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REGIONAL BIOECONOMIES IN CATALONIA AND FINNISH LAPLAND

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Summary

For the purpose of reducing fossil fuel dependence and carbon footprint as urgent measures for environmental sustainability, alongside continuing to fulfil local economic development responsibilities, regions along the world have started to carry out strategies for transition towards green economies. This policy brief explores the bioeconomy strategies implemented in two different European regions, by describing some of the strategies used to promote and implement a bioeconomy agenda in Catalonia and Finnish Lapland, with a focus on the actors involved, their roles and the interactions with other relevant actors or stakeholders. Catalonia does not have a single bioeconomy strategy. Instead, different public organisations from the regional government have designed and implemented their own agendas, partly based on the European Union bioeconomy and circular economy strategies. The regional agency in charge of promoting innovation and competitiveness amongst firms and businesses (ACCIO), and the Forest Science and Technology Centre of Catalonia (CTFC), are the organisations with the greatest advancements in implementing a bioeconomy agenda. Their approach to the bioeconomy and the actors involved vary greatly, depending on the economic sector targeted. While ACCIO approaches the bioeconomy mostly as a process of industrial transformation that should use existing competitive advantages, CTFC sees the bioeconomy as an opportunity to boost an underdeveloped economic sector (forestry).

Lapland, on the other hand, has structured its bioeconomy agenda within the smart specialisation strategy, which prioritises five clusters of selected economic areas. Two of those clusters are directly related to bioeconomy and circular economy. The first cluster, called Artic Industry and Circular Economy targets the region's main economic sectors, aiming to promote circular solutions, efficient use of natural resources and industrial symbiosis. The second cluster, called Arctic Smart Rural Communities, is more preoccupied with rural villages and rural entrepreneurs' well-being and steady income, incentivising local production of food and decentralised energy systems.

Both regions show that accounting for regional diversity is crucial for a successful bioeconomy strategy, as the strategies depend on a variety of institutional, social and economic factors. This also implies that there is not one single way to understand bioeconomy, as its definition adapts to the local context, whether it is bioeconomy as the use of natural resources, circular bioeconomy as efficient industrial production, or a combination of both. This context dependence poses challenges for practitioners and policy makers, as adapting the strategies will require innovative approaches, networking and collaborations with different kinds of actors at different scales.

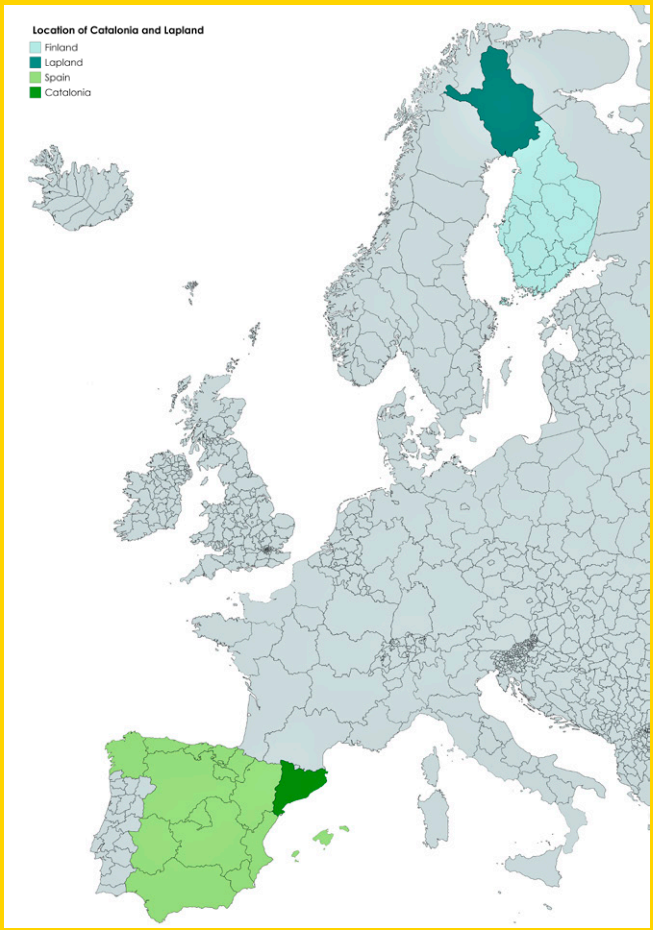

Figure 1. Catalonia and Finnish Lapland. Author via mapchart.

About the project:

This policy brief reports back from social science research within the project *Forests as resources and opportunities in regional development.* The project aims to contribute to the strengthening of regional innovation systems in Värmland, in relation to the transition to a forest-based sustainable bioeconomy. The project explores what it means for a region to transit towards a bioeconomy, and the processes through which regional actors build and implement such transition. The project is carried out with the case study of three European regions where strategies of smart specialisation and regional innovation systems are set in place to promote a forest-based bioeconomy.

