p>	<p>-It is needed to ensure that women are involved in all these aspects, promoting them to speak.</p> <p>-You could say multipliers if you could involve all the women.</p>	<p>-Workshops and informative seminars could be useful.</p>	<p>-Good examples could be shared to show the circular approach in the bioeconomy.</p> <p>-Addressing teachers, it is necessary to act on system thinking at the school level to make them understand the linkages of the bioeconomy with their system.</p> <p>-Addressing policymakers, it is necessary to involve them in the raising awareness activities of the other target groups to make them understand what the practical issues are.</p>



	dissemination documents made available with a fair approach. Information should then be tailored at a national and regional level.				
Communication	<p>-How to approach the target groups can vary very much based on the country and the region of interest. You have to identify their main source of information: for example, public sector from the regional authorities for rural development or regional development.</p>	<p>-You need to ensure that bioeconomy sectors are shown in a correct and comprehensive way to policymakers.</p>	<p>-Social impacts: it is important to pay attention and be careful to avoid greenwashing.</p>		<p>-Public authorities can help you engage citizens and society in general, or you have to go in a very specific environment, as at schools or at the Universities. Otherwise, it's very difficult to reach out towards them.</p>
Education	<p>-There is a gap from just talking about sustainability and bioeconomy and then to get to the level where you can actually act. For this, you need more knowledge and information. This could be pursued through teachers, schools and universities, but also through technical tertiary education.</p> <p>-The pupils in the schools are very interested and could be extremely engaged in this kind of activities.</p>	<p>-At schools, you need to ensure accuracy, but you need to also understand that the required level of knowledge to be provided might not be what researchers expect.</p>		<p>-Training courses providing credits.</p>	<p>-Preparative works are needed to train teachers on the bioeconomy.</p>



	<p>-University teachers, university management, and those evaluating research and technology transfer projects need to receive proper education on the needs and opportunities of the bioeconomy. The same is also true for policymakers, to be engaged at the local level above all.</p> <p>-It is necessary to update the structure of university courses, to provide the required skills in the bioeconomy to the highest number of students, without delegating this task only to post-graduate education, allowing a faster entry into the workforce and speeding up the technology transfer of industries.</p> <p>-School teachers need a lot of professional development activities in the bioeconomy</p>				
--	--	--	--	--	--

### 3.3 Additional survey

A total of five (5) surveys were filled in and delivered by the Advisory Board members and the external expert.

- Definition of the needs, interests and motivations of the target groups

The respondents found the needs, interests and motivations of the target groups defined clearly and comprehensive in D1.1. Some of them suggested presenting the information in the conceptual framework per target group and to better detail information about MULTIPLIERS and SUPPORTIVE ENVIRONMENT target group as many are its components.

One of the respondents further recommended for the toolkits to provide answers to “*Which role can I play in the Bioeconomy?*”, in addition to “*How to communicate and support Bioeconomy?*” for the MULTIPLIERS and SUPPORTIVE ENVIRONMENT target group.

- Consistency of recommendations

The respondents think that the recommendations on *how to set up actions* provided in the D1.1 were defined consistently with the identified needs, interests and motivations of the target groups.

One of the respondents stated that “A comprehensive analysis of the channels and tools to use to enhance awareness on BBPs has been well addressed. Previous projects data in support of Transition2BIO represent a great background to define and set actions.”

Another one found that some important areas are missing and could be considered in the next steps of the project, such as “education and the difficulty of covering the bioeconomy with the present subjects taught at schools and universities” and the governments’ need for “a cross-departmental view [...] to shape bioeconomy industry”. They also found that in the document the environment and the bioeconomy are equated, and for them “this is not always a logical view”.

- Adequacy of recommendations

The respondents think that the recommendations on *how to set up actions* provided in the D1.1 are adequate for the described objectives of the toolkits.

One of the respondents suggested improving the presentation of the information in the D1.1, also supporting the idea to provide target groups with information in different languages.

- Consistency of toolkits

The respondents found the toolkits consistent with the recommendations provided in the D1.1.

One of the respondents stated that “The toolkits go a long way to try to encompass the complexity of the bioeconomy as well as the variety of sectors and stakeholders.”

- Recommendations for the update of the conceptual framework and toolkits to be more effective and useful for the target groups

Particular attention has been paid to the toolkits’ users by one of the respondents: “In the document [ed: D1.1] are well described the targeted audience: demand, supply and multipliers. However, I miss the description of who should use the tool. The tools could be also used by education entities, public institutions (ministries), or third-party advisory services. I suppose this list should be detailed, and also the how to use them to be able to achieve the objectives set in the material. The success of the toolkit [...] depends on who is implementing and using it. Probably there could be defined different motivations on why you want somebody to use the toolkits. I suggest spending a short section explaining how you see the implementation.”

