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Cross-clustering partnership for boosting eco-innovation by developing a joint bio-based value-added network for the Danube Region

Framework Conditions for Cluster Development in bio-based industry in **the Region of Baden-Württemberg, Germany**

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Introduction

The term Bioeconomy will be seen in this project as "the knowledge based production and use of renewable resources to provide products, processes and services to all sectors of a future sustainable economy".
Therefore for a vital bioeconomy in a region it is important to have opportunities for a close cooperation between several, different and capable industrial branches in the region. Essential for a living Bioeconomy the following can be distinguished: agriculture and forestry, food industry, chemical industry, plastics and plastic processing industry, wood processing industry, construction industry, energy industry and machinery and plant engineering.
The situation of these industries in Baden-Württemberg will be shortly described in the following chapter.

Agriculture
The agricultural land surface area remained relatively constant in Baden-Württemberg over the years. The area covered 1.5 million hectare (ha) in 1979 and decreased to 1.4 million ha until 2014, mainly because of the reduction of permanent pasture. The number of companies is constantly declining but the remaining companies have a higher managed surface area. The average use of agricultural land by a company was 34 ha in 2013 and increased about 10 ha compared to 1999. The agricultural fields have a high demand for waste biomass nowadays; 396,000 t compost and 192,000 t digestates were used as fertilizer. The land use is diverse with a variety of plants and a declining livestock farming (cattle's, pigs, sheep's, solipeds are decreasing but goats and poultry are increasing). One third of the companies use renewable energy production on their properties. The overall public awareness for sustainability and ecological life-style fosters also the amount of organic farming (8%). Baden-Württemberg is ranked on 4th place in Germany regarding agricultural production value. However, agriculture, forestry and aquaculture play only a minor role in matters of the gross domestic product of Baden-Württemberg, with a decreasing tendency. The current contribution is only 0.4 % of overall 460 Billion Euro of GDP. This equals only the half of the economic contribution compared to 1991.[1]

Forestry
38% of Baden-Württemberg consists of forest land with about 1.4 million hectares (14,000km^2). About 24% of this forest land is owned by the land of Baden-Württemberg, 40% are owned by municipals and local authorities and about 36% are privately owned.[2]
11 million cubic metre of timber are cut every year. Main user of this timber is the sawmill industry (65%) followed by log trade (18%). 4 million of the 11 million cubic metre of timber are used for energetic use.[3]

Bioenergy
Bioenergy plays a key role in Baden-Württemberg and is already the 2nd most important economic pillar for farmers. Baden-Württemberg was the first German state to pass a law for renewable energy for heat utilization from bioenergy in the building sector in 2008 . As part of the long-term goal for the restructuring of the energy sector, the aim of the state government is to increase primary energy from renewables up to 80 % until 2050. From 2002 to 2012, the renewable energy share already increased from 3 % to 12 %, with the highest share in biogenic energy (8.6 %). In 2011, the Green-Red coalition set the mid-term goal to extend the power supply from renewable energy up to 38 % until 2020 with the focus on biogas and the mobilization of wood resources. This increase will result in electricity from bioenergy of about 4.7 billion kWh and heat from bioenergy of about 18.1 billion kWh (13.2 % of heat demand)[4]. In 2015, the gross energy consumption from biogenic sources was 5.65 % of net electricity consumption, 13 % of heat consumption and 4.8 % of fuel consumption.[5] In total, 8.2 % of the agricultural land is used for bioenergy. However, wood is also an important supplier for bioenergy. Several bioenergy regions and villages exist in Baden-Württemberg, contributing to the importance of use of biogenic sources and showing the possibility to be independent from fossil sources in the future.In Austria, a company has been established in Bruck an der

