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

Task 3

Case Study Report Weser-Ems [Germany]

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Sebastian Hans

1. Short Regional Bioeconomy Profile

Weser-Ems is highly advanced in the Bioeconomy. Not only one sector but also all fields of economic activity in the Bioeconomy do feature an advanced specialisation and a high level of sectorial inter-connectedness. This creates a positive environment for technology transfers.

Also the public sector has a high interest in enhancing Bioeconomy further as Bioeconomy is one of the primary economic sectors of Weser-Ems. This has resulted in many synergies and in the implementation of a public-private entity ('Strategy Council Bioeconomy') that addresses challenges and opportunities within the Bioeconomy.

Most relevant for the Bioeconomy in Weser-Ems is the sub-regional level whereas the *Länder* level (federal state of Lower Saxony) plays only a subordinate role with the RIS3. Even though the RIS3 is in line with the targets set out by the Strategy Council Bioeconomy in the 'Master Plan Bioeconomy 2020', it was the sub-regional level, its RIS and the three subordinate Master Plans Bioeconomy, Energy and Maritime Economy that have fed into the *Länder* level. The sub-regional RIS was initiated earlier than the *Länder* RIS3, connecting at the results of a first European pilot project from 1996.

In order to explain the Bioeconomy in Weser-Ems, the historical specialisation is also important to consider. Poor soil quality and disconnectedness from European and national centres have introduced a first level refinement and later the second-level research and innovation activities in the Bioeconomy sector. This was mainly because of the awareness of the public administration in connection with the private enterprises that diversification in a specialised sector can bring large advantages in terms of generating added-value.

Name of the case region/country	Weser-Ems (DE94)
Member State	Germany
GDP – Euro per capita (2014)*	31,700
Total ESIF Research & Innovation per capita per year*	Niedersachsen (DE9): 4.77
Total H2020 per capita per year*	Niedersachsen (DE9): 6.89
Value Chain Approach to the Bioeconomy**	Bio-based products and R&I
Thematic Focus of the Bioeconomy Approach**	Agro-food and Other
Research and Innovation Fields highlighted for the Bioeconomy**	Primary production with quality, Biology, Biotechnology, Chemistry, Life Sciences, Nano Technologies and Advanced Manufacturing, Machineries
Bioeconomy Activity Level**	Middle-High
CASE STUDY SUMMARY	
Bioeconomy Approach	Early specialisation on Bioeconomy (since 80's) because of relative disconnectedness and framework conditions that did not leave other choices than a further valorisation of agriculture (refinement i.e.).
Bioeconomy Ecosystem	Highly specialised ecosystem in all actor groups with a

	focus on primary production, refinement, agricultural engineering, research and innovation in the food sector and regarding use of alternative materials.
Bioeconomy Policy Support	Master Plan Bioeconomy 2020 on the sub-regional level (region Weser-Ems) represents the main document to enhance research and innovation in the Bioeconomy. Close interconnection between the private and public sector in the Strategy Council Bioeconomy.
Successful initiatives and Good Practices	Actors within the Bioeconomy in Weser-Ems are not only closely connected in terms of structures but also regarding their physical distance.
Main Needs, Gaps and Bottlenecks	Bioeconomy regarding primary production has hit a threshold regarding the UMWELTVERTRÄGLICHKEIT. Main need is in the transfer from innovation from research centres into broad application by private actors. Although there is already a lot done, the results will only show in a few years ahead.

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

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

2. Regional Bioeconomy Ecosystem

This chapter describes the general characteristics of the regional bioeconomy ecosystem, its origins, main stakeholders and driving forces. It gives an overview on the recent evolution and trends on bioeconomy-related issues in the area and some of the main activities and initiatives.

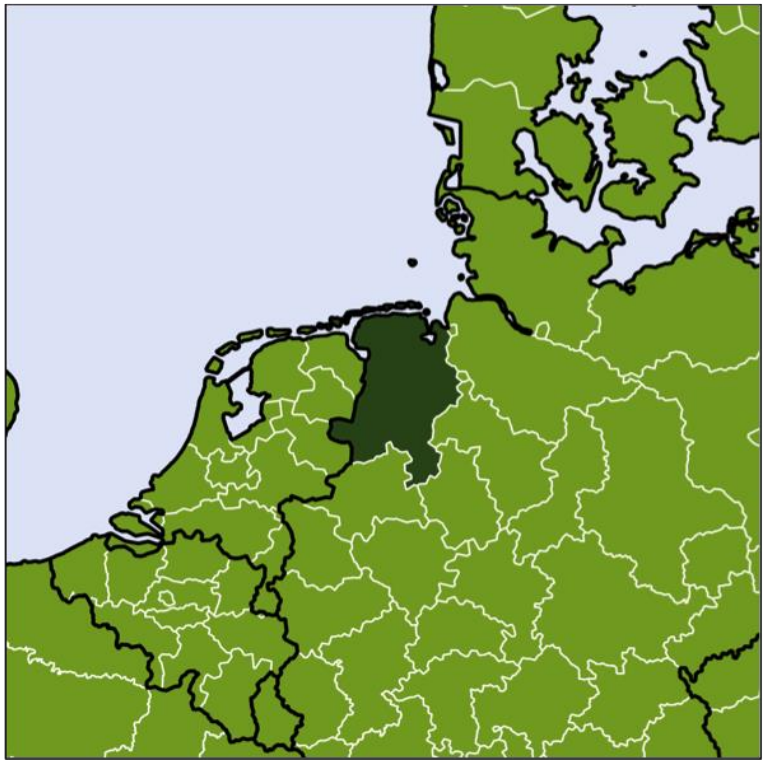
2.1 Origin of Interest of the region in the Bioeconomy