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Introduction:

Climate change is a global challenge that calls for immediate action. Cutting down CO2 emissions, finding alternatives to fossil fuels, changing consumption patterns, and guaranteeing an adequate balance between biodiversity conservation and human well-being are measures that need to be set in place. Within this pressing scenario, nations, regions and supranational organisations have started to call out for more commitments and to design their own strategies. In the case of the European Union, great efforts are made on transitions towards sustainable bioeconomies. Regional transitions in European regions towards sustainable and inclusive bioeconomies are framed within the European Bioeconomy strategy, and often applied through the European strategy for smart specialisation, in connection with the European Regional Development Funds. It is an agenda that has rapidly dispersed to various regions and, although many countries have adopted their own national bioeconomy strategies, most of the implementing responsibilities fall on the regional and local levels. Hence, bioeconomy becomes part of the agenda of regional governments (in this case, of the Catalonian government and Lapland's regional council) and other relevant actors, thus shaping forms of regional and inter-regional cooperation, and challenging the institutional and innovation capacity of those in charge of implementing it. The strategies used by each region, the type of actors involved and the roles they play, vary according to the regional and local priorities, regulations, cultural norms, the industrial landscape and economic context. Bioeconomy strategies cannot follow a one-size-fits-all logic, but the design and implementation require reflecting on goal priorities, existing assets (not only as economic potentials but existing and possible collaborations), and the socio-economic context.

To highlight the influence of the local context when designing and implementing bioeconomy strategies, this policy brief explores the strategies and approaches to bioeconomy in Catalonia (Spain) and Lapland (Finland) in terms of the kind of organisations involved, and how they interact. The document is organised in 3 parts. Part 1 describes the bioeconomy policy landscape in Catalonia regarding the organisations leading the strategy with an emphasis on the forms in which they collaborate with other organisations and actors. Part 2 does the same regarding Lapland, and part 3 concludes by highlighting the lessons that can be learned from the cases. In the process, the reader will find boxes with additional information on the evolution of bioeconomy as a result of the European strategy (box 1), and more specific examples of the strategies used in Catalonia (box 2) and Lapland (box 3).

Part 1: Catalonia

Catalonia is a region with approx. 7, 6 million inhabitants, most of them concentrated in urban areas (IDESCAT, n.d.). It is a region of striking contrasts, having the density of an Asian mega city (over 400 inhabitants per square km), and that of Lapland (less than 10 inhabitants per square km) (Rojas-Briales, 2017).

Catalonia contributes 20% of Spain's gross domestic product (GDP) has a strong industrial tradition, and a diversified and internationalised industrial and services sector. On the other hand, the research and innovation sector face financial shortages, and there is no tradition of cooperation between firms and the other actors of the regional innovation system (Fernandez and Ariño, 2019).

