Mapping of EU Member States' / regions' Research and Innovation plans & Strategies for Smart Specialisation (RIS3) on Bioeconomy

Task 3

Case Study Report: Lapland (Finland)

Contract: RTD/F1/PP-03681-2015

30 November 2016

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1. Short Regional Bioeconomy Profile

Name of the case region/country	Lappi (Lapland, FI1D7)
Member State	Finland
GDP - Euro per capita (2014)*	31 100 (Data available for North and East Finland/Pohjois- ja Itä-Suomi, FI1D)
Total ESIF Research & Innovation per capita per year*	13.69
Total H2020 per capita per year*	13.98
Value Chain Approach to the Bioeconomy**	**Broad:** Biomass processing and conversion; Biomass supply and Waste; Bioeconomy R+I and Tech Support **Specific:** Forest-based primary production ; Foods and beverages; Cosmetics and health; Bio-energy and fuel from biomass; Bio-based construction
Thematic Focus of the Bioeconomy Approach**	**Broad:** Agro-Food; Other bio-based Industries; Bio-based Fuel and Energy **Specific**: Other natural resources; Forestry and Wood; Food Processing; Biopharmaceuticals; Green gas and high value added bio-energy
Research and Innovation Fields highlighted for the Bioeconomy**	**Broad:** Primary Production with quality; Advanced Manufacturing, Machineries; Water and Natural Resources Management **Specific:** Natural Resources and Ecosystem Management; Environmental sciences; Forestry sciences; Quality, Health, Security in Processing; Advanced Manufacturing; Agronomy and crop sciences, oenology, etc.
Bioeconomy Activity Level**	High
CASE STUDY SUMMARY	
Bioeconomy Approach	Strong focus on developing regional bioeconomy through RIS3, underlining increased local value creation based on regional natural resources while improving regional resilience and self-sufficiency.
Bioeconomy Ecosystem	Robust policy support from regional, national and EU levels, relatively strong regional network and innovation ecosystem through public-private partnerships and science-industry collaboration despite geographically dispersed structures.
Bioeconomy Policy Support	Strong support from public authorities both from regional and national levels in form of strategies, innovation support, funding schemes and clustering activities.
Successful initiatives and Good Practices	Good Laplandic initiatives and practices focusing on cross-sectoral and interdisciplinary collaboration for increased critical mass and more strategic approaches, e.g. cluster projects.
Main Needs, Gaps and Bottlenecks	Restrictive regulatory frameworks for decentralised bioeconomy development topped with typical structural challenges facing peripheral regions.

* Source of the data: S3 - Regional Viewer: http://s3platform.jrc.ec.europa.eu/synergies-tool

** Data collected by this Study project in Task 1.

2. Regional Bioeconomy Ecosystem

2.1 Origin of Interest of the region in the Bioeconomy

Interest in bioeconomy in the Finnish Lapland stems from the abundant natural resources present in the region. Lapland includes 21 municipalities which form six sub-regions. The area has approximately 182,000 inhabitants which is 3.5 % of the entire population of Finland. The average population density in Lapland is 2,0/km ^{2} (EU average 116/km ^{2}). Lapland's administrative capital Rovaniemi and industrial cities Kemi and Tornio have the most inhabitants.

Being one the most sparsely populated regions in the European Union, the regional authorities and actors have placed special emphasis on ways to keep the vast region inhabited and prosperous. In Lapland all business is by essence based on the surrounding nature and local natural resources. Despite its remarkable industrial development – the region is home to one of the EU's biggest industrial concentrations of forest and mineral refining – Lapland remains one of the regions with the cleanest water and air worldwide. It is also the largest certified region for harvesting natural products. The balanced mix of industrial expertise and commitment to sustainable development are at the core of refining natural resources in the Lapland region.

