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Commentary

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Ten years of bioeconomy in the Finnish media

Let's talk about bioeconomy

Bioeconomy as a model for reaching different economic, social and sustainability goals has gained prominence since the early 2000s (Staffas et al. 2013; Hausknost et al. 2017). It has been used to promote different, sometimes even contrasting aspects of sustainable use of natural resources (e.g. Kleinsmith et al. 2014). It is, therefore, a concept that possesses interpretative flexibility in ways that can be utilised to the specific needs of diverse actors and objectives (Leigh Star 2010). This kind of flexibility can be harnessed to suit different objectives, but can – and indeed has – also create tensions within the use, function and governance of natural resources.

Hausknost et al. (2017) along the lines of Staffas et al. (2013) and Bugge et al. (2016) have distinguished three approaches to bioeconomy in documents steering national and supra-national policymaking. *Biotechnology-centred approach* understands bioeconomy as dependent on the knowledge and technology in the related fields and has a founding especially in the knowledge-based bioeconomy approach promoted by the EU originating from the 2000 Lisbon Agenda (European Parliament 2000). This approach is also eminent in the related OECD policies emphasising technological aspects such as the significance of biotechnological development (OECD 2009). *The bio-resource-centred approach* looks at bioeconomy more from the perspective of sustainable use of renewable resources and has arisen especially in the 2010s with various climate change and bioenergy policies (e.g. EC 2010; 2011; 2012). The resource-centred approach seems to have a foothold especially – and not surprisingly – in the policies of the resource abundant societies, such as the Nordic countries, which have a strong tradition of forest industries that also influence the related policies (e.g. Bosman & Rotmans 2016; Peltomaa et al. 2016). Along the two dominant narratives, *agro-ecological bioeconomy* is especially supported by environmental NGOs and certain academic research and approaches bioeconomy in an integrated way within the wider issues of societal sustainability.

In Finland, bioeconomy has raised hopes not only in the quest for a more sustainable future, but offering also possibilities for growth and prosperity especially due to the vast forest resources available. More than half of the current bioeconomy is based on forests (Ministry of Employment and the Economy 2014). Bioeconomy as such is, therefore, nothing particularly new as the Finnish national economy has been based on the use of forests for centuries (Siiskonen 2007). Bioeconomy also has extensive societal aims as there are several large scale biorefineries either planned or in the making, such

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as the Äänekoski bioproduct mill by Metsä-Fibre, which is a subsidiary of Metsä Group, in Central Finland. The mill is the largest ever forest industry investment in Finland and started operating in 2017.

Along the business endeavours, governmental actors are also promoting bioeconomy, as it is one of the five “spearhead initiatives” of the current government in Finland. The initiative was launched in 2015. Under this initiative, various incentives and other measures are promoted to boost bioeconomy in Finland. Under the previous government, Finland has also prepared a bioeconomy strategy in 2014 (Ministry of Employment and the Economy 2014) aiming to “generate new economic growth and new jobs from an increase in the bioeconomy business and from high added value products and services while securing the operating conditions for the nature’s ecosystems.” To support the implementation of the strategy, these ministries are primarily responsible for bioeconomy related issues: the Ministry of Employment and the Economy, Ministry of the Environment and Ministry of Agriculture and Forestry have a website supporting the bioeconomy strategy (www.biotalous.fi). On the website, the explicitly promoted areas include wood and forests, fish and waters, energy, chemistry, food and ecosystem services (biotalous.fi 2017).

Despite the flexibility of the concept and occasional consensus in drafting the national bioeconomy-related strategies (e.g. Hodge et al. 2017), bioeconomy has also met some critique. Tensions have risen especially when the plans to increase the use of forests clash with the objectives of biodiversity conservation and controversies in climate change mitigation, namely whether forests should be considered as carbon sinks or a source to reduce the need for fossil-based products (e.g. Makkonen et al. 2015; Hukkinen et al. 2017; Kröger & Raitio 2017). Initially these tensions started to rise in the discussions concerning bioenergy in the early 2010s, but have since continued as bioenergy has been adopted under the broader discussions on bioeconomy.

Besides the conflicting objectives, the application of bioeconomy as a political buzzword has also been criticised for offering a top-down technical solution (McCormick & Kautto 2013). In this, it has the risk of excluding certain actors or neglecting the role of the citizens (Davies et al. 2016). Bioeconomy is not only about the economics or environmental considerations, but both of these aspects are deeply entangled with the lifeworlds of citizens (Mustalahti & Kusmin 2016). Despite the efforts for inclusiveness, for example in drafting bioeconomy-related strategies, the tradition of a neocorporatism in the Finnish forest sector has made open dialogue and the participation of citizens a challenge (Peltomaa et al. 2016; Mustalahti 2017). One could even ask whether the forest-based bioeconomy is merely a rhetorical reframing of the traditional order.