The region Weser-Ems is a NUTS 2 region, which is located in the upper North-West of Germany (Figure 1). Weser-Ems is part of the *Land* Lower Saxony. The region has access to the North Sea and borders with the Dutch regions of Groningen, Drenthe and Overijssel. It consists of 17 counties and independent towns and is considered as a more rural type of region in relation to other EU areas.

Weser-Ems features stable economic framework conditions. The regional GDP is higher than the EU28 average (110 %) but slightly lacks considering the average German score in 2014, which was at 121 % (Eurostat, 2016a).

Regarding Bioeconomy, Weser-Ems is a more developed region in the EU. Because of an early specialisation in farming and in valorisation of agricultural goods, the region has profoundly developed the Bioeconomy sector. Since the region does not feature fertile soils, the primary production potential of the agriculture was initially limited. Therefore, an early specialisation on making use of the primary products through processing and refinement has increased the value of agricultural products. An example therefore is the fact that Weser-Ems is the main producer of animal feed in Germany (Jansen, 2016; Sickelmann, 2016).

Figure 1 Location of the case study region Weser-Ems



Source: Spatial Foresight and University of Geneva based on material from Eurostat GISCO, the GADM database and the EEA

Nowadays, Weser-Ems is an extensively used agricultural area. In 2014, Weser-Ems ranked 6th place in the European Union, EFTA and candidate countries concerning the absolute production output of the regional agricultural industry (Eurostat, 2016b). Also relating to employment, Weser-Ems signifies a high degree of specialisation in Bioeconomy. In total, more than 115 000 jobs (10,7 % of the total active population) are to be found in firms in relation to Bioeconomy (regio gmbh and Müller, 2015).

The early need to diversify from the primitive production to valorisation of goods has introduced a densely connected processing network. The network can be divided into three main types of actor groups in the Bioeconomy; the primary producers, the refiners and the researchers. All three actors can be found on a relatively small area within 200 km. The spatial concentration of all three levels of the Bioeconomy value chain has caused synergies, competitive advantages and economies of agglomeration that have in turn again reinforced the specialisation.

Also problems that root in the extensive agricultural use have reinforced the specialisation on Bioeconomy. Especially the environmental quality is significantly challenged through the use of chemical fertilisers or the spillage of manure for instance. This has in turn led to the necessity to search for alternative practices in order to avoid decreasing acceptance for the Bioeconomy. An example therefore is the transformation of manure to pellets to be used in private and public gardens as natural fertiliser (Große-Kracht, 2016; Sickelmann, 2016).

However, the agricultural sector in Weser-Ems has recently become challenged because of several aspects. The increasing competition on the level of the global market (globalisation), emerging ecological and environmental problems, soil and water limitation, limitation of useable surfaces, lack of skills and know-how in the agricultural labour sector and decreasing consumer acceptance of industrialised type of agro-food-feed production are some of the reasons. In order to address these challenges, the local governance bodies have initiated a process to ease the knowledge transfer in order to enhance regional growth and prosperity through further innovation and research (Große-Kracht, 2016; Heuwinkel and Müller, 2015).

2.2 Bioeconomy Stakeholders

Because Weser-Ems has engaged into an advanced specialisation, there are various actors and stakeholders in the Bioeconomy. Currently, there are three types of actors groups in Weser-Ems in the Bioeconomy; the **public** actors, the **intermediate** (public-private) actors and the **private** actors.

As for the **public** involvement into the Bioeconomy, the primary actors in the field of Bioeconomy are the institutions in charge of governing the region. Most relevant therefore is the Agency for regional development Weser-Ems (‘Amt für regionale Landesentwicklung Weser-Ems’), which is located in Oldenburg. It is one of the agencies under the patroness of the *Land* Lower Saxony, which has delegated the task of regional development through the state chancellery on subsidiary levels in 2014. The agency is in charge of the overall territory

of Weser-Ems and influences both, the holistic alignment (visions and strategies) of the Bioeconomy and concrete measures (priorities and SMEs) on the local level[1]. The director of the Agency for regional development, Franz-Josef Sickelmann was interviewed for the underlying case study.

Another important and consistent institution represents the Working Group of Primary Administrative Officers ('Arbeitsgemeinschaft der Landkreise und kreisfreien Städte in Weser-Ems (AG Weser-Ems)'). This working group meets on a regular basis since the 80's in order to discuss on recent developments and trends and strategic alignments in Weser-Ems. The working group stressed a specialisation in Bioeconomy from early on, leading to a first European pilot project. From 1996 to 1998, this project has lead to the development of a first RIS ('Regionale Innovationsstrategie Weser-Ems (RIS)'), targeting at the structural weakness and underdevelopment of the region. This first attempt was evaluated as a success, leading to the efforts of connecting the current RIS Weser-Ems to the achievements of the old strategy.