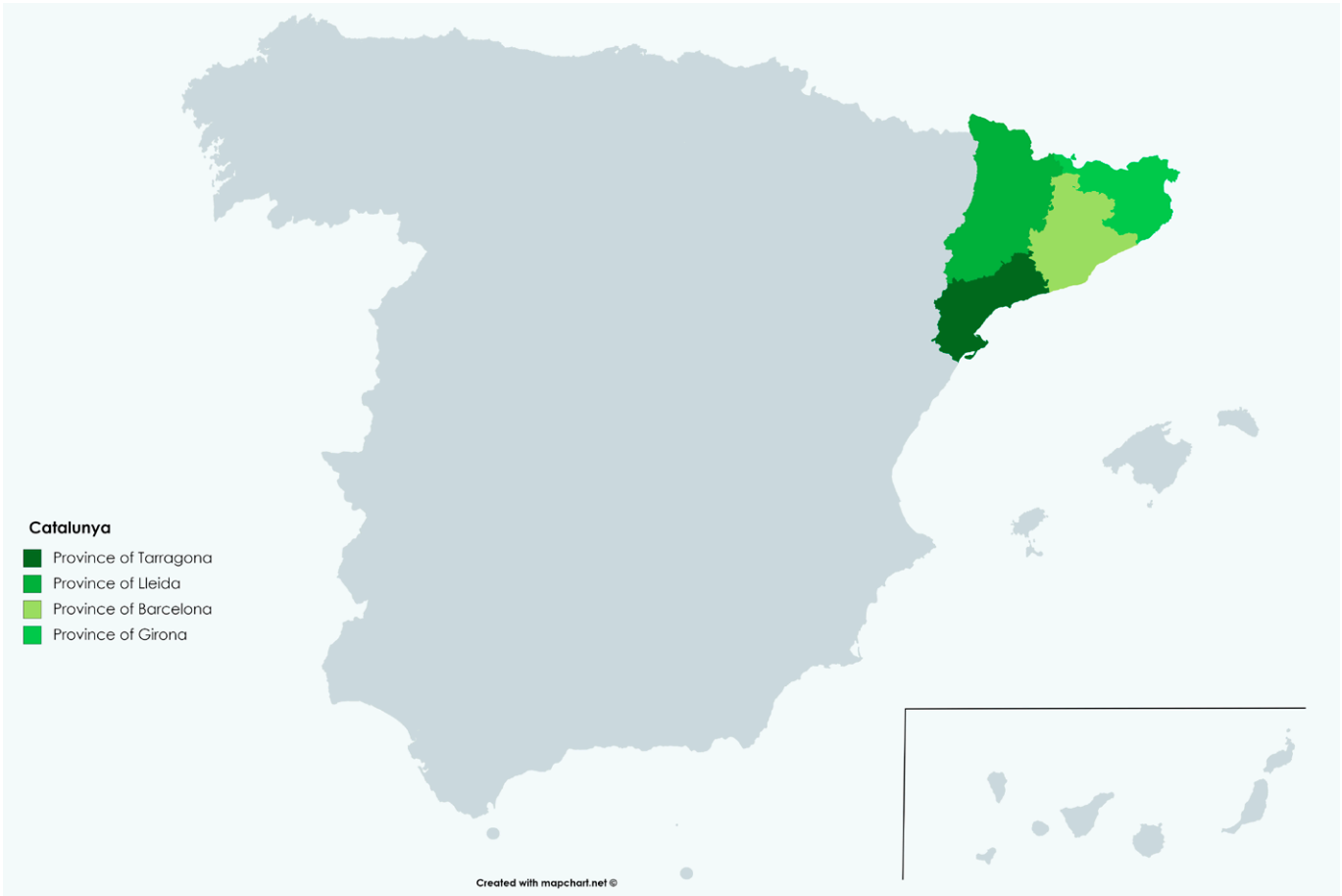

Figure 2. Catalonia. Author via mapchart.net.

Table 1 Economic sectors turnover. Author. Source: Eurostat, Instituto de estadística de Cataluña

Economic sectors turnover (in Million Euros)	2018
Agriculture	2.196
Industry	45.889
Manufacture	39.150
Construction	11.863
Services	161.755
Commerce, transport and tourism	56.983
Estate and profesional services	73.242
Public administration, health and education	31.530

Catalonian bioeconomy public policy landscape

The bioeconomy public policy landscape in Catalonia is shaped by the European strategies (see box 1), the Spanish bioeconomy strategy, and the individual actions that different public organisations have designed according to their business and scope. The rationales to promote bioeconomy in Catalonia are the incentives given by the European Union, regional actors' perception of the opportunities that the bioeconomy represents, and the acknowledgement of environmentally unsustainable practices. Regarding the Spanish bioeconomy strategy, it was described by some of the interviewees as limited because of its bio-resource approach concentrated in agriculture, energy and forestry. It is not the intention of this document to assess the Spanish bioeconomy strategy; yet it is important to pinpoint its general aspects.

The Spanish strategy targets the sectors that produce, use and exploit biological resources and indeed, places great attention to the agro-food sector, comprising agriculture, livestock farming, fisheries, aquaculture, food production, forestry, as well as industrial bio-based products including bioenergy. At the national scale, both the industrial sector and the agro-food sector are of special relevance to Spanish economy. The strategy created a Bioeconomy Observatory in charge of monitoring, coordinating and promoting cooperation between the different administrations, in relation to their bioeconomy strategies. However, when the interviews were conducted, Spain was close to holding national elections and, as confirmed by other interviewees from the Spanish Ministry of Science, Innovation and Universities, the Spanish bioeconomy strategy (as well as the agency designed for its development and execution, the bioeconomy observatory) has been in a 'stand by' status while the national political scene was clarified and the new government took office. In a more recent communication with other participants, it was confirmed that the industrial sector has begun to demand the reactivation of the observatory.

Catalonia does not have a regional bioeconomy strategy, but a collection of plans dispersed amongst different agencies from the regional government. Hence, different plans are designed for specific sectors and regional agencies, and the bioeconomy appears under different names, such as circular bioeconomy, forest-based bioeconomy, or biotechnology. Agencies that have more relation to the industrial sector tend to use the term circular bioeconomy, while the smart specialisation strategy refers to biotechnology. Consequently, each organisation designs actions taken according to their own activities and responsibilities. This also defines how dominant the bioeconomy should be in their own organisational structure, and whether it can be included as a series of additional tasks for an existing department, or will require the creation of a new area. In this document, the focus will be on two agencies in which bioeconomy occupies a dominant place in the organisational structure, and which are taking a leadership position in the promotion of bioeconomy, namely the regional agency in charge of promoting innovation and competitiveness amongst firms and businesses (ACCIO), based in Barcelona, and the Forest Science and Technology Centre of Catalonia (CTFC), based in the municipality of Solsona.

The bioeconomy in the European strategy

The bioeconomy integrates a collection of strategies to reduce carbon emissions and achieve sustainability in Europe.

In 2005, when the notion of a knowledge-based economy was first introduced, the goal was to achieve sustainability by the means of innovation and knowledge (Martinez de Arano et al., 2018). Currently, insofar sustainable development is becoming a more pressing need, and the more international commitments are made to reduce carbon emissions, a collection of strategies have been incorporated into the European strategy to achieve sustainability, including those on fishing, agriculture, forestry, energy, amongst others.

