



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

## Task 3

### Case Study Report [GALICIA]

Contract: RTD/F1/PP-03681-2015

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INFYDE, SL



## 1. Short Regional Bioeconomy Profile

<b>Name of the case region/country</b>	GALICIA
<b>Member State</b>	SPAIN
<b>GDP – Euro per capita (2014)*</b>	19 700
<b>Total ESIF Research &amp; Innovation per capita per year*</b>	17,64
<b>Total H2020 per capita per year*</b>	5,87
<b>Value Chain Approach to the Bioeconomy**</b>	Biomass supply and Waste, Biomass processing and conversion, Bio-based products, Bio-energy and fuel from biomass, Animal-based primary production, Marine-based primary production, Forest-based primary production,
<b>Thematic Focus of the Bioeconomy Approach**</b>	Bio-based Fuel and Energy, Other bio-based Industries, Marine resources, Marine-based biomass, Wood-based biomass, Fisheries and aquaculture, Hydric Resources,
<b>Research and Innovation Fields highlighted for the Bioeconomy**</b>	Biology, Biotechnology, Chemistry, Life Sciences, Nano Technologies, Logistics and Packaging, Processing, Water and Natural Resources Management, Marine sciences, Nano Technologies, New Materials, Biology, Biotechnology, Chemistry, Life Sciences,
<b>Bioeconomy Activity Level**</b>	Middle
<b>CASE STUDY SUMMARY</b>	
<b>Bioeconomy Approach</b>	Agri-food, forestry, biomass, marine energy and resources, fisheries and aquaculture.
<b>Bioeconomy Ecosystem</b>	Galician Innovation Agency; Campus do Mar; Institute of Agrobiological Research; CIAM; UIMA; Compostela University; IBADE, Energylab; University of Vigo; IGAPE, Galicia Aquaculture Cluster; Food Cluster; Wood Cluster; Ministry of Rural Environment and Sea; Regional Ministry of Economy and Industry
<b>Bioeconomy Policy Support</b>	I2C Plan (GALICIAN RESEARCH, INNOVATION AND GROWTH PLAN 2011–2015); Smart Specialisation Strategy of Galicia RIS3; Cross-Border Smart Specialisation Strategy of Galicia– Northern Portugal (RIS3T)
<b>Successful initiatives and Good Practices</b>	<ul style="list-style-type: none"> <li>– The Vanguard Initiative on Bioeconomy;</li> <li>– Cross-Border Smart Specialisation Strategy of Galicia– Northern Portugal (RIS3T);</li> <li>– TREE4FUTURE;</li> <li>– CELTALGA Extract;</li> </ul>
<b>Main Needs, Gaps and Bottlenecks</b>	Interregional collaboration – Galicia and Northern

	Portugal; new bio-based value chains; Hybridisation; Modernisation of traditional business activities; Eccoinnovation, research focused on bioeconomy.
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\* Source of the data: S3 – Regional Viewer: <http://s3platform.jrc.ec.europa.eu/synergies-tool>

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

## 2. Regional Bioeconomy Ecosystem

### 2.1 Origin of Interest of the region in the Bioeconomy

According to the “Regional Innovation Scoreboard 2016” the Galicia Region is a moderate innovator. However, the region is being intensively involved in cooperation with Northern Portugal in the framework of the RIS3T and some joint networks on bioeconomy related sectors such as agriculture, biodiversity, forestry and healthy foods has been created<sup>1</sup>.

The origin and the interest of the region in the Bioeconomy is first of all based on its natural potential. The agroforestry system is very important both for Galicia and Spain. For this reason, Galicia is leader in this sector. In addition, the fishing sector, although produces a small percentage of added value for the Region, it however accounts a few more than half of total employment in the Spanish fishing and 10% of the EU<sup>2</sup>. No ultimately, Galicia is leader in cattle breeding for meat and milk<sup>3</sup>.

An interviewee stated that “Galicia has a strong potential for technological specialization and this potential is applied to the rural and marine environment as well as to biofuels sector”.

In terms of trends in bioeconomy in the region, based on the desk study and according to the information provided during the interview, in the Galician region, the bioeconomy is perhaps implicitly reflected in the strategic documents. Precisely, “bioeconomy does not have a specific element within the smart specialization plan, but it is a priority area of all RIS3 instruments, where all the Galician R&D&I entities participate. In addition, all the working groups elaborate their plans taking into account the elements of the bioeconomy. This includes models for natural resource management, management and valorization of the primary sectors.”<sup>4</sup>

Obviously, the Galicia Region has a quite strong interest for **diversification and the development of bio-based products**. The bioeconomy perception in Galicia is also related to the “blue economy concept” and one concrete just recent example of “extracting value from the blue economy” is the *Celtalga Extract Project*<sup>5</sup>. In addition, in the region there are important stakeholders with an extensive experience in regional assets valorization as potential for the bioeconomy development. Among them are: ANFACO CECOPECA, IGAPE and GAIN (Galician Agency for Innovation).

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<sup>1</sup> Information gathered during the interview with GAIN.

<sup>2</sup> RIS3 Galicia according to data offered by Ministry of Rural Environment and Sea. p 70

<sup>3</sup> Information gathered during the interview with GAIN.

