

## Instructions

Welcome to the interactive query!

This query is part of the research "*A Framework for Identifying and Interpreting Weak Signals of Change in the Forest Bioeconomy Operating Environment*" where the Real-Time Delphi method is used for anticipating changes and weak signals. The Real-Time Delphi method in this study is divided into two rounds, in which this *Changes* query is the starting point. The theme of this round is to examine the nature of various changes affecting the forest bioeconomy.

Please read the following instructions carefully:

There are 6 open-ended questions in this query, 3 general questions about future changes (Questions 1, 3, and 5) and 3 questions applicable to the forest bioeconomy (Questions 2, 4, and 6). Questions 1, 3, and 5 are general level questions and background of the topic while questions 2, 4, and 6 take a stand on what the previous questions mean in the broad environment in which the forest bioeconomy operates. For each question, there are supplementary descriptions before the question to make answering easier. Each question is presented on its own page and below the question there is a comment section for answers and discussion (Elaborate on this topic (add a comment)). Note that you can move between questions at the bottom of the page.

The comment section is used to provide answers, supplement your own answers, and comment and discuss answers provided by others. Please note that your answers and comments are visible for other participants and all the answers can be commented on. However, you cannot be identified as the query is anonymized for the participants. Still, do not reveal your identity in your answers. It is important to have open discussion related to topics of questions and I encourage you to discuss topics started by other participants as well.

You have 10 days (Sep 5 – Sep 14) for giving your answers and comments. Once you have submitted your answers, I encourage you to return to the query later to review the discussions. Thus, answering the query can be divided into two phases: 1) answering the questions and 2) commenting on and discussing the answers of other participants. In order to facilitate discussions, you will receive an automatic notification in your email when your comment is being answered. In addition, I will work as a moderator for the whole 10 day period and give you information from time to time.

Please answer each question if possible. If there are questions which are hard for you to answer, you can skip the question. Still, I encourage you to think through the question from the perspective of your own field of expertise. Every answer is valuable, every answer can promote discussion.

Please note that eDelphi.org may operate slowly and a new query page may take a few seconds to load. In these situations, please wait patiently. However, if for any reason the pages do not load or you have any other questions regarding the query, please contact me by email.

Before starting the query, I kindly ask you to give your consent for participating and processing personal data on the next page. The consent form is based on the Participant information sheet and Privacy notice for scientific research which can be found in the Documents section of the front page of the panel.

Thank you in advance for your time and answers!

Best regards, Tuomas Mauno (tuomas.mauno@uef.fi)

Consent for processing personal data and participating 1/2

**CONSENT FOR PROCESSING PERSONAL DATA AND PARTICIPATING**

September 5, 2022

**Title of the study: A Framework for Identifying and Interpreting Weak Signals of Change in the Forest Bioeconomy Operating Environment**

Researcher conducting the study: Tuomas Mauno (tuomas.mauno@uef.fi) University of Eastern Finland  
Doctoral thesis supervisor: Professor Teppo Hujala (teppo.hujala@uef.fi) University of Eastern Finland

I *Name of the participant* have been invited to participate in the above research study. The purpose of this scientific research is to study weak signals of change in the broad environment in which the forest bioeconomy operates using the Real-Time Delphi method.

I have read and understood the written participant information sheet. The information sheet has provided me with a sufficient account of the above study and of the collection, processing, and transfer/disclosure of my personal data during the study.

I have had enough time to consider my participation in the study. I have received sufficient information about my rights, about the purpose and execution of the study, as well as about the benefits and risks involved in it.

I have had the opportunity to ask questions about the study and have had these answered satisfactorily. I have not been pressurized or persuaded into participation.

I understand that my responses will be kept strictly confidential and that no one outside the research team will be allowed access to them.

