BSR Policy Briefing series 2/2019

Bioeconomy Policies in the BSR

Some recommendations for the policy-makers

By Torfi Jóhannesson

CENTRUM BALTICUM

ISSN: 2342-3153

Bioeconomy Policies in the BSR

Some recommendations for the policy-makers

By Torfi Jóhannesson

Torfi Jóhannesson is a senior adviser at the Secretariat for the Nordic Council of Ministers. He has many years' experience of policy development in bioeconomy and rural development. He has a PhD from the Royal Veterinary and Agricultural University in Copenhagen and has previously worked as associate professor, agricultural consultant and senior expert in the Ministry of Industries and Innovation in Iceland.

Contact: torjoh@norden.org
Twitter: @TorfiJohanneson

Abstract

The bioeconomy is a new term in the context of policy development. It is used partly to cover the traditional primary industries of agriculture, forestry and fisheries but also to represent a rapid and innovative development within and between these sectors. Most of the countries in the Baltic Sea Region have adopted some strategic approaches for the development of the bioeconomy and the same applies for both the Nordic Council of Ministers and the European Union. This policy brief describes how bioeconomy can be defined and it discusses how the bioeconomy can contribute to solving some of the major global challenges we are facing. It sets out the general framework for a macro-regional bioeconomy strategy and finally suggests few relevant policy recommendations for the bioeconomy in the Baltic Sea Region.

Keywords

Bioeconomy, strategies, Baltic Sea Region, circular economy

Table of Contents

1. Definitions – what is bioeconomy

Bioeconomy can be defined in many ways. For this document it may be most relevant to refer to the following description from the European Bioeconomy Strategy 2018:

> *"The bioeconomy covers all sectors and systems that rely on biological resources (animals, plants, micro-organisms and derived biomass, including organic waste), their functions and principles. It includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services."*

It is important to acknowledge that bioeconomy is more than just a new term to cover the traditional sectors of agriculture, forestry and fisheries. The reason we have started talking about some of the traditional bio-sectors in terms of bioeconomy is that recent development in these sectors demands new vocabulary. Some of the most prominent aspects of novelty fall under one of the four following headlines:

1.1 Cross sectorial

Bioeconomy is not just agriculture or just forestry. It deals with the more complicated interactions between many of the traditional sectors. Many of the cross-overs have something to do with energy production. Forests can contribute to energy production on many different levels, such as biomass, black liquor, ethanol, biodiesels etc. Same accounts for agriculture, where biomass from e.g. traditional crop production or from specific energy crops can be used as a direct source for energy. It can also be converted to ethanol or yet other energy products. Manure from farm animals is another source of energy – in this case through the production of methane. Other interesting and relevant examples of cross-sectoral aspects of bioeconomy are e.g. the use of forest based biomass to produce animal fodder or substances for the growth of algae.

What is important to notice is that the same biological principles apply for the different types of biomass. The origin can be wood, leaves, manure or biproducts from the fishing industry but the aim is the same: To maximize the value added from the biological resources and to reduce waste.

1.2 Complex compounds

Many of the most promising elements of bioeconomy concern the extraction of complex compounds from biomass. This relates to the well know hierarchy of utilization of biomass, normally visualized as a pyramid. On the top of the pyramid is high value, specialized products for pharma or cosmetics, at the middle levels we find food, feed, bioplastics, fibres and bulk chemicals and at the bottom bioenergy and biomass for fertilizer etc. The basic idea is this: Most biomass can be used for energy. But before we do that, we should extract as much value as possible from the biomass; values that are in the complex biological compounds like bio-enzymes and polymers produced by the plants and the animals we have harvested. Even if very simplistic this way of regarding biological value chains can be useful in some circumstances.

1.3 Strong focus on circularity

The development of the bioeconomy is closely linked to the emergence of the "*circular economy*" as a paradigm for sustainable development. Where the circular economy emphasizes circularity of all materials, the bioeconomy focuses on the potential of biological resources to replace fossil based or otherwise unsustainable products. It should be noted that in most cases bioeconomy cannot be circular. This is not realistic. A fish is not returned to the sea after use, nor is a tree returned to the forest. And as for the standard examples of biomass being returned to the fields in form of manure, or trimmings left in the forest – these examples are perhaps becoming the next victims of the success of the bioeconomy. As we get better in utilizing by-products and side-streams less and less biomass will be returned to the fields.

Instead the circularity of the bioeconomy must be regarded more broadly as the health of the ecosystems, where we harvest the biomass. We cannot return a tree to the forest but we can plant a new tree for every tree we remove. And we can make sure, that fish stocks manage to reproduce at a rate that compensates for the annual harvest.