<sup>4</sup> Considers GAIN

<sup>5</sup>[http://www.usc.es/export9/sites/webinstitucional/gl/investigacion/avte/descargas/Fichas\\_spin\\_off/Celtalga.pdf](http://www.usc.es/export9/sites/webinstitucional/gl/investigacion/avte/descargas/Fichas_spin_off/Celtalga.pdf)

According to RIS3T in Galicia in terms of technological specialisation, the areas with highest weight are rural environment, marine environment, food and biotechnology (transversal)<sup>6</sup>.

## 2.2 Bioeconomy Stakeholders

There is wide variety of bioeconomy-related stakeholders, due to the important role of primary activities in the Galician economy. Research and innovation in agriculture, forestry, fisheries and aquaculture is not new to Galicia or its Universities. To boost the Galician bioeconomy and the R&I in bioeconomy in Galicia Region, following bioeconomy stakeholders are considered as relevant:

Innovation Agencies, Technology and Research Centers, Institutes	
Galician Innovation Agency (GAIN) <a href="http://gain.xunta.es/">http://gain.xunta.es/</a>	In 2014 elaborated the Smart Specialisation Strategy for Galicia (RIS3) and 3 main challenges for Galicia were set up: <ul style="list-style-type: none"> <li>- Innovative management of natural and cultural resources;</li> <li>- Galicia industrial model for the future;</li> <li>- Healthy lifestyle based on active ageing.</li> </ul>
Galician Technology Institute (ITG) <a href="http://www.itg.es">http://www.itg.es</a>	Participation in European projects and consortia of R+D+I; Improving the competitiveness of local businesses as well as R&I in the companies; facilitate the access to technologies, etc
Campus do Mar <a href="http://campusdomar.es/es">http://campusdomar.es/es</a>	The campus is structured in the <b>four areas</b> : <ul style="list-style-type: none"> <li>• Ocean observation and global change</li> <li>• Sustainable use of marine resources</li> <li>• Integral management of the coastal zone</li> <li>• Competitiveness: technological progress and business management</li> </ul> And <b>3 emerging lines</b> : <ul style="list-style-type: none"> <li>• Modelling of complex systems</li> <li>• Omic technologies applied to the marine environment, and</li> <li>• Marine energy</li> </ul>
Institute of Agrobiological Research <a href="http://www.iiag.csic.es/">http://www.iiag.csic.es/</a>	Scientific and technical research in the agro-forestry area
Mabegondo Agricultural Research Center (CIAM) <a href="http://ciam.gal/sp/index/?r=portada.index">http://ciam.gal/sp/index/?r=portada.index</a>	“Basic and applied research in targeted research programs of preferential resources and agro technologies”.
University Institute of Environment. IUMA <a href="http://www.udc.es/iuma/">http://www.udc.es/iuma/</a>	Research lines: Air quality; Water quality; Soil quality; Waste; Environmental Law; Environmental economics
Compostela University <a href="http://www.usc.es/">http://www.usc.es/</a>	The university has several institutes and research center, but R&I in bioeconomy related could be considered Instituto de Biodiversidade Agraria e Desenvolvimento Rural (IBADER); Instituto de Investigación e Análises Alimentarias
Institute of Agricultural Biodiversity	R&d&I lines:

<sup>6</sup> Cross-border Smart Specialisation Strategy of Galicia- Northern Portugal (RIS3T). p. 48

<p>and Rural Development (IBADER)  <a href="http://www.ibader.gal/esp/seccion/1/2/Que-es-el-IBADER.html">http://www.ibader.gal/esp/seccion/1/2/Que-es-el-IBADER.html</a></p>	<ul style="list-style-type: none"> <li>• Conservation and improvement of traditional agricultural production</li> <li>• Typology and characterization of the components of biodiversity in rural areas</li> <li>• Plant Health</li> <li>• Management and use of silvopastoral systems</li> <li>• Soil fertility. Macro and micronutrient cycles.</li> <li>• Soil contamination and waste management</li> <li>• Management of water resources in rural areas.</li> <li>• Production systems and meat quality</li> <li>• Genetic improvement and analysis of the genetic heritage of native breeds.</li> <li>• Animal health.</li> <li>• Engineering and Technology of rural production systems.</li> <li>• Effects of agricultural activity on biodiversity.</li> <li>• Development of commercial strategies for the promotion of agro-food products and rural services.</li> <li>• Structure of the rural territory.</li> </ul>
<p>The Timber Technological Innovation and Services Centre  <a href="http://www.cismadeira.com/ingles/inicial.php">http://www.cismadeira.com/ingles/inicial.php</a></p>	<p>Located in Tecnópolis (Parque Tecnológico de Galicia) has the following areas of activity:</p> <ul style="list-style-type: none"> <li>• Applied research projects.</li> <li>• Technology transfer.</li> <li>• Promotion and diffusion of the use of timber in its diverse applications.</li> <li>• Giving training in areas related to timber technology.</li> <li>• Technical services.</li> </ul>
<p>Tecnology Center for Energy Efficiency and Sustainability (EnergyLab)  <a href="http://www.energylab.es/esp/energylab_mision_y_vision.asp">http://www.energylab.es/esp/energylab_mision_y_vision.asp</a></p>	<p>Projects related to alternative energies (“Demonstrative Project to install a Biogas Pilot Plant in a Bovine Livestock Farm”).</p>
<p>Biological Mission of Galicia  <a href="http://www.mbg.csic.es/inicio">http://www.mbg.csic.es/inicio</a></p>	<p>Objective: “Develop genetic material with lower fertilization and irrigation needs, tolerant to biotic and abiotic stresses and higher quality”  14 staff scientists and 8 postdocs</p>
<p>University of Vigo  <a href="http://www.uvigo.gal/uvigo_es/investigacion/">http://www.uvigo.gal/uvigo_es/investigacion/</a></p>	<p><b>Support Centres:</b></p> <ul style="list-style-type: none"> <li>• Scientific and Technological Assistance Research Centre (CACTI)  (<a href="http://cactiweb.webs.uvigo.es/joomla/index.php">http://cactiweb.webs.uvigo.es/joomla/index.php</a>)</li> <li>• Toralla Marine Science Station (ECIMAT)  ((<a href="http://ecimat.uvigo.es/gl/">http://ecimat.uvigo.es/gl/</a>))</li> <li>• Research, Transfer and Innovation Centre (CITI)  (<a href="http://www.citi.uvigo.es/">http://www.citi.uvigo.es/</a>)</li> <li>• Technological- Industrial Research Centre (MTI)</li> <li>• Biomedical Research Centre (CINBIO)  (<a href="http://www.cinbio.es/">http://www.cinbio.es/</a>)</li> </ul> <p><b>Strategic groupings;</b></p> <ul style="list-style-type: none"> <li>• AEO-ECIMAT Strategic Grouping in Oceanography- ECIMAT (<a href="http://ecimat.uvigo.es/gl/">http://ecimat.uvigo.es/gl/</a>)</li> <li>• AtlantTIC (initially called ACETIC)  (<a href="http://atlanttictic.uvigo.es/">http://atlanttictic.uvigo.es/</a>)</li> <li>• CIA Agro-environmental and Food Research Centre  (<a href="http://www.cia3.es/">http://www.cia3.es/</a>)</li> </ul>