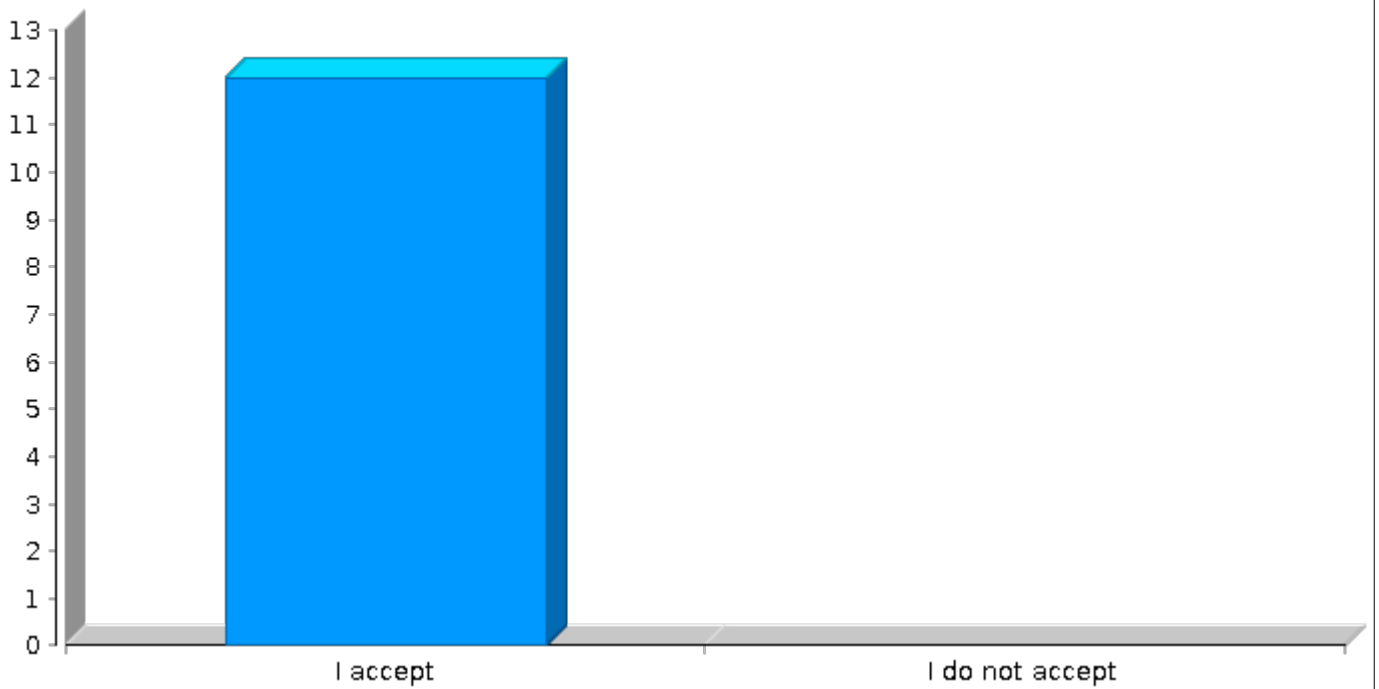
I understand that my participation is entirely voluntary and that I am free to withdraw my consent at any time, without giving any reason. I am aware that if I withdraw from the study or withdraw my consent, any data collected from me before my withdrawal can be included as part of the research data.

**By accepting this form, I confirm that I voluntarily consent to participate in this research and give consent to process my personal data.**

Please give your answer on the next page.

Consent for processing personal data and participating 2/2

**By accepting the form presented in previous page, I confirm that I voluntarily consent to participate in this research and give consent to process my personal data.**



## Question 1/6

First, let's start with the concept of change on a general level. By considering that various types of changes are and will be happening in the world, how to identify any upcoming change.

**Question 1: What criteria could be used for identifying possible future changes? What kind of signs or signals of change would capture your attention when exploring information?**

Please give your answer in the comment section below (Elaborate on this topic (add a comment)).

After you have given your own answer, please comment on other answers and promote discussion.

## COMMENTS

*Comment date Sep 5, 2022, 6:43:17 AM*

Price development of goods and services, different national and EU new strategies and programs and the preparation process with them, changes in global security, IPCC reports

*Comment date Sep 5, 2022, 9:04:56 AM*

Investment decisions on various fields. Price development. Trends of SDG goals. Formation of global market blocs. Donald Trump.