2. The challenges

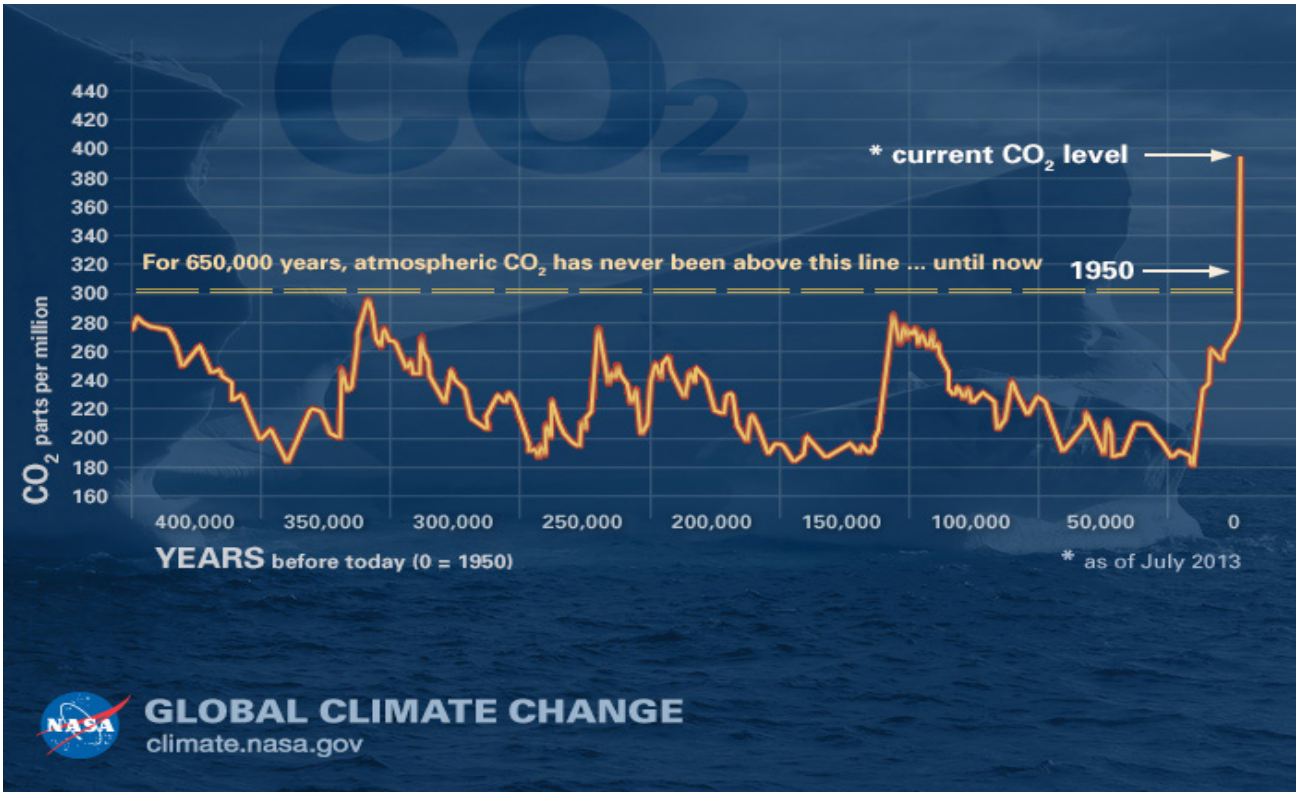
The world is facing many serious environmental challenges that will shape the lives of generations to come. The current world population of 7.6 billion is expected to reach 8.6 billion in 2030, 9.8 billion in 2050 and 11.2 billion in 2100. Annual population growth rates have been declining for almost five decades (FAO: The future of food and agriculture) and the world population will not become much bigger than 11-12 billion people. But accommodating four billion people on the top of the present 7.6 billion is going to be a challenge.

The linear models of economy that have served us so well in the past have reached their limits. At the eve of the industrial revolution, the world population was less than 1 billion people and as late as mid-1960s this figure had only risen to 3 billion. Going from 3 billion in the 1960s to over 11 billion in 2100 will put both the resources and the planet's ability to absorb waste under huge pressure.

Expanding food production and economic growth has so far made it possible to meet the growing demands of the human population, caused both by population growth and increased consumption. But this has come at a serious cost to the natural environment. Loss of forests, groundwater depletion, rapid loss of biodiversity and of course the large-scale climate change caused by greenhouse gas emissions should serve as reminders that we cannot go on with business as usual.

The rapid warming of the atmosphere, commonly referred to as the "*climate change*" has widespread effects on all biological resources. These effects can be hard to predict on local or regional scale. Despite widespread predictions of warmer and wetter climate in the Nordic countries, the summer of 2017 was unusually cold in Scandinavia and the summer of 2018 was unusually dry. But perhaps the most alarming is the following graph, showing the development in atmospheric levels of CO_2.

Figure 1: Atmospheric levels of CO_2 the last 400.000 years.



Source: NASA (climate.nasa.gov)

The graph shows how the levels of CO_2 have reached unprecedented levels and unfortunately there is still massive yearly addition to the already alarming situation. Even a dramatic reduction in emissions will still leave us with higher levels of CO_2 than humans has experienced since the dawn of the species.

Human activities are also taking their toll of the biodiversity in the world. Many studies could be cited but one of the most alarming ones is a new review study looking at global insect populations. It concluded that insect

populations are in "*dramatic rates of decline that may lead to the extinction of 40% of the world's insect species over the next few decades*." The reasons are according to the authors: *i) habitat loss and conversion to intensive agriculture and urbanisation; ii) pollution, mainly that by synthetic pesticides and fertilisers; iii) biological factors, including pathogens and introduced species; and iv) climate change*.

In the drier areas of the world where surface water is scarce, groundwater is abstracted in large volumes to irrigate crops, and to a lesser extent for drinking water supply and industry. According to a recent study by NASA, 30% of the world's largest groundwater basins are under distress. An example is given of the water basins under Beijing that are now almost 300 m lower than in 1970 and still being depleted. As a matter of fact, the massive extraction of ground water is estimated to result in 0.8 mm rise in sea levels every year.

Around 1/3 of the total agricultural farmland is moderately to highly degraded. This is especially worrying as few options are left for expanding the present agricultural land further. Even if warmer climate will make it possible to take new areas in use, this will be outweighed by the loss of existing land in traditional agricultural regions.