One key domain where the use and definition of these concepts is contested is media. Media discourses reflect the public opinion but are also shaped by it. These discourses function in a similar manner regarding policy processes. Media offers a platform for political actors to present their views, but can also represent certain viewpoints or interest more directly (Shanahan et al. 2008; Peltomaa et al. 2016). These weightings can be unintentional, but can also reflect the ways a medium wants to represent certain societal groups, political interest, parties or regional stances (Kim et al. 2014). Whether intentional or not, these weightings can also have practical consequences. It is important to scrutinise how the different interests and viewpoints are represented when discussing bioeconomy in the public domain. In order to assess this, we have analysed the content of Finnish newspapers. We present findings from the analysis of the media coverage herein.

Data and methods

We have examined the bioeconomy-related discussions in four major Finnish newspapers, *Helsingin Sanomat*, *Maaseudun Tulevaisuus*, *Keskisuomalainen* and *Kauppalähti* in 2005–2006, 2010–2011 and 2015–2016. Each newspaper has an online archive and we have searched for articles that mention bioeconomy in the different inflected forms.

Helsingin Sanomat is the leading daily newspaper in Finland providing a general view of public discussion in the media. *Maaseudun Tulevaisuus* is another major national newspaper, being the second most read newspaper and having a special interest on rural issues and publishes three issues per week. The daily *Keskisuomalainen* is the fifth most circulated newspaper, a regional newspaper from Central Finland where the Äänekoski bioproduct mill is also located. The fourth newspaper, *Kauppalähti* is the leading business media in Finland.

Table 1. The number of articles mentioning bioeconomy in the four newspapers.

BIOECONOMY	2005-2006	2010-2011	2015-2016
Helsingin Sanomat	2	21	259
Maaseudun Tulevaisuus	2	78	625
Kauppalehti	1	8	87
Keskisuomalainen	0	9	259

In total, we have collected 1 230 articles from 2015-2016, 116 articles from 2010-2011 and 5 articles from 2005-2006 (Table 1.). We ran a word frequency analysis (e.g. Hsieh & Shannon 2005) on the articles per newspaper with nVivo software. Due to the small amount of articles in 2005-2006, we have excluded these from the analysis. We then omitted insignificant words such as conjunctions and combined the different inflections and synonyms of each word or term in order to obtain results on what kinds of themes, issues, actors or societal questions the newspapers cover. To give an idea of the frequencies, in Helsingin Sanomat for example the most frequent actor and second most frequent word in total, Government, occurred 827 times in the 259 articles in 2015-2016.

**Figure 1.** The fifty most frequent words in all four newspapers in 2010-2011 weighted according to frequency.**Figure 2.** The fifty most frequent words in all four newspapers in 2015-2016 weighted according to frequency.

Table 2. The twenty most recurrent substance topics in the newspapers in 2010-2011 and 2015-2016.

2010-2011	Amount of occurrences	Position in total words	2015-2016	Amount of occurrences	Position in total words
forest	156	4	forest	1 424	5
wood	144	5	wood	1 131	9
energy	71	14	energy	540	20
forest industry	47	24	forest industry	517	25
food	45	26	agriculture	353	46
forestry	39	34	education	259	64
bioenergy	39	35	forestry	231	74
agriculture	35	41	bioproduct mill	224	78
forested area	34	45	food	221	79
services	29	58	services	170	101
coal	27	61	transport	160	108
paper	22	77	coal	111	148
electricity	18	102	forested area	84	174
pulp	17	110	electricity	82	178
education	17	111	pulp	78	187
wood construction	14	135	bioenergy	69	205
timber sales	13	142	pulp mill	69	209
biomass	12	144	logging	68	210
energy wood	11	156	forest estates	60	234
oil	10	178	fuel	60	235

The makings of bioeconomy

An example of the 50 most frequent words in all of the newspapers after the cleaning of the results are shown in figures 1 and 2. The 2010-2011 data seems to emphasise the use of forests and the actors in this data are mostly forest owners, forest industry and the actors and institutions representing these. In the 2015-2016 data, the role of state actors seems a lot more explicit. The current government being one of the main topics reflects the directing of public initiatives towards bioeconomy. The Centre Party, which has been a vocal advocate of resource intensive bioeconomy, had twice as many hits (846) along with their Prime Minister Juha Sipilä (706) as the next party, National Coalition (383). The third party involved in these discussions was the Greens (250), not currently part of the government. The third governing party, The Finns, occurred 175 times.

As the 425 880 words in 2015-2016 and 32 336 words in 2010-2011 data sets are very diverse in nature, we have grouped them into different categories. One of these categories is substance or the topic area following the lines of the bioeconomy strategy such as wood and forests, food, energy etc., but not limited to these. In the following, we present the 20 main topic areas the articles cover (Table 2.). As can intuitively be seen also from the word clouds (fig. 1 & 2), forests and wood in general play a dominant role in the articles during both times. This is also the case when looking at the most frequent topic area words.