*Comment date Sep 5, 2022, 11:51:25 AM*

Development of prices, costs and interest rates. Public opinion and political debate. EU-strategies and global development. The question of energy prices seems very relevant right now.

*Comment date Sep 5, 2022, 12:48:20 PM*

Future changes could be explored by using google analytics, what information people seek from the internet. I also could think media has to deal with upcoming issues. Then opinion makers (whoever they are) could be followed, what their writings, posts and snapchats include. Agendas of various organisations also reflect their interests and issues of interest.

*Comment date Sep 6, 2022, 6:07:10 AM*

Apart from economic factors, possible future changes can be identified and monitored by analysing their impact on nature and environment. For example, are the identified changes to enhance sustainable development (economic, ecological, social) or pose risk to that.

*Comment date Sep 6, 2022, 8:30:34 AM*

PEST (political, economic, socio-cultural and technological) analysis.

In addition, study information such as patterns: for example weather patterns, analyse the impacts of regulatory changes and others for ex on prices (supply & demand),, budget decisions etc utilize AI, machine learning to help to predict changes based on the identified variables and patterns.

*Comment date Sep 6, 2022, 10:45:35 AM*

I would complete this to PESTEL (political, economic, socio-cultural, techonlogical, environmental, legal).

*Comment date Sep 13, 2022, 11:43:34 PM*

Our version of this is STEEP-V (science, technology, economics, ecology, politics and governance, and values and ethics).

*Comment date Sep 6, 2022, 12:41:26 PM*

We need to understand the current state-of-art to really (try to) understand the future. SDGs or MDGs could be one, large and comprehensive enough, starting point:

- to analyze complex sustainability challenges reflecting and impacting on decision-making at all societal levels (local, national, regional, global)

- to recognize generally acceptable, equal development goals that are/can be/should be reflected in policy decision-making at all levels  
=> basic criteria could be developed on the basis of these, known elements  
=> further understanding on the environment (exhausting resources, planetary boundaries => development of ecosystem services), economic trends and sustainable models, and policies.

*Comment date Sep 8, 2022, 9:35:28 PM*

My team and our work put heavy weight on changing values, or how people perceive systems, moreso than on technological developments. New technological developments can provide insight into what is possible, and those possibilities will certainly influence future directions. However, we tend to note in our work that changes in values are slower moving and less leading, but provide good insights into the directions of changing trends that do not easily reverse.

As such, we tend to focus not on the development of a technology, but how it is that people value it, whether it is being taken up and by whom, and how it is affecting existing technological modes. Similarly, is there a pent-up demand for a development? Are groups protesting against its application, or for it, or both? These signals can all be subjective, but they provide context to how successful the adoption of a technology could be.

*Comment date Sep 8, 2022, 11:47:51 PM*

The most important criteria for identifying possible future changes should be social-ecological sustainability:

Signals:

1. Changes in forest health
2. Stagnant institutional arrangements around forest management

*Comment date Sep 13, 2022, 11:45:39 PM*

I agree that these should be the hallmarks of desirable signals, but that it is also important to review and analyze signals that are not desirable.

*Comment date Sep 12, 2022, 1:33:29 PM*

More attention could be paid on consumer behaviour and changes in it. Political trends are also meaningful. Also the science-based and objectively measured facts concerning different kinds of sustainability issues should be carefully taken into account.

*Comment date Sep 14, 2022, 8:07:11 AM*

Good points, I would emphasis the behavior analysis of forerunners. Their opinion may sound radical today, but the history is full of examples how some radical opinions have been institutionalised in time. National policies follows normally more slowly, reflecting the needed means of guide and control for today. EU level debate provides fruitful signals on to-be-phenomena.

*Comment date Sep 14, 2022, 10:26:55 AM*

The question of which sustainability model will be at the heart of the debate (if it is not yet). This debate will include not only environmental issues but also social and economic. The commitment to SDGs is a starting point, but more emphasis must be put in the geopolitical output of the different sustainability models. Global south versus global north issues must be put forward .

