ERRIN European Regions Research and Innovation Network

Summary from ERRIN Bioeconomy mapping of Smart Specialisation priorities

Introduction

One of the main focus areas for ERRIN's (European Regions Research and Innovation Network) Bioeconomy working group in 2015 have been to identify the importance of Smart Specialisation strategies for the growth of the regional Bioeconomy sector. One of the outcomes from this priority has been the execution of a mapping exercise in order to facilitate the planning of the working group's activities. The findings from the mapping exercise may also be used to partner the ERRIN regions that find the same or complementing priorities in their Smart Specialisation Strategies. Furthermore, the mapping aimed to indicate what obstacles the regions find when they are building Bioeconomy value chains in their regions. This information may be used to improve policy making and to direct funding where it is needed the most.

The Bioeconomy Working Group also organised an event in collaboration with ERIAFF and the BIC on 20th March 2015, with the title "**Boosting economic growth and facilitating investments through Bioeconomy: How to build effective regional strategies**". This event included presentations from main institutions and organisations in the field of Bioeconomy. The afternoon was dedicated to two regional panels discussing the current needs and obstacles in the implementation of a Bioeconomy strategy on regional and national level. For more information please see : http://errin.eu/content/boosting-economic-growth-and-facilitating-investments-through-bioeconomy-how-build-effective

Conclusions from the regional panels on 20th March, will be used as input for a guide developed by ERRIN, ERIAFF and BIC, in order to highlight the five main steps in developing and implementing a regional Bioeconomy strategy.

The sections below display a summary of the main findings from the mapping exercise.

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Regions participating in the mapping

Out of 40 active regions in the working group, 24 regions from 11 countries took part in the mapping exercise. Only few regions have a specific strategy for Bioeconomy, but most of the regions have strategies on different sectors of Bioeconomy (e.g. on energy, food, waste) and all of the regions indicate that Bioeconomy is a priority in their Smart Specialisation Strategy. Most of the regions see themselves as advanced in the progress of Bioeconomy in their region (17). Seven regions answered that they were less advanced, but no regions indicated that they were not at all advanced. This indicates that while Bioeconomy sectors are important and prevalent in regional strategies, creating Bioeconomy strategies as holistic and horizontal understanding of all the sectors is only starting to gain ground.

Country	Regions
Finland	Oulu
	South Ostrobothnia
	Central Finland
	North Karelia
	Kainuu
	Satakunta
Spain	Asturias
	Extremadura
	Castilla-León
	Navarra
Swe	North Sweeden
	Ostergotland (East Sweeden)
	Varmland

Country	Regions
ITA	Lombardy
	Basilicata
France	Lower Normandy
Belgium	Flanders
Denmark	Central Denmark

Country	Regions
Poland	Lodzkie
Netherlands	Gelderland
UK	Scotland
	Wales
	Nothern Ireland
NORWAY	North Norway

Figure 1 - Regions participating in the mapping exercise

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Do your country and/or region have a national / regional strategy for the Bioeconomy?

Countries such as Finland and Spain have a national strategy for Bioeconomy. The mapping furthermore reveals that all participating regions in the mapping have indicated Bioeconomy in their Regional Research and Innovation Strategies for Smart Specialisation (RIS3). Below is a table showing the priority areas for each region. The Chemicals and material sector is the largest, including for example nano- and biotechnologies, Biopharma and green chemistry, followed by the Food sector, including for example food, nutrition and health and Food processing and safety and forestry, which however concerns mainly the Nordic countries.