One of the respondents suggested exploring new possible formats for the toolkits, allowing the consultation of resources without exiting from the toolkits.

Some of the respondents reported no particular suggestions.

- Recommendations beyond the objectives of the toolkits

Some of the respondents suggested including success stories for each target group or approach and checklists.

Some also suggested tailoring the information more to the target groups, providing for example a User Guide.

### 3.4 Insights from the validation workshop

Below are listed a summary of the most relevant insights and recommendations coming from the results of the workshop for the validation of the first version of the toolkits (T1.3.2):

- It should be clearly described what the toolkits are for and what goals they aim to achieve, and also explaining what kind of needs they aim to meet for the target groups;
- The toolkits should be made more understandable and appealing to people who are not yet involved in the bioeconomy, using understandable language and providing resources in local languages and examples of the local context;



- A side panel should be installed so that the users can easily come back to the previous section of the toolkits or advance to a further section without having to scroll all the way up or down;
- For the toolkit aimed at the SUPPLY SIDE target groups, it was suggested to show best practice examples (instead of technical guidelines and references) or focus more on helping SMEs/start-ups convey reliable messages to consumers and gain trust from the market. This later point would refer to a communication aspect: how a new company should communicate about their innovation, products, and sustainability impacts;
- For the same toolkit, it was suggested to support entrepreneurs and start-ups willing to enter the bioeconomy field, using the toolkit as a guideline manual. Particularly, it should help understand concrete steps to face recurrent issues, and present bioeconomy feedstock issues, the availability of financial support, networking opportunities, and technological uncertainties.



## 4. Key dimensions of the conceptual framework and recommendations

### 4.1 Overview of the framework

The main objective of the conceptual framework is to provide a common set of terminology for the main activities in the project, and to classify/qualify tools investigated in WP1. An overview of the conceptual framework is provided in Figure 3.

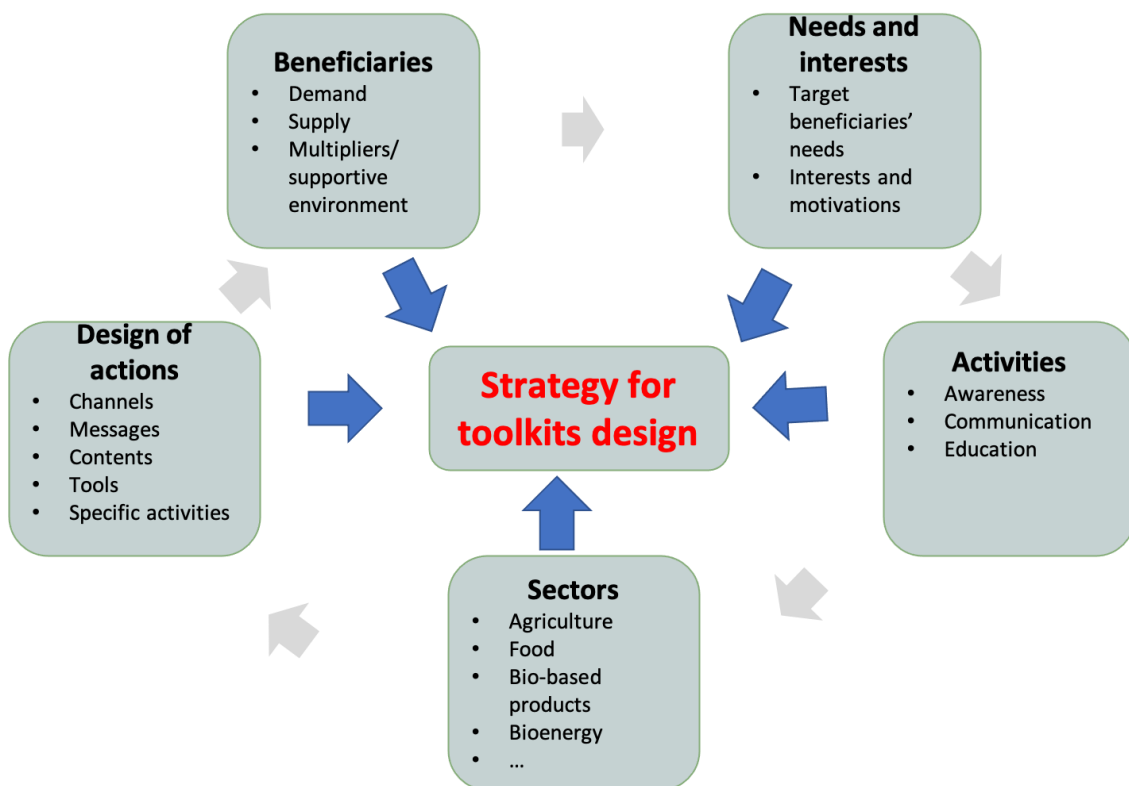


Figure 3. Conceptual framework structure

The conceptual framework identified five main dimensions (those highlighted by the project) that needed to be combined in D1.1 in order to identify strategies for the development of toolkits. The five dimensions also followed a (tentative) sequential logic aimed at designing toolkits (which however does not need to be in this order).