The uptake of bioeconomy as a concept for regional development in Lapland occurred in line with national and EU level policies, underlining the bioeconomy as a vital approach for the revitalisation of national and regional economies and sustainable development. Finland has a national bioeconomy strategy, which is aimed at guiding and supporting development efforts at the regional levels. Bioeconomic approaches as such have been present in Lapland for long. However, the request by the EU and national government to articulate regional bioeconomy ambitions and projects further – especially as a favourable precondition for receiving European and national regional development funds – contributed to the emergence of more strategic approach for Laplandic bioeconomy. (Interview)

Lapland's Strategy for Smart Specialisation (Arctic Specialisation Programme) drafted by the Regional Council of Lapland in 2013 was among the first official regional strategy documents to take a stance to the regional bioeconomy development. The roadmap, annexed to the RIS3 Strategy identified regional potential for bioeconomy development and set out concrete actions plans/proposals for actions in the field. (Lapland's Arctic Specialisation Programme, 2013)

An external push for the regional bioeconomy development and innovation has also been the international interest towards Laplandic bioresources indicated e.g. by multinational companies. While major investment decisions towards Lapland by multinationals have been welcomed news for regional economy (see e.g. the current

biorefinery investment plans by Chinese Kaidi), the establishment of external corporations in the region has also challenged the local actors to act and create regional added value from the place-based resources before the external actors will and the profits stream away from the region. (Interview)

2.2 Bioeconomy Stakeholders

From the very outset, the regional bioeconomy development – especially after the creation of RIS3- has been based on the wide participation and regional commitment of stakeholders, emphasising interaction between different sectors and technologies within both regional and interregional collaboration. An inclusive approach has proven crucial in the region for the creation of regional critical mass for bioeconomy innovation.

The Regional Council of Lapland and the Regional Development Agency (ELY Centre, stands for The Centre for Economic Development, Transport and the Environment) constitute the key driving force in promoting and coordinating regional activities in bioeconomy.

The intermediate actors such as ProAgria (member-owned non-profit agricultural and rural expert organization supporting rural entrepreneurs and businesses) and Kemi Digipolis Technology Park (providing innovation and development services for industry and businesses), focusing on business support, incubator services and technology transfer, are crucial players in advancing and boosting bioeconomy activities and businesses.

ProAgria and Digipolis also coordinate two of the five Arctic Smartness regional clusters - Arctic Industry and Circular Economy Cluster and the Arctic Smart Rural Community Cluster - which are contributing to Lapland's sustainable development and regional innovation system and helping in overcoming the region's lack of critical mass and integrating Lapland's industries into global value chains.

The regional universities also have a key role to play in the regional bioeconomic innovation ecosystem. The Lapland University Consortium (LUC) is composed of two higher education institutions in the province of Lapland: Lapland University of Applied Sciences and the University of Lapland. Moreover, research institutes such as the Finnish Natural Resources Institute (LUKE), the Finnish Forest Centre and Geological Survey of Finland are important actors.

Additional actors in the innovation environment include Chamber of Commerce; entrepreneurs' associations; vocational colleges; sub-regional development agencies and; municipal development offices.

Considering the cross-border activities around bioeconomy, the North Calotte Council is a relevant regional actor, funded mainly by the Nordic Council of Ministers. Geographically, the North Calotte covers provinces of Nordland, Troms, and Finnmark in Norway, the region of Lapland in Finland, and the County of Norrbotten in Sweden. The authorities responsible for the regional policies and the economy take part in the operations, and the secretariat of the North Calotte Council operates in the Regional Council of Lapland.

On a municipal level, the small municipality of Sodankylä in Lapland is a strong actor in the bioeconomy network, working intensively and strategically around renewable energy, fisheries, local food and forest based bioeconomy.

2.3 Bioeconomy – strategies, plans and projects

Lapland was one of the first regions in Finland to adapt to the smart specialisation (S3) concept. Smart specialisation was perceived as a milestone that helped the regional actors to recognise emerging industries arising from the region's potential, including bioeconomy, and laid down the foundation for the region's Arctic Smartness branding.

The following development cornerstones were identified in Lapland's Arctic Specialisation Programme: accessibility, the sustainable utilisation of natural resources and natural conditions, increasing value added, making more efficient use of the expertise already accumulated in Lapland, and Arctic pride. The most important Arctic spearhead sectors in Lapland were identified as mining and metal industry, tourism and bioeconomy. The proposals are divided into three main categories: the refining of Arctic natural resources, utilisation of Arctic natural conditions and cross-cutting development enabling Arctic growth. (Lapland's Arctic Specialisation Programme, 2013)

Following the regional RIS3 Strategy, the Regional Council has, in close collaboration with regional stakeholders, implemented a regional clustering project, *Arctic Smartness*, partially focusing on bioeconomy.