The list of challenges could be longer: Multi resistant bacteria; rising sea level; extreme weathers; ocean acidity; coral deaths etc. But even if the list of potential and existing threats is long and daunting the solutions are not out of reach in terms of financial or technical constrains. Most CO_2 emissions come from energy production by the burning of fossil fuel. Here, many alternatives exist that can replace fossil fuel to the necessary extent. Producing food for 11-12 billion people with less input (fertilizer, pesticides, land, water) is not impossible but requires a both changes in the supply side and the demand side. Increased efficiency through breeding and better management and reduced food waste at all stages of the production are important on the supply side. On the demand side a dietary shift from animal based food towards plant based food is probably the single most important factor. In fact, if the richest 2 billion people in the world would reduce their intake of ruminant meat by 40% compared to 2010 levels this change alone would free up roughly the amount of land required to feed 11 billion people in 2050, according to the World Resource Institute.

The bioeconomy will be an important part of the changes needed for a sustainable future on the planet. The bioeconomy contributes to energy production, food, textiles and construction, all of which are major contributors to climate change and other environmental hazards.

3. Policies on bioeconomy

Chapter 2 illustrated that the world is facing a dire future if the leading economic powers do not develop more sustainable economic paradigms. This development may happen by itself in some countries but the progress is still too slow and too limited to mitigate the aversive effects of the non-circular, fossil-based economy. Therefore, more policy makers must make bigger efforts to develop and implement new policies to propel the transformation to circular- and bio-based economies.

The Nordic countries are among the frontrunners in this aspect, as many others. They have all implemented various national strategies and initiatives to promote the bioeconomy and an overview made by Rambøl for the NMC has revealed that a very broad range of strategic approaches have been used.[1]

In some instances, the bioeconomy strategies revolve around the specific biomass value chains that are dominant in the country or region. Such approaches often identify the growth potential that relates to a specific type of biomass, and focus on a few initiatives designed to promote the development of new products and solutions related to that particular type of biomass, all along the value chain. Other strategies focus on the more structural challenges that face the bioeconomy sector. In these instances, the proposed initiatives most often try to overcome the barriers related to the need for more research and development of new bioeconomy solutions, and the need to secure for instance research funding or large-scale testing facilities, across the various biomass value chains. Other groups of initiatives focus on the need for building up clusters and/or networks, either among the various value chains or around various types of product. Yet other approaches revolve around more specific market and societal needs, taking their starting point either in bioeconomy markets with a particularly large commercial or environmental potential, or in specific, major environmental challenges that can be addressed using bioeconomy solutions. This approach can for instance be found in some of the Nordic strategies that focus more directly on biofuels as a potentially large, global market; likewise, the focus on bioeconomy in the European Commission

1 Much of this chapter is based on Rambøl, 2017.

approach is on global climate and resource agendas that may in part be alleviated by the development of the bioeconomy sector.

Each of these strategic approaches holds some clear advantages as well as challenges in terms of a strategic framework. This means that a successful strategy to promote the transition towards bio- and circular economy must consider several generic strategic considerations and objectives that should be given weight when the strategy is formulated. In the following sections three such strategic objectives are presented and discussed.

3.1 Creating added value and impact

This objective may seem self-evident, but exactly therefore, it must always be the first consideration for any strategy development. Creating and implementing new strategies is a demanding task and should only be undertaken in so far as it provides value that cannot otherwise be provided by other strategies on the same or other administrative levels. This means that a national strategy must complement an existing regional or an international strategy in a clear and valuable way, otherwise it should not be adopted.

The type of impact or value can, on the other hand, vary considerably. It can be environmental impacts, it can be impact in form of increased innovative capacity, the creation of economic value or even societal benefits or specific regional growth. The distinction between these different understandings relates in many ways to the question of impacts on either a long term or a short-term basis. It is hard to imagine an environmental or societal impact that will not, at some point of time, have economic consequences. And economic growth is of course important for regional development and society as whole.

To create value and impact, no matter which type, a successful strategy must be complemented by instruments, resources and actions that will make it possible – and likely – to realize the mission and intent of the strategy. There is, for example, not much point in declaring several strategic "*goals*" (such as an actual percentage of reduced resources in specific sectors, or a concrete low emission target) unless the strategy contains instruments that make it probable that such goals will be reached. There may also be very little point in stating an intention to influence international – or national – bioeconomy strategies unless it is substantiated that such types of influence are realistic.

It should be noted that these instruments do not have to be financial. Governments, both local and national, can use other instruments such as regulations and procurement rules to achieve important goals. Setting standards for productions processes and products, including waste and side-streams, and setting long term goals for the share of bio-based products in sectors, such as energy or construction can also push the development in the right direction, without requiring specific state funding.

3.2 Political and financial realism

Following from the objectives described above, a strategy must be aligned with the existing political landscape in which it will operate. This objective may also appear relatively straight forward but is nevertheless important in terms of aligning the various ambitions and wishes that will be expressed by the relevant stakeholders and interest groups. This does not mean that strategies should aim at the lowest common denominator in every case – on the contrary, they should inspire but they must also be realistic. An unrealistic strategy will not benefit any case. It will not gain supporters but rather cement any potential opposition. Therefore, every strategy should include a few easily achievable, short term goals that are not likely to be politically sensitive. Such low hanging fruits can pave the way for a longer term and complex ambitions.