*Comment date Sep 15, 2022, 5:49:47 AM*

Good point, the impact of geopolitics but also Covid 19 has emphasized the importance of resilience. Resilience of forests is important but also business models and decision making must pay closer attention to risk management of supply chains as well as public policies.

## Question 2/6

Think what the previous question means in the case of the broad environment in which the forest bioeconomy operates. In considering possible future changes, how would you identify any upcoming change that may have an impact on the forest bioeconomy.

**Question 2: What criteria could be used for identifying possible future changes that may affect the forest bioeconomy?**

Please give your answer in the comment section below (Elaborate on this topic (add a comment)).

After you have given your own answer, please comment on other answers and promote discussion.

## COMMENTS

*Comment date Sep 5, 2022, 6:52:11 AM*

The changes in the information concerning forest resources and their management (referring here to the discussion about the land-use sector and that it has changed from carbon sink to the source of emissions highlighting the role of forests as sinks - leading easily to the increasing demands for protection areas etc.), changes in the global markets (where is the demand, where is the production, demands for sustainability and how they are realized), changes in labour demand, interest of young people towards forestry studies and forestry as a profession, resources for bio-economy research available

*Comment date Sep 5, 2022, 9:36:00 AM*

The trends of root causes for the demand of forest based goods and services. The global demand is neutral starting point. After this we have many alternatives - where the production is done, what are

then the effects on ecological and social sustainability, what are the impacts on global carbon sink and fossil carbon dioxide emissions of substitution products.

*Comment date Sep 5, 2022, 11:57:18 AM*

Changes in production of energy to non-fossil sources will change the importance of forest products as substitution to fossil energy and materials. Such changes could alter the value of managed forests to mitigate climate change.

*Comment date Sep 14, 2022, 10:57:00 AM*

In this the current turbulence in geopolitics and economics shows the links from global to local. For example, the firewood market and wood price is a direct continuum from the large-scale trends. And this happened really quickly. This type of capacity to set indicators that reacts quickly but are reflected reliably until Finnish forest bioeconomy.

*Comment date Sep 5, 2022, 12:51:35 PM*

Google analytics - what search words are used. Media and agenda analyses, what is in the focus of journalists organisations. Mostly qualitative data on issues relevant for forest bioeconomy.

*Comment date Sep 6, 2022, 6:17:34 AM*

The development of new policies (EU, national, private sector initiatives) that regulate the forest bioeconomy. The economic viability/competitiveness of the sector in relation to more fossil based sectors. The ecological "footprint" (impact on carbon sinks and reservoirs and the biodiversity) of the forest bioeconomy at national and global level. Global and regional demand patterns.

*Comment date Sep 6, 2022, 12:47:06 PM*

It is essential to understand that global phenomenon, e.g. planetary boundaries, are reflected to the forest bioeconomy. Like some other comments refer: from carbon sink to source of emission. The understanding of the impact of global phenomenon to global resources and governance of resources => reflection to EU level policies => national regulation.

Furthermore, demand and product development may change the demand of wood and ecosystem services. New products can be based on a totally different technology and philosophy than today's product.

=> Institutionalization of the new phenomena.

=> The new phenomena could/should convert into new types of criteria.

*Comment date Sep 13, 2022, 11:49:57 PM*

This focus on planetary boundaries seems well-put. We have arrived at a point in history where climate change has arrived, and it has real and widespread effects that are broadly

understood by the public. It is becoming increasingly difficult for political leaders to argue in favour of fossil fuel developments when their costs are increasingly obvious and universally borne.

*Comment date Sep 7, 2022, 12:13:34 PM*

Regulatory changes supporting the low-carbon society, circular economy... (increases in taxes, potential funding made available for new climate change mitigation innovations), I would again look into the sustainability = environmental, economic, and social – criteria and the role of the forest bioeconomy in the circular economy & low-carbon society

*Comment date Sep 8, 2022, 9:53:02 PM*

At my place of work, we have a robust economic model for the pathways that fibre and value take through the forest industry, starting with the standing tree and ending with a series of finished products or materials (in something akin to a Sankey diagram). It does not, for instance, capture the value of ecosystem services from standing trees, or the economic inputs of planting and silviculture because it is just a limited model.