	FINLAND						SPAIN				SWEDEN			ITALY		FRANCE	BELGIUM	DENMARK	POLAND	NETHER	UK			Norway
	Oulu	South Ostrobothnia	Central Finland	North Karelia	Kainuu	Satakunta	Asturias	Extremadura	Castilla-Leo	Navarra	North Sweeden	Ostergotland (East Swe.)	Varmland	Lombardy	Basilicata	Lower Normandy	Flanders	Central Denmark	Lodzkie	Gelderland	Scotland	Wales	Northern Ireland	North Norway
Through which sector is Bioeconomy mentioned in your RIS3?																								
Marine						x															x			x
Food		x	x				x			x		x		x	x	x		x			x			
Energy					x		x			x		x						x		x			x	
Chemicals and Materials				x		x	x		x	x			x	x	x		x	x	x		x			
Agriculture						x		x	x					x	x			x	x		x			
Forestry	x		x	x	x	x				x	x		x									x		
Other																								

Figure 2 – Sectors included in the RIS3

In the figure below sectors have been divided by regional activities within the sectors.

FORESTRY		
Forestry	8	Central Finland, North Karelia, North Sweden, Navarra, Kainuu Region, Finland, SATAKUNTA REGION, FINLAND, Region Värmland
Wood processing	2	Oulu region, Finland and Kainuu Region, Finland
Fiber based packaging materials	1	Region Värmland, Sweden
Technology for tissue	1	Region Värmland, Sweden

skills and capacity for industrialisation and automation of processes for value creation from wood and service innovation research	1	Region Värmland, Sweden
Fiber based packaging materials coating and environmental barriers	1	Region Värmland, Sweden
Cellulose-based textile fibres, alternative fibre-based products	1	Region Värmland, Sweden
Forestry - Wood based bio-refinery, lignin and cellulosic conversions	1	Scotland
AGRICULTURE AND FOOD		
Agri-food	4	Principality of Asturias, Regione Lombardia, Navarra, Basilicata, Italy
Agro-farm	1	Navarra
Sustainable food systems	2	South Ostrobothnia, Finland, Basilicata, Italy
Environments and resources for safe, healthy and sustainable food	1	Lower-Normandy, France
optimized utilization of residual products from the agricultural sector	1	Central Denmark
sustainable yield increase	1	Central Denmark
sustainable enhancement of production area (agriculture/marine)	1	Central Denmark
development of agriculture/food production.	3	Central Denmark, Extremadura, Castilla y León, Spain
biobased food ingredients;	1	Central Denmark

agri-food	2	Regione Lombardia, Castilla y León, Spain
Food science and technology	1	Extremadura
Animal Genetics	1	Extremadura
Animal Welfare	1	Extremadura
Animal health	1	Östergötland, Sweden
Veterinary sciences	1	Castilla y León, Spain
Biofertilizers	1	Extremadura
Agro-tourism	1	Extremadura
Locally produced and processed food.	1	Central Finland
Agroindustry	1	Basilicata, Italy
Food for nutrition and health	1	Basilicata, Italy
Innovation in Agro-Food industry.	1	SATAKUNTA REGION, FINLAND,
Intensive agro-food production.	1	SATAKUNTA REGION, FINLAND,
Added value and sustainability in the agro-food, aquaculture and fish industries	1	SATAKUNTA REGION, FINLAND,
Food processing and safety	1	Östergötland, Sweden
Biotechnology, in particular proteins and enzymes	1	Östergötland, Sweden
Efficient use of waste and CO2 capture by natural and cultivated ecosystems.	1	SATAKUNTA REGION, FINLAND,
Improved competitiveness of agriculture and cattle industry.	1	SATAKUNTA REGION, FINLAND,

Exploitation of opportunities resulting from green and blue economy. Development and improvement of food entrepreneurship, environmental services	1	SATAKUNTA REGION, FINLAND,
Efficient technologies are designed for energy efficiency, traceability, quality management, transparency, and risk management in Food Systems	1	SATAKUNTA REGION, FINLAND,
Integrated and sustainable food chain	1	Basilicata, Italy
Agriculture - Breeding programmes	1	Scotland
Food - Waste to higher value products	1	Scotland
Agri-tech, in particular machinery, telecommunications and sensors	1	Östergötland, Sweden
production of agrotechnical and geotechnical nonwovents;	1	Łódzkie Region, Poland
Drinking water quality research	1	SATAKUNTA REGION, FINLAND,
BIOPRODUCTION SYSTEMS		
Smart and efficient systems	1	South Ostrobothnia, Finland
ICT applied to forest and livestock	1	Extremadura
New bio based products and the machinery enabling the production	1	Central Finland