1) Betzholz, T., Büringer, H., Hartmann, A., Schmauz, S., Schmidt, K., Seitz, R., Thalheimer, F. & Weißenberger, D. (2014). Landwirtschaft und Umwelt in Baden-Württemberg. Reihe Statistische Analysen, 03/2014. Statistisches Landesamt Baden-Württemberg, Stuttgart.
2) https://mlr.baden-wuerttemberg.de/de/unsere-themen/wald/waldland-baden-wuerttemberg; status as of March 2017
3) Riedmann, M., Dispan, J., Held, C. & Lückge, F.J. (2010). Clusterstudie Forst und Holz Baden-Württemberg – Analyse der spezifischen Wettbewerbssituation des Clusters Forst und Holz und Ableitung von Handlungsempfehlungen. Ministerium für Ländlichen Raum und Verbraucherschutz Baden-Württemberg
4) Agentur für Erneuerbare Energien (2013). Potenzialatlas Bioenergie in den Bundesländern, Teilkapitel: Baden-Württemberg.
5) Ministerium für Umwelt, Klima und Energiewirtschaft, Baden-Württemberg. Erneuerbare Energie in Baden-Württemberg 2015. Referat 64 „Erneuerbare Energien"

Leitha for the industrial production of micro-algae, which is specialized in the development, construction and operation of industrial breeding systems ("hanging gardens" of ecoduna). 2017 will be expanded and a new plant will be opened at the existing site, in which not only algae biomass is produced for energy production, but also high-quality vegan oil.
In order to establish a future energy supply from microalgae and to exploit the great potential of the varied types of algae, a lot of R&D work is still necessary.

Bio-based industry key assets in Baden-Württemberg

The innovation index of Baden-Württemberg compared to the EU countries or regions is 69.5 % (rank 1), the level index 80.7 % (rank 1) and the dynamic index 36.0 % (rank 54).[6] Baden-Württemberg is quite successful in commercialisation of bio-based industry inventions, and has the highest number of overall patents per capita of the countries of the EU.[7]
Key assets of the bio-based industry in Baden-Württemberg are the well-established cluster landscape related to certain bio-based sectors and besides commonly used bio-based products such as food and feed, competitive high-tech products on the market. This well matured cluster landscape is a result of a long-term cluster policy in Baden-Württemberg, which is an essential part of its innovation policy and policy for small and medium sized businesses. Its goal is to improve the innovative capabilities of the companies in the region and thus to increase the competitiveness of the industry. Therefore, cluster policy systematically supports the establishment and development of clusters and cluster initiatives. Some of the bio-based clusters in Baden-Württemberg have significantly benefited from the cluster policy in the past. The initiatives also allow these important stakeholders for innovations, to maintain their positions at this hub where industry, research and politics come together. However, funding of clusters has always been understood as a seed funding to support cluster emergence and early stage growth. Consequently the proportion of public or private funding of cluster is comparably low. Thus, cluster initiatives in Baden-Württemberg are clearly less dependent on public funding than the cluster initiatives in Germany as a whole or in Europe. The mean value in Baden-Württemberg is approximately 38 %, whereas the peer Portfolios from Germany and Europe show higher values of over 45 %.[8] The cluster initiatives, also related to bio-based industries in Baden-Württemberg, are mainly financed by membership fees and fee-based services.

Stage of development

The overall cluster landscape in BW is not focusing on the new bio-based economy. Several clusters in the primary biomass sector for forestry and wood exist in the region but non for agriculture or fishery. The remaining clusters partially cover the bio-based economy but are not specifically focusing on the usage, refinery or final application of renewable biomass. However, strong clusters exist within which bio-based products are already used. These clusters with their associated partners would further benefit from an intensified bio-based approach: 5 biotechnology clusters, 2 energy clusters, 4 forestry and wood clusters, 2 clusters in the plastic sector, 1 cluster concerning paper industry, 1 cluster for textile and clothing, 5 environmental technology clusters, 3 packaging clusters, 1 new materials and surfaces cluster, 11 automotive clusters.
The research landscape in BW is working closely together with the above mentioned clusters and cluster initiatives. Researchers in Baden-Württemberg are investigating in such topics that are of key importance in the transition from a fossil-based to a bio-based economy. The University of Hohenheim carries out research into biomass production, biomass potentials, land use, land-use changes and many other aspects associated with bio-based raw materials. The Institute of Farm Management at the University of Hohenheim is mainly focusing on efficiency of land use, material flows and production systems in the agrarian sector. The Institute of Forest Utilisation and Work Science at the University of Freiburg is focusing on research to improve the industrial utilisation of forest wood products, including biomass quantities and resources as well as biomass quality. The Karlsruhe Institute of Technology (KIT) has developed a method known as “biomass steam processing” that enables the production of biochar from residual biomass.