However, as a crude first attempt to identify changes to the forest bioeconomy, I might look at any new process, product, or technological development that creates new paths within that model, or immediately adjacent to it.

*Comment date Sep 8, 2022, 11:49:20 PM*

Hard for me to answer this question as I think it'll result from some sort of forecast modelling

*Comment date Sep 12, 2022, 1:36:13 PM*

Consumption trends, changes in political environment, common opinion concerning bioeconomy and use of forests, surveys....

*Comment date Sep 15, 2022, 5:51:57 AM*

Monitoring consumption trends is very important. Maybe also think about ways how to change them to be more sustainable.

*Comment date Sep 14, 2022, 10:31:05 AM*

economic specialization and diversification, entrepreneurial and startup ecosystem, system of innovation, natural resource availability, bio-based value webs, socio-ecological systems, biodiversity, and climate change impacts.



## Question 3/6

Let's move closer to searching for future changes. Future changes and the present can have a connection. From which sources could one get useful information that leads to identification of future changes?

**Question 3: Where do the possible future changes appear in the present? What are some channels, platforms, or sources of information where possible future changes may be identified?**

Please give your answer in the comment section below (Elaborate on this topic (add a comment)).

After you have given your own answer, please comment on other answers and promote discussion.

## COMMENTS

*Comment date Sep 5, 2022, 6:54:45 AM*

The different policy forums (?), social media in some cases. I think that the persons studying foresight issues are more professional to answer this question...

*Comment date Sep 5, 2022, 9:44:02 AM*

I believe on long term paradigm waves. The early signs of a rising paradigm can be found from social media and other public discussion forums.

*Comment date Sep 5, 2022, 12:57:03 PM*

Difficulty lies in looking what are so large changes to be called paradigm shifts. The waves certainly exists, but what they are and what is their magnitude?

*Comment date Sep 6, 2022, 12:11:16 PM*

In EU context the belief structure, where environmental sustainability is a primary one, and the other SD pillars have to accommodate to this - is a major change compared to the Brundtland report era. Is this a change of paradigm - I think it is, when we think the future development of forest bioeconomy. There are also smaller changes and shifts, but their effects are smaller. In weak signals we are trying to anticipate hints of becoming big changes...

*Comment date Sep 5, 2022, 11:59:18 AM*

International and national official statistics as well as political debate. Social media of course.

*Comment date Sep 5, 2022, 12:54:49 PM*

Social media, conventional media, policy debates, schools and universities. Tricky part is who can follow the enormous amounts of "data" that reflect the coming changes. Artificial intelligence (AI) applications perhaps?

*Comment date Sep 6, 2022, 6:23:02 AM*

Already described well in other posts, namely statistics, policy dialogue, professional media, research institutions, think tanks and their reports. The role of social media can be more and more important in identifying emerging themes.

*Comment date Sep 6, 2022, 1:01:34 PM*

Interpretation of global web-discussion (expert platforms, social media, etc.). Research is slow. First signals can be identified commonly from social discussion.

Furthermore, to understand what really will be happen in the forest bioeconomy, a deep understanding of crosscutting sectors (energy, agriculture, food, chemistry, medicine) and what is going there (technologies, products, resources, consumption habits) is needed.

*Comment date Sep 7, 2022, 12:16:55 PM*

University research material, web & social media, politic debates, EU channels (web)

*Comment date Sep 8, 2022, 11:51:11 PM*

Forest fires and how relevant institutions are responding to it. Climate models and predictions

*Comment date Sep 12, 2022, 1:39:18 PM*

Some changes can be identified and forecasted by studying forest owners' behaviour and attitude towards forestry services and bioeconomy in general.

*Comment date Sep 13, 2022, 11:16:59 PM*

I try not to prescribe to my scanning team what sources to use. In practice, much of what we get are news sources, varying from the mainstream to the fringe. However, our scanning sources also include watercooler conversations at the office, internally published documents, research journals and papers, industry newspapers, other organizations' foresight work (both scanning and finished reports), feature-length magazine articles, and documentaries.