Also relevant, but less important for the Bioeconomy in Weser-Ems are Federal actors. Recently, some efforts were undertaken in order to promote Bioeconomy as possibility to promote territorial development. However, this has only little relevancy to Weser-Ems since it is already quite advanced in developing Bioeconomy as leverage for regional development. One can say that Weser-Ems as main actor in the Bioeconomy has influenced the alignment of the RIS3 on the *Länder* level (with a focus on Bioeconomy) (Sickelmann, 2016).

The Strategy Council Bioeconomy Weser-Ems ('Strategierat Bioökonomie Weser-Ems')[2] as intermediary connects at the intersection between **public and private** functions in the Bioeconomy. It consists of 25 stakeholders from private and public bodies coming from enterprises, research institutions and public institutions. The council has conceptionalised the alignment of the Bioeconomy, which has resulted in the Master Plan Bioeconomy, which is one of the three primary pillars of the RIS Weser-Ems. The objective target of the Council Bioeconomy is to define areas of cooperation between the stakeholders and to discuss further potential and bottlenecks of a more specialised Bioeconomy.

In terms of research and innovation in Bioeconomy, the universities in Weser-Ems take a key role. They do not only enhance the Bioeconomy through research and innovation but they also act as transfer points between science and application in the private economic sector (nine transfer points in total)[3].

Research and scientific institutions are a separate type of bodies that can be characterised as intermediate bodies. They do represent research institutions, universities, competence centres, technology centres, etc. whereas the links and interconnections between the clusters cannot always be split into being of public or of private nature. An example is for

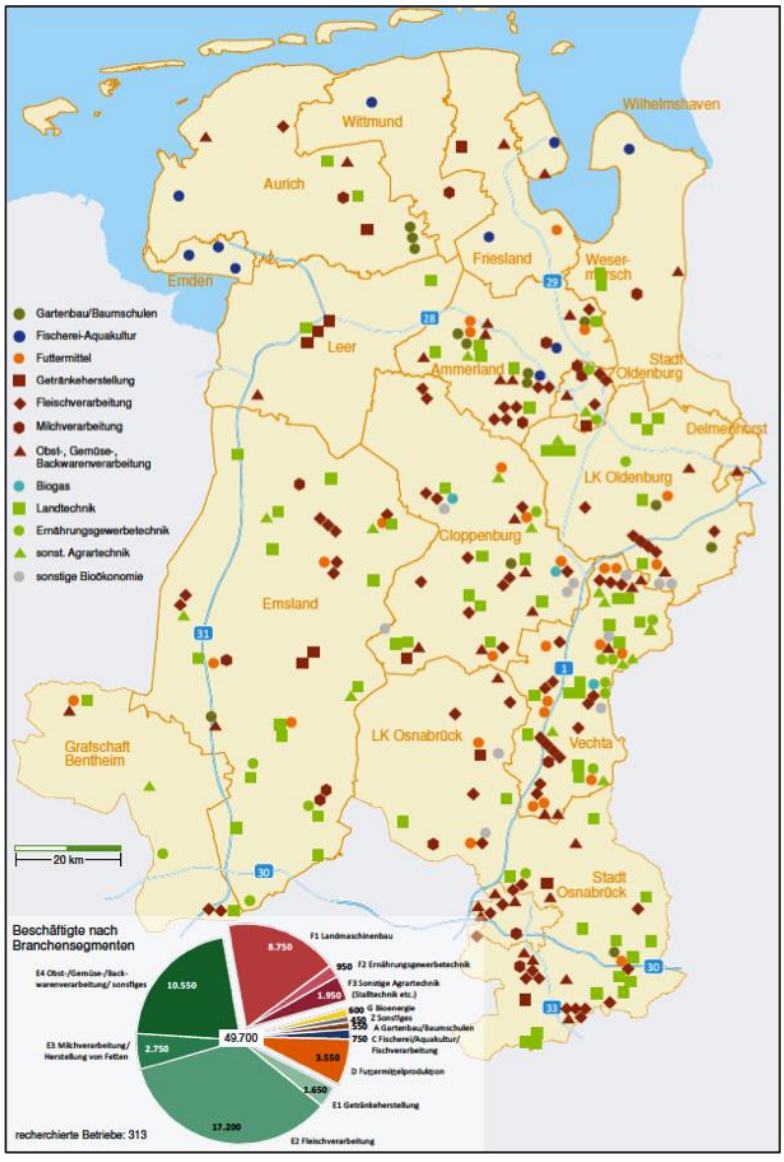
[1] For further information, please see: http://www.stk.niedersachsen.de/startseite/staatskanzlei/landesaemter_regionalentwicklung/die-aemter-fuer-regionale-landesentwicklung--121365.html
[2] For further information, please see: http://www.weser-ems.eu/wissensregion/de/biooekonomie/strategierat.html
[3] For further information, please see: http://www.weser-ems.eu/wissensregion/de/beratung-transfer/hochschultransfer.html

instance a cluster consisting of two entities, the one being publicly and the other being privately funded. They feature the most advanced level of specialisation in the sector in Weser-Ems.