6) http://www.statistik.baden-wuerttemberg.de/GesamtwBranchen/ForschEntwicklung/Innovation-I.jsp; Status as of March 2017
7) http://www.statistik.baden-wuerttemberg.de/Presse/Pressemitteilungen/2016358; status as of March 2017
8) Ministerium für Finanzen und Wirtschaft, Baden-Württemberg. Regionaler Cluster-Atlas Baden-Württemberg 2012

Cluster landscape in Baden-Württemberg related to bio-based industry

The ClusterAtlas Baden-Württemberg lists about 90 cluster initiatives and 30 state-wide networks9. 30 cluster categories can be distinguished in the different fields of industry. In total, 39 cluster initiatives are related to Bio-based industry. Following cluster initiatives are somewhat supporting the bio-based industry:

- AFBW
- Automotive-Initiative RheinMainNeckar
- Automotive-Initiative Ostwürttemberg
- Automotive. Engineering. Network Das Mobilitätscluster e.V. (AEN)
- AutomotiveDIALOG Wirtschaftsraum Heilbronn
- Automotive_NETZ
- Bioenergie-Region Hohenlohe-Odenwald-Tauber GmbH
- Biomastec: neue BiomasseEffizienz
- Be-engineers GbR
- Cluster Energie & Umwelt
- Cluster Green City Freiburg
- Cluster Verpackungstechnologie – International Packaging Institute (IPI)
- Clusterinitiative Clean Tech der Region Stuttgart
- Cluster Nutzfahrzeuge Schwaben e. V.
- Cluster Technische Textilien Neckar-Alb (techtex)
- Clusterinitiative Automotive Region Stuttgart (CARS)
- Commercial Vehicle Cluster – Nutzfahrzeuge GmbH
- ENERGETIKOM – Energiekompetenz und Ökodesign e. V.
- EnergieForum Karlsruhe
- Engineering – Life Sciences – Automation (ELSA)
- Focus.energie e.V.
- Fotec – Netzwerk Funktionale Oberflächen
- Holzkette Schwarzwald e. V.
- IHK-Chef Arbeitskreis "Druck, Verpackung, Medien"
- IHK-Netzwerk Automotive
- INNONET Kunststoff
- Innovations- und Effizienzcluster Klimapartner Oberrhein, INNOeff" KPO
- KITE hyLITE: Karlsruher Innovationscluster
- Kompetenznetz Medtech & Biotech
- Kompetenzzentrum Umwelttechnik – KURS e. V.
- KunststoffDIALOG Wirtschaftsraum Heilbronn
- Modell Hohenlohe – Netzwerk für betrieblichen Umweltschutz und nachhaltiges Wirtschaften e.V.
- Netzwerk Umwelttechnik & Ressourceneffizienz
- Packaging Excellence Region Stuttgart e.V.
- Packaging Valley Germany e.V.
- proHolz Schwarzwald
- Regioholz Nordschwarzwald
- TechnologyMountains e.V.
- Umweltkompetenzzentrum Rhein-Neckar e. V. (UKOM)

Following key assets can be found in Baden-Württemberg regarding the field of bio-based industry from existing cluster initiatives to funding:

Table 1: Key assets in Baden-Württemberg regarding the field of bio-based industry from existing cluster initiatives to funding