### 4.2 Key dimensions

Insights on how to exchange knowledge in the European bioeconomy can be found in Section 3. Herein we summarise guidelines and recommendations coming from the review of the literature and previous projects and initiatives, and experts' consultation. This information will be used





mainly to define and guide the production of the updated version of the toolkits (T1.3), and also the collection of existing information (T1.2), the update of the Library (T1.4), and other activities of the project within WP3 and WP5, while it could apply also to other actions beyond the objectives of the projects.

- Sectors

The bioeconomy sectors defined and drawn from the literature, the European Commission and experts' feedback are included in the following categories:

- a. land and marine ecosystems, including the services they provide;
- b. all primary production sectors using and producing natural resources (agriculture, forestry, fisheries and aquaculture);
- c. all economic and industrial sectors using natural resources and processes to produce food, feed, BBPs (bio-based textiles, chemicals, pharmaceuticals, plastics and rubber), wood products and furniture, paper, bioelectricity and liquid biofuels;
- d. bio-based services and all support sectors relevant to unlock the full deployment of bioeconomy (regulatory, normative, risk assessment, technology transfer, investment, IPR, dissemination, etc.).

Nevertheless, the consulted experts suggest also taking into account sub-categories of sectors that may have specific characteristics and needs, such as:

- Bio-based building sectors
- Better detail of biochemicals and bio-based green chemistry sectors
- Bio-based packaging and biomaterials
- Sustainable systems using natural resources, caring of different environmental matrices
- Institutions addressing biodiversity conservation, valorisation, and research
- Systems using microbial biomass
- Links to European and national research infrastructures which provide services related to bioeconomy
- Recovery of waste with a circular approach
- Possible contacts with circular economy sectors related to materials which are not bio-based.

Proper communication of the bioeconomy sectors extent to policymakers is important, ensuring to cover the bioeconomy at large.

Instead, in communication activities aimed at economic actors and consumers, it could be useful to use other forms of sector classification, for example following the flow of biomass from primary production to industry, including services.



- Categories of relevant stakeholders

Starting from our initial categorization of the Transition2BIO's target groups, the categories of relevant stakeholders in the European bioeconomy are included and updated (based on the experts' feedback) as follows:

- DEMAND SIDE (consumers, citizens), B2B, public procurers, students, etc.; physical persons in the first two categories can further be classified according to demographic characteristics, such as age, with a focus on young people as the main target for some actions; several of these groups may also be target together under more generic labels, for example the one of the general public).
- SUPPLY SIDE (primary production, production industries, biorefineries, farmers, etc.; the supply side actors may also be distinguished based on sector/value chain or by structural characteristics, e.g. large industry, SMEs, micro family-managed companies).
- MULTIPLIERS and SUPPORTIVE ENVIRONMENT (EUBIONET, citizens' organisations, NGOs and other associations, brands, retailers, teachers, EU-funded projects and initiatives, influencers, media, policymakers, regional authorities, initiatives, networks, clusters, vocational education programs, bankers, investors, researchers, universities and research institutions, etc.).

#### 4.3 Recommendations for the production of the updated version of the toolkits

Within the scope and objectives of Transition2BIO, it is important to address directly and specifically some categories of stakeholders, depending on the available materials and knowledge. The extent of the categories of relevant stakeholders in the European bioeconomy is vast, and the materials and tools available are aimed at only a part of them. In this sense, following the feedback and suggestions of the Transition2BIO's consortium, for the production of the updated version of the toolkits we recommend **addressing with dedicated toolkits only specific categories of stakeholders** that we consider relevant to the scope and objectives of the project:

- **Citizens**
- **Teachers**
- **Students and Trainees**
- **Communicators**
- **Policy Makers**
- **Business**

These selected target groups should be clearly defined and made explicit in the toolkits. Also, the **motivations** for which the activities, materials and knowledge have been made available should be defined too, as well as explaining what kind of needs the toolkits aim to meet for the



target groups. In this sense, it could be useful to provide **user guides** for the fruition of the toolkits.