We do this in part to reduce the burden of work on our scanners ("find scanning hits in things that

you are already reading") and in part to help diversify our sources by ensuring that we don't have all of our scanners reading the same handful of sources. We do this to try and reduce groupthink.

*Comment date Sep 14, 2022, 10:56:36 AM*

My team and I are working in the research project "Transition pathways towards the forest bioeconomy in Uruguay" which started last May 2022. Our hypothesis is that changes in the future of the forest sector must be analysed in the articulation of the forest (in literal sense- primary, pulp, mechanic) with other activities, such as other ecosystem services, livestock farming, apiculture, digital, R&D, innovation etc.

## Question 4/6

After contemplating the different sources where future changes may generally be identified, now think about the forest bioeconomy. From which sources could one get information that leads to identification of changes that may affect the forest bioeconomy?

Question 4: Where do the possible future changes that may affect the forest bioeconomy appear in the present? What are some channels, platforms, or sources of information where those possible future changes may be identified?

Please give your answer in the comment section below (Elaborate on this topic (add a comment)).

After you have given your own answer, please comment on other answers and promote discussion.

## COMMENTS

*Comment date Sep 5, 2022, 6:55:04 AM*

Look the previous answer

*Comment date Sep 5, 2022, 9:45:49 AM*

Same as 3/6

*Comment date Sep 5, 2022, 12:00:04 PM*

To me it looks like the same question as the previous.

*Comment date Sep 5, 2022, 12:59:37 PM*

I believe that at least in Europe the EU (and especially Commission) work if investigated could give insights on the changes upcoming in a year or two. Particularly environmental issues are in the top priority in the Commission, followed by national implementation and legislation.

*Comment date Sep 6, 2022, 6:29:16 AM*

The sustainability and potential to deliver of the forest bioeconomy is called into question by various parties, such as NGO's, environmental administration, some part of science community. Accordingly, there are multiple channels for this information. These attitudes are reflected, e.g. in many current legislative proposals by the EU commission.

*Comment date Sep 6, 2022, 1:05:55 PM*

History shows lot: phenomenon that changed the forest industry from polluting industry to the modern one: social discussion, environmental movement since 1960's -> institutionalization of external demands to legal obligations since 1980's -> technology development since 1980's. My guess is that the process is still pretty much similar, but forums different, such as emotional Twitter discussion.

See the previous question: what is going on in the other sectors.

*Comment date Sep 13, 2022, 11:55:15 PM*

This seems correct. The future is deeply rooted in the present and, even if the search for weak signals is looking for transformative changes, the bulk of change is likely to be evolutionary. The industry of tomorrow is going to be largely built on today's capital and that capital will try to increase its value. Most changes will be extensions of existing technologies (e.g., repurposing pulp plants as bioreactors) rather than creating new modes from scratch.

*Comment date Sep 7, 2022, 12:18:01 PM*

Same as 3/6 answer - but would also add similar to the comment to look into the past developments from the history to analyze some patterns from today

*Comment date Sep 8, 2022, 11:52:11 PM*

Again, climate-related changes, forest fires, species diversity, etc

*Comment date Sep 13, 2022, 11:19:06 PM*

University press releases (and the sorts of scientific publications that review and republish them) give a good sense of how technological capacities might change over the next decade.

Trade magazines and their online equivalent are a good source, in part because they tend to highlight the ideas that business owners and managers are concerned with... This is a good way of ground-truthing how valuable/important a signal might be.

The mainstream press is often late to pick up these trends, but they tend to reveal and/or shape public opinion that can ultimately tell us whether or not those capacities will be successful and/or adopted.

*Comment date Sep 14, 2022, 10:59:03 AM*

prevoius question

## Question 5/6

Now that you have elaborated the information sources for identifying possible future changes, let's conceptualize the future changes. What is the nature of future changes in general?

**Question 5: What do you think what might be some key features and characteristics of future changes?**

Please give your answer in the comment section below (Elaborate on this topic (add a comment)).