In 2016, the Regional Council also initiated Arctic Bioeconomy Project, which is so far the largest regional project focusing on the potentials on Laplandic bioeconomy and its commercialisation, value creation and contribution to regional resilience. The focus areas are agro-food, forest based refining, decentralised renewable energy solutions, bio-components, wood/CLT (cross-laminated timber) construction and blue bioeconomy. The core aspiration of the project is to increase the coordination of regional bioeconomy activities and synergies in an interdisciplinary and inter-sectoral manner, and to better strategically integrate regional projects, actors and funding schemes. The project is funded by the EU's Rural Development Fund. (Regional Council of Lapland, 2016)

3. Bioeconomy Policy Support

The RIS3 of Lapland is complemented with a regional Innovation Programme drafted by the Lapland University Consortium (LUC). The Innovation Programme aims at creating a smart region working as an innovation laboratory and test bed to bridge the gap between R&D and real life application, focusing on joint arenas for co-creation, idea spaces, incubators, and enterprises. The areas of emphasis outlined in the Programme are:

1. Sustainable use of arctic environment and natural resources as a source of wellbeing and livelihood
2. Northern society and wellbeing, learning and managing distances
3. Innovation environments and services (Innovation skills, readiness, co-operation, co-creation; New ways of working together) (LUC Innovation Programme, 2014)

In order to further crystallise the strong and prevailing focus areas of regional bioeconomy and to accelerate innovation activities, the Regional Council initiated the Arctic Bioeconomy Project in 2016. A core component of the project is to produce, in a close dialogue with the regional bioeconomy actors, the concrete development plan and programme for the Arctic Bioeconomy until 2025, which for its part serves as the regional expression on the national bioeconomy strategy of Finland. The development plan is expected to be released in March/April 2017. (Interview)

The main actors supporting innovation and research in relation to the bioeconomy (e.g. in form of channelling funds and coordinating activities) are the Regional Council of Lapland and the Regional Development Agency (ELY Centre, The Centre for Economic Development, Transport and the Environment). However, support mechanisms are created in close dialogue with the regional actor field, and stakeholders are encouraged to contribute with ideas, concepts and projects (separate funding is occasionally made available for these purposes)

3.1 Bioeconomy Policy Support

The regional actors in Lapland have implemented a number of projects and operational models serving as tools for bioeconomy-related research, development and innovation. Besides the regional strategies and programmes, clustering approach has emerged as a core instrument for advancing regional innovation and bioeconomy. In 2014, Lapland was chosen as one of Europe's model regions in cluster development, thus receiving the access to the European Cluster Observatory expertise.

In 2015, the Arctic Smartness Portfolio (ASP) project, funded by the European Regional Development Fund and coordinated by the Regional Council of Lapland,

gave a further boost to the five thematic regional clusters. The project created a road map for future cluster activities that will combine Arctic business, research and conditions-related expertise.

From the Arctic Smartness Clusters, the Arctic Industry and Circular Economy Cluster and the Arctic Smart Rural Community Cluster have a special focus on different themes of bioeconomy. The clusters have created individual strategies with concrete objectives with the help of European Cluster Observatory, and these strategies are expected to be released in December 2016.

An ongoing follow-up project, Arctic Smartness Excellence (ASE), funded from the ERDF, aims to take Smartly Specialising Clusters from Lapland to European arenas. Main results of the project will be improved and more internationalised cluster cooperation and impact, and also support clusters' ambitions toward internationalisation and tapping into direct EU funding, Horizon 2020 in particular. The new Lappish Innovation platform - Center of Arctic Smartness Excellence will be created to support cluster's needs and also feed innovations and ideas and work as a booster for innovations using UE's TRL (technological readiness level) classification implementation, in particular in development, testing and service design laboratories and facilities. (ASE Project, 2016)

Lapland is also a partner of the European S3PEnergy and S3Agro-Food platforms, which enable Lapland to collaborate with other European regions in the field on decentralised bioenergy development and local food.