	<ul style="list-style-type: none"> <li>• ECOBAS Economics and Business Administration for Society (<a href="http://ecobas.webs.uvigo.es/">http://ecobas.webs.uvigo.es/</a>)</li> <li>• INBIOMED (<a href="http://inbiomed.webs.uvigo.es/">http://inbiomed.webs.uvigo.es/</a>)</li> </ul>
<b>Galician clusters</b>	
Clusters Galicia <a href="http://clustersgalicia.com/about-us/?lang=en">http://clustersgalicia.com/about-us/?lang=en</a>	<p><b>Objective:</b> Competitiveness, cooperation, innovative projects and internationalisation.</p> <p><b>10 Clusters:</b> Automotive; Wood; ICT; Aquaculture; Audio-visual; Naval; Food; Granite; Textile and Graphics</p>
Food Cluster of Galicia <a href="http://www.clusteralimentariodegalicia.org/">http://www.clusteralimentariodegalicia.org/</a>	<p><b>Partner:</b></p> <ul style="list-style-type: none"> <li>• Food Technology Centre of Lugo (CETAL), MeatTechnology Centre Meat (CTC) Center for Conservation of Fisheries Products (CECOPESCA).</li> <li>• Innovation centers and Food R&amp;D&amp;i of the three Galician universities.</li> </ul>
Galicia Aquaculture Cluster <a href="http://www.cetga.org/es/area_corporativa/area_corporativa.php">http://www.cetga.org/es/area_corporativa/area_corporativa.php</a>	Galician Technology Center of Aquaculture (Centro Tecnológico Gallego de Acuicultura (CETGA)) depends on the Aquaculture cluster. Is considered as model of other national and european clusters.
Wood Cluster <a href="http://clustermadeira.com/?lang=en">http://clustermadeira.com/?lang=en</a>	“Gold Label” European cluster.
IGAPE (Instituto Galego de Promoción Económica) <a href="http://www.igape.es/es/que-e-o-igape">http://www.igape.es/es/que-e-o-igape</a>	Objectives: New businesses creation, internationalisation, competitiveness of local companies, attract investment to Galicia, support for collective enterprise projects
<b>Public Entities</b>	
Ministry of Rural Environment and Sea (Consellería do Medio Rural e do Mar) <a href="http://mediorural.xunta.gal/es/">http://mediorural.xunta.gal/es/</a>	
Regional Ministry of Economy and Industry (Consellería de Economía e Industria, Xunta de Galicia) <a href="http://ceei.xunta.gal/portada">http://ceei.xunta.gal/portada</a>	

Source: The information provided for each of stakeholders is retrieved from their web-sites

### 2.3 Bioeconomy – strategies, plans and projects

Before listing bioeconomy related strategies, plans and projects, it is important to mention that in Galicia as in the majority of the Spanish Regions (except Castilla la Mancha that has already officially published a Bioeconomy Strategy), in their RIS3 or other supporting and strategic documents, the bioeconomy is implicitly reflected.

1. **RIS3 Galicia** identifies 30 potential niches and among them (as bioeconomy related) are Food, Agriculture, Fisheries and Biotechnology and Energy, Environment and Services; 3 challenges and the first one responds to the bioeconomy needs and trends: “*Innovative management of natural and cultural resources*” including 5 priorities (1) Valuation of maritime resources, (2) Modernisation of aquaculture, (3) Modernisation of the agricultural and livestock, fishing and forest sectors, (4) Improvements in obtaining energy



from natural resources, and (5) Modernisation of the tourism sector and the cultural industries by means of ICT<sup>7</sup>.