In many cases the political opposition to new solutions is linked to the need to divert funding towards new sectors or initiatives. The benefits of new solutions and new business models can be uncertain and long-term so acquiring sufficient funding will always be difficult. If this is the case, proposal for a strategy should take a realistic view on the possibility of securing funding for initiatives under the upcoming strategy, which implies that the initiatives should be focused on areas that require limited or no financing. Secondly, the structural challenges that characterizes the development of the bioeconomy sector and can be approached in other ways than through direct funding. This can be through support for the creation of clusters, networks and other, perhaps more direct types of collaboration between research institutions, companies etc. A third point is the possibility of operating with a short and a long-term perspectives in the strategy. Thus, the short-term objectives could be directed towards

establishing a stronger analytical basis that will in turn make bigger commitments at later stages more feasible.

3.3 Securing buy-in from major stakeholders

Building on from the two objectives described above, one of the key questions for any strategy is of the target group of the strategy: Who should the strategy and the initiatives within the strategy be directed at, to create true added value and the largest possible impact?

The bioeconomy field is composed of many **SME's and relatively small research environments.** This means that it may be relevant for a strategy to focus on creating value to this kind of stakeholders who find it most difficult to create and maintain networks and knowledge exchange without external assistance. Examples could be investments for research, product development and marketization.

Another approach is to aim for the the **major industrial companies and research environments**, partly due to the co-financing and political influence that they will be able to bring to the table.

It is also possible that the goal of the strategy – rather than improving the funding and framework conditions of the bioeconomy – should be to raise **public awareness** about the bioeconomy agenda. The target group would then be the public in the region or the country.

Preferably all three target groups should be addressed but this is not always possible. Securing the participation and support of the larger companies and research environments in the sector is in many cases the most likely way to success. The buy-in of the major industrial companies and research environments is usually crucial to secure long-term collaboration within the sector (for instance in terms of co-development or standardization). Also, funding for R&D projects or for other types of public-private partnerships normally requires the participation of companies or research environments with the ability to provide some type of funding and leverage. The involvement of the major stakeholders will very often automatically lead to the involvement of the smaller stakeholders, such as the SME's, that will be given an opportunity to be involved in knowledge sharing and collaboration with major companies.

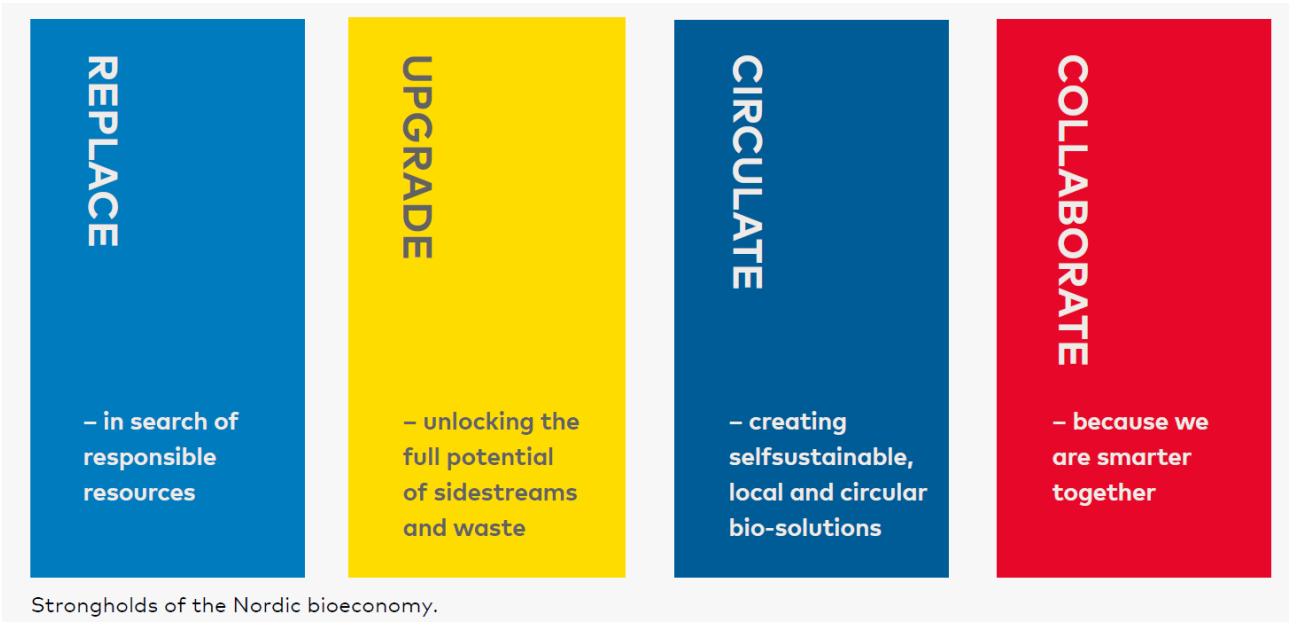
4. The Nordic Bioeconomy Strategy

In 2014, the Nordic Council of Ministers decided to develop a Bioeconomy Strategy for the region. The strategy should build upon existing strategic initiatives in the Nordic countries and seek to identify areas, where Nordic cooperation would give added value. To carry out the work, a Nordic Bioeconomy Panel was established with representatives from all the countries, some Nordic organizations and the EU. The primary objective of the panel was to propose a strategic programme for the Nordic bioeconomy. This work resulted in the publication "*15 Action Points for the Nordic Bioeconomy"* that came out in 2018. The 15 actions highlight the need for more innovation support, more targeted policies and market support and more networking efforts.