Also educational reforms have been implemented for the advancement of bioeconomy: The Lapland University of Applied Sciences has launched a renewable energy study module worth 30ECTS. (Interview)

3.2 ESIF and H2020 resources for the Bioeconomy

The Finnish Operational Programme “Sustainable growth and jobs 2014-2020 – Finland's structural funds programme” (OP) receives a combined amount of EUR 1,299,461,095 from the European Regional Development Fund (ERDF) and the European Social Fund (ESF) under the Investment Package for growth and jobs in Finland. Around 24% of programme investments will promote research and innovation activities. The ERDF allocation for Lapland for 2014-2020 is €92,2m and ESF €43,0m, equalling up to €135,2m. Also financing from European Agricultural and Maritime and Fisheries Funds are important enablers for Lapland’s bieoconomy development. (Sustainable Growth and Jobs 2014-2020 – Finland’s Structural Funds Programme)

The ongoing efforts in Lapland in the field of bioeconomy innovation have pinpointed access to Horizon 2020 projects under bioeconomy theme as one of the

aspects requiring further attention and addressing. At the current stage, applications have been submitted e.g. in the field of novel rural business models.

Interreg funding is deemed vital for collaborating across the borders and generating the critical mass and joint infrastructure for bioeconomy innovation and business collaboration in the northern hemisphere. The Regional Council of Lapland is involved in various EU programmes promoting cross-border cooperation. EU Programmes such as Kolarctic ENPI CBC, Interreg North, Northern Periphery and Baltic Sea Region, among others, offer funding for cross-border projects with a potential for collaboration around bioeconomy activities.

Erasmus funding is currently being used for developing regional educational/training environments for bioeconomy. (Interview)

The regional actors are also engaged in a proposal for the Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI) under the coordination of Natural Resources Institute of Finland (LUKE) and the national Ministry of Agriculture and Forestry. The present call for proposals aims to improve collaboration and cooperation across the European Research Area in the area of sustainable intensification of food and non-food biomass production and decentralised transformation systems, in particular small scale multi-input, multi-product biorefinery concepts. (Interview)

Even though assessing the utilisation of regional synergies between ESIF and H2020 funding is not yet tangible, it is worth noting that e.g. the Arctic Bioeconomy Project run by the Regional Council aims at improved project coordination and better strategic, integrated use of territorial funds and investments.

4. Successful Initiatives and Good Practices

4.1 An ecosystem of Arctic industries in Kemi-Tornio

The Kemi-Tornio industrial symbiosis involves companies exchanging industrial by-products (i.e. waste) with other companies that can use them as a substitute for raw materials. The collaboration includes actors from forestry, mining and steel industry companies, industrial service companies, research and educational organisations and intermediaries. The regional Arctic Industry and Circular Economy Cluster emerged from this setting to further support circular business models and innovation in Lapland.

The Kemi-Tornio region is important for industrial refinement and exports. It is responsible for 80% of Lapland's industrial production and 7-8% of the total export value of Finland's products. Companies in the region have been exchanging materials in a manner consistent with circular economic thinking for decades. A more systematic approach, and specific use of concepts such as "green growth", "circular economy", and "industrial symbiosis", began in the early 2000s. Some examples of waste being used as raw materials include:

- Riffler waste (Metsä Fibre's Kemi mill) is used as mulch in landscaping.
- Ash (StoraEnso Veitsiluoto mill) is used to fill open pits of a chrome mine after metal extraction has concluded (Outokumpu Kemi mine).
- Carbon monoxide surplus (Outokumpu ferrochrome factory) is used as fuel (SMA Mineral factory), replacing 17,000 m3 of oil annually.

Conditions for green growth have been favourable to the development of the Kemi-Tornio industrial symbiosis. Climate considerations are high on the agenda at the national, regional, and local levels, and sustainable natural resource use is seen as a key way to add value to Lapland's exports. Regional strategies that have been instrumental in promoting green growth in the region include:

- ERDF 2007-2013 Programme for Lapland – Promotes business and innovation.
- Lapland's Arctic Specialisation Programme – Promotes the sustainable utilisation of natural resources.
- ERDF 2014-2020 – Aims to strengthen Finland's climate change and energy ambitions through the development of a new regional plan for climate and energy.