Additional intermediate actors are business associations, chambers of commerce, chambers of agriculture and chambers of craft. Within the specialisation on Bioeconomy, they contribute to a large proportion in enhancing research and innovation towards a good innovation ecosystem.

On the side of the **private** actors, Weser-Ems provides a differentiated structure (Figure 3). Firstly, many primary producers such as farmers and pastoralists are to be found, as the region is extensively cultivated. Secondly, based on the inputs from the primary producers, there is a large sector branch of refiners. This sector branch represents for instance the agro-food and the animal feed producers.

Figure 2 Bioeconomy businesses in Weser-Ems (except for farms and veterinary services)



Source: regio gmbh and Müller (2015)

Complementary to the research and innovation producing facilities that might be characterised as intermediate bodies, Weser-Ems features many private-only technology oriented research centres and enterprises. These actors are primarily involved in enhancing farming through technological innovations (agricultural engineering) such as ‘smart farming’. World-leading clusters with important actors and a high added value generated are spin-offs from the extensive primary production and refinement in the region. The main objective of this sector is to enhance the classical farming as well as to increase sustainability of established farming practices (Große-Kracht, 2016).

The research and scientific institutions as part of the intermediate actors comprise also clusters that are crucial to thrive research and innovation in the Bioeconomy. An example therefore is the German Institute of Food Technology ('Deutsches Institut für Lebensmitteltechnik (DIL)') in Quakenbrück. or the 3N Competence Centre Network Renewable Resources and Bioeconomy ('3N Kompetenznetzwerk Nachwachsende Rochstoffe und Bioökonomie'), specialised on bioenergy, bio-based plastics and more[4]. The above knowledge intensive clusters of the Bioeconomy are further explained in chapter 4.

The actors of the Bioeconomy in Weser-Ems are closely interconnected across different levels. Intense relations between different types of actors do create synergies and innovations. This is also due to their fragmented geographical location. As highlighted in Figure 3, the distribution of Bioeconomy actors is fragmented, resulting in smaller physical distances between different types of actors.

Overall, the **private** and **public** actors involved in research and innovation have a strong intrinsic motivation to become involved (Große-Kracht, 2016; Sickelmann, 2016). The involvement is thus not superimposed by the administration on the private actors. Because of the nested interests of both parties, they have created an environment of cooperation, which is permanent. This has created synergies and innovation potentials that would not have been capable without the connecting structures such as the Strategy Council Bioeconomy 2020.

2.3 Bioeconomy – strategies, plans and projects

Within the region of Weser-Ems, a manifold of strategic plans, master plans and projects do coexist. Even though not all are entirely dedicated to the Bioeconomy, many of them do address at least one aspect of the Bioeconomy due to the general economic specialisation of the region.

The most relevant document in terms of Bioeconomy is the Master Plan Bioeconomy 2020 ('Masterplan Bioöknomie 2020') published by the Strategy Council Bioeconomy Weser-Ems. It intersects at the applied and theoretic level by picking up objectives from the RIS Weser-Ems and RIS3 of Lower Saxony and sets concrete targets in terms of projects.

In terms of European Territorial Cooperation (ETC), the INTERREG VA programme between the Netherlands and Germany represents an important leverage to foster Bioeconomy innovations in Weser-Ems[5]. The Community is funding several projects through ETC and mainstream programmes, which is key to increase the competitive advantages on both sides of the border.

[4] For further information, please see: http://3-n.info/
[5] For further information, please see: http://www.projecten.bioeco-edr.eu/

3. Bioeconomy Policy Support

This chapter gives a brief account of the existing policy instruments and action lines to support the bioeconomy in the area. It highlights the most important value chain approaches to promote the bioeconomy, the thematic focus of the Bioeconomy-related research and innovation, as well as some of the research fields that are relevant for further deployment of the bioeconomy.

3.1 General support framework

Within the framework of the Smart Specialisation Strategy of Lower Saxony (RIS3), Bioeconomy is mentioned as one of the priorities. In Weser-Ems, the *Land* identifies a further potential in enhancing innovation among the Bioeconomy, the medical technologies and others, which are not necessarily linked to Bioeconomy. This shall be achieved by enhancing innovation potential and transfer from and to SMEs and craftsman workshops. It is sensible to the fact that most innovations are created during pro-active research in clusters but sometimes innovation does occur unintended during work of a craftsman or a farmer. The transfer points do represent within the RIS3 the pivot point for achieving the above objectives. The creation of posts for so-called 'Knowledge Managers' ('Wissensmanager') shall institutionalise the transfer processes of innovation from research to implementation and lift the innovative potential of Weser-Ems (Niedersächsische Staatskanzlei, 2014a).

