



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

Task 3

Case Study Report Crete



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1. Short Regional Bioeconomy Profile

“It is the dynamics of people that build good cooperations” (Dr Eleni Hatziyanni)¹

Name of the case region/country	Κρήτη (Crete)
Member State	Greece
GDP – Euro per capita (2014)*	14 100 M
Total ESIF Research & Innovation per capita per year*	16.24
Total H2020 per capita per year*	29.33
Value Chain Approach to the Bioeconomy**	Biomass processing and conversion Biomass supply and waste
Thematic Focus of the Bioeconomy Approach**	Agro-food Bio-based fuel and energy
Research and Innovation Fields highlighted for the Bioeconomy**	Logistics and packaging, processing Primary production with quality
Bioeconomy Activity Level**	Low
CASE STUDY SUMMARY	
Bioeconomy Approach	Long history on agriculture and high potential on renewable energies and biomass build the focus of the two bioeconomy related complexes.
Bioeconomy Ecosystem	The island of Crete is home to a large number of universities and research institutions. Being an island never hindered the region to be active in cooperations, promotion of its comparative advantages and actions, as well as participating in several networks.
Bioeconomy Policy Support	The policy support comes both from the national and regional level. The guidelines and priorities as regards innovation and bioeconomy related themes are in line at national and regional level. ESIF and Horizon 2020 are the main supportive funding sources.
Successful initiatives and Good Practices	Several good initiatives that build on the comparative advantages of the island. These regard the promotion of high quality local products, branding of the name ‘Crete’ and the Cretan diet. Other good practices regard the biomass energy production from olive oil kernels.
Main Needs, Gaps and Bottlenecks	There is a great need to change the mindset and culture of actors in the market sector as regards innovation and research, as well as of actors in the research sector, as regards cooperation with the market. Bringing the world of research together with the market reality will be essential for the deployment of bioeconomy in future.

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

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

¹ Quote from the interview for internal use only, no authorisation to use or publish it.

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

Crete is the largest and most populous island of Greece, with a 5.8% of the total country's population (2011 census). Situated in the southern part of the country, it accounts for 5% of the country's GDP in 2014.

Crete is an important tourism hotspot, as tourism is one of the most dynamic sectors on the island. However, it is not the only sector where Crete has a dynamic. The primary sector and agriculture is a very important economic sector of the island, contributing to the regional development. According to the regional operational programme of Crete, agriculture accounts for 19,4% of the employment.

Crete holds a high position in the agricultural sector with the production mainly of olive oil, fruits and vegetables, as well as dairy products. The Cretan locally produced agricultural products have made the Cretan Mediterranean diet famous, which is among the intangible UNESCO heritage. The promotion of the Cretan diet and of high quality local products is of great importance for the island, which already implemented some actions to this direction.

Crete contributes 10% to the GVA of the primary sector at national level, as shown in Figure 1 below. This percentage can be further improved if focusing on standardisation, packaging and promotion of the quality of the Cretan agricultural products.²

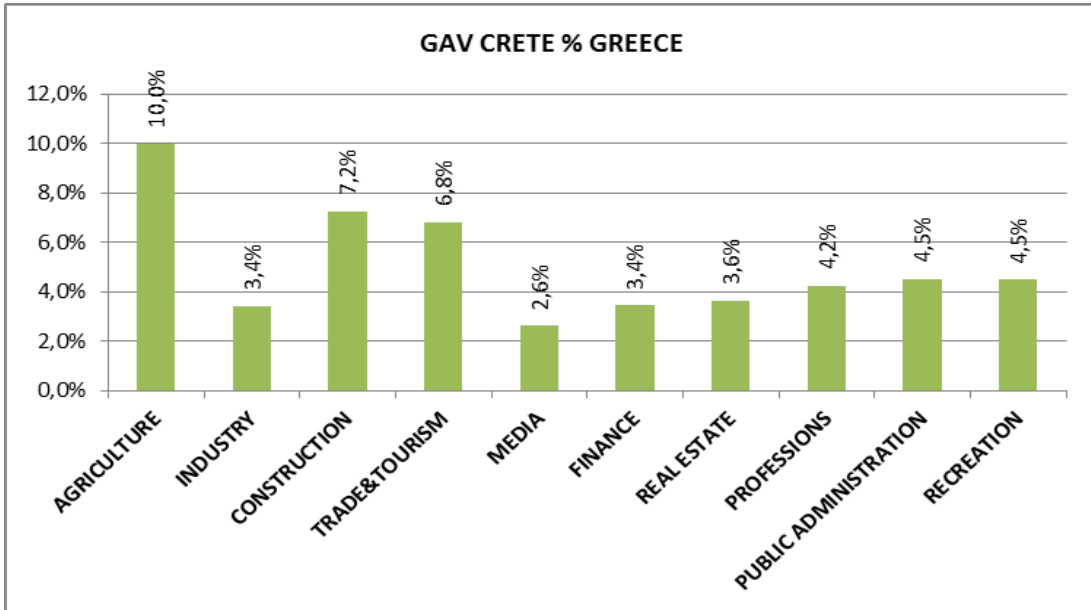
In addition to that, Crete has also an important share in manufacturing activities, such as the processing and packaging of agricultural products, food and beverages, non-metallic mineral products, metallic products, plastics and chemicals. Furthermore, the sector of energy with the renewable energy in particular has the potential to develop further and be a source of economic growth for the region.³