Sitra, the Finnish innovation fund, along with private sector actors, for example, Digipolis Technology Park, have also been strong drivers of green growth in the region. Despite positive outcomes so far, there is a concern in the region that the full potential for green growth will not be realised without a long-term and

systematic role for a competent and trustworthy intermediator to catalyse future activities.

In 2014, Digipolis Technology Park in Kemi coordinated a project mapping industrial side streams in the Kemi-Tornio region. The aim of the project was to increase the utilisation of industrial waste as a substitute for raw materials by creating connections between companies in the region. It created a regional actor network through which to match companies whose raw material needs and waste were compatible. It also documented existing (unutilised) side streams with a view to paving the way for new business opportunities. Documentation of relevant side streams included recording their chemical and physical properties; analysis of the utilization grade of the side streams; and studies on markets, technology, and logistics related to the side streams. The project identified more than 1.3 million tonnes of annual by-products and waste streams (excluding the veinstone of mining activities). These have been documented in a databank of industrial side streams that will soon be opened up to companies and enterprises in the region.

Sustaining local industries, while at the same time minimising their environmental impact, is vital to supporting the livelihood of communities in the Kemi-Tornio area in the long term. The industrial symbiosis in Kemi-Tornio also presents substantial opportunity for regional development. This is evident in two ways. First, knowledge of unutilised side streams lays the foundations for new and innovative business ideas. Secondly, the symbiosis itself can draw positive attention to the region as a unique example of a platform through which to create and strengthen an industrial ecosystem in Artic conditions. (Mikkola, Randall & Hagberg, 2016)

4.2 Arctic Smartness Excellence

Arctic Smartness Excellence (ASE) project carries out activities related to the Regional Smart Specialisation Strategy of Lapland, including regional bioeconomy development. The Arctic Smart Specialisation Programme is by definition supporting growth and empowerment through entrepreneurship linkages that have been executed in two previous ERDF projects led by the Regional Council of Lapland with core actors present also in this project.

The ASE project, launched in 2016, will carry out actions that are concentrated on developing and supporting the consolidation and development of five modern clusters with entrepreneurial thinking driving them forward. The clusters are called Arctic Smartness Clusters and the five are called Arctic Design, Arctic Safety, Arctic Industry, Arctic Smart Rural network and Arctic Development Environments. The core actors in the clusters and also in this Project are University of Lapland (Project leader), Lapland University of Applied Sciences, Geological survey of Finland, Rovaniemi Regional Development Agency, Regional Council of Lapland, Digipolis Ltd and Natural Resources Institute Finland.

Work is divided between four integrated Work Packages. First WP is coordinating the Cluster development, second WP will be creating methods for R&D support for clusters and also creation of a new Lappish Innovation platform Center of Arctic Smartness Excellence, Third WP is devoted to Internationalisation actions, in particular aiding the clusters by creating funding and consortium building roadmaps and also acquiring expertise in preparing and submitting more successful application to EU funding instruments. The fourth WP is taking care of the overall management and communications and proactive evaluation of the project.

Main results of the project will be improved and more internationalised Cluster cooperation and impact, and also support clusters' ambitions toward internationalisation and tapping into Direct EU funding, Horizon 2020 in particular. The new Lappish Innovation platform - Center of Arctic Smartness Excellence will be created to support cluster's needs and also feed innovations and ideas and work as a booster for innovations using UE's TRL (technological readiness level) classification implementation, in particular in development, testing and service design laboratories and facilities.