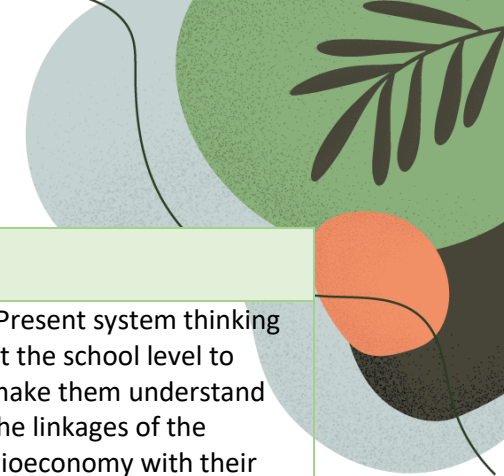
It is also suggested to make the toolkits more understandable and appealing to people who are not yet involved in the bioeconomy, using a more **understandable language**. The use of the toolkits by users could be facilitated by allowing the **consultation of resources without exiting from the toolkits** or **installing a side panel** so that the users can easily navigate the different sections of the toolkits without having to scroll all the way up or down. Concerning the ways to convey the messages within the toolkits, it is suggested to use **storytelling** and **success stories**, providing examples of concrete projects and best practices.

In Table 4, the recommendations for addressing the selected target groups in the dedicated toolkits are summarised.

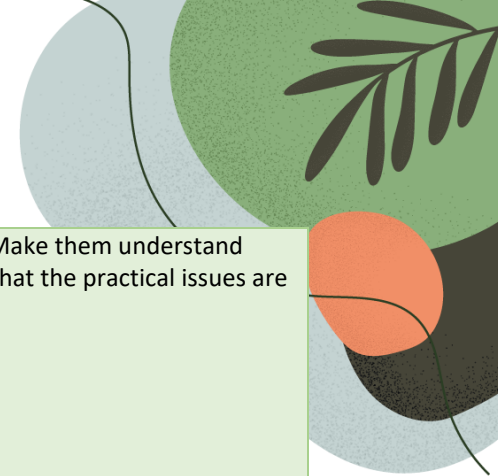


Table 4. Summary of recommendations for the selected target groups

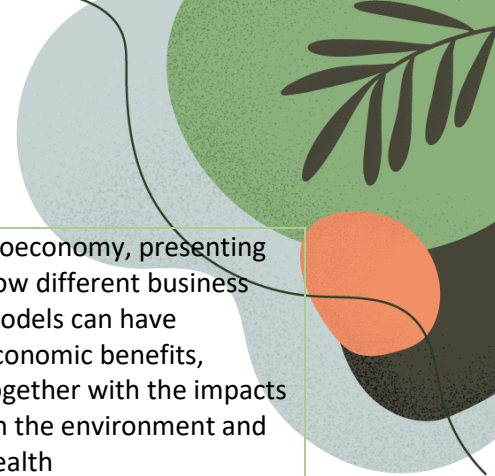
Target group	Messages	Channels	Tools	Contents
<b>Citizens</b>	<p>Address the following questions:  <i>What is bioeconomy?</i>  <i>What are the bioeconomy areas? What are the benefits and impacts for the society, the environment and the economy? What could be our contribution in driving the transition towards a more sustainable consumption and lifestyle?</i></p> <p>-Messages should be based on a solid scientific background            -Use a lay language and avoid jargon            -Show the uses and benefits of BBPs, as well as the biodegradability and disposal of these products            - Given that some BBPs are aimed at a specific gender, it is needed to</p>	<p>-Innovative channels (large-scale events, science festivals, workshops, fairs, social media)</p> <p>-TV</p> <p>-Social media</p>	<p>-BBPs exhibits in big fairs</p> <p>-Hands-on activities</p> <p>-Serious games</p> <p>-Cartoon visual communications</p> <p>-TV broadcast</p>	<p>-Successful stories</p> <p>-Information materials in their mother language</p> <p>-Depict women and girls in events and graphic materials</p> <p>-Impacts and benefits of BBPs</p> <p>-Emphasise the additional benefits for them, especially when they are not immediate and easily understandable, even going beyond the mere difference in the origin of the raw materials</p>



	keep in mind the needs of that gender			
<b>Teachers</b>	<p>Address the following question: <i>How to educate and inspire on the bioeconomy?</i></p> <p>-Consider that their perception and engagement could be different, as it could depend on the subject they teach</p>	-Mass media and social media, especially in their native language	-Serious games  -Educational materials	-Present system thinking at the school level to make them understand the linkages of the bioeconomy with their system  -Professional development opportunities for them concerning the bioeconomy
<b>Students and Trainees</b>	-Guide them towards educational and career paths that could develop their skills for future jobs in the sector	-Social media	-Hands-on activities  -Serious games	-Successful stories  -Depict women and girls in events and graphic materials, especially if concerning career advice
<b>Communicators</b>	<p>Address the following questions: <i>How to communicate and raise awareness about the bioeconomy?</i></p>	-Official communication and websites of public authorities	-Communication and awareness-raising materials	-Good examples presenting the circular approach in the bioeconomy
<b>Policy Makers</b>	<p>Address the following questions: <i>How to support bioeconomy?</i> <i>Which role can I play in the Bioeconomy?</i></p>	-Official communication and websites of public authorities	-Workshops and seminars	-Make information understandable and relevant from a policy point of view