Aiming for policy coordination and coherence, the European Commission made public its bioeconomy strategy in 2012. The bioeconomy was defined as the production and conversion of renewable resources to replace fossil fuels (European Commission, 2012), with emphasis on food, feed, biobased products and bioenergy. It was a sectorial approach focused on transforming biomass, but short on actions for its sustainability and the involvement of civil society. Aware of this shortcoming, the strategy was reviewed in 2017, and an updated version was published in 2018. This new strategy emphasises on implement circular solutions to guarantee the sustainability of the bioeconomy, referring to the circular economy as the 'quintessential element of the European Commission vision for the EU bioeconomy' (European Commission, 2018:50). The circular economy has a separate strategy (European Commission, 2014). It also links the bioeconomy with the debates on smart and inclusive growth, which also has its own separated strategy (European Commission, 2010). The bioeconomy, as defined by the European Commission, has evolved from a straightforward notion of biotechnology, all the way to an inclusive and sustainable economic transition.

In terms of its materialization, the bioeconomy is a prioritised area for the European Regional Development Fund; it is push forward through regional cohesion policies, and instrumentalized through smart specialisation strategies.

Photo: Diana Morales.

Regional and local leadership - Key actors promoting bioeconomy in Catalonia

ACCIO firmly advocates focusing on the bioeconomy strategy in the economic areas that have most potential, instead of using it to promote forestry which, from their perspective, is one of the main targets of the European strategy. According to their research and sectorial assessment, these areas are the chemical industry and agro-food sector because of their potential to maximize the use of biomass, implement circular solutions and provide new technologies to replace fossil fuels, besides being strong sectors in the Catalonian economy. ACCIO approaches bioeconomy and circular economy as complementary, that is, the bioeconomy provides the renewable resources, and the circular economy maximises its use. Innovation and knowledge are the core of the bio/circular economy, which, in this case, relies on an existing robust and diverse regional economy for its deployment. However, when it comes to promoting the circular economy as a wider concept, that is, as a model of production that avoids waste and minimises resource consumption (European Commission, 2014), the strategies are open to all industrial and economic sectors, not only chemicals or agro-food. In this case, the strategy is integrated within several others, such as the strategy for smart specialisation, waste management, or plastics use reduction.

ACCIO strategies to promote bio/circular economy solutions are not different from those listed in the European or Spanish strategy. Broadly, they involve providing grants, incentivising entrepreneurship and innovation with prizes and financial incentives, and creating spaces for the exchange of ideas and experiences. They also keep active partnerships with some other regional public agencies, aiming to coordinate efforts and raise funds. One of these collaborations highlighted in the interviews was the use of taxes on dangerous waste material to fund the entrepreneurship grants.

Seen as a process of industrial transformation, Catalonia's bioeconomy has the advantage of having a thick and diverse industrial sector, knowledge production centres that can drive the technological changes, and a big local market and international networks. It has the disadvantage that many of the large industries decisions are not made in the region, as the headquarters can be located anywhere in the world, or the production sites are located in lower cost countries; hence, bioeconomy solutions will be applied elsewhere.

CTFC is a public consortium (as defined on their webpage) created in cooperation with local universities and governments. Their aim is to 'contribute to the modernization and competitiveness of the forest sector, to promote rural development, and to foster the sustainable management of the environment' (CTFC, n.d.). CTFC is divided into six areas, one of which is bioeconomy and governance. For CTFC, bioeconomy and forest-based bioeconomy are one concept. Similar to ACCIO's approach, bioeconomy is sectorial, but in this case, it builds on an underdeveloped economic sector (forestry). Another key difference is that bioeconomy blends in with the notion of governance, perhaps because the diversity of actors involved in the forestry sector is more evident. It deals with a classic value chain (suppliers, workers, stakeholders, consumers), plus forest owners, municipalities, natural disasters prevention and mitigation agencies, and environmental protection groups. Most of Catalonia's surface (70%) is covered in forests; however, the forestry sector only contributes 6% of the regional GDP. Hence, the aim of a forest-based bioeconomy is to boost an economic sector that when combined with state-of-the-art technology and growing domestic and international markets has the potential to activate rural economies and solve the issue of forest management and risk.

CTFC is a research centre and therefore invests in research and innovation in the organisation, rather than providing incentives and grants to other actors outside of it. This means that research projects are carried out in the centre, or in collaboration with the universities as part of the public consortium. These projects include understanding the diversity of Mediterranean and Atlantic forests, their potential uses and products, as well as the relationships with the rural communities and region inhabitants. Another key action area is networking and collaboration, with the objective both to transfer and exchange knowledge, and apply for grants and other funds provided by the European Union (mainly). CTFC collaborates with other agencies from the regional government, but especially with other forest-based research centres at the European level, many in Northern Europe, and other European organisations, whether public or private. Indeed, CTFC is an active actor of the European forest-based bioeconomy network, that is, an informal network of experts, practitioners, researchers and public agents located along the continent, but especially prominent in Finland and Sweden.