Renewable energies and reduction of CO₂ emissions is one of the priorities of the Regional Operational Programme of Crete, especially as regards the energy efficiency in public buildings, the promotion of actions for energy saving in houses, as well as renewable energies promotion. The actions for energy efficiency in the tourism spots and industries are priority of the national Entrepreneurship, Competitiveness and Innovation programme.

Figure 1 Gross Value Added, Crete % Greece

² <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/region-kriti>

³ <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/region-kriti>



Source: Dr Eleni Hatziyanni, 2016, Ecological territories: Region of Crete, Greece. Eco-innovation, as a driver to the opportunity, presentation⁴.

The regional potential and the priorities of the region of Crete form a solid basis for the Regional Innovation Strategy, where they are also reflected. Therefore, based on the long history in agriculture and the potential of Crete on sustainable energy and alternative energy resources, the Regional Innovation Strategy of Smart Specialisation (RIS), focuses two of its four complexes⁵ on bioeconomy related themes:

- ▶ The agro-alimentary complex

The agro-alimentary complex regards activities related to Crete's primary sector and more specifically to rearing/growing, processing and distributing / commercialising local agricultural products, which contribute to the the gross output of the region (such as olive oil), to shape the Cretan nutrition model (such as aromatic plants, honey and wine), and are included among emerging sectors of primary production (high nutritional value seafood).

- ▶ The environmental complex

The activities of this complex regard the decrease of CO2 emissions, the rational use of Crete's national resources and addressing climate change challenges.⁶

Thus the case study is focusing on these two complexes.

⁴ Available at:

http://www.nexa.re/fileadmin/user_upload/nexa/actualites/Forum_eco_circulaire/20160927_Eleni_HATZIYANNI_Crete_Eco-Innovation.pdf

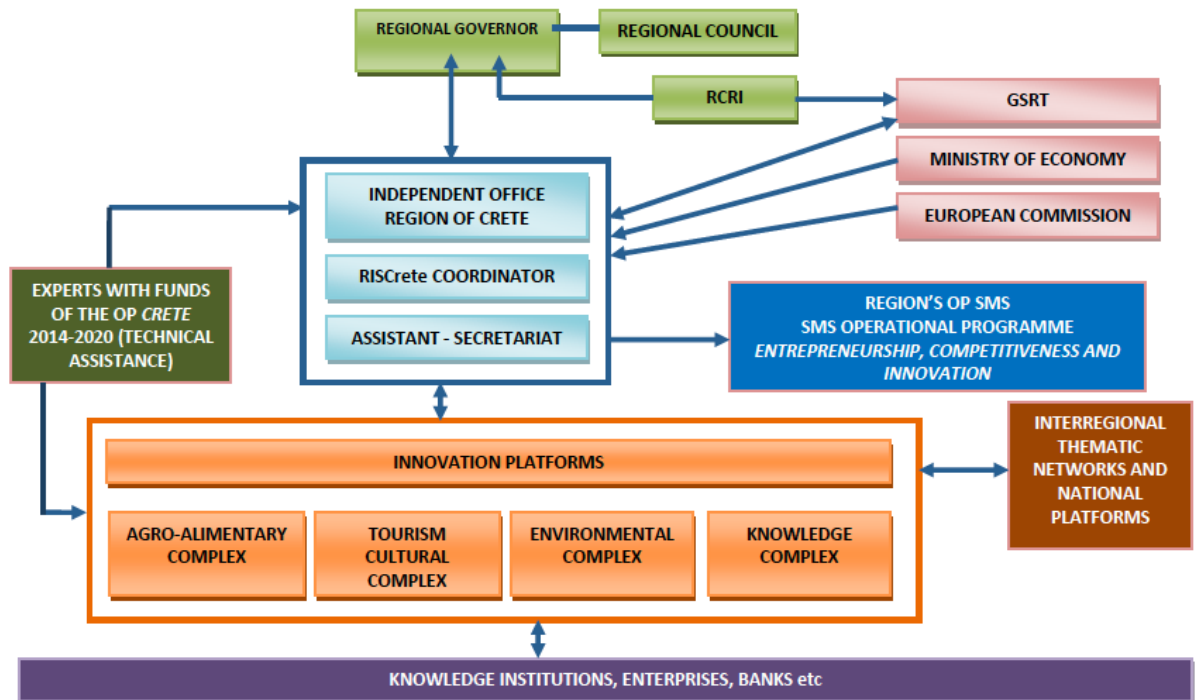
⁵ The four complexes of the Regional Innovation Strategy are agro-alimentary complex, the cultural-touristic complex, the environmental complex and the knowledge complex.