Resource-wise systems	1	Central Finland
Entrepreneurship in bioeconomy	1	Central Finland
eco - industry	1	Regione Lombardia
Measurement technology and measurement expertice	1	Kainuu Region, Finland
Bio-production and bio-services.	1	SATAKUNTA REGION, FINLAND,
Integrated water cycle management.	1	SATAKUNTA REGION, FINLAND,
Business support services	1	Basilicata, Italy
Engineering	1	Castilla y León, Spain
Industrial environment	1	Castilla y León, Spain
production of filter systems;	1	Łódzkie Region, Poland
System optimization and circular systems (bio-based)	1	Östergötland, Sweden
Business development, entrepreneurship and innovation management are cross-cutting themes of high regional importance.	1	Östergötland, Sweden
MARINE		
Marine	1	SATAKUNTA REGION, FINLAND,
Marine - Macroalgae to chemicals and high value extractions. Waste from Aquaculture to higher value products	1	Scotland
ENERGY		

Energy	1	Principality of Asturias
Biomass to energy	2	Central Denmark, Kainuu Region, Finland
Biomass production for bioenergy applications	1	Navarra
Energy - Waste to electricity (through AD or direct combustion), bio-fuels (bio-diesel, bio-ethanol, bio-butanol, bio-jet fuel)		
Smart Grids	1	Gelderland, the Netherlands
Biofuel solutions/implementation	1	Östergötland, Sweden
WASTE		
Use of waste	1	Navarra
Other - Synthetic Biology and other technologies that support the development of IB. Municipal waste to chemicals and fuels.	1	Scotland
CHEMICALS AND MATERIALS		
Biology sciences	1	Castilla y León, Spain
byproducts from the industrial sector and biomass waste from consumption;	1	Central Denmark
Increased value added from industrial biproducts.	1	Region Värmland, Sweden
Valorisation	1	Gelderland, the Netherlands
health care industry	1	Regione Lombardia
Biopharma	1	Navarra

Technology and materials	1	North Karelia
Chemicals and Materials	5	Flanders, Principality of Asturias, Regione Lombardia, Castilla y León, Spain
Chemicals and Materials - Supporting the existing chemical and life science industries in Scotland to better utilise bio-technology	1	Scotland
Bioplastic production	1	Navarra
Green chemistry	1	Basilicata, Italy
Research on bio products and biorefineries	1	SATAKUNTA REGION, FINLAND,
new biopolymers, surface modification of materials (based on biopolymers)	1	Łódzkie Region, Poland
nanotechnology and functional materials (pharmaceutical technologies, material technologies, nanomaterials, chemistry, textile technology	1	Łódzkie Region, Poland
biodegradalbe materials and biomaterials;	1	Łódzkie Region, Poland
biotechnology (biochemistry, pharmaceutical technologies, medical biotechnology, clinical medicine technologies, industrial, biotechnology, molecular biotechnology)	1	Łódzkie Region, Poland
technical materials on the basis of biogenic substances;	1	Łódzkie Region, Poland
ENVIRONMENTAL PROTECTION		

Natural patrimony	1	Extremadura
Environmental recovery and risk management.	1	SATAKUNTA REGION, FINLAND,

Figure 3 – Regional activities in Bioeconomy sectors

Regions using ESIF funds for funding Bioeconomy related initiatives?

Regions show a rich variety of cases about their regional Bioeconomy situation and the use of ESIF funding infrastructures. Regions indicating that they are less advanced in the sector tended not to show practical examples of how ESIF funds have been used to strengthen their Bioeconomy sector. However, some of the regions with no regional Bioeoconomy strategies were able to illustrate some use of ESIF funds, therefore sometimes there is a lack of a supra regional strategies but regions try to implement projects.

Advanced Bioeconomy regions, that made progress in the past, have shown clear examples about the use of ESIF funds at regional level. These differences between less and more advanced regions, appear not only among regions from different countries but also inside the same country (e.g. Finland, Sweden, Spain).