The strategies in Catalonia

The type of strategies applied to promote a bioeconomy transition depend on who has designed them, and who is the target. The strategies designed by ACCIO target industries and business of all sizes, aiming to promote innovation and collaboration between private actors. The circular bioeconomy is part of the Catalonian smart specialisation strategy, which is the way the European Union has instrumentalized the strategy at the regional level. Some examples:

- Grants for firms to reach technological and research centres (promoting innovation by reaching external organisations), and to develop circular economy solutions, either individually or collectively (promoting innovation within the firms)
- Helping firms to find external funding for research and development (funders can be another regional agencies, or programs of the European Union)
- Collaborate with other regional agencies to obtain additional resources for the grants scheme
- Collect and document good practices and successful examples to share with firms

The strategies designed by CTFC, on the other hand, are aimed to strengthen the research carried out in the centre, find external partners and create networks, and exchange knowledge with other actors working in the forest-based bioeconomy. Some examples:

- Investigate the diversity and alternative uses of Catalonian forests
- Collaborate with other regional agencies interested in rural development, for example, to create circular solutions to agricultural production
- Organise conferences with European partners
- Keep an active networking with European organisations aiming to become a reference point of the forest based-bioeconomy in Southern Europe

CTFC and ACCIO are connected through the ACCIO TECNIO Network, which is a certification program created by the Catalonian government, identifying and certifying centres of applied technology and facilitators. As one of the participants mentioned in an internal communication, 'ACCIO facilitates and help technological transfer from CTFC to business'.

To summarise, Catalonian bioeconomy, as seen from the perspectives of ACCIO and CTFC, is sectorial and has two different approaches, bioeconomy as bio-technology, or bioeconomy as bio-resources (Bugge et al, 2016).

Collaborations with other actors relevant to the bioeconomy

The type of relationships that occur in Catalonia are not different from those found in a typical regional innovation system, or triple helix approach: collaborations between the public sector, research centres and universities, and firms, mainly promoted by the public sector. These are horizontal and voluntary collaborations created through networking and some of them, for the industrial sector, facilitated by the Catalonian Circular Economy Observatory. A great challenge has been creating a collaborative culture between firms and universities, partly because when it comes to large companies, they will have their own research and development departments, or have a wider international network making them global instead of local players. When it comes to SMEs and new firms, financial difficulties and strong competition occupy most of their agendas.

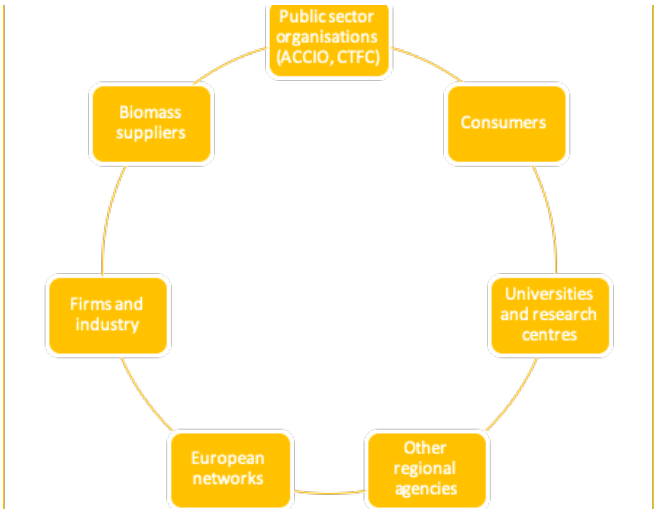

Figure 3 Actors of the Catalonian bioeconomy landscape. Author

The most common collaborations, in terms of promoting the bioeconomy of ACCIO, take place between ACCIO and other regional agencies, or with research centres, including universities. These collaborations are formalised through agreements, as is to be expected when the public sector is involved. It is a traditional method to collaborate, formal agreements between regional actors. CTFC, although having these types of formal collaborations with regional actors, has given more attention to networks and inter-regional cooperation, whether motivated by increasing knowledge and innovation through learning and teaching from actors in the forest sector, in or outside of Spain, or

to obtain funds from supra-national organisations through inter-regional partnerships. Not all the relationships and collaborations have to come from, or involve the public sector. Here is an example of another type of collaboration outside the regional innovation system (in strict sense), namely a technological centre, whose business is to innovate for other firms:

We try to promote value chain collaboration. One small firm might not be able to hire us for a big project, but it could if it collaborates with some of its providers and some if its clients (…) in the 1990s, firms' decisions were based on costs only, which resulted in a process of industrial de-territorialisation. Today costs remain a crucial factor of course, just not only about the cost per unit but the global cost, which includes reputation, for example, [and that motivates the collaboration between firms]. So the paradigm is changing (…) consumers are looking for promptitude, personalisation, and sustainability. Luckily, we are more aware of sustainability, and those criteria must shape the firm's decisions, if they want to remain competitive (interview. Author's translation).

Photo: John Murzaku, Unsplash.