After you have given your own answer, please comment on other answers and promote discussion.

## COMMENTS

*Comment date Sep 5, 2022, 6:59:51 AM*

Usually money talks, also it is good to follow the decision making (national and EU levels) and the demands set there. Increasing demands for sustainability and resources efficiency, renewable energy, carbon sequestration, carbon sinks, hopefully there will also be more and more discussion about the reductions of emissions and consumption, carbon neutrality.

*Comment date Sep 5, 2022, 9:55:55 AM*

Seems like regulation is taking a bigger role in Europe. The global security development is at the same time making it harder to make unanimous global market agreements.

*Comment date Sep 5, 2022, 12:02:27 PM*

The trend in EU the last decades has been towards an increasing political influence from NGO:s, especially the environmental ones. Rapid changes in global security and global trade may change this.

*Comment date Sep 5, 2022, 1:02:52 PM*

Last years have lifted the importance of climate change and loss of biodiversity in EU and Europe. Will this continue or are the social issue in the spotlight as energy, economy and welfare of European citizens continue to decline? Are there polirical will and time for decision makers to tackle them all?

*Comment date Sep 6, 2022, 6:39:06 AM*

In short term the current energy crisis and substitution of natural gas, and oil to lesser extent from Russia, and increasing new (and renewable) sources for electricity dominate the policy debate. This can have both negative and positive impacts on the forest bioeconomy. For example, there is immediate need to strengthen resilience in the EU countries. In long-term it is the necessary for "the forest bioeconomy sector" to show and tell that it's contribution to global mega trends (biodiversity loss, climate change, resource scarcity) is positive.

*Comment date Sep 12, 2022, 9:37:07 AM*

If the forest bioeconomy sector is active enough and able to show positive contribution to global megatrends - an prove it by holistic research, then the tide can turn, and forest bioeconomy can have a broader acceptance and new renaissance. But the EU environmental paradigm is still against the active use of forest resources. And rightly so, because the bd-indicators are still showing a slight decline. So the forest bioeconomy has to improve its behavior first, before the renaissance can take place.

*Comment date Sep 14, 2022, 12:02:27 AM*

This also speaks to the idea that these decisions are not always entirely rational or made in a vacuum and we have to recognize that much of the drag in combatting climate change comes from many of these imperfections (e.g., sunk costs, salesmanship, acts of God, human preferences).

*Comment date Sep 6, 2022, 1:07:49 PM*

Blurring sectoral boundaries (forest, energy, agriculture, food, chemistry, medicine) => new products, new potential

Simultaneously customer behavior and trends: demand for new products, consumption habits (less consumption, vegan food)

*Comment date Sep 7, 2022, 12:22:31 PM*

Sustainability & mitigation of the climate changes in the war environment (impacting supply & demand) & "energy crisis" & high inflation - still post-COVID world too which again impacts on supply and demand. In Europe we also have aging generations and may have lack of talents - so again social, political, environmental etc. all aspects impact on the future changes.

*Comment date Sep 8, 2022, 11:53:25 PM*

Decreased/changes forest diversity, less cold-tolerant species, most frequent forest fires

*Comment date Sep 13, 2022, 11:38:25 PM*

Further pushes towards automation and increasing productivity per human unit of labour and, further on, how that automation affects social and cultural patterns. Will people gravitate towards new kinds of work? Will the amount of work people do decline? Will profits increasingly be consolidated in the hands of ownership, rather than labour? How does jobless resource extraction affect agreements between communities and resource industries?

I do think that a big question, however, is "where are the limits of automation?" We probably can't keep accelerating change into some kind of technological singularity, since the energy costs will be too high, technology too complicated to advance further, chips too scarce, resources too slow to grow back, or perhaps cultural barriers too powerful. It remains to be seen how our breakneck rate of progress begins to slow, but it seems that it will have to slow.

Climate change is a big wild card. It seems that much of the modelling around the bioeconomy is based on utilizing present bio-resources at a time when climate change is causing massive uncertainty in availability. The bioeconomy certainly has the potential to mitigate some of climate change, but its potential is also deeply dependent on it.