Country	Regions	National or Regional Strategy for Bioeconomy?	State of Progress of Bioec. in the Region ?	Is the Bioeconomy included in your RIS3?	Are your ESIF Funds used for funding Bioeconomy related initiatives?
Finland	**Oulu**	Yes	Advanced	Yes	Yes - (Not concrete examples)
	South Ostrobothnia	Yes	Advanced	Yes	Yes - (concrete examples)
	Central Finland	Yes	Advanced	Yes	Yes - (concrete examples)
	North Karelia	Yes	Advanced	Yes	Yes - (Not concrete examples)
	Kainuu	Yes	Less Advanced	Yes	Yes - but in future
	Satakunta	Yes	Advanced	Yes	Yes - (Not concrete examples)
Spain	**Asturias**	No	Less Advanced	Yes	Yes - (concrete examples)
	Extremadura	No	Less Advanced	Yes	Yes - (Not concrete examples)
	Castilla-León	Yes (RIS3)	Advanced	Yes	Not answered
	Navarra	Yes (Integrate)	Advanced	Yes	Yes - (concrete examples)
Swe	**North Sweeden**	Yes (RIS3)	Advanced	Yes	Yes - (Not concrete examples)
	Ostergotland (East Sweeden)	Yes (RIS3)	Advanced	Yes	Yes - (concrete examples)
	Varmland	No	Advanced	Yes	Yes - (concrete examples)
ITA	**Lombardy**	Yes (RIS3)	Advanced	Yes	Yes - (Not concrete examples)
	Basilicata	Yes	Advanced	Yes	Yes - (concrete examples)
France	**Lower Normandy**	No	Less Advanced	Yes	Yes - (concrete examples)
Belgium	**Flanders**	Yes	Advanced	Yes	Yes - (concrete examples)
Denmark	**Central Denmark**	In Progress	Advanced	Yes	Yes - (concrete examples)
Poland	**Lodzkie**	No	Less Advanced	Yes	Yes - (concrete examples)
Netherlands	**Gelderland**	Yes	Advanced	Yes	Yes - (concrete examples)
UK	**Scotland**	Yes	Less Advanced	Yes	Yes - (concrete examples)
	Wales	Yes	Less Advanced	Yes	Yes
	Nothern Ireland	No	Less Advanced	Yes	Not by the moment
NORWAY	**North Norway**	In Progress	Advanced		Not by the moment

Figure 4 – Regions using ESIF for the Bioeconomy sector

Regional ambitions and goals for the Bioeconomy sector

The regions participating in the ERRIN mapping responded with a great variety of ideas in relation with their objectives for Bioeconomy. This was expected du to the different regional profiles and maturity levels among the regions in their Bioeconomy strategies.

The main ***aims*** to achieve in relation with the Bioeconomy discovered in the mapping are divided in several themes such as;

- Create a sustainable economy
- Gaining investors and exports
- More jobs
- Better and new products

- Development and integration of bio-refineries per-sé and with the rural sector

Main goals expected to achieve in relation with regional Bioeconomy activities have their root on a strategies level and regions indicated that the main goals are to:

- use Bioeconomy as strategy for cluster development
- Bioeconomy as a reinforcement for models of entrepreneurial innovation
- Bioeconomy to maintain people linked to the territory
- Bioeconomy as a regional scale demonstrators builder
- Creation of more jobs
- Development of better products

The ***importance of the food chain*** is clearly stressed in the list of regional priorities too; some answers were about the use of the Bioeconomy to develop whole food chains engaging key additional sector players (e.g. machinery industry) and rethinking concepts such as the logistics in relation with the Bioeconomy.

Main challenges and obstacles in achieving main Bioeconomy goals

The figure below show that 9 regions see the lack of capacity building and awareness raising as the main obstacle for achieving the regional Bioeconomy goals, yet this is key according to regions for a long term investment in the sector. Six regions see the lack of research and development as a challenge and six additional regions also identified regulation and red tape on EU, national and regional level hindering the regions to achieve their goals in Bioeconomy. It was also argued by some regions that there may be a need for more EU strategies to enable the developments on regional level.