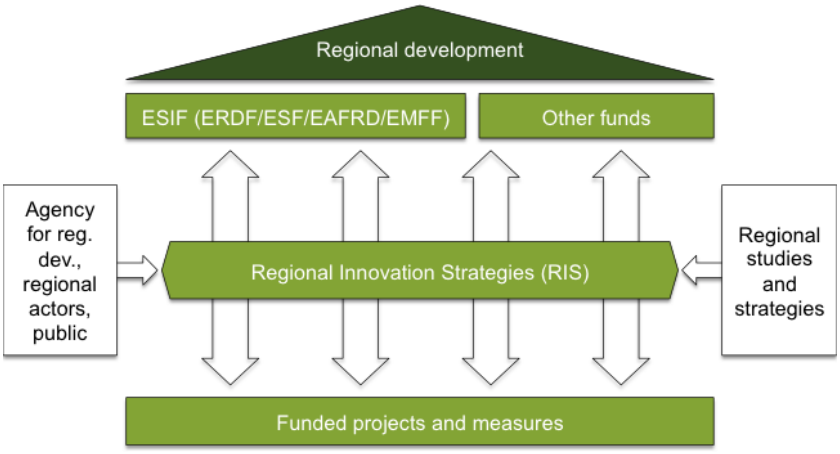
On the regional level, the RIS Weser-Ems has defined objectives and identified competences towards innovation and knowledge transfer already in 2013 before the RIS3 of Lower Saxony was published. Therefore, the regional level RIS has substantially influenced the *Länder* level RIS. This is also important to consider in light of the fact that starting in 2014, the competence of regional development was transferred from the *Länder* to a lower administrative regional level. Also because of the EU pilot project of a first RIS in 1996, the regionalised governance system profited from a valuable advantage in terms of knowledge networking that other levels did not have (Große-Kracht, 2016; Jansen, 2016; Sickelmann, 2016).

The regional level RIS has thus the main competence in this federalised structure in terms of stimulating innovation and research within the Bioeconomy. The rationale lies in the awareness that interwoven governance levels have varying scopes where the lowest level has easiest access to local specificities and tacit knowledge. The formulation of needs and targets by the regional level is thus closest to what is really needed in order to foster innovation and research within the Bioeconomy.

Regarding the financial support through ESIF, the regional and subordinate levels (districts and independent towns) are in close communication with the Managing Authority on *Länder* level. This guarantees that the Community support to enhance technologies and innovations are well-allocated based on the specific needs and objectives, defined in the RIS Weser-Ems (Figure 3). Also regarding other funds in support for innovation in the Bioeconomy, the regional authorities are the main directing actors. The main actors in promoting innovation

and research in the Bioeconomy are therefore the administrative bodies of the districts and the independent towns as stakeholders in charge of the RIS Weser-Ems.

Figure 3 Strategic governance structures in Weser-Ems



Source: own representation based on Amt für regionale Landesentwicklung Weser-Ems (2014)

Regarding the financial support in research and innovation, also the *Länder* and national level must be considered. Even though there's no direct mainstream-funding scheme that promotes projects and institutions in Bioeconomy yet, the fact that university budgets are allocated by the federal and federal state level ensures a steady work towards innovation and research in Bioeconomy. Additionally, the regional and local administrative bodies provide soft support to stakeholders when a project would not be eligible for Community support. In individual cases, it is also checked whether any federal or federal state contributions could be made available to support a Bioeconomy project. Even though the primary support towards Bioeconomy happens through ESIF, the districts and independent cities have implemented a small support fund. Within the framework of the Master Plan Bioeconomy 2020, stakeholders can receive support in different financial forms to a maximum of EUR 5 000. This support can be used for smaller initiatives of SMEs or clusters within the Bioeconomy, for instance for supporting a study, a public information process or a networking event (Große-Kracht, 2016).

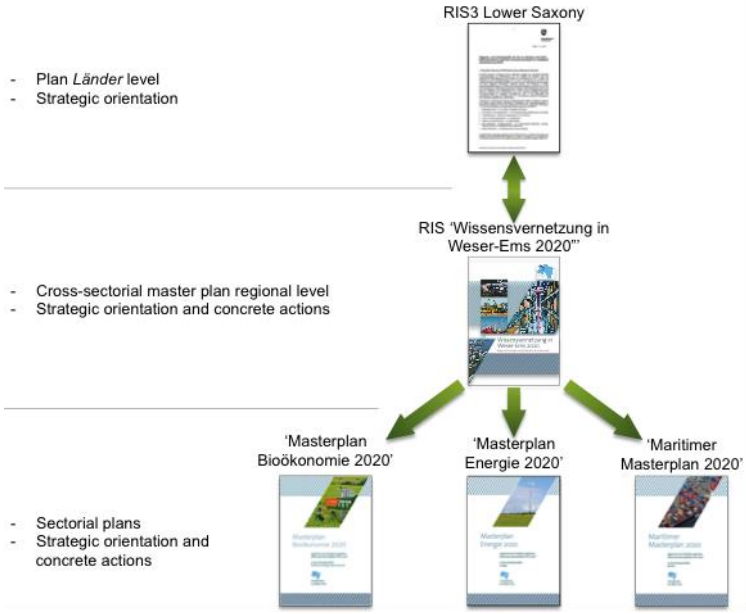
3.2 Bioeconomy Policy Support

The Master Plan Bioeconomy 2020 represents one pillar of the threefold approach of the RIS Weser-Ems, targeting at knowledge networking. The parallel Master Plans Maritime Economy 2020 and Energy 2020 do also address innovations in Bioeconomy in related sectors (Figure 4). The Master Plan is published by the Strategy Council Bioeconomy Weser-Ems under the umbrella of the 17 districts and independent cities.