2. **I2C Plan (Galician Research, Innovation and Growth Plan 2011–2015)** defines 5 challenges related to recruitment, training, innovation, business growth, new competitive model and reference research; and 10 strategic axes from which the *8<sup>th</sup> Strategic axis: Sector Programs* (11 thematic areas and among them Food, Agriculture, Fisheries and Biotechnology and Energy and Environment) is implicitly bioeconomy related.
3. **Galician network of clusters.** Among bioeconomy related: *INNOTEC Strategy Plan 2016–2019* (Wood Cluster); *The Strategic Plan of the Galician Food Cluster 2016–2020* (Food Cluster) and actions of vertical and horizontal character (among the last one are technology monitoring and specialized training in aquaculture, etc.)
4. **Rural Development Programme of Galicia 2014–2020** defines 6 priorities (1) Knowledge transfer and innovation in agriculture, forestry and rural areas; (2) Competitiveness of agri sector and sustainable forestry; (3) Food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management in agriculture; (4) Restoring, preserving and enhancing ecosystems related to agriculture and forestry; (5) Resource efficiency and climate; (6) Social inclusion and local development in rural areas; and funds actions in priority sectors like agriculture and forestry<sup>8</sup>.
5. **Cross–Border Smart Specialisation Strategy of Galicia– Northern Portugal (RIS3T)** establish strategic collaboration bioeconomy related areas such as Biomass and marine energies and resources and agri–food and agri–environmental systems<sup>9</sup>.
6. **Galicia–Industria 4.0 Competitiveness Agenda** aims the sectoral hybridisation. The sectorial agenda focus on strategic sectors (among bioeconomy related are Agrifood products, Sea and aquaculture, Renewable energy, Wood / Forestry, Naval/Maritime industry, Natural stone), on emerging and of high potential (bioeconomy related are biotechnology and ecoindustry) and on support of the new industry (such as enabling technologies)<sup>10</sup>.

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<sup>7</sup> Smart Specialisation Strategy of Galicia RIS3 2014–2020

<sup>8</sup> European Commission. "Factsheet on 2014–2020 Rural Development Programme Galicia" [http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet-galicia\\_en.pdf](http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet-galicia_en.pdf)

<sup>9</sup> Cross–border Smart Specialisation Strategy of Galicia– Northern Portugal (RIS3T). p 69

<sup>10</sup> Galicia–Industria 4.0 Competitiveness Agenda, p. 23

### 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

Among main actors in supporting innovation are the Galician universities, research centers and institutes. Further are presented some of them and their research lines<sup>11</sup>:

- GAIN
- Institute of Agrobiological Research;
- Mabegondo Agricultural Research Center (CIAM)
- University Institute of Environment. IUMA
- Institute of Agricultural Biodiversity and Rural Development (IBADER)
- The Timber Technological Innovation and Services Centre
- Biological Mission of Galicia
- University of Vigo
- Food cluster
- Wood Cluster
- Aquaculture Cluster

As mentioned above, the documents that frame the support to innovation and research in Bioeconomy related areas (implicitly) are:

- **I2C Plan (GALICIAN RESEARCH, INNOVATION AND GROWTH PLAN 2011–2015), Strategic Axes 3:** Integrated Research Support with 8 action lines (among them *3.1 Mechanisms to support the management of R&D*; *3.3 Infrastructure of support for R&D*; and *3.7 Support to the development of Technology Platforms*);
- **RIS3 Galicia** identifies R&D relevant agents for the *Challenge 1. Innovative management of natural and cultural resources* concentrated into 3 subsystems: (1) Knowledge generation and diffusion subsystem (Campus of the Sea) – 5 universities, technology and innovation centers and support agentes/structures; (2) Application and exploitation subsystem: important companies and innovative SMEs; (3) Regional Policy Subsystem.
- **Cross-Border Smart Specialisation Strategy of Galicia– Northern Portugal (RIS3T)**, reveals that in terms of technological specialisation, the areas with

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<sup>11</sup> See above table about Bioeconomy stakeholders

highest weight are rural environment, marine environment, food and biotechnology (transversaly); in terms of production specialisation there were identified 7 areas of specialisation and among them Primary sectors: agriculture, livestock farming, forestry, wood sector, and fishing (relative specialisation) and in terms of scientific specialisation two dominant areas were identified like Marine Environment (Campus of the Sea) and Health (Life Campus). To the last two areas, according to RIS3T it has been added the Green bioetecnology (Rural Environment and Environment itself)<sup>12</sup>.