⁶ Smart Specialisation Strategy of Crete Region, Abbreviated Text, March 2015

2.2 Bioeconomy Stakeholders

Being an island region, never hindered Crete in being very active in the field of innovation. The region holds a high research and innovation potential, being home to several universities and research institutions. A number of bioeconomy-related stakeholders are identified below. Figure 2 describes the governance model, as presented in the Regional Innovation Strategy.

Figure 2 RIS Crete governance structure



Source: Smart Specialisation Strategy of Crete Region, Abbreviated Text, March 2015, p.27

The governance structure of RIS is comprised by two levels: i) the decision-making level, responsible for the policy development, evaluation and decision-making and the ii) executional level.

The headquarter (decision-making) level is comprised by the regional Governor, the Regional Council and the Regional Research and Innovation Council Crete. The Regional Research and Innovation Council was created in 2014, as a supportive institution for operations and implementation of the National Strategy for Research, Technologic Development and Innovation. There is another regional council, the Regional Innovation Council of Crete, which has an advisory role to the regional authority on topics such as energy, environment, culture, tourism, primary sector and other. The Council is also comprised by representatives of the academic, research and market sector.

The responsibility for implementing the RIS3 lies at the Directorate of Regional Development Planning. A special working group has been formed for the implementation of the RIS3, comprised of different directorates of the Region of Crete, among others the Regional

Directorate of Regional Planning, the Directorate of Environment and Spatial Planning, the Directorate of Agricultural Economy. The Coordinator of the working group comes from the Regional Directorate of Regional Planning and is responsible for the general support and implementation of the RIS3. Each platform / complex has also its own coordinator, who is responsible for the implementation of the complex, awareness raising, cooperation with national/ European/international networks etc. Under each complex, the creation of different working groups is envisaged, which will be supervised by the respective coordinator.

The number of bioeconomy-related stakeholders that implement the envisaged activities in the region is high. At the implementation level, the main actors are universities, research institutions, technology parks, as well as agricultural cooperatives.

► **Universities, research and other bio-economy related Institutions**

- **University of Crete.** It develops knowledge and technological innovation especially, among others, on biotechnology, environment (onshore, marine, atmospheric), nanotechnology, marine science.
- **Technical University of Crete.** The research and technological focus of the University are, among others, on energy management and production, production technology, environment and ecosystem protection, marine resources.
- **Technological Educational Institute of Crete.** The research focus of the Institute is among others on renewable energy resources, rural development, olive mill waste treatment.
- **Mediterranean Agronomic Institute of Chania.** It does applied research on plant molecular biology, analytical chemistry and chemistry of natural products. Among its objectives are the conservation of native, rare and endemic flora, the conservation of landraces, studies, research and training and awareness raising. In addition, the Institute has developed a Seed Bank for the preservation of endemic and threatened wild plants of Crete.
- **Hellenic Centre for Marine Research.** The Centre operates under the supervision of the General Secretariat for Research and Innovation. It comprises three institutes, the Institute of Marine Biology, the Biotechnology and Aquaculture, the Institute of Marine Biological Resources and Inland Waters and the Institute of Oceanography. It aims at promoting the sustainable exploitation of marine biological and other resources, promote sustainable aquaculture, while it does applied research on aquatic biodiversity, integrated marine observing and forecasting systems in Greek seas, integrated river basin and coastal zone management, biotechnological applications and others.⁷
- **Foundation for Research and Technology-Hellas⁸.** It is one of the largest research centres in Greece with high qualified personnel and state of the art facilities.
- **Innovation Centre of Crete⁹.** The centre works on the sustainable agricultural development, on addressing environmental problems created by human

⁷ <http://www.hcmr.gr/en/about-us/missions-objectives/>

⁸ <http://www.forth.gr/index.php?l=e>

activities in the primary sector and the valorisation of agricultural products and by-products. It aims to act as a liaison for technology transfer between the private and local research sectors.