The Master Plan Bioeconomy 2020 features nine fields of action in order to assure the conditions for bioeconomy development and to enhance bioeconomy. Under each field of action, the plan summarises concrete measures and projects (Heuwinkel and Müller, 2015). The strategy is based on the local/regional resources and foresees concrete and practical measures to promote the bioeconomy within a long-term approach:

- Field of action 1: Provide orientation for the structural changes in the Bioeconomy: a) bring together and disseminate examples of a sustainable bioeconomy Weser-Ems 2020, b) Knowledge pool about the bioeconomy (trends, scenarios, studies).
- Field of action 2: Management and quality standard of water supply: a) Advice on expected water supply in industrial areas.
- Field of action 3: Sustainable use of soil: a) Develop a regional map with the specific needs to protect soil from degradation and other risks.
- Field of action 4: Bio-based materials and products from renewable biological resources: a) Dissemination Campaign about the possible production and use of bio-based materials in the Weser-Ems region, including bio-refineries and bioenergy use.
- Field of action 5: Management and quality standard of fertilisers: a) Project to optimise the use of soil nutrients, b) Use of Algae to gain specific biomass, c) Project to improve and sell quality fertilisers from Weser-Ems.
- Field of action 6: Good communication and public awareness about the bioeconomy, also in Food Crisis: a) Exchange about communication good practices about the bioeconomy (agro-food), b) additional journalist education for students in agronomy and other relevant sciences.
- Field of action 7: Impact of changes in diet and nutritional habits: a) Applied research on changes in diet and nutritional habits, but also in agro-food production systems, b) Project 'iAlgaePro' to innovate on the use of algae in the production of nutraceuticals, c) FOOD2020, German-Dutch project to support the food sectors on both side of the border, d) Sustainability transition – the role of new proteins in future agricultural systems.
- Field of action 8: Technical innovations for shaping the future of agriculture: a) Optimise the nutritient management of farms, b) regional information and assistance systems 'smart farming', c) Independent sensor systems to optimise the use of natural resources, d) improving the advice and support to farmers for innovation,
- Field of action 9: Specialised labour for structural change within the Bioeconomy: a) Creation of a network with specialised training institutes outside of the region, b) Creation of a new Vocational Training Institutes in the region (food technology), c) Assure the supply of professional and specialised trainers in technical areas, d) Training and on-going training for the dairy sub-sector, e) Systematic development of a dual-training system for the Bioeconomy in the region , f) Assure academic and research capacities in bioeconomy for the region g) Open Engineering and Open Learning Network with partners from business and research.

Figure 4 Breakdown of the RIS3 strategy into thematic master plans



Source: Spatial Foresight, 2016

3.3 ESIF and H2020 resources for the Bioeconomy

The Operational Programmes do not specify the amount of Community funds that are allocated to the topic of Bioeconomy. However, the share of money attributed to Thematic Objective 1 (TO 1 – research and innovation) can give an indication on the importance of innovation within the region. The Multifund Operational Programme for Lower Saxony 2014-2020 (ERDF/ESF) allocates 27,4 % of the Community contribution to TO 1 (EUR 189,4 million) for the entire *Land.* This contribution is completely provided by the ERDF. The INTERREG V A Operational Programme Germany-Netherlands 2014-2020 has a stronger focus on promoting research and innovation. 80,5 % of the ERDF funds are attributed to TO 1 (EUR 179,8 million). These numbers represent the Community contribution only, excluding national and private amounts (Joint INTERREG Secretariat, 2014; Niedersächsische Staatskanzlei, 2014b).

There is no overarching support structure in Weser-Ems to channel Horizon 2020 investments to where they are needed. The region relies on the professional capacity of the research institutions and clusters in acquiring Community support from the different funds (Jansen, 2016). Therefore, also no financial synergies are pro-actively planned from the side of the public administrative level. Synergies between funds are to be created through the strategic alignment of priorities within the RIS and Master Plans in Weser-Ems.

4. Successful Initiatives and Good Practices

This chapter highlights successful initiatives and good practices to promote research and innovation in bioeconomy-related fields.

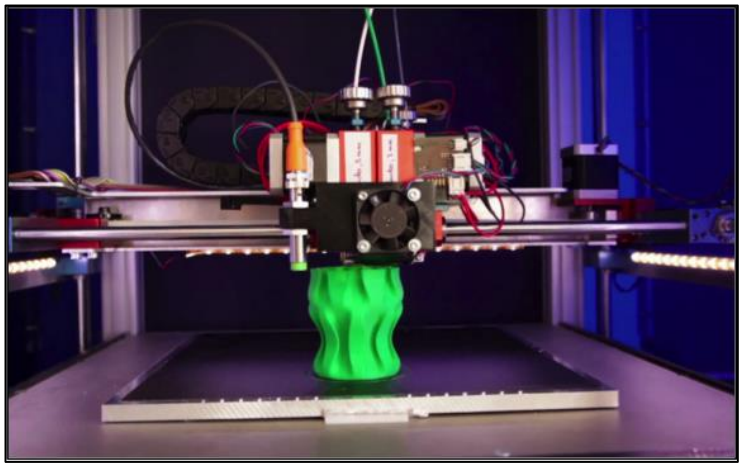
Research and innovation in the Bioeconomy in Weser-Ems can make use of a wide range of support types. Because of Bioeconomy being one of the main topics in Weser-Ems, the individual projects are so manifold that is becomes difficult to identify projects and initiative not having a Bioeconomy dimension. Therefore, the following selected examples do address structures that have a focus on research and innovation and knowledge transfer.