	<ul style="list-style-type: none"> <li>-Stimulate them to boost the development of the bioeconomy through the definition of strategies and the investment of public resources</li> <li>-Take care of science advice about the extent of bioeconomy</li> </ul>			-Make them understand what the practical issues are
<b>Business</b>	<p>Address the following questions:</p> <p><i>What is bioeconomy? What are the bioeconomy areas? What are the opportunities for my sector? What are promising regional business models? How can I valorise my residues? What is the contribution of the supply side in driving the transition towards a more sustainable production? What are possible financial opportunities for bioeconomy sectors?</i></p>	-Communication channels of chambers and clusters	<ul style="list-style-type: none"> <li>-Short videos</li> <li>-Webinars</li> </ul>	<ul style="list-style-type: none"> <li>-Practical and useful information about waste opportunities and the circular approach in the bioeconomy</li> <li>-Make information understandable and relevant from a business point of view</li> <li>-Show them “reality in practice”</li> <li>-Information about biodiversity</li> <li>-Show to SMEs best practices in the</li> </ul>



				bioeconomy, presenting how different business models can have economic benefits, together with the impacts on the environment and health
--	--	--	--	--

Other insights and recommendations can be found in Section 3.

It is not suggested or expected that all recommendations have to be taken up in the development of the updated version of the tools (D1.6). Rather, they have to be used as guidelines with the intention to be adapted to the project's aims and resources. Those that will not be implemented (e.g., translation into local languages) can be taken as a reference for future activities and developments.

## 5 Discussion

This document provides an updated framework for the activities to be developed in the project Transition2BIO. It intentionally focuses on exploring categories useful for the identification and qualification of tools and on identifying the main directions indicated by a small number of selected stakeholders.

The main advantage of this approach is to provide a timely summary of existing knowledge. On the other hand, in the light of this approach, the following limitations should be acknowledged: the number of interviewed stakeholders does not allow to expect that our exercise is representative of all possible combinations of target groups, needs and tools.

An emerging issue is that the different activities addressed in the project (communication, education, awareness rising) need to be thought in combination in order to yield the expected effects.



## 6. Conclusions

This conceptual framework provides the guidelines for T1.2 (collection of existing information), T1.3 (production of the toolkits), WP2 (for the awareness and public engagement activities), WP3 (for the support activities to Member States and Regions), and WP5 (for the design of the Dissemination and Communication plan and activities), as well as for the structure and navigation logics for the Transition2BIO Library (T1.4).

The information in this deliverable will be used as a set of recommendations for the most suitable channels, messages, contents, tools and activities to target the different stakeholders. The production of the awareness, communication and education toolkits (T1.3) will be then tailored to the target groups following what emerged here.

As all combinations of target users, activities and tools are beyond the objectives of the project, it is recommended a careful choice of further activities in such a way as to identify cases and ideas with the higher level of replicability.



## 7. References

- Affatato, L., Bonadies, I., & Marturano, V. (2021). Un serious game per salvare il pianeta. *Quaderni di Comunicazione Scientifica*, 1, 179-186. <https://doi.org/10.17454/QDCS01.14>.
- Beluhova-Uzunova, R., Shishkova, M., & Ivanova, B. (2019). CONCEPTS AND KEY SECTORS OF THE BIOECONOMY. *Trakia Journal of Sciences*, Vol. 17, Suppl. 1, pp227-233.
- Biobridges. (2020a). *Biobridges Action Plan for raising consumers' awareness*. Retrieved from Biobridges: <https://www.biobridges-project.eu/results/action-plan-for-raising-consumers-e2-80-99-awareness/>
- Biobridges. (2020b). *BIOBRIDGES PLATFORM design: WHAT, WHO and HOW*. Retrieved from Biobridges: <https://www.biobridges-project.eu/results/biobridges-platform-design-what-who-and-how/>
- Biobridges. (2020c). *Communication needs in the bio-based economy*. Retrieved from European Bioeconomy Library: [https://www.bioeconomy-library.eu/wp-content/uploads/2020/05/bioeconomy-communication\\_20200311\\_final\\_0312045333.pdf](https://www.bioeconomy-library.eu/wp-content/uploads/2020/05/bioeconomy-communication_20200311_final_0312045333.pdf)
- Biobridges. (2020d). *BIOBRIDGES CONSULTATION Consumers' Awareness on Bio-Based Products*. Retrieved from Biobridges: <https://www.biobridges-project.eu/results/biobridges-consultation/>
- BioCannDo. (2019). *Factsheet For communicators and multipliers-What people want to learn and know about bio-based products Communication topics & desired info*. Retrieved from AllThing: [http://www.allthings.bio/wp-content/uploads/2019/11/Factsheet-Communication-topics\\_v5\\_SR.pdf](http://www.allthings.bio/wp-content/uploads/2019/11/Factsheet-Communication-topics_v5_SR.pdf)
- BioCannDo. (2020). *The BioCannDo experience: Let's talk about bio-based products, 10 Insights on communicating the bioeconomy*. Retrieved from European Bioeconomy Library: <https://www.bioeconomy-library.eu/wp-content/uploads/2020/01/Final-Publication-The-BioCannDo-experience.pdf>
- BioCannDo. (a). Retrieved from AllThing.Bio: <https://www.allthings.bio/>
- BioCannDo. (b). *Glossary Table*. Retrieved from AllThings.Bio: <https://www.allthings.bio/keywords/>
- BioCannDo. (c). *Insights from BioCannDo*. Retrieved from AllThings.Bio: <https://www.allthings.bio/insights-from-biocanndo/>
- BIOVOICES. (2018). *DELIVERABLE 3.2 Interviews Data Analysis Identification of Stakeholders' Interests and Motivations*. Retrieved from <https://www.biovoices.eu/download.php?f=34&l=en&key=6b75b921fe9a263e48ce727aad68bdba>