However, some notions are worth considering. Both bioproduct mill and pulp mill are rather high in the latter data, which can be explained by the building of the Äänekoski bioproduct mill and other similar planned and realised projects. The rise of education in the latter data is noteworthy. Transport

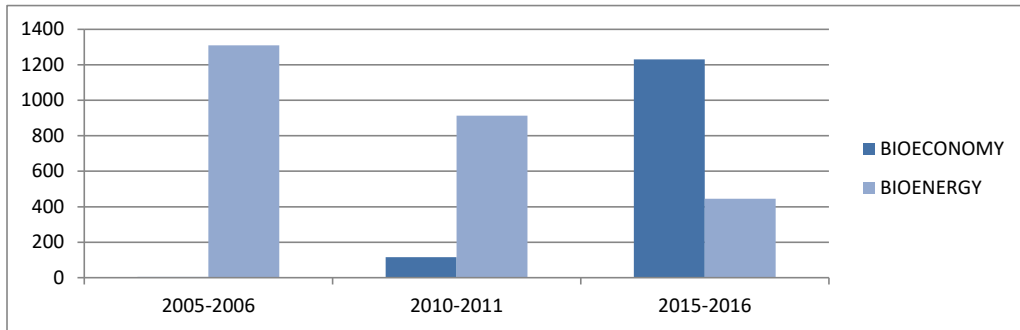


Figure 3. The occurrence of the terms bioenergy and bioeconomy in the four newspapers.

is another area, which does not occur in the former data. These can also be explained by the building of large bioeconomy facilities, as both the need for skilled labour and demands to improve transport infrastructure to supply timber to the new plants have been voiced. The supply of timber in general seems to be one key element in the bioeconomy discussions, as the sales of timber, forested area, forestry and logging are all recurrent topics. Interestingly, wood construction does not show up in the latter data, despite the recent initiatives in promoting wood construction and the increasing discussions of expanding the life cycle of wood based products to mitigate climate change. However, as an example of a product with lower added value, bioenergy along with energy wood is not apparent in the latter data.

Although bioeconomy is our main scope of interest, bioenergy has been one key aspect of bioeconomy at least in the Finnish context. To assess their relations, we have run a similar analysis on the occurrence on the term bioenergy in the newspapers. To illustrate the development and comparison of these discussions, figure 3 shows the trend in the past 10 years. Similar results can be found when looking how the term bioenergy occurs in the bioeconomy-related articles it being the 35th most frequent word in 2010-2011 and 205th most frequent in 2015-2016. At the same time, the price of crude oil has practically halved, which gives one explanation for this trend. These discussions might have been at least partially replaced with discussions of wood-based products of more added value and improving the use of side streams from forest industries.

So what?

It is not insignificant how concepts such as bioeconomy are understood and used in society. The frequent use of concepts that resonate with different interest in the society can change real-life processes and eventually lead to a paradigm shift (Meadowcroft 1997). The way popular and even controversial topics like bioeconomy are represented in the public realm also affect the practices within this realm. These include areas such as policymaking and research funding. The use of the concept also raises power-related questions regarding the way and by who bioeconomy is framed and can affect, for example, investments in technologies or forest owners' decisions on how to manage their forests.

One interesting question is how influential the media actually is and how intentional it is in affecting these discussions. One can, of course, argue that the newspapers simply represent the stances of the societal actors and their power positions. However, the media also has a role in steering how bioeconomy is realised in practices and what kinds of futures the concept proposes and creates.

The results show that the Finnish discussions on bioeconomy are positioned in the bio-resource end of the three approaches presented in the introduction (Hausknost et al. 2017). Products of more added value and a longer life cycle seem to still be having a minor role, as the discussions are centred on the more efficient utilising of natural resources. One reason for the results could be the bigger share of bioeconomy related articles in *Maaseudun Tulevaisuus*, which traditionally represents the interests of forest owners and rural livelihood and thus the supply side of bioeconomy, but as the results were surprisingly similar also in the other newspapers, this is not the only explaining factor. The traditionally

strong role of the forest sector in Finland offers some explanations for this tendency (Mustalahti 2017). However, neglecting issues such as inclusiveness, equality or well-being from nature in these discussions endangers the beneficial objectives of bioeconomy as a sustainable future.

Besides the minor emphasis on social sustainability issues, which might cause the legitimacy of bioeconomy to deteriorate, the emphasis on increasing forest use also brings some political risks. This might further challenge the use of the concept. A prime example of this is the controversies the role of forests in climate change mitigation has recently raised. A bioeconomy discussed mainly in terms of the exhaustive use of forests is a path that at some point might become difficult to continue, especially if the role of forests in the global policy arenas becomes increasingly contested.

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