Key asset	Primary biomass sector	Food & Feed	Pulp & Paper	Bio Chemicals	Bio Polymers	Phyto-pharma	Textile & Clothing	Renewable Energy (biomass, biogas, biofuels)	Eco-Construction
Cluster organization	x		x		x		x	x	x
Enterprises	x	x	x	X	x	x	x	x	x
Policy makers									
Knowledge institutes	x	x	x	X	x	x	x	x	x
Biomass supply	x	x	x					x	x

Key asset	Primary biomass sector	Food & Feed	Pulp & Paper	Bio Chemicals	Bio Polymers	Phyto-pharma	Textile & Clothing	Renewable Energy (biomass, biogas, biofuels)	Eco-Construction
Competitive bio-based industry product on the market	x	x	x		x	x		x	x
Funding	X						x		
Policies, programs and regulations	X						x		

Regional strengths and opportunities

As the managed surface area is remaining relatively constant over more than 30 years, the potential for enlarging agricultural production land seems non-existent. However, new technologies and changing crops allowed an increase in arable production, from 4.7 million t to 5.3 million t (grain, maize, corn-cob mix, rape and beet, potato, sugar beets)1. Since no clusters exist, a better cooperation of the sector should be aspired. Also the changing consumption patterns and rising ecological awareness of the general public depict a chance to diversify production in terms of the interest of the end user or industry.
Strengths of the forestry landscape are high tech applications for forestry and the well-connected industry in general. The whole forestry sector had a business turnover of 3.5 % of total turnover of Baden-Württemberg. 4 out of 11 million cubic meter wood were used energetically, substituting 910 million L heating oil, thereby saving 2.5 Mio t CO2. Chances of the forestry sector are sustainable economy, side product usage as separate business model[9] and new applications of wooden biomass in construction, noting that already 1 out of 4 houses are made of wood in Baden-Württemberg[10]. For pulp and paper, general economic upswing enhances the industry. Bio-based refineries do not exist in Baden-Württemberg on an industrial scale.

Bio-based value creation from primary biomass:
The Phytopharma sector in Baden-Württemberg plays an increasing role. Germany, and mainly Baden-Württemberg, is covering 50 % of the European market. 50 % to 60 % of the entrepreneurial activities in Germany concentrate in Baden-Württemberg. The overall market volume is about 4 Billion EURO annually and the trend continues upwards. The companies in Baden Württemberg focus on high quality medicines and natural cosmetics.[11]

Bio-based application:
In Baden-Württemberg, there are quite significant numbers of cluster initiatives and enterprises that are making direct use of bio-based application. Bio-based textile & clothing is already in the scope of interest in Baden-Württemberg. Several events for cooperation and information have already taken place. 100 % bio-based sustainable and fair trade clothes are on the market but are still niche products. Bio-based textiles are entering significant application fields and especially in the high-tech automotive sectors, bio-based solutions have entered the market (distance-sensors, car interiors, engine covers and exhaust manifold).
Packaging cluster initiatives are also key drivers for making better use of bio-based polymers for specific packaging applications. Packaging Valley is a good example since it represents a significant number of companies dealing with bio-based packaging materials.
The comparable broad variety of bio-polymer-based products is furthermore enabled by a strong competence in manufacturing. E.g. INNONET bundles core competences of SMEs specialized in manufacturing bio-based polymers
Bio-based polymers are used in Baden-Württemberg for the application in several sectors, but the major production of bio-based chemicals and polymers is located in other regions of Germany. Regarding the strong industry in Baden-Württemberg on the application side, purchase of bio-based chemical building blocks from other regions must be considered as a significant bottleneck. Summarizing, Baden-Württemberg well covers significant parts at the end of the value chains that is manufacturing products for the market.