	FINLAND						SPAIN				SWEDEN			ITALY		FRANCE	BELGIUM	DENMARK	POLAND	NETHER	UK			Norway
	Oulu	South Ostrobothnia	Central Finland	North Karelia	Kainuu	Satakunta	Asturias	Extremadura	Castilla-Leo	Navarra	North Sweeden	Ostergotland (East Sve.)	Varmland	Lombardy	Basilicata	Lower Normandy	Flanders	Central Denmark	Lodzkie	Gelderland	Scotland	Wales	Northern Ireland	North Norway
For the implementation of the RIS3 relating to the bioeconomy objectives, what are the challenges and obstacles in achieving your goals and aims?																								
International	x	x							x			x												
Regional cooperation								x				x			x	x								
Capacity building and awareness raising							x	x	x	x	x	x				x			x				x	
Industry					x			x			x								x					
Research and Development					x			x				x	x		x					x				
Regulatory and Public Investment issues						x	x	x							x		x	x						
Infrastructure			x			x		x																
Skills													x			x								
lack of key actors				x			x			x														
value chains										x			x	x										
Lack of pr	x			x	x																			

Figure 5 – Main challenges and obstacles in achieving Bioeconomy goals

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Fields where more Research and Innovation is needed to advance regional Bioeconomy activities

	FINLAND						SPAIN				SWEDEN			ITALY		FRANCE	BELGIUM	DENMARK	POLAND	NETHER	UK			Norway
	Oulu	South Ostrobothnia	Central Finland	North Karelia	Kainuu	Satakunta	Asturias	Extremadura	Castilla-Le	Navarra	North Sweeden	Ostergotland (East Swe.)	Varmland	Lombardy	Basilicata	Lower Normandy	Flanders	Central Denmark	Lodzkie	Gelderland	Scotland	Wales	Northern Ireland	North Norway
In which field more research and innovation is needed to advance the bioeconomy in your region? (i.e. logistics, consumer behaviour, financial instruments, etc.)																								
Logistics	x		x	x		x					x	x			x									
Consumer behaviour																			x					
Financial	x				x	x			x	x				x	x			x	x	x	x			
New technologies	x						x	x				x	x											
Development of new	x				x					x														
New value chains										x														
Policy changes						x																		
system impact												x												
competetiveness of SMEs																			x					
valorisation																							x	

Logistics, Consumer behaviour, Financial, New Technologies, Development of new products, New value chains, Policy, Competitiviness of SMEs, Valorisation

Figure 6 – Fields where more Research and Innovation is needed to advance regional Bioeconomy activities

According to the surveyed regions 11 regions from across Europe see financial instruments as a main barrier where more research and Innovation is needed. Seven regions, mostly from the Nordic countries have identified logistics as a field in need where more research and innovation is needed. Five additional regions from across Europe identified that there is a need of more research and innovation for the development of new technologies.

Regional actions for involving all actors in the Bioeconomy value chain

Top priorities for involving actors from the whole Bioeconomy value chain have been identified to be the right Business Model/collaboration model and collaboration form such as clusters. Projects have also been listed as an important aspect to foster collaboration and involving all actors along the regional value chains. Figure 7 below displays the answers in more detail.

	FINLAND						SPAIN				SWEDEN			ITALY		FRANCE	BELGIUM	DENMARK	POLAND	NETHER	UK			Norway
	Oulu	South Ostrobothnia	Central Finland	North Karelia	Kainuu	Satakunta	Asturias	Extremadura	Castilla-Leo	Navarra	North Sweeden	Ostergotland (East Swe.)	Varmland	Lombardy	Basilicata	Lower Normandy	Flanders	Central Denmark	Lodzkie	Gelderland	Scotland	Wales	Northern Ireland	North Norway
How to involve all actors along the bioeconomy value chain, from the primary producers until the end users, what is / have been the role in your region?																								
Regional	x										x			x										
National strategies														x										
International strategies														x										
Projects						x				x	x	x			x			x						
Funding instruments			x																				x	
Research and innovation centres																x								
Joint initiatives				x																				
Horizontal approach																	x							
Communication							x																	
Collaboration Models					x			x										x	x	x				
Clusters									x			x	x	x	x				x					