- **National Agricultural Research Foundation (NAGREF), Hellenic Agricultural Organisation (HAO) DIMITRA.** It is a national foundation working on applied research and develops technology for the rural and animal production, crop protection, the processing of agricultural products as well as agricultural economy. Two institutes are based in Crete and are the Institute of Viticulture, Floriculture and Vegetable Corps of Heraklion¹⁰, which focuses on collection, characterisation, identification and release to the farmers of plant propagation material adapted to the requirements of contemporary certified agriculture and the Plant Protection Institute of Heraklion¹¹, which focuses on the development of integrated control strategies for the protection of cultivated and ornamental plants from pests and pathogens.
- **Science and Technology Park of Crete¹²**. It helps and guides companies to unleash their potential through innovation, access and secure their intellectual capital, support the interests and needs of companies and transfer their technological advancements to the manufacturing to innovative products and services.

▶ **Agricultural cooperatives**

Agricultural cooperatives, which promote the local products and help producers cooperate are another bioeconomy related actor active in the region. Some of these cooperatives are presented as good practices in section 4, while a few are also presented here. They are potential implementers of agro-food bioeconomy innovations.

- **Minoan land¹³**

Agricultural cooperative focusing on the cultivation of prickly pear, aloe vera and other herbs. Guided by scientific collaborators, the collaboration aims at finding new ideas and techniques, which provide a quality result. The end products can be used for different purposes, such as consumption, animal feed or cosmetology.

- **Union of agricultural cooperatives of Sitia¹⁴**

Sitia is a production location of one of the best quality extra virgin olive oils. The union is a cooperative bringing together 27 olive oil mills.

⁹ http://www.liaison.uoc.gr/index.php?option=com_content&view=article&id=277&lang=en and <http://www.innovationcenter-crete.gr/>

¹⁰ <http://www.nagref-her.gr/en>

¹¹ <http://www.nagref-cha.gr/>

¹² <http://www.stepc.gr/index-gr.php>

¹³ <http://www.minoan.land/>

¹⁴ <http://www.oliveoilmarket.eu/item/union-of-agricultural-cooperatives-of-sitia/>

2.3 Bioeconomy – strategies, plans and projects

The term 'bio-economy' is usually not used as such in Greece and often other terms, such as eco-innovation or agricultural innovation are more familiar. Thus, relevant studies on bioeconomy as such are difficult to find for the region of Crete. As for the scope of the study, bio-economy is considered as a rather broad term comprising a number of sub-sectors, there are a few national strategies and action plans, mainly related to innovation, as well as a regional strategy on relevant themes to bioeconomy, to be mentioned.

- ▶ The **National Strategy for Research, Technological Development and Innovation**. The Strategy aims to strengthen innovation, research and technological development in the country. It is structured in three pillars: smart development based on knowledge and specialisation, excellency in research and development of research human resources, social challenges, which are connected with ministerial policies, such as health, security and environment. Among the more concrete priorities of the strategy lie among others priorities related to the agro-food, energy and environment.
- ▶ The **Strategic Partnership Agreement for Research, Technological Development and Innovation**¹⁵. Under this Agreement the Hellenic Federation of Enterprises undertook the responsibility to define an action plan for the creation of an Innovation Development Network.
- ▶ The national RIS3, **National Strategic Framework for Research and Innovation 2014-2020**¹⁶. Its scope is to define the strengths and weaknesses of the country in the field of research and innovation and trigger their improvement.
- ▶ **Action Plan for the implementation of the National Strategy for Research, Technological Development and Innovation**¹⁷. In this Action Plan the ESI Funds are acknowledged as a primary source for research and innovation development. The Action Plan envisages the development of innovation, the promotion of excellence in research, the development of synergies and the funding of technologies in line with the priorities set out in RIS3.
- ▶ **The Strategic Plan of the Region of Crete** for the development of the Primary sector and the management of its products¹⁸. The Plan highlights the importance of the primary sector for the region of Crete. The objectives are to develop local products of high quality and security and the sustainable use of natural resources. This will contribute in the economic development of the island.
- ▶ **National Strategy for the European Research Area, National Road Map 2015-2020**. The Road Map aims to improve the national research systems and develop an open market for researchers.

¹⁵ <https://rio.jrc.ec.europa.eu/en/library/strategic-partnership-agreement-research-technology-development-and-innovation>

¹⁶ <https://rio.jrc.ec.europa.eu/en/library/national-strategic-framework-research-and-innovation-2014-2020>

¹⁷ <https://rio.jrc.ec.europa.eu/en/library/action-plan-implementation-national-strategy-research-technological-development-and>

¹⁸ Available at:

http://www.crete.gov.gr/attachments/article/3039/_PROGRAMMA_ANAPTYXHS_PROTOGENH_TOMEA_KRH_THS%20%CE%A4%CE%95%CE%9B%CE%99%CE%9A%CE%9F_21-11-2011.pdf

The region has a good record in innovation projects of bioeconomy sectors and plans to play an active role in the participation in projects during the 2014-2020 programming period. The regional authority seems committed in the RIS implementation.