9) Riedmann, M., Dispan, J., Held, C. & Lückge, F.J. (2010). Clusterstudie Forst und Holz Baden-Württemberg – Analyse der spezifischen Wettbewerbssituation des Clusters Forst und Holz und Ableitung von Handlungsempfehlungen. Ministerium für Ländlichen Raum und Verbraucherschutz Baden-Württemberg.
10) www.forstwirtschaft-in-deutschland.de/forstwirtschaft/produkte-leistungen/holz/; status as of March 2017.
11) https://www.hs-rottenburg.net/aktuelles/aktuelle-meldungen/detail/artikel/wildpflanzen-und-ihre-bedeutung-fuer-die-phytopharma-und-die-naturkosmetik-industrie/; status as of April 2017

Human resource

In 2014 (latest available data), Baden-Württemberg had 10.6 million inhabitants, of which 54% can be counted to the labour force (5.8 million). Of these 5.8 million, 96.9 % have been employed.
Educational attainment in 2014:

Graduation
45.8 % with secondary school certificate, 23.3 % with intermediate school-leaving certificate, 22.4 % with general qualification for university entrance, 8.5 % still under education or without certificate.

Professional
46.7 % with apprenticeship training, 9.6 % with a master craftsman training/technician, 15.9 % with a university degree, 28.7 % without professional training.

In 2015/16: Relating to all of the 75 universities in Baden-Württemberg, 47 universities were affiliated to Applied Sciences. The faculty of Mathematics and Science had 33,263 students while agricultural, forestry, nutrition and veterinary medicine had 6,635 students and engineering had 96,042 students.

2017: There are 356,700 students at universities in Baden-Württemberg of whom 47,600 are non-German students. 28 % of the inhabitants of Baden-Württemberg have a migrant background (direct or indirect). In general, migrants have a younger age structure and thus higher economic and educational potential.[12]
Baden-Württemberg has a high potential for well-trained personnel with a good scientific infrastructure for bio-based industry. Considering higher education and employment, 156 Biotech companies that research, develop, produce and offer services employed 18,680 persons with taxable revenue of 5.03 billion Euros in 2014.[13] Several universities have dedicated Master programs for Bioeconomy (Hohenheim) or offer special courses, preparing the highly educated workforce for the bio-based industry.
Vast areas of Baden-Württemberg are covered with agricultural, horticultural or forestry land. Yet, the main employer is the industry sector with 1.2 million employees[14] and a turnover of 165.7 billion Euros in 2015.[15] The industry sector without construction accounted for a gross domestic product of 35.5 % and the biomass (agriculture, forestry, and fishery) sector for only 0.4 % of BW.[16] A further indicator of the industrial strength of BW is the implementation of the sustainability concept in bringing several products to market maturity, e. g. partly bio-based dowels; engine hood covers in the automotive sector and know-how in production of bio-based polymer compounds based on lignin. BW is a location of high tech industry and drop in solutions for bio-based material. Moreover, tailor made systems can be implemented in the region.

12) http://www.statistik.baden-wuerttemberg.de/; status as of March 2017
13) BIOPRO Baden-Württemberg GmbH (2016). Biotech Guide Baden-Württemberg – Biotech Companies in the South-West of Germany.
14) http://www.statistik.baden-wuerttemberg.de/Industrie/Struktur/kenngrWZ2008.jsp; status as of March 2017
15) http://www.statistik.baden-wuerttemberg.de/Presse/Pressemitteilungen/2016078; status as of March 2017
16) Ministerium für Wirtschaft, Arbeit und Wohnungsbau, Baden-Württemberg. Wirtschaftsdaten Baden-Württemberg 2016. Statistisches Landesamt Baden-Württemberg, Stuttgart.