Figure 7 – Regional activities for involving actors along the full value chain

Synergies with Horizon 2020 and OP/ RIS3 for Bioeconomy

The majority of the regions participating in the mapping have responded that synergies with Horizon 2020 in the OP/RIS3 have been considered. However, for most of the regions, implementation still needs to be clearly defined. Only very few regions (less than five) have implemented the synergies in a concrete way.

Two examples of synergies:

The ***Government of Navarra*** is promoting and encouraging the participation of Navarra stakeholders in H2020 by providing vouchers to elaborate project proposals for this EU program. This action is co-funded by ERDF funds. Other co-funded actions include grants for R&D collaborative projects and for technological centres (including the Bioeconomy sector).

Synergies are considered by building up value chains on the whole territory of ***East and North Finland*** aiming at utilisation of Horizon 2020 funding for building regional path of development. Part of the plan is launching the ERDF thematic call for project proposals in the wood product sector.

Horizon 2020

Regions were offered the opportunity to comment their thoughts on the scoping paper for Bioeconomy calls under Horizon 2020, Societal Challenges two and regions proposed more calls for pilots, demonstration and deployment activities. Regions from the Nordic countries also proposed more forestry-related calls, such as processing wood and peat into new high value end products, or Forestry based bio-refineries .

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In the figure below regions have indicated which focus areas and subthemes that are of most interest for the region.

	FINLAND						SPAIN				SWEDEN			ITALY		FRANCE	BELGIUM	DENMARK	POLAND	NETHER	UK			Norway
	Oulu	South Ostrobothnia	Central Finland	North Karelia	Kainuu	Satakunta	Asturias	Extremadura	Castilla-Leo	Navarra	North Sweeden	Ostergotland (East Swe.)	Varmland	Lombardy	Basilicata	Lower Normandy	Flanders	Central Denmark	Lodzkie	Gelderland	Scotland	Wales	Northern Ireland	North Norway
Which focus areas and subthemes are most interesting for your region?																								
1a More resilient a	x					x		x		x		x	x	x	x	x	x		x	x			x	x
1b A competitive food industry						x		x		x		x		x	x		x		x	x			x	x
1c Healthy and safe foods and diets for a	x					x		x		x		x		x	x	x	x			x	x		x	
Impleme		x				x		x		x		x			x		x			x			x	
2a Innovation for emerging Blue Growth activities						x				x						x	x				x			x
2b Healthy oceans and seas for healthy people						x				x						x	x				x			
2c Strengthening the European ocean observing, surveying a						x				x							x				x			
3a New approaches	x	x	x	x	x			x		x	x	x			x		x				x		x	x
3b New value chains and busi	x		x	x	x					x	x	x			x		x						x	x
3c Innovation and s	x	x		x	x			x		x	x	x	x		x		x				x		x	x
4a Fostering sustair	x		x		x			x		x	x	x		x		x	x		x		x		x	x
4b building the bio-based market of the	x		x	x	x					x	x	x	x	x	x	x	x		x		x			
5. Other and cross-cutting areas																								

Figure 8 - Focus areas and subthemes that are most interesting for the region

List of Focus areas and subthemes listed below:

1.a More resilient and resource efficient value chain

1.b A competitive food industry

1.c Healthy and safe foods and diets for all

1.d Implementation of the EU-China FAB Flagship initiative

2.a Innovation for emerging Blue Growth activities

2.b Healthy oceans and sees for healthy people

2.c Strengthening the European ocean observing, surveying and monitoring capability

3.a New approaches towards policies and governance

3.b New value chains and business models

3.c Innovation and skill development

4.a Fostering sustainable biomass

4.b building the bio-based market of the future

5. Other and cross-cutting areas