Crete has managed to identify objectives as well as the region's comparative advantages and plans to build upon them. Thus, a number of actions and projects have already been in place, under the umbrella of Interreg, Horizon 2020, LIFE and others. Such good practices, actions and projects are presented in detail in section 4.

In general, the region favours cooperation with other regions and macro-regions and wishes to establish closer links in the future. So far, it has been active in the participation and its promotion in several networks. The CPMR (Conference of Peripheral and Maritime Regions) is one of the networks where the region is specifically active. A recent CPMR study has analysed the potential of maritime development in Europe by looking at the priorities of the coastal RIS3¹⁹. In the framework of this study, over 110 RIS3 have been analysed to identify their maritime dimension. Crete has quite a number of indirect references to maritime issues in its RIS. According to this study, there are references on aquaculture and marine biotechnology. Aquaculture activities are considered as very important and food products from marine organisms are referred (under the agro-alimentary complex of RIS), as well as productive activities at sea (environment complex). In addition, there is a reference in the development of pharmaceutical products from marine resources (under the agro-alimentary complex).²⁰

As regards the blue growth sector, the region was active during the EUSAIR design and more specifically on Pillar 1 – Blue Growth, focusing on blue technologies, fisheries and aquaculture and maritime and marine governance and services.

Last but not least, ERRIN is another network where the region is especially active. It participates in the working groups for bioeconomy and blue growth. Currently it plans its future actions for 2017.

¹⁹ CPMR (2016). The Maritime Dimension in Smart Specialisation Strategies. Results and key messages. CPMR Technical Paper. October 2016.

²⁰ Crete Fact sheet at:
https://www.google.com/maps/d/viewer?mid=1p3gL7nvL6b19tAuW8KARU47_h7E&ll=35.25215533460261%2C24.919688500000007&z=9

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

Policy support mainly in innovation related actions can come from the national level. This regards mainly research and innovation actions, decided at national level for the implementation of the Research, Technologic Development and Innovation in the country.

- ▶ The **General Secretariat for Research and Innovation**. It is responsible for the design and the implementation of the National Strategy for Research, Technological Development and Innovation. The region of Crete also works closely with the General Secretariat for the implementation of the strategy.
- ▶ The **Steering Committee of Research and Technological Development and Innovation** policy, which works together with the General Secretariat for Research and Innovation on the implementation of the National Strategy for Research, Technological Development and Innovation.
- ▶ The **National Council for Research and Technology**²¹. It is an advisory body of the state for the formulation and implementation of the National Strategy for Research, Technological Development and Innovation.

3.2 Bioeconomy Policy Support

There are no specific bioeconomy-related policy support instruments or institutions in Crete. Support is included in the overall support framework, in particular for environmental and for agro-food innovation. In addition to the national level policy support on innovation, there are some more region-specific documents regarding bioeconomy-related themes. In the region of Crete there are mainly three documents that support the bioeconomy. These are the following:

- ▶ **Regional Innovation Strategy 2014-2020**
As described in earlier sections, the RIS3 for Crete defines the complexes of focus, two of which (the agro-alimentary complex and the environment complex) are of relevance to the bioeconomy focus of the study. The Strategy shows the linkages between
- ▶ **Regional Operational Programme of Crete**

²¹ <https://rio.jrc.ec.europa.eu/en/organisations/national-council-research-and-technology-ncrt>

The Regional Operational Programme of Crete sets the regional priorities for the programming period 2014-2020. There is no specific link to bioeconomy as such, but regional priorities are in line with the priorities of the RIS3.

▶ **The national Entrepreneurship, Competitiveness and Innovation programme**

This national Operational Programme sets priorities for research and innovation investments at national level. Thus, some of the bioeconomy related priorities are funded through the national Entrepreneurship, Competitiveness and Innovation programme, as shown in section 3.3.

▶ **The National Research and Innovation Strategy for Smart Specialisation 2014-2020**

The national RIS3 strategy has identified in total eight priorities: Agrofood, life sciences and health (Pharma), information and communication technologies, energy, environment and sustainable development, transport and logistics, materials-construction and culture-tourism-cultural and creative industries. Both the agro-food priority and the environment priority are complementary to the regional RIS of Crete.

The priorities and guidelines of innovation and bioeconomy-related themes is in line at national and regional level. The responsibility of the R&I policy lies in the regional authority, which is also responsible for the funding of bioeconomy related actions. As mentioned in the previous section, the main implementation body of bioeconomy is the region of Crete and more specifically the Directorate for Development Planning.