Table 2: Land use, Biomass availability, Innovation and Industry size in Baden-Württemberg (2010 & 2014/2015)

Criteria	Indicator	Region	
		2010	2014/2015
Land use	Forestry land (% of total land area) (2015)	38.2	38.2
	Agricultural & horticultural land (% of total land area) (2015)	39.4	39.8
Biomass availability	Agricultural biomass production (only plants) (kg/capita] (2015)	961.8*	984.8*
	Blue biomass production (kg/capita) (2015)	na	0.2
	Forestry biomass production (fm/capita) (2015)	0.7	0.8
	Waste production (kg/capita) (2015)	40.9	44.7
	*excluding vegetables, strawberry and bush berries		
Innovation	SME birth rate (% of total firms in region)	na	na
	R&D expenditure (index (EU = 1))	na	na
	R&D employment (% of total employment in region) 2010: 1178/2014: 16312	0.44	0.61
	Total Employment & Firms 2010: 3,720,684 & 484,671		
	Total Employment & Firms 2014: 4,102,906 & 498,414		
Industry size	Firms in total suitable for bio-based industry sectors (% of total firms in region) (sum of the list below) (2014)	11.62	na
	Employment in total in firms with potential in bio-based industry sectors (% of total employment in region) (sum of the list below)	10.43	na
	Firms in primary biomass sector (% of total firms in region) 2010: 47863	9.87	na
	Employment in primary biomass sector (% of total employment in region) 2010: 190100, without forestry	5.11	na
	Firms in food & feed sector (% of total firms in region) 2010: 5693/2014: 5032	1.17	1.01
	Employment in food & feed sector (% of total employment in region) 2010: 78594/2014: 80592	2.11	1.96
	Firms in paper & pulp sector (% of total firms in region) 2011: 357/2014: 332	0.07	0.07
	Employment in paper & pulp sector (% of total employment in region) 2011: 29107/2014: 28215	0.78	0.69
	Firms in Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials sector (% of total firms in region) 2010: 2954/2014: 2788	0.61	0.56
	Employment in Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials sector (% of total employment in region) 2010: 20684/2014: 20521	0.56	0.50
	Firms in chemicals sector (% of total firms in region) 2010: 595/2014: 585	0.12	0.12
	Employment in chemical sector (% of total employment in region) 2010: 28395/2014: 29641	0.76	0.72
	Firms in pharma sector (% of total firms in region) 2010: 136/2014: 126	0.03	0.03
	Employment in pharma sector (% of total employment in region) 2010: 26267/2014: 26874	0.71	0.65
	Firms in textile sector (% of total firms in region) 2010: 1692/2014: 1575	0.35	0.32
	Employment in textile sector (% of total employment in region) 2010: 24447 /2014: 24896	0.66	0.61
	Firms in bio-energy sector (% of total firms in region)	na	na
	Employment in bio-energy sector (% of total employment in region)	2011: 0,3[4]	na

Source: [17] all data listed in the table above were obtained from reference 17, except for "Employment in bio-energy sector", reference 4

17) © Statistisches Landesamt Baden-Württemberg, Stuttgart, 2017.

Regional bio-based industry strategy for Baden-Württemberg

Baden-Württemberg has a dedicated research strategy focusing on bio-based industry (Bioökonomie im System aufstellen)[18], lasting from 2014 – 2019 with a budget of 12 million Euro. Core of the strategy are circular value chains and a holistic systematic approach. The strategy is based on three pillars, biogas, lignocellulose and microalgae for an energetic and material use.
The Smart Specialisation Strategy for BW is only partially regarding the bio-based industry and covers the fields of Biotechnology; Environmental technologies, renewable energies & resource efficiency.

Effects/Impact

The bioeconomy is a leading topic and a research focus in Baden-Wurttemberg. It combines complex agricultural science, natural sciences and economic and social sciences in a complex way. The aim of bioeconomy is to secure global nutrition, to make agricultural production sustainable, to produce healthy and safe foods, to use sustainable raw materials industrially and to expand biomass. Thus, the bioeconomy is a central concern of politics and society and takes equal account of ecological, economic and social interests.
The particular challenge will be to intensify the use of the clusters' application strength, in particular their skills in the industrial implementation of R & D results with respect to bioeconomy.
The challenges to be mastered during this process include:

- Ensuring a solid and safe raw material base through agricultural and forestry production or waste management
- Conversion of bio-based raw materials with so-called conversion processes into hydrocarbons or similar precursors to enable good further processing in a wide range of value chains
- Ensuring the sustainability of developments
- Transfer of R & D results into economic success, measurable in workplaces, facilities, services and export goods.
- The task and the claim of the involved clusters is to coordinate, implement and further promote this interdisciplinary topic in Baden-Württemberg, for which BW offers the best prerequisites regarding research, manufacturing and above all, application.