Other actors have appeared on the Catalonian bioeconomy map, for example, consumers and biomass suppliers. When bioeconomy is approached as biotechnology, that is, as a process of industrial transformation and business models based on circularity, the role of consumers is the key. According to some interviewees, firms become intermediaries between consumers and research centres, as they have the information on consumers' demands and changes in preferences, which can be reflected in innovation to offer improved and greener products. Consumer demands can re-shape business models towards green and circular production, and force firms to innovate or reach research centres. Other actors are the biomass suppliers, in this case, forest owners. Most of Catalonian forests are private, divided into small parts and owned by an ageing population; additionally, forest organisations and owner cooperatives are scarce and new, making the biomass suppliers a dispersed population (Martinez de Arano et al, 2018). The challenges are not few, as Catalonian topography makes wood mobilisation expensive, and there is a general belief that the Mediterranean wood is of low quality, hence only useful for pellets and other low-cost products (interviews). This creates a great challenge for CTFC, as its role is not only to produce knowledge to improve Mediterranean wood reputation, but to persuade forest owners to invest in forest management and to supply forest products for non-traditional and higher cost products.

Part 2: Finnish Lapland

Lapland is the northernmost region in Finland, with approx. 180 000 inhabitants dispersed along a vast territory. It is indeed a region with a very low population density (1.8 inhabitants per square km), which qualifies for specific structural funds allocation for the Northern Sparsely Populate Areas, and has specific rules in relation to the European Regional Development Funds (European Commission, 2019; article 11 EU Regulation No 1301/2013). It is a rural region, even 'in this café in the middle of Rovaniemi, we are in the rural area' (interview). The region faces challenges such as depopulation and, especially in the northeast, low accessibility by road and train, high unemployment and low productivity (when compared to the rest of the country) (European Commission, 2019).

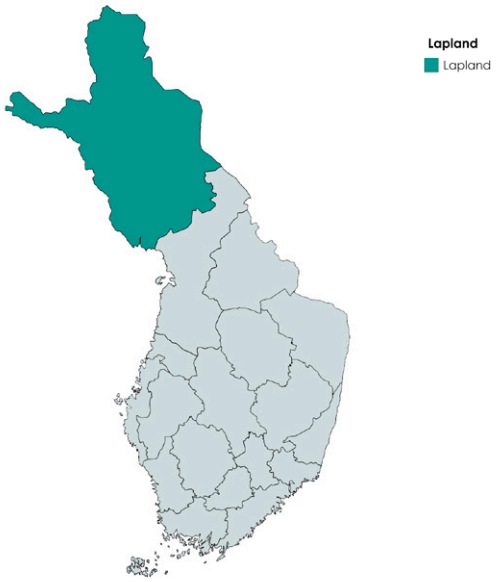

Figure 4. Lapland. Author via mapchart.net

Table 2. Lapland economy. Author. Source: Lapin Liito.

Economic sectors turnover (in Million Euros)	2018
Mining	2200
Forestry	1410
Tourism	632
Agriculture (food)	300

Bioeconomy policy landscape

The bioeconomy policy landscape is bounded by the Finnish National Bioeconomy strategy, and the Lapland's smart specialisation strategy. The Finnish strategy takes a value chain approach to bioeconomy. It departs from acknowledging the already strong position Finland has in world markets for forest products, and its natural advantages (availability of forestland and fresh water) as assets to become a bioeconomy referent, as well as the drivers for transitioning to a fossil fuel-free economy. It also highlights the traditional relationship between Finnish people and nature as an additional and valuable strength for developing bioeconomy.

Regional and local leadership

The smart specialisation strategy, implemented by the regional government, resulted in five clusters of prioritised economic sectors. Each sector was chosen and designed according to the region's potentialities, and is organised under the label of clusters, two of which are of interest to bioeconomy, namely the Arctic Smart Rural Cluster, whose target are rural inhabitants, entrepreneurs and SMEs, and the Arctic Industry and Circular Economy, whose target are major economic actors in the region (steel and forestry), and SMEs linked to the steel, forestry and energy.

The Arctic Smart Rural Cluster works with the bioeconomy carried out by rural inhabitants. The cluster is managed by Proagria, a cooperative organisation integrated by rural communities and entrepreneurs with national presence and regional branches. Other active participants are Lapland's regional council, regional universities and national research centres with local presence. This cluster reaches rural entrepreneurs and communities, is concerned with rural development and well-being, and their activities are intended to support rural businesses (small and family businesses mostly), while advocating decentralised energy systems and local food production. The cluster focuses on the two areas in which great part of a rural household income would be spent (50% of the household income in average) (interviews), namely energy and food. The goal is to support farmers to produce food (aiming for a 30% of local consumption to come from local producers), and villages to have biogas refineries and other local solutions to energy and heating, using the natural resources available.

Photo: Diana Morales.

In contrast, the Arctic Industry and Circular Economy works with the bioeconomy that is carried out by industries and larger economic actors. The cluster is hosted at Digipolis OY, a technological centre located in the Kemi-Tornio sub region (southwest, frontier with northern Sweden). This area alone holds 80% of Lapland's industrial production (Jokelainen, 2019). Digipolis gathers more than 50 companies, working as an industrial agglomeration that facilitates innovation and industrial collaboration. It also hosts the Circular and Bioeconomy centre, project supported by the Finnish Innovation Fund (Sitra), with essentially the same goals as the cluster (industrial symbiosis, use of side streams, innovation, entrepreneurship). The Arctic Industry and Circular Economy cluster aims to promote innovation and collaboration, but focuses on circular solutions to the industrial production, in order to find 'eco-innovative-ways to modernise production, manage by-products and by-processes', and promoting entrepreneurship and sustainability (Jokelainen, 2019). In other words, the concern is that the arctic industry's productions systems are circular and more efficient in terms of use of biomass, and that other actors can create businesses by taking advantage of side streams.