### 3.2 Bioeconomy Policy Support

In terms of specific instruments to bioeconomy related areas, the RIS3 Galicia establishes 4 groups of instruments (1. SME INNOVATE; 2. INNOVATE IN GALICIA; 3. GALICIA TRANSFER; 4. INNOVATIVE ENTREPRENEURSHIP), each of them are disaggregated into several programmes that are having success in the region. In the next table (inspired from the RIS3 Galicia) it is reflected a simplified matching between Galicia RIS3 challenges and the instruments:

Challenge	Instrument	Programme group
Challenge 1, Priority 1. Maritime resources	(1) Sectorial Innovation Programme; (2) Support for Open Innovation Programme; (4) International Financing Bonus Programme; (5) Innovation Agents Accreditation Programme; (6) Promotion of Knowledge Capacity Enhancement Programme for Enterprises.	1
	(7) Development Centre Attraction Fund Programme; (9) Demonstration Projects Programme; (11) Horizon 2020 Cooperation Programme for the Development of Collaborative R&D&I Projects; (12) Financial Engineering Instruments Programme for the Mobilisation of Private Capital.	2
	(13) Contracts-Transfer Programmes for Science and Technology Centres; (14) Knowledge and Technology Assets Investment Programme for Science and Technology Centres.	3
	(19) Talent Retention, Incorporation and Mobility Programme. (20) Transversal Action Programme (launch, follow-up, assessment and dissemination of RIS3 Galicia).	4
Challenge 1, Priority 2. Aquaculture	(2) Support for Open Innovation Programme; (4) International Financing Bonus Programme; (5) Innovation Agents Accreditation Programme; (6) Promotion of Knowledge Capacity Enhancement Programme for Enterprises.	1
	(7) Development Centre Attraction Fund Programme; (11) Horizon 2020 Cooperation Programme for the Development of Collaborative R&D&I Projects; (12) Financial Engineering Instruments Programme for the Mobilisation of Private Capital.	2
	(13) Contracts-Transfer Programmes for Science and Technology Centres; (14) Knowledge and Technology Assets Investment Programme for Science and Technology Centres	3

<sup>12</sup> Cross-border Smart Specialisation Strategy of Galicia- Northern Portugal (RIS3T). pp. 47-52

Challenge 1, Priority 3. Modernisation, primary sectors	(18) Innovation Acceleration Programme; (19) Talent Retention, Incorporation and Mobility Programme; (20) Transversal Action Programme (launch, follow-up, assessment and dissemination of RIS3 Galicia).	4
	(2) Support for Open Innovation Programme; (4) International Financing Bonus Programme; (5) Innovation Agents Accreditation Programme; (6) Promotion of Knowledge Capacity Enhancement Programme for Enterprises.	1
	(7) Development Centre Attraction Fund Programme; (8) Early Demand Fund Programme; (9) Demonstration Projects Programme; (10) Strategic Public-Private Projects Programme; (11) Horizon 2020 Cooperation Programme for the Development of Collaborative R&D&I Projects; (12) Financial Engineering Instruments Programme for the Mobilisation of Private Capital.	2
	(13) Contracts-Transfer Programmes for Science and Technology Centres; (14) Knowledge and Technology Assets Investment Programme for Science and Technology Centres	3
Challenge 1, Priority 4. Biomass and marine energy	(18) Innovation Acceleration Programme; (19) Talent Retention, Incorporation and Mobility Programme; (20) Transversal Action Programme (launch, follow-up, assessment and dissemination of RIS3 Galicia).	4
	(1) Sectorial Innovation Programme; (2) Support for Open Innovation Programme; (3) Technology Service Bonus Programme; (4) International Financing Bonus Programme; (5) Innovation Agents Accreditation Programme; (6) Promotion of Knowledge Capacity Enhancement Programme for Enterprises.	1
	(12) Financial Engineering Instruments Programme for the Mobilisation of Private Capital	2
	(13) Contracts-Transfer Programmes for Science and Technology Centres; (14) Knowledge and Technology Assets Investment Programme for Science and Technology Centres; (15) Concept Testing Programme; (17) Industrial Property Promotion Programme.	3
Challenge 1, Priority 5. Tourism, ICT	(19) Talent Retention, Incorporation and Mobility Programme; (20) Transversal Action Programme (launch, follow-up, assessment and dissemination of RIS3 Galicia).	4
	(2) Support for Open Innovation Programme; (3) Technology Service Bonus Programme; (4) International Financing Bonus Programme; (5) Innovation Agents Accreditation Programme; (6) Promotion of Knowledge Capacity Enhancement Programme for Enterprises.	1
	(9) Demonstration Projects Programme; (12) Financial Engineering Instruments Programme for the Mobilisation of Private Capital.	2
	(13) Contracts-Transfer Programmes for Science and Technology Centres; (14) Knowledge and Technology Assets Investment Programme for Science and Technology Centres; (15) Concept Testing Programme; (17) Industrial Property Promotion Programme.	3
	(19) Talent Retention, Incorporation and Mobility Programme; (20) Transversal Action Programme (launch, follow-up, assessment and dissemination of RIS3 Galicia).	4

Source: Elaboration based on RIS3 Galicia, “Fig. 25. Interacción entre Instrumentos e as Prioridades da Estratexia RIS3 de Galicia”, p.116

Other types of support to the bioeconomy related areas, can be considered:

- Projects portfolio within the *INNOTEC Strategy Plan 2016–2019* of the Wood Cluster: TRAINING; DESIGNWOOD; NEWMARKETS; INDUSTRY 4.0; LIGNUM FACILE;

CONSTRUCTION; MKT&COMMUNICATION; STRATEGIC PARTNERSHIPS; and SERVICES)<sup>13</sup>;

– 4 lines of action within The *Strategic Plan of the Galician Food Cluster 2016–2020*: L1: Promotion of R&D&I and strengthening of the innovative capacity; L2: Human capital, entrepreneurship, and progress towards the factory of the future; L3: Markets and internationalisation; access to new markets and adapt to consumer trends and L4. Consolidation and projection of the Galician Food Cluster.