3.3 ESIF and H2020 resources for the Bioeconomy

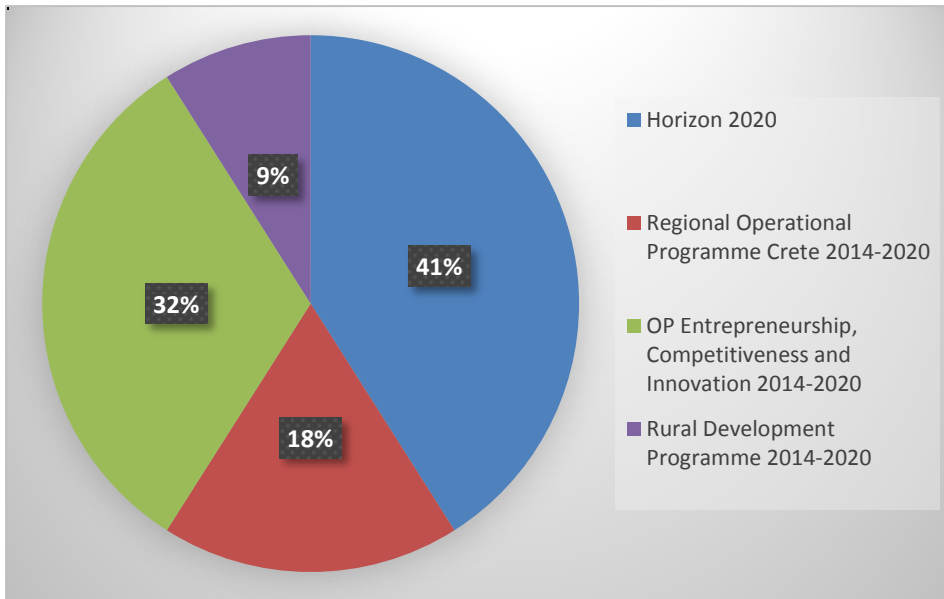
The implementation of RIS3 is still at a very early stage and no figures for actual synergies between Horizon 2020 and ESIF can be presented. The region is open to several funding opportunities and committed to implement the RIS3. For the RIS3 implementation, a number of funding sources are already mobilised. These are introduced in the RIS3, together with the envisaged amounts. The priorities of the RIS3 reflect not only the priorities of the region, as stated in the Regional Operational Programme, but also some of the priorities of the national Operational programme on Entrepreneurship, Competitiveness and Innovation, the Rural Development Programme and definitely the actions of Horizon 2020.

Thus, the sources regard:

- ▶ The Regional Operational Programme of Crete 2014-2020;
- ▶ The national Operational programme Entrepreneurship, Competitiveness and Innovation 2014-2020;
- ▶ The Rural Development Programme 2014-2020;
- ▶ Horizon 2020.

The overall budget dedicated to the RIS3 totals EUR 330 156 686. The distribution across the funding sources is presented in the chart below.

Figure 2 Percentage breakdown of the budget per source of funding



Source: Smart Specialisation Strategy of Crete Region, Abbreviated Text, March 2015

With a focus on the bioeconomy identified priorities, i.e. the agro-alimentary sector and the environment sector, Table 1 presents the budget per bioeconomy identified sector and source of funding. The table also refers to the envisaged actions under each sector and funding source.

The table below presents the total budget per source of funding and sector relevant to this bioeconomy case study.

Table 1 Budget per bioeconomy sector and source of funding, including envisaged actions