- BIOWAYS. (2017a). *D2.2 Public perception of bio-based products*. Retrieved from <https://www.bioways.eu/download.php?f=243&l=en&key=faf3e6f477c8183036b6eb591863b6e8>
- BIOWAYS. (2017b). *D2.3 List of relevant initiatives supporting the development and uptake of bio-based products at European and regional level*. Retrieved from BIOWAYS: <https://www.bioways.eu/download.php?f=221&l=en&key=b4a1c5e88e7e5a81045f645879d03dda>
- BIOWAYS. (2018c). *D2.4 Public perception of bio-based products –societalneeds and concerns (updated version)*. Retrieved from European Bioeconomy Library: [https://www.bioeconomy-library.eu/wp-content/uploads/2019/10/Public\\_perception\\_of\\_bio-based\\_products-societal\\_needs\\_and\\_concerns.pdf](https://www.bioeconomy-library.eu/wp-content/uploads/2019/10/Public_perception_of_bio-based_products-societal_needs_and_concerns.pdf)
- BIOWAYS. (n.d.). *Toolkit*. Retrieved from BIOWAYS: <https://www.bioways.eu/toolkit/tool-kit>
- BLOOM. (2018). *D3.3 Guidebook on engagement and co-creation methodologies*. Retrieved from European Bioeconomy Library: [https://www.bioeconomy-library.eu/wp-content/uploads/2020/02/D3-3\\_Guidebook-on-engagement-and-co-creation-methods\\_final-2.pdf](https://www.bioeconomy-library.eu/wp-content/uploads/2020/02/D3-3_Guidebook-on-engagement-and-co-creation-methods_final-2.pdf)
- BLOOM. (2020a). *Outreach & EngagementGuidebook*. Retrieved from BLOOM: <https://bloom-bioeconomy.eu/wp-content/uploads/2020/12/BLOOM-Outreach-Engagement-Guidebook.pdf>
- BLOOM. (2020b). *BLOOM Bioeconomy Key Messages*. Retrieved from BLOOM: <https://bloom-bioeconomy.eu/2020/05/04/bloom-bioeconomy-key-messages/>
- CommFABnet. (2014). *BUILDING THE BIOECONOMY CREATING IMPACT THROUGH COMMUNICATION*.
- Dallendörfer, M., Dieken, S., Henseleit, M., Siekmann, F., & Venghaus, S. (2022). Investigating citizens' perceptions of the bioeconomy in Germany – High support but little understanding. *Sustainable Production and Consumption*, 30, 16-30. <https://doi.org/10.1016/j.spc.2021.11.009>.
- DESIRE. (2013). *REACH OUT Toolkit*. Retrieved from DESIRE: <http://desire.eun.org/toolkit>
- Druckman, J. (2015). Communicating Policy-Relevant Science. *PS: Political Science & Politics*, 48(S1), 58-69.
- European Commission. (2018). *A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment - Updated Bioeconomy Strategy*.
- European Commission. (2020). *Special Eurobarometer 501 Attitudes of Europeans towards the Environment*. Brussels: Directorate-General for Communication .