The following examples do only grasp very few aspects of the Bioeconomy in Weser-Ems. To understand the comparability to other European regions, policy makers need to become aware of the fact that these initiatives do represent only a small share of the economic sector and it's specialisation. Meaning that these research activities only exist because of the regions' specialisation in Bioeconomy of the primary producers and refiners as well as the fact that there's subsequently a strong local demand for the research activities. Research activities inside the Bioeconomy are the last step with an alignment towards the Bioeconomy.

4.1 Bioeconomy in the non-food sector

'Bioeconomy in the non-food sector' is a project under the umbrella of the INTERREG V A cooperation programme between Germany and the Netherlands[6]. With EUR 3,9 million Community support, it is additionally financed by public means from both partner countries. The project comprises four different thematic work packages about a) innovative products and materials, b) new green routes, c) bio-based products for residential construction and d) knowledge transfer about bioeconomy in the non-food sector. Within these four work packages, the project brings together 49 enterprises, organisations, competences and universities between 2015 to 2018. The key objective is to link research facilities with SMEs, which do not have the financial means to invest in research and innovation. Through this, the SMEs can make use of the research capacities and findings that

Figure 5 3D printing with bio-based materials



Source: https://goo.gl/jRgc95

[6] For further information, please see: http://www.bioeco-edr.eu/de/start? and http://www.stk.niedersachsen.de/download/106937/ Projektreportage_Bio-Oekonomie.pdf

would otherwise remain inaccessible.

Within the project, there are ten subprojects, for instance;

- Replacement of established building materials (i.e. insulation materials) with bio-based alternatives. The use of cork, grass, stone wool or seaweed could be alternatives for polystyrene whereas they're however not sufficiently researched yet. The project targets at researching their characteristics in order to introduce them on a broader field.
- Use of bio-based materials in 3D printing. Bio-based products can be used to craft 3D printed parts without the need to rely on fossil fuels. In terms of quality and structure, the 3D printed parts are similar to conventional plastics.

4.2 Competence Centre 3N – Netzwerk Nachwachsende Rohstoffe und Bioökonomie e.V.

The 3N network is an association that resulted from the RIS Competence Centre NaRo.Net between 2003 and 2006 and the Bioeconomy project BEN[7]. The former hosts were a combination of public and private actors in the field of Bioeconomy, from administration, research and implementation. In 2010, these organisations (*Land* Lower Saxony, district Emsland, chamber of agriculture Lower Saxony, University for applied sciences and art, University of Holdesheim/Holzminden/Göttingen, the Lower Saxon *Länder* Forestry, two bodies of the commune of Werlte) have allowed the competence centre to be transformed into a non-profit association. The network fosters an increase in development and use of renewable resources in substantial and energetic forms.

Figure 6 3N competence centre logo

Kompetenzzentrum
Niedersachsen · Netzwerk
Nachwachsende Rohstoffe e.V.
www.3-n.info

Source: http://3-n.info/

The competence centre has specialised in the research of four primary areas; new resources, substantial use of new resources, energetic use of new resources and Bioeconomy which are each split up in different thematic sub-areas. Currently, 32 enterprises are member of the self-sustaining 3N competence centre. It is one of the partners involved in the 'Bioeconomy in the non-food sector' project.

The competence centre provides access to research and innovation activities to enterprises, situated in Weser-Ems. The involved enterprises, which were initially not capable of supporting research activities can thus profit from the work of the competence centre. Additionally, because of the networking of shared interests, the partners do get an insight into so far unknown innovative potentials.

4.3 Lower Saxon Competence Centre for Food Industry

[7] For further information, please see: http://3-n.info/

The Lower Saxon Competence Centre for Food Industry ('Niedersächsisches Kompetenzzentrum Ernährungswirtschaft (NieKe)')[8] represents a cluster that bundles know-how and competences for all areas of agricultural and food industry. The competence centre is hosted through the University of Vechta in cooperation with the German Institute for Food Technology (DIL) in Quakenbrück. It's field of research to enhance agricultural and food industry applications lies among natural sciences and technologies. The promotion of research activities is a core task of NieKe. The cluster has introduced technology transfer offices at the DIL and the Institute for Structural Research and Planning in Extensively Used Agricutlural Areas ('Institut für Strukturforschung und Planung in Agrarischen Intensivgebieten (IPSA)') to support the technology transfer from research to application.

Figure 7 NieKe logo

Source: http://www.ernaehrungswirtschaft.de

The focus with these tasks lies at the support in applying for funding, networking of different types of actors, cooperation for cluster projects, individual consulting and initiation of collaborative projects. Therefore, the centre does not conduct active research in the Bioeconomy but brings together different research institutions within the region and addresses by this the dimension of improving the soft locational and framework conditions of a valorised innovative climate.

[8] For further information, please see: http://www.ernaehrungswirtschaft.de/de/ueber-uns/

5. Needs, Gaps and Bottlenecks to Deploy the Bioeconomy

This chapter describes the main needs of the area to further deploy the bioeconomy in the near future, as perceived by the regional stakeholders and in the revised documents. In particular, the gaps and bottlenecks that hamper the development of research and innovation for specific bioeconomy-related business areas are described.