Funding Source Sector	Regional operational programme Crete 2014-2020	Operational programme entrepreneurship, competitiveness and innovation 2014-2020	Rural development programme 2014-2020	Horizon 2020	Total
Agro-food	EUR 4 million	EUR 14.26 million	EUR 29.8 million	EUR 10 million	EUR 58.1 million
Measures	<ul style="list-style-type: none"> - applied research programmes, strengthening first production / pilot applications and fostering partnerships/ collaborations between companies and university and research centres (0,91% IP 1b) - Development and introduction of integrated digital applications in enterprises (0,15% IP 2b) - Development of integrated digital services/ products (0,15% IP 2c) 	<ul style="list-style-type: none"> - Support of partnerships - collaborations between companies and university and research centres (2,26% IP 1b) - Development of broadband and high-speed networks in remote rural areas (1,76% IP 2a) - Actions for the upgrading of public information infrastructures to support (mainly) extrovert enterprises (0,30% IP 2b) 	<ul style="list-style-type: none"> - Actions for counselling services (3,03% Measure 2) - Actions for networking and business co-operations (2,85% Measure 16) - Training and information actions (1,94% Measure 1) - Actions for the enhancement of entrepreneurship (1,21% Measure 6) 	<ul style="list-style-type: none"> - Actions to strengthen the capacity for the development of excellence in research & innovation (Action 1) - Training - specialisation of scientific personnel (Action 1) 	
Environment	approx.. EUR 18.4 million	approx. EUR 27 million	--	EUR 30 million	EUR 75.8 million
Measures	<ul style="list-style-type: none"> - Supporting the creation of new innovative businesses (1,51% IP 3a) - Support to high-added-value businesses, certification, standardization and product promotion (1,21% IP 3c) - Applied research programs, strengthening first production / pilot applications and fostering partnerships/ collaborations between companies and university and research centres (1,13% IP 1b) - Development and implementation of innovative solutions and technologies to improve energy efficiency (0,61% IP 4f) - Development of integrated digital services / products (0,52% IP 2c) - Development and introduction of integrated digital applications in enterprises (0,30% IP 2b) - Counselling and funding for the creation of new innovative enterprises (0,15% IP 8iii) - Counselling and training of workforce and entrepreneurs (0,15% IP 8v) 	<ul style="list-style-type: none"> - Development of centres of competence while enhancing laboratory innovation infrastructure (3,03% IP 1a) - Support of partnerships - collaborations between companies and university and research centres (1,82% IP 1b) - Preparation and implementation of adaptation and restructuring plans, services and business support tools and guidance (1,32% IP 8v) - Acquisition of expertise on new products and services, automation - streamlining of operational activities (0,91% IP 3c) - Actions for the upgrading of public information infrastructures to support (mainly) extrovert enterprises (0,76% IP 2b) - Development of new business ideas and creation of new products and services (0,30% IP 3a) - Development (mainly) of female entrepreneurship (0,15% IP 8 iii) 	--	<ul style="list-style-type: none"> - Actions to strengthen the capacity for the development of excellence in research & innovation (Action 1) - Training - specialisation of scientific personnel (Action 1) 	

Source: table adjusted from Smart Specialisation Strategy of Crete Region, Abbreviated Text, March 2015, pg.19, 24-25

4. Successful Initiatives and Good Practices

This chapter highlights successful initiatives and good practices, as well as potential good practices of the region, to promote research and innovation in bioeconomy-related fields. It also presents a number of good project examples where the region has participated.

From the projects and initiatives presented below, it becomes obvious that Crete has identified its comparative advantages and builds upon developing them further.

4.1 NICHE – *bringing together good practices*²²



NICHE is a project funded under the Interreg Europe programme 2014-2020. It brings together seven partners from different countries with the aim to develop a view of best practice in relation to innovation and how organisations can apply technology to increase their capacity for innovation. One of the project's objective is to increase the adoption of research and innovation solutions by food-related businesses. NICHE aims to promote open innovation in the food sector where partners and stakeholders can share their experience and knowledge, work together and trigger innovation in the sector.

The region of Crete is one of the partners participating in the project, which has identified two good practices for NICHE. These are:

► **The Agronutritional Cooperation of the Region of Crete**



AGRONUTRITIONAL
COOPERATION
REGION OF CRETE

This is a specialised body and constitutes the main body for implementing the strategic plan for development and upgrading of the food industry in the region. Apart from the region of

Crete, a mix of private companies of the food sector of the island, Chambers of Commerce, producers and associations of agricultural cooperatives take part.

Its main areas of action regard the support of strategic development of the primary sector of Crete, the promotion of local Cretan products and of the Cretan diet, the promotion of certified quality of products under the brand 'Crete', the support of networking between producers and companies of the agri-food sector (e.g. Network of winemakers of Crete), creation of an integrated marketing strategy for the Cretan products, integration of Cretan products in the tourism sector (consumption in hotels and development of agri-tourism).

The first results are positive. The number of certified Cretan products has increased, while Cretans have been encouraged to return to the primary sector production. Cooperation with other institutions, organisations, networks in Crete, as well as academic institutions in Greece has also been established. The cooperation

²²http://www.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/NICHE%20Good%20Practice%20Booklet_website.pdf

developed between Crete and the Region of Veneto in Italy plans to transfer know-how as regards the procedures of certifying products.

▶ **Heraklion Winemakers Association**



Started in 2006, thirty-one wineries, covering more than 90% of the bottled production, were brought together from all corners of the island and formed the “Wines of Crete”. They now work together, define common actions and manage national and EU funds with the view to promote both the product and its tourism potential. The members of this cooperation consist of both private and cooperative wineries of different sizes, operating at the same level.

The aims of the cooperation is to expand the brand worldwide, increase the awareness of the brand as a globally quality wine, empower the created cluster, promote wine tourism and increase the sales and export of Cretan wine. The cooperation started working toward this direction, through organising inter alia different exhibitions, seminars and participating in project proposals.