*Projects*: INNOFOOD (healthy foods); INNOCONSUMER (consumer analysis); INMARKET (competitive surveillance) and INNSTRATEGY (innovative solutions)<sup>14</sup>.

Also, additional aid instruments for research programs in Galicia have been identified during the interview with GAIN, as following:

- **Mixed units** in order to attract long term private investment (financed by ERDF and own funds);
- **Agrobiotech Fund** as “projects accelerator” – public and private financial resources for biotechnology, biofood and biomass.
- **Innovation Public Procurement** – important role play for bioeconomy the Food Cluster.

Likewise, following Investment Funds and Accelerators should be also considered in the context of Bioeconomy Policy Support:

- I2C Fund <http://www.xesgalicia.gal/en/content/i2c-technology-fcr-pyme>
- Xes-Innova Fund <http://www.xesgalicia.gal/en/content/xes-innova-fcr-pyme>
- Fondo Galicia Iniciativas Emprendedoras <http://www.xesgalicia.gal/en/content/gie-fcr-pyme>
- Galicia Open Future
- Aceleradora ViaGalicia [http://www.zfv.es/viavigo/index.php?option=com\\_content&task=view&id=72&Itemid=36&idh5=17](http://www.zfv.es/viavigo/index.php?option=com_content&task=view&id=72&Itemid=36&idh5=17)
- Agrobiotech Innovación <http://www.agrobiotechinnovacion.es/>

### 3.3 ESIF and H2020 resources for the Bioeconomy

To guarantee the execution of the RIS3, several actions and development of programs are going to be funded through the EU Structural and Investment Funds

<sup>13</sup> INNOTEC Strategy Plan 2016–2019. <http://clustermadeira.com/wp-content/uploads/2012/06/Documento-para-Web.pdf>

<sup>14</sup> Food Cluster. <http://www.clusteralimentariodegalicia.org/english>

and own funds. The total amount for the 3 challenges sums € 936 million. However, there is no specific disaggregation of funds per each challenge or bioeconomy related sector.

According to **FEDER INTERCONNECTA 2015**, Galicia registered a 15% of collaborations outside the territory. In terms of sectorial distribution of projects in GALICIA, 17,42 % of beneficiaries are from the agri-food sector and 7,58% from bio-health sector <sup>15</sup>.

In the following table are reflected some of examples of bioeconomy related projects from the previous call:

PROJECT TITLE	Total cost (euros)
APLICACIÓN DE TÉCNICAS DE ANÁLISIS Y ADAPTACIÓN DEL PROCESO EDUCATIVO EN LA NUBE PARA LA PROVISIÓN DE ESPACIOS DE APRENDIZAJE INTEROPERABLES	1.039.742,30
SIMOVI: SISTEMA PORTABLE DE VISIÓN MULTIESPECTRAL PARA LA MONITORIZACIÓN DE VIÑEDOS	906.962,00
DESARROLLO DE NUEVAS TECNOLOGIAS PARA CALDERAS DE BIOMASA DE ALTA EFICIENCIA (BIO+)	992.705,20
DESARROLLO DE UNA LÍNEA DE PRODUCTOS INNOVADORES EN EL SECTOR CONSERVERO CÁRNICO QUE INCREMENTA LA SEGURIDAD ALIMENTARIA Y LA CALIDAD ORGANOLÉPTICA MEDIANTE NANOTECNOLOGÍA E INTELIGENCIA ARTIFICIAL	926.434,90

Source: Data retrieved from “Resolución de 9 de enero de 2014, del Centro para el Desarrollo Tecnológico Industrial, por la que se publican las ayudas concedidas correspondientes a la convocatoria del año 2013 del Programa FEDER-INNTERCONECTA, para la Comunidad Autónoma de Galicia”. Resolution dated January 30, 2013 (BOE 02/02/2013).

According to 2014–2020 Rural Development Programme Galicia, € 305 million are allocated to Measure 8: Investment in forest area development and improvement of the viability of forests<sup>16</sup>.

***POCTEP Approved Projects:*** Galicia /North Portugal

***Project Title:*** “Biodiversidad Vegetal Amenazada Galicia–Norte de Portugal. Conocer, gestionar e implicar”

***Project total cost:*** 654.684,57 €

***FEDER:*** 491.013,43 €

***Duration:*** 10/10/2011 – 30/06/2013

***Objective:*** “Inventory of threatened transboundary biodiversity of Galicia and Northern Portugal”

<sup>15</sup> Data retrieved from CDTI. “CONVOCATORIA FEDER INNTERCONECTA 2015 ANÁLISIS DE LAS SOLICITUDES (11 de septiembre de 2015)”

<sup>16</sup> [http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet-galicia\\_en.pdf](http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet-galicia_en.pdf)

*Thematic:* Environment, heritage and the natural environment

## 4. Successful Initiatives and Good Practices

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

### 4.1 Name of the Initiative or Project

Two important initiatives are briefly presented:

1. **The Vanguard Initiative on Bioeconomy**, “Bio-Economy – Interregional cooperation on innovative use of non-food Biomass” that “concerns the implementation of synergies in new bio-based value chains across regions based on their smart specialisations”<sup>17</sup>. Currently, the Vanguard Initiative on Bioeconomy partners are: Norte, Galicia, Upper Austria, Skane, Emilia Romagna, Nord Pas de Calais.
2. **Cross-Border Smart Specialisation Strategy of Galicia– Northern Portugal (RIS3T)** that defines 6 strategic collaboration areas between Galicia and Northern Portugal and among them, 2 can be considered as bioeconomy related:
  - Taking advantage of energy from biomass and the sea;
  - Boosting competitiveness of the agri-food and biotechnology industries;

*6 working groups* were set up: 1) Energy from biomass and the sea; (2) The agri-food and biotechnology industries; (3) Industry 4.0; (4) Mobility Industries; (5) Tourism and creative industries; (6) Healthy lifestyle and active ageing.