The Bioeconomy in Weser-Ems is already very advanced in comparison to other regions. This has lead to the occasions where the specialisation has highlighted the limits of a further increase of primary production within the Bioeconomy. As such, the prices for arable land have increased significantly within Weser-Ems during the recent years (regio gmbh and Müller, 2015). Another issue is the increased nutrification of groundwater bodies because of fertilisation. The problems have in turn reinforced the innovative capacity of the sector in the past, as the need for alternatives was imminent.

Additionally, the gap between research and innovation producers and consumers is not yet sufficiently bridged. Between the developers and appliers of innovation often do occur differences in terms of how an innovation is to be applied. The RIS connects at this weakness by trying to formalise the transfer through transfer points and innovation dialogs.

Bioeconomy has proven to be rather dependent on global market developments. In case less agricultural products are consumed, produced or sold, the revenues and investments within the sector decrease. Subsequently also the investments in research and innovation decrease. Even though the economic structure in Weser-Ems is highly diversified, the initial focus on agriculture makes it vulnerable for global trends. On the other hand, this specialisation can be useful in light of recent political decisions, i.e. the ‘Energy Revolution’ (‘Energiewende’). The advantage in knowledge in Bioeconomy and renewable materials will prove as an asset in the near future.

One has to keep in mind that the development of the Bioeconomy to its current state was caused through a manifold of reasons, initiatives and low- and high-threshold (un-)intended synergies. It should be highly questioned whether an extrinsic strategy would have led to the similar result since policy blueprinting discounts local socio-economic structures. The main aspects were not the external stimuli but internal necessities to specialise in Bioeconomy. The low soil fertility and the relative disconnectedness of the region from the strong central European economic centres i.e. has not left any alternatives in some cases than to specialise and diversify in Bioeconomy. This has also supported a positive entrepreneurial environment in which stakeholders were less reluctant to take risks.

Bioeconomy avoids rural deprivation and migration of young people to urban centres since it provides jobs and perspectives. The acceptance of Bioeconomy in Weser-Ems of the population is therefore also an important aspect.

Steady structures in regards to support for SMEs and research institutions from the private sector, provided by the public sector are also important for the Bioeconomy. Sustainable specialisation can only be successfully achieved when support is not timely limited and research activities start to produce self-reinforcing advantages of agglomeration.

6. Information Sources

Literature and Documents:

Amt für regionale Landesentwicklung Weser-Ems, 2014. Regionale Handlungsstrategie Weser-Ems 2014-2020.

Eurostat, 2016a. GDP at regional level.

Eurostat, 2016b. Agriculture statistics at regional level.

Große-Kracht, I., 2016. Interview on "Smart specialisation Weser-Ems 2020" in the Bioeconomy Cluster.

Heuwinkel, D., Müller, H., 2015. Masterplan Bioökonomie 2020. Ergebnisse der Projektierungsphase "Wissensvernetzung Weser-Ems 2020" in dem Kompetenzfeld Bioökonomie/Agrarsystemtechnik.

Jansen, N., 2016. Interview on "Smart specialisation Weser-Ems 2020" in the Bioeconomy Cluster.

Joint INTERREG Secretariat, 2014. Kooperationsprogramm 2014-2020. INTERREG V A Deutschland-Nederland.

Niedersächsische Staatskanzlei, 2014a. Regional- und Strukturpolitik der EU im Zeitraum 2014-2020 – Niedersächsische regionale Innovationsstrategie für intelligente Spezialisierung (RIS3).

Niedersächsische Staatskanzlei, 2014b. Operationelles Programm EFRE und ESF 2014-2020 Niedersachsen.

regio gmbh, Müller, H., 2015. Bioökonomie in Weser-Ems. Struktur und Entwicklung der Landwirtschaft, des Ernährungsgewerbes und der Agrar- und Ernährungsgewerbetechnik.

Sickelmann, F.-J., 2016. Interview on "Smart specialisation Weser-Ems 2020" in the Bioeconomy Cluster.

Relevant websites:

http://www.weser-ems.eu/wissensregion/de/

http://www.projecten.bioeco-edr.eu/

Interviews and Contact details:

Name	Position	Institution/ Organisation	Phone	Email	Interview Date
Herr Ingo Große-Kracht	Member of the Referat für Strategische Planung, specialisation Bioökonomie	Referat für Strategische Planung	+ 49 (0) 541 501 3461	Ingo.Grosse-Kracht@lkos.de	16.11.2016
Herr Franz-Josef Sickelmann	Landesbeauftragter für regionale Landesentwicklung Weser-Ems	Amt für regionale Landesentwicklung Weser-Ems	+ 49 (0) 441 799 2359	Franz-Josef.Sickelmann@arl-we.niedersachsen.de	17.11.2016
Herr	Ansprechpartner	Amt für regionale	+ 49	Nikolaus.Jansen@arl-	17.11.201

Nikolaus Jansen	Amt für regionale Landesentwicklung Weser-Ems	Landesentwicklung Weser-Ems	(0) 441 799 2346	we.niedersachsen.de	6