Collaborations with other actors relevant to the bioeconomy

Similar to Catalonia, the type of relationships promoted in Lapland relate to the triple helix approach: firms, universities and research centres, and regional governments. However, the leadership roles are taken by a civil society organisation (Proagria), and a pre-existing industrial network/technological centre (Digipolis). The regional government and the smart specialisation strategy have served to articulate these actors and label them under a common theme, which already included an established network, operations and history of collaboration with local universities and industries. The Arctic Smart Rural Community, using the language of regional innovation systems, has opened the innovation system to a quadruple helix by actively engaging a civil society organisation (a cooperative) in the management.

As the bioeconomy here is contained within a wider regional development and innovation strategy, the actions and programs are more easily targeted and coordinated, avoiding duplicity of efforts and target population exhaustion. The cluster network in Lapland has a peculiar characteristic. Often, one person will be involved in different projects, especially those working in universities and research centres, making it difficult to pinpoint the 'owner' of certain project, or determine the target population or area where the project will have influence. Therefore, it is not rare that one person has several roles. For example, one of the interviewees manages one of the Arctic Smart Rural Communities program, while being a rural entrepreneur. It is also common that the manager of one cluster travels to Brussels to give a talk about the other cluster. This is seen as an advantage, as the clusters network remain fluid instead of bounded by rigid rules that might limit innovation in their jobs. Another advantage is that the personal networks facilitate coordination of activities, and collaboration between actors working in different sectors can occur more easily. The disadvantage is that those collaborations risk remaining in informal networks and depending more on personal connections rather than on the incentives provided for them to be established. In terms of innovation and knowledge exchange, a tight network is beneficial to coordinating efforts and direct resources more efficiently, but the lack of the diversity required to bring about new ideas, make international networks especially important.

The strategies in Lapland

The actions designed to promote the bioeconomy are framed within the smart specialization strategy, which has reached advanced levels of implementation in Lapland. Indeed, Lapland was chosen as a model region in cluster development, and both the Artic Smart Rural Communities and the Arctic Industry and Circular Economy cluster, have Silver Award in cluster management excellence (from the European Secreatriat for Cluster Analysis. These recognitions are especially relevant for finding partners for collaborative projects and funding applications.

The strategies will depend on who is targeted. In general, they aim to promote research and innovation, gain and maintain recognition at the European level, and to endorse the forest-based bioeconomy as a regional branding. Some examples:

- Connect individual customers with local food producers through social media, and local producers with the tourist industry and public kitchens
- Visits to rural villages to explain the benefits of the forest-based bioeconomy, and the forms in which rural entrepreneurs can get involved
- Promote entrepreneurship by taking advantage of existing forest and mining industries (use of side streams)
- Connect researchers with industries
- Update educational curricula to the local context and the bioeconomy (for example, include teaching on local food production in the agriculture program), as well as creating postgraduate programs with applied research.

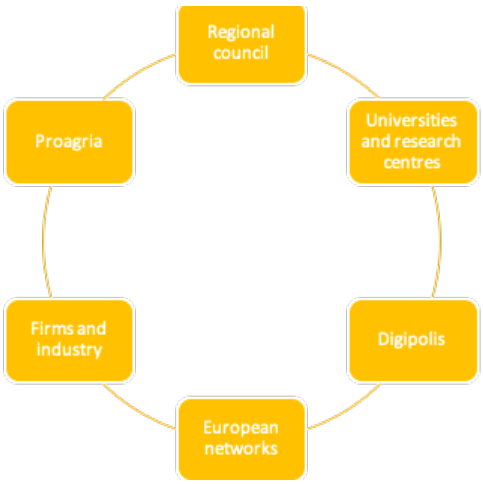

Figure 4. Actors of the Catalonian bioeconomy landscape. Diana Morales.

Part 3: Lessons learned

The local context matters – Regions are internally diverse

The way in which the bioeconomy strategies are deployed depends on a variety of institutional, social and economic factors. It is true that the strategies for promoting bioeconomy tend to be similar (financing innovation, promoting networking and knowledge exchange, encouraging entrepreneurship linked to circular solutions, and facilitating or strengthening agglomeration). However, the areas in which the efforts will be made, and the way in which the actors interact to deploy these actions are context-dependent. This dependence on context does not refer to the region as a jurisdictional area, but to the region as a socio-economic construct. Catalonia illustrates this better. There are two different organisations promoting two types of bioeconomy for two different regions, a populated urban and industrial region, and a rural region that lags behind. ACCIO has an industrial perspective, aiming to build bioeconomy on the strong industrial tradition and markets (actual or potential), a characteristics which is more visible in Barcelona and other significant urban centres in or out of Catalonia (international partners for Catalonian industries, for example). CTFC has a rural and forestry perspective, aiming to promote economic development in depopulated areas that constitute the non-urban. It is crucial to acknowledge that within regions there are important differences that need to be considered when designing bioeconomy strategies.