4.1 25 cases for sustainable change

As a stepping stone on the road towards a Nordic bioeconomy strategy, the panel decided to compile a case catalogue to illustrate the diversity of the Nordic Bioeconomy. That publication, "*25 Cases for Sustainable Change*", sets out four principles for the new bioeconomy: Replace – Upgrade – Circulate – Collaborate.

Figure 2: The four pillars of sustainable bioeconomy, as defined by the Nordic Bioeconomy Panel.



Source: Nordic Council of Ministers, 2017.

These four principles can be understood as the suggested pillars of a new economic paradigm for a sustainable development. The exact wording and the number of pillars are not sacred and may be debated. But without a general and wide-ranging conversion of our economies the future on planet Earth is not going to be bright.

We must **replace** fossil based and otherwise harmful products with bio-based and sustainable alternatives. In the case of energy, multiple options exist already and many more are on the drawing tables. Bioenergy is one of the options and together with solar-, wind-, ocean-, hydro- and geothermal energy these sustainable energy sources can replace fossil fuels to the necessary extent. Other large-scale industries that require a major change are construction and packaging. In both cases wood can be a part of a sustainable solution, in combination with the adherence to the principles of circular economy.

Upgrading refers to optimisation throughout the whole value chain, and an emphasis on higher value products and services. The Nordic bio-economies have focused on increasing the value of currently unused and underutilised living natural resources, as well as on unlocking the full potential of residues and waste. This is an area, where stricter regulations e.g. on waste disposals have driven the search for new markets opportunities for a range of side-products from both fishing industry and meat processing. Many inspiring cases also exist in the forest industry where, low value by-products have become valuable resources for new and innovative products.

The third theme is **circulate**. As discussed earlier in this paper biological products cannot always be circulated. Food and feeds are fuels. And fuels are burned in machines or in our own bodies to produce heat and kinetic energy. When the energy is used, there is no turning back. But in real life things are more complicated. We are today wasting large amount of thermal energy through wastewater and by not insulating buildings properly. Food waste often ends up in landfills, wood from construction sites is not used again, large parts of fish catches are thrown back into the ocean. The circular approach does not mean that a product must end its cycle of life at the same place as it started. Perhaps a spiral is a more useful metaphor. We reuse the product but be reuse it for other purposes than originally.

The last of the four principles is **collaboration.** It is a reminder that progress requires cooperation and pooling of competences. It is hard to imagine one person holding the competences to build common household equipment, such as a phone or a toaster. Even less so for windmills or factories to process wood. And then there is the whole spectrum of industrial symbiosis that requires not only personal collaboration but the collaboration of businesses, organizations and regional authorities. And after all – we are all in this together.

The four pillars laid the foundation for the actual Bioeconomy Strategy. Where the 25 cases showcased what is possible and laid out the conceptual framework of the future strategic approaches, there was a need for a more direct, action-based strategy to create a roadmap for the development of the Nordic bioeconomy.

4.2 15 action points for sustainable change

Each of the Nordic countries have chosen different strategic approaches for the enhancement of bioeconomy. Some operate with bioeconomy panels, other have included the bioeconomy in a broader strategic framework and some have adopted a specific bioeconomy strategy. As the work progressed towards a common Nordic approach it was clear that the countries did not wish for "*yet another strategy*". Therefore, the decision was made to aim for an action-based, strategic program. One, where the emphasis would be on direct, achievable actions and initiatives instead of a more general strategic framework.

In their national strategic approaches most of the Nordic countries have a strong focus on **research and development**. The strong R&D focus can be ascribed to a demanding transition, which sectors must go through to develop into a bioeconomy sector. Bioeconomy is widely considered to be technology and knowledge intensive and thus the development of bioeconomy must be done through R&D. The new bioeconomy value chains do often include immature technologies (with a few notable exceptions particularly within the forestry sector) and many bioeconomy sectors face challenges securing the proper amount of financing for R&D activities.

The second strong emphasis that can be derived from the national strategies and policies is **knowledge sharing and network**s. Networks have become progressively widespread in the Nordic countries. However, very few are established across the national borders or have an interdisciplinary approach. The existing networks have proven to be extremely important for the development of the bioeconomy by increased knowledge sharing. Thus, expanding existing and establishing new networks would enable a stronger coherence in the Nordic bioeconomy sectors.

The third category of initiatives relates to the need to **speed up** the development of the bioeconomy. It builds on the general aim of the Nordic countries to align their legislation and to share good practices regarding good governance and administration but is also linked to proven successes, such as the Nordic environmental certificate "*the Swan*". The "*opening up*" of a collective, Nordic market with (potentially) 25 million consumers could provide exactly the type of mechanism that would make many bioeconomy products commercially viable in the longer run – to an extent that no national strategy or policy would be able to. In terms of possible "*impact*", there is no doubt that regulation – i.e. the "*forced*" entry of new technologies – are among the most potent instruments in terms of speeding up market development.

Market regulation of this kind, however, also contains several challenges, among which are the economic costs to society as well as the consequences for existing, non-bioeconomy companies. These challenges traditionally mean that most governments are reluctant to implement such measures – and will likely be even more reluctant to do so on a Nordic scale.

The 15 action points of the Nordic Bioeconomy Programme fall under the three broad categories described above. Although the focus is on the Nordic region, many of the action points would benefit from a wider macro-regional approach. This could for example be the Baltic Sea Region, where the countries share many of the same resources and are facing many of the same challenges as the Nordic countries. All the action points aim to address global challenges such as climate change, biodiversity loss, feeding a growing population and reducing waste. In that way, they are clearly aligned with the Sustainable Development Goals of the United Nations. The 15 action points are shown in table 1.