Cluster organisations are facing significant budget cuts that shift their activities on quick successes, which are often outside the bio-based industry sector. R&D actors that might benefit from the BW research strategy are often badly connected to the industrial sector. Thus the challenges can be summarized like this:

Better framework conditions for cluster development
The special research strategy focusing on bio-based industry is not properly aligned with cluster development. Consequently, the framework conditions for cluster development in bio-based industries in Baden-Württemberg are limited. Key drivers are the industry, mainly those from the application areas. Although there is a significant interest of them to become more active in bio-based industry, appropriate incentives are missing. Thus, cluster initiatives play a crucial role regarding the issue to facilitate bio-based innovation and lower the reluctance of the industry. Cluster managements are often not aware of the benefits of bio-based products arising for their industrial members.

Strengthening supply chain
Cross-regional cooperation is also crucial, since Baden-Württemberg adequately covers the end of the bio-based value chain, but not the beginning. Key success factors to motivate more enterprises to deal with bio-based products are ensuring a reliable supply of bio-based raw materials with sufficient quality. Thus, cross-sectoral/cross-regional cooperation should focus on an improved supply chain.

Better align with policies on federal level
The German government still invests in bio-based innovation on federal level. However, there is a lack of alignment and synchronization between regional and federal policy that would support cluster development in bioeconomy. Regions, like Bavaria or Saxony are good examples on how cluster development in the field of bio-based industry can be assured much well due to an excellent alignment between the regions and the federal state.
The main role of cluster organisations to promote bio-based innovations can be seen to better inform and motivate the related industry to deal with bio-based innovations:

18) Ministerium für Wissenschaft, Forschung und Kunst, Baden-Württemberg. Bioökonomie im System aufstellen 2013.

- Completing value and supply chains - many enterprises in Baden-Württemberg are reluctant since the bio-based value and supply chains are not as well developed as traditional ones. Enterprises are also reluctant to communicate with "new actors". The concern of insufficient supply and quality of bio-based products are often used arguments, not to engage in bio-based industry. Completed value and supply chains would help to reduce this reluctance.
- Creating platforms and other (network) approaches to bring actors along the value chain together
- Moderate processes that help industry to successfully deal with bio-based innovations

Bio-based innovations are risky and often not understood as competitive advantage. Cluster managements can better moderate the process by showing the added value and helping companies to become engaged.

Annex

Definitions/Glossary

Clusters: Clusters are generally described as groups of specialised enterprises, often SMEs, and other supporting actors in a particular location that cooperate closely together.

Cluster initiatives: A cluster initiative is an organised effort aiming at fostering the development of the cluster either by strengthening the potential of cluster actors or shaping relationships between them. They often have a character like a regional network. Cluster initiatives usually managed by a cluster organisations.

Cluster organisations: Cluster organisations are entities that support the strengthening of collaboration, networking and learning in innovation clusters and act as innovation support providers by providing or channelling specialised and customised business support services to stimulate innovation activities, especially in SMEs. They are usually the actors that facilitate strategic partnering across clusters. Cluster organisations are also called cluster managements.

Cluster participants: Cluster participants are representatives industry, academia or other intermediaries, which are commonly engaged in a cluster initiative. Given the case a cluster initiative has a certain legal form, like associations, cluster participants are often called cluster members.

Cluster policy: Cluster policy is an expression of political commitment, composed of a set of specific government policy interventions that aim to strengthen existing clusters and/or facilitate the emergence of new ones. Cluster policy is to be seen as a framework policy that opens the way for the bottom-up dynamics seen in clusters and cluster initiatives. This differs from the approach taken by traditional industrial policies which try (and most often fail) to create or back winners.

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