Photo: Diana Morales.

There is not a single bioeconomy

Bioeconomy, in the cases described here, is approached as bio-resources or as bio-technology, depending on the sector in which the actors have their focus. Hence, the strategies designed are also shaped by how bioeconomy is understood. In other words, for a bio-technology approach, it could be more appropriate to impose taxes on dangerous waste, or giving tax breaks for spin-offs using side stream products; for a bio-resource approach, it could be more appropriate to investigate the alternative uses of biomass, or provide subsidies for forest-based products so they can have a competitive price in the markets.

Innovation is also expected from the practitioners, not only firms and research centres

Having to integrate economic growth with environmental sustainability is a challenge for regional and local public actors. The public sector has to fulfil different and sometimes overlapping roles. It promotes innovation, leads the implementation of the strategies, provides and consumes services, and is a market player, regulator, facilitator and investor. This requires high levels of commitment, institutional capacity and coordination, financial resources, but specially, innovation. Innovation is not only required from the firms and research centres, but also from those actors in charge of designing and implementing the strategies. Hence, finding new ways to collaborate within the public sector, or with private actors outside the region, becomes crucial to renewing the strategies and finding financial resources. In addition, innovating the way in which the strategies are communicated to the public becomes crucial for gaining social support.

The role of informal networks

In regions with smaller populations, such as Lapland, the multiplicity of roles becomes a challenge not only to the public sector as an abstract entity, but to the actual people working in the public and research sector, as they are themselves performing different roles. This, however, has facilitated coordination and networking in Lapland, which is much more advanced than Catalonia in terms of policy coherence. Having a small population, which is otherwise considered a disadvantage, has become a strength.

However, the informal networks are not unique to regions with smaller populations. The Catalonian forest-based bioeconomy promoted by CTFC relies on informal and external networking. The CTFC director plays a 'political role' (interviews), creating and maintaining connections with actors from the forest-based bioeconomy elsewhere. Indeed, CTFC is an active actor of the European forest-based bioeconomy network. CTFC does not collaborate with ACCIO on their bioeconomy strategies, but it does so with actors in Lapland. The aim of this international networking is to produce knowledge, position the forest-based bioeconomy, design and implement collaborative projects and obtain external funding.

The role of smart specialisation

Smart specialisation is often the chosen tool to implement regional bioeconomy strategies, as it offers flexibility in choosing prioritised areas, focuses on knowledge-based economies and sustainability, and has funds allocated through the European Regional Development Fund and other similar programs. Another advantage of framing the bioeconomy in the smart specialisation strategy is that the language of smart specialisation

Photo: Diana Morales.

(collaboration, clusters, industrial symbiosis, innovation, economic growth) is appealing to the local governments and the private sector. The role of smart specialisation is, therefore, to instrumentalize the bioeconomy at the regional and local level, so it can be integrated with regional development strategies and language. This is clearer in Lapland. Some interviewees would argue that bioeconomy, as the use of forest biomass in regional production, was introduced long before the European and Finnish strategy came into effect. Similarly, Digipolis and the attempts to promote innovation and resources efficiency, have existed since 1993. However, it was with the Arctic Smartness program that otherwise isolated or unconnected efforts gathered under the same objectives and shared a common language, facilitating communication and collaboration. However, smart specialisation is not the only way to instrumentalize bioeconomy at the local level, as Catalonia shows. The smart specialisation strategy focuses on biotechnology, and yet CTFC and ACCIO materialise bioeconomy by incorporating it in their organisational structure, that is, having a department named and in charge of bioeconomy.

To conclude, in the cases analysed here, the actors have emphasised the following aspects when tailoring regional bioeconomy strategies:

- Knowing the industrial landscape. What kind of firms already exist, and what is their innovation potential (location of the decision-making centres, or existence of a collaborative culture or agglomerations, for example).
- Knowing the industrial and entrepreneurial potential.
- Assessing the culture of collaboration of universities and research centres with the industry.
- Knowing the regional networks, not only in terms of established or potential markets, but in terms of collaborations for projects and fundraising.
- Knowing the civil society organisations in the region that can be related to the bioeconomy strategy (forest owner associations, or rural producer cooperatives, for example), and acknowledging their potential role in developing a bioeconomy.

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CRS, CENTRE FOR RESEARCH
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TRANSFORMATION

Centre for Research on Sustainable Societal Transformation (CRS)

The Centre for Research on Sustainable Societal Transformation at Karlstad University conducts multidisciplinary research on current and historical trends as well as future challenges. Our researchers work collaboratively across local, regional, national and international issues, and aim to contribute new research results and methods to the field of sustainable development and a range of other societal challenges.

CRS is an inclusive center that unites researchers from many different areas and with different approaches, which fosters a dynamic research environment. Some of the research questions in which our researchers are engaged include: How can we jointly use all the forest's resources in a sustainable way? How does digitization affect tourism and the development of visitor destinations? How is the day-to-day life of a family affected when moving from the big city to an urban area? How can we learn from local and historical knowledge for a sustainable future? These are just some of the issues within CRS's broad research fields.

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