- Farinella, M. (2018). The potential of comics in science communication. *Journal of Science Communication*, 17 (01) Y01.
- Fletcher, C. A., Niemenoja, K., Hunt, R., Adams, J., Dempsey, A., & Banks, C. E. (2021). Addressing Stakeholder Concerns Regarding the Effective Use of Bio-Based and Biodegradable Plastics. *Resources*, 10(95), <https://doi.org/10.3390/resources1010095>.
- Global Bioeconomy Summit. (2020a). *Colorful City*. Retrieved from Global Bioeconomy Summit: <https://gbs2020.net/exhibition-city/>
- Global Bioeconomy Summit. (2020b). *Airport World*. Retrieved from Global Bioeconomy Summit: <https://gbs2020.net/exhibition-airport/>
- Hakovirta, M., & Lucia, L. (2019). Informal STEM education will accelerate the bioeconomy. *Nature Biotechnology*, Vol. 37, 1.
- Hodge, D., Brukas, V., & Giurca, A. (2017). Forests in a bioeconomy: bridge, boundary or divide? *Scandinavian Journal of Forest Research*, 1651-1891.
- Knowledge Centre for Bioeconomy. (n.d.). *Bioeconomy Glossary*. Retrieved from European Commission: [https://knowledge4policy.ec.europa.eu/bioeconomy/glossary\\_en](https://knowledge4policy.ec.europa.eu/bioeconomy/glossary_en)
- Lenormand, M., Tugores, A., Colet, P., & Ramasco, J. J. (2014). Tweets on the Road. *PLoS ONE*, 9(8), e105407. doi:10.1371/journal.pone.0105407.
- LIFT – Boosting bioeconomy by maximizing CSAs results. (2020a). *FACTSHEET #1 Awareness Raising and Communication*. Retrieved from European Bioeconomy Library: [https://www.bioeconomy-library.eu/wp-content/uploads/2020/03/01\\_LIFT\\_FactSheets\\_awareness.pdf](https://www.bioeconomy-library.eu/wp-content/uploads/2020/03/01_LIFT_FactSheets_awareness.pdf)
- LIFT – Boosting bioeconomy by maximizing CSAs results. (2020b). *FACTSHEET #2 Bioeconomy Education*. Retrieved from European Bioeconomy Library: [https://www.bioeconomy-library.eu/wp-content/uploads/2020/03/02\\_LIFT\\_FactSheets\\_education.pdf](https://www.bioeconomy-library.eu/wp-content/uploads/2020/03/02_LIFT_FactSheets_education.pdf)
- LIFT – Boosting bioeconomy by maximizing CSAs results. (2020c). *FACTSHEET #3 Stakeholders Engagement and Co-creation*. Retrieved from European Bioeconomy Library: [https://www.bioeconomy-library.eu/wp-content/uploads/2020/03/03\\_LIFT\\_Factsheets\\_engagement.pdf](https://www.bioeconomy-library.eu/wp-content/uploads/2020/03/03_LIFT_Factsheets_engagement.pdf)
- Mainar Causapé, A. J., Philippidis, G., & Sanjuán, A. I. (2017). *Analysis of structural patterns in highly disaggregated bioeconomy sectors by EU Member States using SAM/IO multipliers*. EUR 28591. JRC Technical Reports. European Commission-Joint Research Centre. doi:10.2760/822918.
- Masiero, M., Secco, L., Pettenella, D. et al. (2020). Bioeconomy perception by future stakeholders: Hearing from European forestry students. *Ambio*, 49, 1925–1942.
- Mehta, N., Cunningham, E., Roy, D., Cathcart, A., Dempster, M., Berry, E., & Smyth, B. M. (2021). Exploring perceptions of environmental professionals, plastic processors,



students and consumers of bio-based plastics: Informing the development of the sector. *Sustainable Production and Consumption*, 26, 574-587.  
<https://doi.org/10.1016/j.spc.2020.12.015>.

Pubule, J., Blumberga, A., Rozakis, S., Vecina, A., Kalnbalkite, A., & Blumberga, D. (2020). Education for Advancing the Implementation of the Bioeconomy Goals: An Analysis of Master Study Programmes in Bioeconomy. *Environmental and Climate Technologies*, vol. 24, no. 2, pp. 149–159.

Road To Bio. (2019). *Key Messages For Communication About Bio-Based Products*. Retrieved from European Bioeconomy Library: [https://www.bioeconomy-library.eu/wp-content/uploads/2019/10/RoadToBio\\_factsheet\\_3\\_key\\_messages.pdf](https://www.bioeconomy-library.eu/wp-content/uploads/2019/10/RoadToBio_factsheet_3_key_messages.pdf)

Ronzon, T., & M'Barek, R. (2018). Socioeconomic Indicators to Monitor the EU's Bioeconomy in Transition. *Sustainability*, 10, 1745.

Stern, T., Ploll, U., Spies, R., Schwarzbauer, P., Hesser, F., & Ranacher, L. (2018). Understanding Perceptions of the Bioeconomy in Austria—An Explorative Case Study. *Sustainability*, 10, 4142.

Urmetzer, S., Lask, J., Vargas-Carpintero, R., & Pyka, A. (2020). Learning to change: Transformative knowledge for building a sustainable bioeconomy. *Ecological Economics*, 167(106435), <https://doi.org/10.1016/j.ecolecon.2019.106435>.

Wendler, J., & Shuttleworth, E. (2019). Downpour! – Flood risk communication through interactive immersive street games. *Research for All*, 3 (1): 18–2.