*Management team:* Galicia (GAIN) + Regional Innovation Council, chaired by the CCDRN (Northern Portugal).

*Management tools:* RIS3T APP; RIS3T Forums; RIS3T Observatory.

*Specific fund:* POCTEP (Spain–Portugal Cross–Border Operational Programme)

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<sup>17</sup> <http://www.s3vanguardinitiative.eu/cooperations/bio-economy-interregional-cooperation-innovative-use-non-food-biomass>

## 4.2 TREE4FUTURE Project

**Project:** TREE4FUTURE Project<sup>18</sup>.

**Objective:** “aims to helping the European forestry sector to respond, in a sustainable manner, to increasing demands for wood products and services in a context of changing climatic conditions”<sup>19</sup>.

**Duration:** November 2011 – April 2016 (4 years)

**Budget:** app. 9 Mill EUR

**Partners:** 28 European organisations (from Galicia – Fundación para o Fomento da Calidade Industrial e Desenvolvemento Tecnolóxico de Galicia Santiago de Compostela, Spain)

**Funding:** EU 7th Framework Programme (FP7)

**Funding Scheme:** Combination of CP & CSA

**Events:** “Stakeholders debated the contribution of trees to the bio-economy” (24 September, 2013 Nancy, France).

**Other relevant projects in the forestry sector** are: (1) Restoration and forest management; (2) Near infrared spectroscopy, application to study the variability of wood properties and genetic improvement programs; (3) Using non-destructive testing for the selection of trees according to the wood quality in the genetic breeding program of the Douglas fir (*Pseudotsuga menziesii*)<sup>20</sup>.

**In biofuels area**, the following bioeconomy related projects could be of interest: (1) Use of energy crops in the production of densified solid biofuels; (2) Development of an integrated equipment for picking and processing forest (RETRABÍO); (3) Possibilities for biomass energy use of bush in Galicia; (4) Project for the Use of Forest Biomass in the Forest-Industry Chain in Galicia<sup>21</sup>.

## 4.3 CELTALGA Extract

**CELTALGA Extract** is a technology-based company and the University of Santiago de Compostela’s spin-off (Technologies for bio-product development, “whose activity

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<sup>18</sup> <http://www.trees4future.eu/>

<sup>19</sup> CIS-Madeira. Projects. <http://www.cismadeira.com/ingles/projects/projets.html>

<sup>20</sup> These projects were retrieved from the CIS-Madeira Official Web-site. Section “Projects”.  
<http://www.cismadeira.com/ingles/projects/projets.html>

<sup>21</sup> These projects were retrieved from the CIS-Madeira Official Web-site. Section “Projects”.  
<http://www.cismadeira.com/ingles/projects/projets.html>



focuses on the production of aqueous extracts of algae from the Galician coast<sup>22</sup> with focus on food and cosmetics sectors. The company was created in 2015<sup>23</sup>.

## 5. Needs, Gaps and Bottlenecks to Deploy the Bioeconomy

During the desk study and interviews, the following needs in order to deploy the Bioeconomy have been identified:

- (1) “Modernisation of traditional business activities in the primary sectors through innovation” including the following means and actions<sup>24</sup>:
  - use of biotechnology know-how and ICT;
  - innovative products and services;
  - biomass production and maritime biofuels;
  - tourism sector modernization;
- (2) Eco-innovation: clean technologies, excellence knowledge, technology transfer and technological intensity and diversification<sup>25</sup>;
- (3) To foment the interregional collaboration – Galicia and Northern Portugal “new bio-based value chains across regions based on their smart specialisations” to be configurated<sup>26</sup>;
- (4) High Impact Innovation Consortium creation – research focused on bioeconomy<sup>27</sup>;
- (5) More participation in European calls for inter-territorial cooperation;
- (6) Hybridisation between strategic sectors (among bioeconomy related are Agri-food products, Sea and aquaculture, Renewable energy, Wood / Forestry, Naval / Maritime industry, Natural stone), on emerging and of high potential (bioeconomy related are biotechnology and eco-industry) and on support of the new industry (such as enabling technologies)<sup>28</sup>.

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<sup>22</sup> <http://www.celtalga.com/es/empresa>

<sup>23</sup> For more information see [http://www.usc.es/export9/sites/webinstitucional/gl/investigacion/avte/descargas/Fichas\\_spin\\_off/Celtalga.pdf](http://www.usc.es/export9/sites/webinstitucional/gl/investigacion/avte/descargas/Fichas_spin_off/Celtalga.pdf)

<sup>24</sup> Smart Specialisation Strategy of Galicia RIS3. Overview (English version), pp. 07–011

<sup>25</sup> Smart Specialisation Strategy of Galicia RIS3. Overview (English version), pp. 013–015

<sup>26</sup> The Vanguard Initiative on Bioeconomy. <http://www.s3vanguardinitiative.eu/cooperations/bio-economy-interregional-cooperation-innovative-use-non-food-biomass>

<sup>27</sup> This information is obtained thanks to the interview realised with the Galician Innovation Agency.