Table 1: The 15 action points from the Nordic Bioeconomy Strategy

INNOVATE: Supporting research, innovation and human capital	ACCELERATE: Policies and market development	NETWORK: Forging new and stronger connections
1. Increased R&D funding	6. Targeted public procurement	11. Support bioeconomy clusters
2. More coherent policies	7. Regulatory frameworks	12. Open access to test and demonstration centres
3. Investment support	8. Labelling and certificates	13. Macro-regional co-operation
4. New educational opportunities	9. Regional innovation strategies	14. Bolstering networking activities
5. Provide intelligence	10. Promote cross-border freedom of movement	15. Nordic impact and branding

Source: Nordic Council of Ministers, 2018.

Each of the points is explained in more detail in the publication. They are aligned with both the national strategic initiatives of the Nordic countries and the bioeconomy strategy of the European Union. That way, they serve as a link between the national and the transnational. The action points are also general and in many ways universal and may therefore serve as an inspiration for other regions or countries aiming at facilitating their bioeconomy sector.

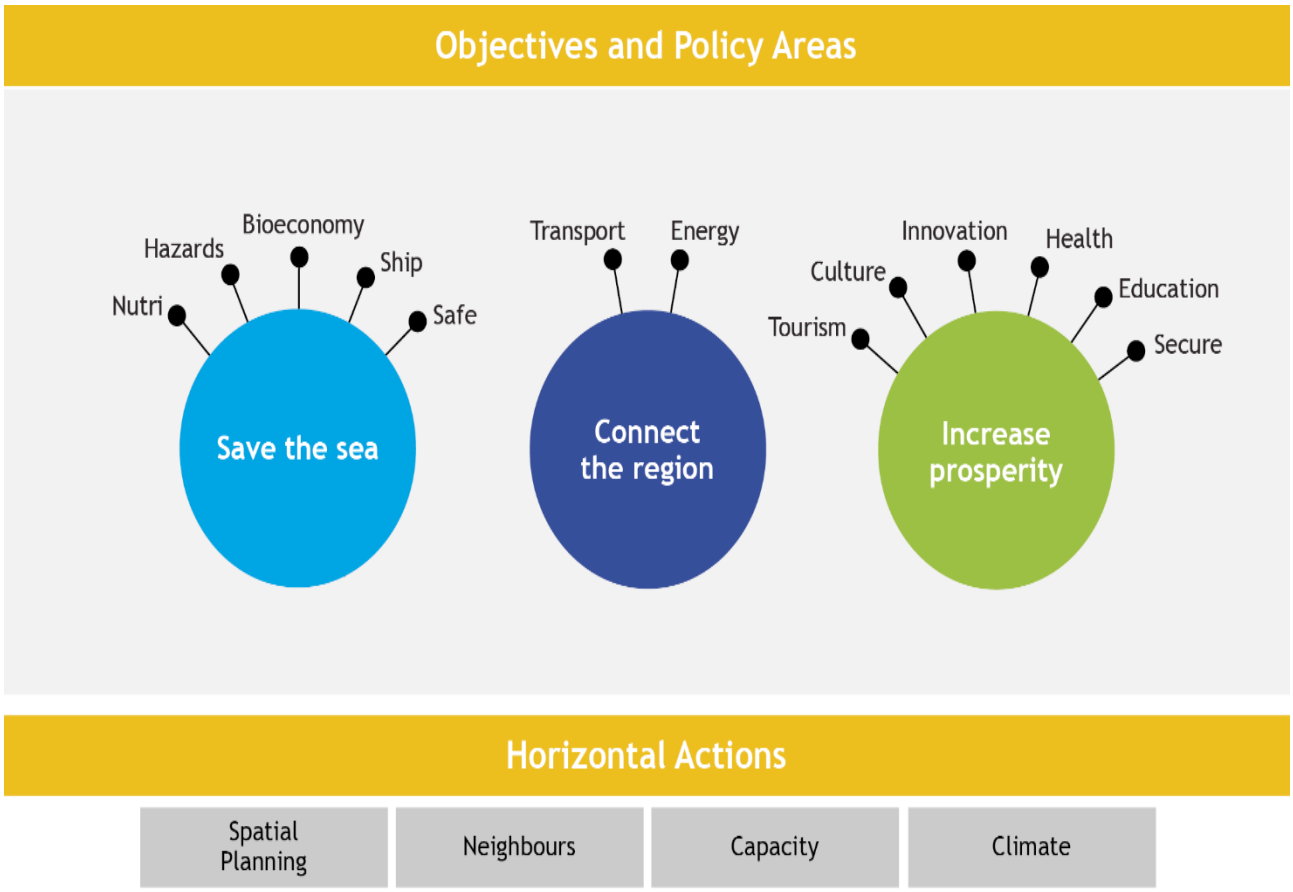
The strategy is operational and process oriented but does not stipulate specific goals. This may seem like a weakness for the strategy as it will be difficult to evaluate the progress without measurable goals. There is however a reason and argumentation for this structure. The Nordic countries have different starting points for the development and the bioeconomy sectors differ very much between the countries. Finland and Sweden are giants when it comes to forest production but have more moderate food production. Denmark, Iceland and Norway on the other hand, are large exporters of food (from agriculture and fisheries) but with much smaller forestry and biomass sectors. Therefore, it is not feasible to set fixed goals but better to identify areas of interest and mark a desirable path for the region as whole to follow.