The project is funded by the European Regional Development Fund (ERDF). (Arctic Smartness, 2016)

4.3 The Arctic Bioeconomy Project

In 2016, the Regional Council initiated Arctic Bioeconomy Project, which is so far the largest regional project focusing on the potentials on Laplandic bioeconomy and its commercialisation, value creation and contribution to regional resilience. The ambition is to strengthen Laplandic bioeconomy through smart specialisation. The project is funded from the European Rural Development Funds and runs for 2016-2017. The focus areas of the project and their sub-themes are:

1. Natural products and Biocomponents
    - Organic food, berries, herbs, nutrients, cosmetics
    - Processing of natural resources, forest-based processing
    - Logistics, mobile slaughtering unit and development of processing

2. Wood construction and CLT (cross-laminated timber)
    - Dissemination of existing good practice and project examples
    - Pilke Campus in Oulu as leading example of public premises
    - Pilot house in Kemi and local football stand from CLT
    - Kolari log schools (coming)
    - Policy-making issues

3. Blue Bioeconomy: fisheries
    - Fishing, management of fishing

- Processing stations, high-quality care
- Fishing cooperatives

4. Decentralised renewable energy
    - Promote the use of renewable energy
    - Model examples
    - Communities as energy producers
    - Small scale investments
    - CHP, wood chip, pellets, PV and hydro

The core aspiration of the project is to increase the coordination of regional bioeconomy activities and synergies in an interdisciplinary and inter-sectoral manner, and to better strategically integrate regional projects, actors and funding schemes.

A core ambition of the project is to create a profound understanding of the current state of the regional bioeconomy and to realise its full potential. A main objective of the project is to preparing Arctic Bioeconomy Development Programme and to enhance the conditions for the development of Laplandic bioeconomy through versatile measures, including e.g: the building of regional bioeconomy network and its operating model; improving communication and consumer branding and thus increasing awareness and demand of the industry and products; and promote good practice and successful examples. (The Regional Council of Lapland 2016; Interview)

4.4. Kaidi Biorefinery in Kemi

Chinese Kaidi Finland[1] plans to build a globally unique second generation biomass plant in Kemi by 2019, producing biofuels by using wood based biomass, such as energy wood, harvesting remains and leftover bark from the forest industry as the main feedstock.

The total investment for the biorefinery is EUR 900 million. The European Commission granted EUR 88,5 million of NER 300 (funding programme for innovative low-carbon energy demonstration projects) investment subsidies for Kaidi's biofuel refinery in Kemi. The subsidy was initially granted in 2012 for the realisation of a biofuel refinery planned in Kemi by Vapo (a Finnish state-owned company producing energy e.g. from peat and wood). Vapo halted the project in 2014 due to political and economic uncertainties.

According to the estimates, the plant will produce 225,000 metric tons of biofuel per year, of which 75% will be biodiesel and 25% biogasoline. Kaidi's annual need for wood will be approximately 2.8 million cubic meters. According to the National

[1] Kaidi Finland is owned by one of China's largest biorefining actors, Sunshine Kaidi New Energy Group

Forest Inventories (NFI) conducted by the Natural Resources Institute of Finland (LUKE) this amount can be sustainably procured from within a 200 kilometer radius of Kemi. In addition to energy wood, Kaidi's plant can utilise harvesting remains and leftover bark from the forest industry.

Kemi was identified as the ideal location for Kaidi's plant due to the existing infrastructure, abundant feedstock and favourable site conditions. Finland's progressive biofuels policy and close proximity to the world's largest biofuel markets in Europe are potential additional factors to have contributed to Kaidi's location decision.

Prospectively, Kaidi's biodiesel plant could bring several direct and indirect benefits to Lapland's economy and bring an additional boost for the regional bioeconomy. According to Kaidi Finland's calculations, it is estimated that the plant will bring over EUR 200 million of annual tax revenues to Finland (based on the current taxation) and boost the local employment with 150 permanent positions once the plant is operational. The construction process is estimated to bring about an additional 4,000 man-years of work.

It has also been estimated that the biorefinery can contribute to hundreds of jobs along the supply chain in the form of e.g. sub-contractors, service companies and spin-offs (harvesting entrepreneurs, transportation service providers, machine manufacturers etc.). The total Finnish involvement in the project is aimed to reach over 50%. In the optimal scenario, this would generate new IPR (intellectual property rights) and knowledge for Laplandic and national companies and organisations in Finland. It remains, however, to be seen what the final benefits for the region of Lapland are. Locals have also voiced their concerns for handing over their local resources for an international giant in fears that the investor will mainly rely on their own external expertise and that revenues from the biorefinery will flow away from the region. (Kaidi 2016; Spinverse 2016)

4.5. Sodankylä municipality and the local food value chain

Sodankylä municipality has strong history in agriculture and forestry. Besides the growing industry municipality is passionate about supporting locally produced and processed food and ingredients. Initiatives for local food value chain are stated in Municipal Strategy 2014-2020 and Municipal Bioeconomy Programme 2015-2017. Municipality of Sodankylä introduced new central kitchen for local food in the beginning of 2014. The kitchen produces 1500 meals per day and capacity for larger volumes exists. Procurement processes are ongoing for wider local food value chain.