The public consensus in the West that economic growth needs to be sustainable appears to be persistent and slowly strengthening over time.

*Comment date Sep 14, 2022, 11:04:28 AM*

the emphasise of the "cross-sectoral" nature of the forest bioeconomy

## Question 6/6

Finally, let's consider the forest bioeconomy and its operating environment. What is the nature of future changes that may affect the forest bioeconomy?

**Question 6:** What features or characteristics may those possible future changes have that may influence the forest bioeconomy?

Please give your answer in the comment section below (Elaborate on this topic (add a comment)).  
After you have given your own answer, please comment on other answers and promote discussion.

## COMMENTS

*Comment date Sep 5, 2022, 7:01:14 AM*

See the previous answer, I would say the same, my knowledge is not good enough to separate these.

*Comment date Sep 5, 2022, 12:04:43 PM*

Increased demand for bioenergy. Forest industry decline due to high energy costs.

*Comment date Sep 5, 2022, 1:06:44 PM*

Forests provide economic welfare in terms of income, jobs, energy and other good & services. If European economies meet long-term depression, forests (among other sectors) may have to help on keeping the welfare we are used. This is especially important to forest rich countries like Finland and Sweden. Forest as a source of energy may be important also elsewhere.

*Comment date Sep 5, 2022, 2:28:48 PM*

The recent EU kommissions environmental ambition arises from the poor development of biodiversity and the progress of climate change - all scientific facts. These facts have led to a new paradigm, which tries to straighten the global development after the era of Brundtland Report. This thinking led to a new paradigm, where ecological sustainability has to be the capital goal, and other SD-goals, and the society as a whole have to adapt the ecological constraints. However this paradigm is simplified, and can not solve the SD Wicked problems. Simplified approaches do not work. So we need to widen this paradigm and make a new synthesis-paradigm, that does not simplify the problems we are confronting. We have to analyse the development problems through this wider paradigm, and set new targets for the forest bioeconomy. The next phase will contain the bioeconomy business as usual: "Increasing demands for sustainability and resources efficiency ....", PLUS new serious attempt to control SD and existing environmental hazards using holistic research approach. The new paradigm will define the changes needed.

*Comment date Sep 8, 2022, 9:10:13 AM*

I totally agree, the simplified solutions that politicians like cannot solve the complex problems we are facing.

*Comment date Sep 6, 2022, 6:59:02 AM*



The forest bioeconomy is to face increased environmental regulation and in order to meet demand for higher ecological criteria. At the same time, there's growing need for delivering substitution for fossils, energy in particular in the EU. It is a key challenge to meet these partly contradicting demands.

*Comment date Sep 6, 2022, 1:10:22 PM*

Everything. Production, demand and consumption are in transformation. Simultaneously, high external pressure, e.g. EU biodiversity conservation, may change the governance of forest bioeconomy radically.

*Comment date Sep 7, 2022, 12:25:17 PM*

I think everything mentioned earlier, but also I would add the increasingly required education / publications on the forest & sustainability to help to innovate actions to mitigate climate changes and also to help to make informed decisions to influence the forest bioeconomy.

*Comment date Sep 14, 2022, 12:05:10 AM*

Maybe not the way you meant this, but I see two kinds of education at play: consumer education in making good choices to reduce ecological impact. But also, labour education: we are going to need many more educated people to collect and analyze data that supports climate and ecosystem management.

*Comment date Sep 8, 2022, 11:55:00 PM*

Changes in the type, quality and supply of most forest products

*Comment date Sep 13, 2022, 11:40:09 PM*

Climate change will wreak havoc with the quantity, quality, and types of resource stocks available to the bioeconomy.

*Comment date Sep 14, 2022, 11:05:46 AM*

sustainability

Thank you!

Thank you for your answers and comments!

I encourage you to return to the query later to review the progress of the discussions.

This round is open until September 14, 2022.

Next round (*weak signals*) will start on September 21, 2022.

Please follow your email for further instructions.