5. Bioeconomy in the Baltic Sea Region

The Baltic Sea Region (BSR) includes the Nordic countries as well as Estonia, Latvia, Lithuania, parts of Russia, Poland and the northern part of Germany. The eastern part of the region is rich in forest resources and food production, whereas Germany and Denmark are more densely populated and with a strong technical base. The BSR does not have a specific bioeconomy strategy but national approaches exist and are developed and the bioeconomy strategy of the EU acts of course as a general framework for the region.

The European Macro Regional Strategy for the BSR (EUSBSR) includes three objectives, 13 policy areas (PA) and four horizontal actions (HA). The three objectives are: Save the sea; Connect the region and Increase prosperity.

Figure 3: The objectives and policy areas of EU's Strategy for the Baltic Sea Region



Source: Action Plan for European Union Strategy for the Baltic Sea Region.

Bioeconomy is one of the 13 policy areas of the EUSBSR and includes agriculture, fisheries and aquaculture, forestry and rural development.

The PA-Bioeconomy has defined five focus areas for the strategic development of bioeconomy in the region. These five focus areas are: Bioeconomy policy; Bio-based Business; R&D and Innovation; Civil Society and of course, Communication.

Figure 4: The five focus areas of Policy Area Bioeconomy

Source: BSR-Bioeconomy 2015-2018. Strategy and Action Plan. Towards a BSR Bioeconomy.

PA Bioeconomy has covered a wide range of activities and initiatives under the current action plan. One of them is a forum for policy dialog, called the BSR Bioeconomy Council, with participation from all the countries in the BSR and several NGOs and bioeconomy related organisations. The "Council" has mainly functioned as a reference group for the policy area, but has also produced valuable contributions of its own. A good example of this is "Sustainability Criteria for Bioeconomy"; guidelines that the Bioeconomy Council published in November 2017.

Another example of success is the networks of Managing Authorities of both rural development (EFARD) and fisheries (EMFF). These networks have made it possible for the national authorities in the BSR to meet and learn from each other and to discuss possible alignment of activities or other potential cooperation.

A third important area of impact concerns nutrient recycling from agriculture. During the last 10 years PA Bioeconomy has on several occasions brought together researches, NGOs, farmers and authorities from all Baltic Sea Region to work for better recycling of nutrients from agriculture. The joint events have led to exchange of knowledge, new forms of cooperation throughout the Baltic Sea Region following with new ideas and projects for implementing these ideas. These, in turn, have created new solutions for the common problems as well as new platforms for exchange and spreading of knowledge.

Yet another group of activities is flagship projects. Under PA Bioeconomy there are 8 flagship projects that contribute to the policy development in the BSR. The flagships can be projects or consortia of several projects that share the same aim.

More information on the PA Bioeconomy can be found on the webpage for the policy area: www.bsrbioeconomy.net.

6. Conclusions

Bioeconomy is a new concept. Only few years back it was largely unknown to policy makers and the wider public. But in very short time it has gain popularity and now most of the countries in the BSR have implemented strategic approach to bioeconomy. When a new concept gets adopted so fast and so widely, it is because it is useful. It helps us understand and navigate the world around us and make sense of the rapid changes in the economic development and consumption.

The bioeconomy is useful for putting words on the transformation of the traditional sectors like forestry or fisheries. Once, bulk producing industries with questionable ecological records, these sectors are now steaming with innovation, producing textiles, pharma, cosmetics and clean energy in addition to their former bulk products. Bioeconomy also helps us making sense of how new sectors are emerging (take algae production or insect farming) and how others may be transformed by technology (think digitalization and precision farming).

But where does that leave the Baltic Sea Region? The bioeconomy has a strong national focus in many of the countries around the Baltic Sea and now the EU and the Nordic Council of Ministers have adopted their respective strategies. If the Baltic Sea Region should form its own bioeconomy strategy, what would it look like?

The answer to this question can only be suggestive and on the sole responsibility of the author. But a bioeconomy strategy for the Baltic Sea Region would have to give added value to the existing strategies. It would have to address challenges that this region is especially concerned with. There are two obvious contenders for thematic challenges unique for the BSR. One is the Baltic Sea itself and the other is the neighbours to east. The Baltic Sea suffers from runoff from agriculture, forestry and industry. This must be addressed. The Baltic Sea also holds the potential for the development of the blue bioeconomy and these potentials should be developed. Both policy areas require a coordinated effort from all the countries around the Baltic Sea, including Russia. NW-Russia is a part of the BSR but not EU and therefore, specific measures may be required to ensure its full participation. Given these premises, it would be logical to suggest the following policy recommendations for the development of the bioeconomy in the Baltic Sea Region:

1. The direct negative environmental impact on the Baltic Sea must be systematically reduced. This includes runoff from agriculture and forestry and wastewater from industries and municipalities.

2. The Baltic Sea blue bioeconomy should be supported and advanced through research, innovation and economic development programmes. Examples could be algae and mussels farming, land-based aquaculture, sustainable fishing practises and tourism.

3. Local food production should be enhanced to strengthen the smaller scale, high quality and sustainable food production in the region. This in turn will strengthen tourism and increase the interest of local stakeholders to protect the environment of the region.

These three overarching goals can be broken down to sub-targets and more can be added. Also, it is important to put in place a strategy "*owner*" and some financial and regulatory instruments. The BSR has a great potential in developing the bioeconomy and has much to offer to other regions and a common bioeconomy strategy for the region might just be the tool we need to realise the potentials.