Kitchen's capacity and storage systems were re-designed and modified to better facilitate smaller deliveries from local community without losing the functionality or

food quality. Public sector policy making and steering activities play an important role in local food processing and development of primary food production. Locally purchased ingredients will develop and innovate within local supply chains and capital leakage from the region has decreased. Demand for local ingredients creates local value for the local natural products and primary food production.

Compared to the previous wholesale and delivery chain, the new local model reduces 30 % of deliveries and 20 % waste food.

From 2016 onwards, 38% of the purchases of the central kitchen have been regional, and the major volume products such as meat and fish come from Sodankylä or surrounding municipalities. In case dairy products can be added to the equation, the share of local products will be 60%. In 2012, the share of local supply in the central kitchen was around one percent (1%).

Also personnel costs are smaller than earlier as food can be produced between 7 am to 4pm during the day. In addition, local SMEs in food value chain are likely to be more motivated to develop their business when the demand is growing on local level.

Key factors for the Sodankylä case have been the new design of supply chain and purchasing system.

The Sodankylä case is also depictive of a wider regional strive to increase the self-sufficiency, resilience and vitality of rural villages across Lapland through bioeconomic approaches and innovation, focusing especially on locally produced food and energy. Sodankylä case alongside e.g. Finnish labels for local, organic food have generated interest on the international field, e.g. within the S3 Agro-food platform. The project has been nationally awarded and today Sodankylä has gained titles such as the “star municipality of local food” in Finland. (Interview)

5. Needs, Gaps and Bottlenecks to Deploy the Bioeconomy

According to the regional views, a notable share of Lapland's potential in bioeconomy remains untapped. Further potential is in particular seen in the fields of biocomponents (e.g. chemicals and packaging technologies), fisheries (especially generating higher value products from fish) and wood construction (many regional construction projects ongoing, Laplandic expertise could serve as a strong export article).

The main impeding factors identified are related to regulative frameworks and the regional actors have voiced the need to cut red tape both at national and EU levels. The current frameworks are favouring centralised systems which are not beneficial for vast, sparsely-populated Lapland. In order to advance bioeconomy and smart specialisation in Lapland, more attention should be given to decentralised systems and dynamics between centralised and decentralised systems.

A depictive case in point is the production of local renewable energy in small villages. In the current situation the energy is imported long distances from the outside and system maintenance is relatively costly. Regional calculations indicate that local renewable energy production would be both more sustainable and cost-efficient but is currently prohibited by the regulative framework.

Other bottlenecks are related to Lapland's peripheral status and linked to issues such as negative demographic trends and brain drain; lack of critical mass; uptake of digitalisation and broadband access; lack of educational/competence development opportunities and dispersed actor network. Further education/competence development investigations are undertaken by the regional research and education institutions. Shortages have been identified especially in the field of vocational education which would have the potential produce future entrepreneurs and work force/operators for the regional bioeconomy sectors. Access to finance remains a pressing regional issue for bioeconomy R&D and entrepreneurial discovery processes, especially with regards to risk capital. (Interviews)

6. Information Sources

Literature and Documents:

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'Sustainable growth and jobs 2014 – 2020 – Finland's structural funds programme: https://www.rakennerahastot.fi/documents/27742/432739/Ohjelma_asiakirja_final_en.pdf/fe2eb6ab-2d8b-48dd-aba2-767c0e548ec6

Relevant websites:

Regional Council of Lapland: http://www.lappi.fi/lapinliitto/en/development

Arctic Smartness Clusters: http://luotsi.lappi.fi/arcticsmartness

Kaidi Finland: http://www.kaidi.fi/

Spinverse: http://www.spinverse.com/kaidi-receives-nearly-90-million-euros-eu-funding/

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