<sup>28</sup> Galicia-Industria 4.0 Competitiveness Agenda, p. 23

## 6. Information Sources

### Literature and Documents:

#### *Documents:*

CDTI. "Convocatoria FEDER Innterconecta 2015 Análisis de las solicitudes (11 de septiembre de 2015)"

Cross-border Smart Specialisation Strategy of Galicia- Northern Portugal (RIS3T)

Galicia-Industria 4.0 Competitiveness Agenda

Galician Research, Innovation and Growth Plan 2011-2015(I2C Plan)

Galician Biotechnology Strategy 2016-2020

Report on Environmental Sustainability of the Rural Development Programme of Galicia 2014-2020

Rural Development Programme of Galicia 2014-2020

Smart Specialisation Strategy of Galicia RIS3

Strategic Plan of the Galician Food Cluster 2016-2020

#### **Other documents:**

CIS-Madeira. Projects. <http://www.cismadeira.com/ingles/projects/projets.html>

European Commission. "Factsheet on 2014-2020 Rural Development Programme

Galicia" [http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet-galicia\\_en.pdf](http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet-galicia_en.pdf)

INNOTECH Strategy Plan 2016-2019. <http://clustermadeira.com/wp-content/uploads/2012/06/Documento-para-Web.pdf>

The Vanguard Initiative on Bioeconomy.

<http://www.s3vanguardinitiative.eu/cooperations/bio-economy-interregional-cooperation-innovative-use-non-food-biomass>

#### **Relevant websites:**

Aceleradora ViaGalicia

[http://www.zfv.es/viavigo/index.php?option=com\\_content&task=view&id=72&Itemid=36&th5=17](http://www.zfv.es/viavigo/index.php?option=com_content&task=view&id=72&Itemid=36&th5=17)

AEO-ECIMAT Strategic Grouping in Oceanography-ECIMAT. <http://ecimat.uvigo.es/gl/>

Agrobiotech Innovación <http://www.agrobiotechinnovacion.es/>

ANFACO-CECOPESCA. <http://www.anfaco.es/es/index.php>

AtlantTIC (initially called ACETIC). <http://atlanttico.uvigo.es/>

Biomedical Research Centre (CINBIO). <http://www.cinbio.es/>

CELTALGA. <http://www.celtalga.com/es/empresa>

CIA Agro-environmental and Food Research Centre. <http://www.cia3.es/>

ECOBAS Economics and Business Administration for Society. <http://ecobas.webs.uvigo.es/>

Fondo Galicia Iniciativas Emprendedoras <http://www.xesgalicia.gal/en/content/gie-fcr-pyme>

Galician Innovation Agency (GAIN). <http://gain.xunta.es/>

Galician Technology Institute (ITG). <http://www.itg.es>

Campus do Mar. <http://campusdomar.es/es>

Institute of Agrobiological Research. <http://www.iiag.csic.es/>

Mabegondo Agricultural Research Center (CIAM). <http://ciam.gal/sp/index/?r=portada.index>

University Institute of Environment. IUUMA. <http://www.udc.es/iuuma/>

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Institute of Agricultural Biodiversity and Rural Development (IBADER).  
<http://www.ibader.gal/esp/seccion/1/2/Que-es-el-IBADER.html>

The Timber Technological Innovation and Services Centre.  
<http://www.cismadeira.com/ingles/inicial.php>

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[http://www.energylab.es/esp/energylab\\_mision\\_y\\_vision.asp](http://www.energylab.es/esp/energylab_mision_y_vision.asp)

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Clusters Galicia. <http://clustersgalicia.com/about-us/?lang=en>

Food Cluster of Galicia. <http://www.clusteralimentariodegalicia.org/>

Galicia Aquaculture Cluster. [http://www.cetga.org/es/area\\_corporativa/area\\_corporativa.php](http://www.cetga.org/es/area_corporativa/area_corporativa.php)

Wood Cluster. <http://clustermadeira.com/?lang=en>

IGAPE (Instituto Galego de Promoción Económica). <http://www.igape.es/es/que-e-o-igape>  
<http://mediorural.xunta.gal/es/>

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Regional Ministry of Economy and Industry (Consellería de Economía e Industria, Xunta de Galicia). <http://ceei.xunta.gal/portada>

Research, Transfer and Innovation Centre (CITI). <http://www.citi.uvigo.es/>

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<http://cactiweb.webs.uvigo.es/joomla/index.php>

Toralla Marine Science Station (ECIMAT). <http://ecimat.uvigo.es/gl/>

TREES4FUTURE. <http://www.trees4future.eu/>

Xes-Innova Fund <http://www.xesgalicia.gal/en/content/xes-innova-fcr-pyme>

**Interviews and Contact details:**

<b>Name</b>	<b>Position</b>	<b>Institution/ Organisation</b>	<b>Phone</b>	<b>Email</b>	<b>Interview Date</b>
Enrique Rohrer Sobrino	Coordinator of the Planning and Strategic Cooperation Unit	GAIN – Galician Innovation Agency	+34 981 541671	–	30/11/2016