Wensing, J., Baum, C., Carraresi, L., & Bröring, S. (2021). What if consumers saw the bigger picture? Systems thinking and the adoption of bio-based consumer products. *Journal of Behavioral and Experimental Economics*, 94(101752), <https://doi.org/10.1016/j.socec.2021.101752>.



## Annex 1

Survey structure					
Name		Organisation		Main competence in Transition2BIO	
CV					
Have the sectors been defined in a clear and comprehensive way?					
Have the target groups been divided and defined in a clear and comprehensive way?					
DEMAND SIDE (consumers, B2B, young people, public procurers, etc.)					
Activities	Needs and interests	Core message(s)	Gender impacts	Most suitable tools	Good practices
Awareness					
Communication					
Education					
SUPPLY SIDE (primary production, industries and SMEs, biorefineries, etc.)					
Activities	Needs and interests	Core message(s)	Gender impacts	Most suitable tools	Good practices
Awareness					
Communication					
Education					



MULTIPLIERS and SUPPORTIVE ENVIRONMENT (citizens' organisations, NGOs and other associations, brands, retailers, teachers, EU-funded projects and initiatives, influencers, media, policy makers, regional authorities, initiatives, networks, clusters, etc.)					
Activities	Needs and interests	Core message(s)	Gender impacts	Most suitable tools	Good practices
Awareness					
Communication					
Education					



## Annex 2

# Feedback on the Conceptual framework

### Introduction

Dear members of the Advisory Board, Dear external experts,

We are glad that you are again available and interested in providing your inputs and feedback for Transition2BIO activities.

The Transition2BIO project will build upon the most relevant communication and education EU-funded projects and initiatives to contribute to the implementation of the Updated 2018 EU Bioeconomy Strategy, and promote the transition towards a more sustainable production, consumption, and lifestyle by implementing an integrated package of activities addressing a wide range of target stakeholders.

Among the strategic objectives of the project, Transition2BIO aims to valorise and exploit sectoral communication tools and activities developed at national, regional, and local level by EU-funded bioeconomy projects and other relevant initiatives. This is also the general objective of the WP1 for the creation of three awareness-raising, communication, and education toolkits, aimed at a wide range of target stakeholders, namely: 1) DEMAND SIDE; 2) SUPPLY SIDE; 3) MULTIPLIERS and SUPPORTIVE ENVIRONMENT.

Last year, UNIBO conducted an analysis of the target beneficiaries' needs, interests and motivations, based on the literature review and the outcomes of several workshops, surveys, interviews and other activities implemented by the LIFT, BIOVOICES, BIOWAYS, BLOOM, Biobridges, and the results of other EU-funded projects and initiatives on communication, awareness-raising and education activities in the European bioeconomy. This analysis has been complemented by the interviews that UNIBO conducted with you.

The output of this activity is the first version of a conceptual framework designed by UNIBO to define a strategy for the creation of the awareness, communication and education toolkits. Deliverable 1.1 – Conceptual framework of the awareness, communication and education toolkits – 1st version is public and accessible on the dedicated page of the project website: [https://www.transition2bio.eu/public\\_result/conceptual-framework-of-the-awareness-communication-and-education-toolkits-1st-version](https://www.transition2bio.eu/public_result/conceptual-framework-of-the-awareness-communication-and-education-toolkits-1st-version).

BIOCOM produced a first version of the toolkits based on the conceptual framework and the most "actionable" tools collected by UNIBO in Task 1.2





**Collection of contents, tools, databases, platforms and good practices. The three toolkits are public and accessible on the dedicated page of the project website: <https://www.transition2bio.eu/toolkit>.**

**Both the conceptual framework and toolkits have been sent to you along with this document.**

**Now, we kindly ask you to answer the questions in the following survey after a thorough reading of the conceptual framework and toolkits. Please send the filled-in survey to [marcomaria.grande@unibo.it](mailto:marcomaria.grande@unibo.it).**

**Your feedback will provide us with recommendations and advice to validate the conceptual framework and improve the toolkits.**



## Survey

Full name:

**1) Do you think that the needs, interests and motivations of the target groups are defined clearly and comprehensively in the conceptual framework?**

Answer:

**2) Do you think that the recommendations on how to set up actions are defined consistently with the needs, interests and motivations of the target groups?**

Answer:

**3) Do you think that the recommendations on how to set up actions are adequate for the objectives of the toolkits?**

Answer:

**4) Do you think the toolkits are consistent with the recommendations provided by the conceptual framework?**

Answer:

**5) How do you think the conceptual framework should be updated to make the new version of the toolkits more effective and useful for target groups?**

Answer:

**6) How do you think the conceptual framework should be updated to describe more comprehensively how to set up awareness-raising, communication and education activities in the European bioeconomy, even beyond the objectives of the toolkits?**

Answer:



# Consortium



DIPARTIMENTO DI SCIENZE E TECNOLOGIE  
AGRO-ALIMENTARI

@biovoices