References

https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_strategy_2018.pdf#view=fit&pagemode=none
https://population.un.org/wpp/

Worldwide decline of the entomofauna: A review of its drivers. FranciscoSánchez-Bayoa

Kris A.G.Wyckhuys https://doi.org/10.1016/j.biocon.2019.01.020

https://www.jpl.nasa.gov/news/news.php?feature=4626

https://www.seametrics.com/blog/groundwater/

https://www.un-igrac.org/news/global-groundwater-depletion-leads-sea-level-rise

FAO, 2017. The future of food and agriculture – Trends and challenges. Rome.

https://wriorg.s3.amazonaws.com/s3fs-public/creating-sustainable-food-future_0.pdf

Rambøl, 2017. A FRAMEWORK FOR A NORDIC BIOECONOMY STRATEGY. Unpublished report.

Nordic Council of Ministers, 2017. Nordic Bioeconomy – 25 cases for sustainable change. http://norden.diva-portal.org/smash/record.jsf?pid=diva2%3A1065456&dswid=3023

Nordic Council of Ministers, 2018. Nordic bioeconomy programme – 15 action points for sustainable change. http://norden.diva-portal.org/smash/get/diva2:1222743/FULLTEXT01.pdf

https://www.balticsea-region-strategy.eu/action-plan/17-action-plan-2015/viewdocument

http://bsrbioeconomy.net/resources/BSR_Bioeconomy_Strategy_and_Action_Plan_March_2015.pdf

http://bsrbioeconomy.net/5principles/Policybrief_5P.pdf

Earlier publications in the BSR Policy Briefing series by Centrum Balticum Foundation

BSR Policy Briefing 1/2019	**Cooperation between Saint-Petersburg and Finland** Stanislav Tkachenko
BSR Policy Briefing 10/2018	**The sanctions against Russia. Are there winners and losers around the Baltic Sea?** Susanne Oxenstierna
BSR Policy Briefing 9/2018	**Future of Public Sector Governance and Digitalization** Meelis Kitsing
BSR Policy Briefing 8/2018	**American Policy Towards the Baltic States** Stephen Blank
BSR Policy Briefing 7/2018	**Russian direct and indirect investment in the Baltic Sea region** Alexey Kuznetsov
BSR Policy Briefing 6/2018	**Foreign economic relations of the Kaliningrad region** Vitaliy Zhdanov, Vladimir Kuzin and Mikhail Pliukhin
BSR Policy Briefing 5/2018	**Why is Russia seeking to ignite a civil war in the European Union and how to stop it?** Ruslanas Iržikevičius
BSR Policy Briefing 4/2018	**On the paradoxes of foreign expansion: the experience of Polish firms** Piotr Trąpczyński & Krystian Barłożewski
BSR Policy Briefing 3/2018	**The bioeconomy in the Baltic Sea region** Anna Berlina
BSR Policy Briefing 2/2018	**Russia vis-à-vis Ukraine: On Some Economic Costs** Sergey Kulik
BSR Policy Briefing 1/2018	**Chinese Direct Investment in the Baltic Sea Region** Jean-Marc F. Blanchard
BSR Policy Briefing 5/2017	**The economic impact of China on the Baltic Sea region** Jean-Paul Larçon
BSR Policy Briefing 4/2017	**National innovation and smart specialisation governance in the Baltic Sea region** Edited by Zane Šime
BSR Policy Briefing 3/2017	**The economic state of the Baltic Sea region** Edited by Kari Liuhto
BSR Policy Briefing 2/2017	**Russia's foreign relations and the Baltic Sea region** Sergey Kulik
BSR Policy Briefing 1/2017	**Russia and the security in the Baltic Sea region** Justyna Gotkowska & Piotr Szymański

BSR Policy Briefing 2/2016	**The EU-Russia relations and their reflections in the Baltic Sea region** Stanislav L. Tkachenko
BSR Policy Briefing 1/2016	**The maritime cluster in the Baltic Sea region and beyond** Edited by Kari Liuhto
BSR Policy Briefing 1/2015	**Natural gas revolution and the Baltic Sea region** Edited by Kari Liuhto
BSR Policy Briefing 4/2014	**A Russian Sudden Stop or Just a Slippery Oil Slope to Stagnation?** Torbjörn Becker
BSR Policy Briefing 3/2014	**Poland and Russia in the Baltic Sea Region: doomed for the confrontation?** Adam Balcer
BSR Policy Briefing 2/2014	**Energy security in Kaliningrad and geopolitics** Artur Usanov and Alexander Kharin
BSR Policy Briefing 1/2014	**The Baltic Sea region 2014: Ten policy-oriented articles from scholars of the university of Turku** Edited by Kari Liuhto
BSR Policy Briefing 4/2013	**The Kaliningrad nuclear power plant project and its regional ramifications** Leszek Jesien and Łukasz Tolak
BSR Policy Briefing 3/2013	**Renewable Energy Sources in Finland and Russia - a review** Irina Kirpichnikova and Pekka Sulamaa
BSR Policy Briefing 2/2013	**Russia's accesion to the WTO: possible impact on competitiveness of domestic companies** Sergey Sutyrin and Olga Trofimenko
BSR Policy Briefing 1/2013	**Mare Nostrum from Mare Clausum via Mare Sovieticum to Mare Liberum - The process of security policy in the Baltic** Bo Österlund

BSR Policy Briefing series 2/2019

CENTRUM BALTICUM

www.centrumbalticum.org/en