4.2 SCREEN project²³ - *supporting circular economy in EU regions*

SCREEN (Synergic Circular Economy across European Regions) is a new project funded under Horizon 2020 (EU.3.5.4. - Enabling the transition towards a green economy and society through eco-innovation). The project aims at the definition of a replicable systemic approach toward transition to Circular Economy in EU regions within the Smart Specialisation Strategy context. It aims to contribute to novel future eco-innovative and horizontal business models across different value chains. Overall, SCREEN supports:

- ▶ sustaining the regional actors’ participation in Horizon 2020 (reinforce the ‘vouchers’ mechanism to ensure common rules in the EU regions);
- ▶ encouraging the entrepreneurial initiatives based on Horizon 2020 project’s results (participating regions will agree on a specific rule in their ESIF giving advantage to initiatives of Horizon 2020 approach with a circular economy approach).

In total eleven partners participate in the project, including regional authorities from Italy, Spain, Poland, Portugal, France, Netherlands, Finland, a knowledge transfer network and a university.

4.3 PACMAAn project²⁴ - *promoting the Cretan brand*



PACMAAn (Promoting Attractiveness, competitiveness and internationalisation of Agro-food Clusters of the Med Area) was financed under the Interreg Med Programme 2007-2013. The project

²³ http://ec.europa.eu/project/rcn/205933_en.html
²⁴ <http://www.pacmanproject.eu/> and http://www.pacmanproject.eu/page/project-documents/doc-2012/10/CRETE_BEST%20PRACTICE_Report.pdf

aims at stimulating the innovative and dynamic capacities of the agrofood sector in Mediterranean regions, which are able to promote attractiveness and competitiveness at transnational level. The project was operationalised through the cooperation of public and private actors working on innovation issues.

The Region of Crete developed one good practice, the 'Cretan Quality Agreement'. It is a non-profit organisation which aims to promote the Cretan diet and Cretan local products. Two new regional labels of quality are introduced. These are the label of Quality of Cretan Cuisine that certifies local restaurants and the label of Open Wineries that certify Cretan wineries. The main aim of the initiative is to promote the Cretan diet. The project has been funded by local, regional and European funds, internal capital and funds from local organisations and entrepreneurs. One of the success factors of the practice has been the contribution and involvement of local government and local stakeholders from the tourist sector. This can open new paths in combining the primary sector with the tourism sector, as quality local products can serve as tourist products too.

4.4 Cliq project²⁵ - *bringing governance, research, market and civil society together*

The logo for CLiQ consists of the letters 'CLiQ' in a bold, green, sans-serif font. The 'i' is lowercase and has a dot. The 'Q' is uppercase and has a tail that curves upwards.

CREATING LOCAL INNOVATION THROUGH A QUADRUPLE HELIX

CLiQ (Creating local innovation through a quadruple helix) was funded under the Interreg IVC 2007-2013. It aimed at strengthening local and regional authorities' policy and capacity to support innovation in medium-sized cities. A successful factor of the project has been the cooperation combination of the Triple Helix, i.e. the cooperation between governance level, universities and industry together with civil society.

A best practice coming from Crete regards the development of the 'Innovation Pole of Crete – I4CRETE'. The aim of the initiative was to enhance the relationships and cooperation between businesses, local universities, technological and scientific fields on the island. The initiative focused its activities on i) information society, ii) biotechnology and iii) medical technology. Several local actors of different fields participated in the initiative, among other the Heraklion Chamber of Commerce, Centre for Technological Research of Crete, as well as companies and local authorities.

Among its outcomes are the reinforcement of existing research partners, the development of applied research on specific thematic areas, such as aquaculture, molecular identification of varieties of olive tree and vineyard, the creation of new products which were exploitable in business terms, the development of regional technological platforms for the diffusion of marine biological resources, knowledge and technology diffusion tasks. More specifically, in the primary sector, the initiative had an impact on creating olive oils' and wines' identity and certification, and establishing innovative quality controls for fruits and vegetables.

²⁵ http://www.cliqproject.eu/filebank/1178-CLiQ_CTRC_innovation_pole.pdf and http://www.cliqproject.eu/en/cliq_project/?id=2

4.5 Adapt2Clima²⁶ - *adapting to climate change through cooperation*



Funded by LIFE, Adapt2Clima aims at increasing knowledge regarding the vulnerability of the EU Mediterranean agriculture to climate and to support decision making for adaptation planning. The project comprises three of the largest islands of the Mediterranean, Crete, Sicily and Cyprus and has established networking opportunities with other projects. Started in 2015, it plans to raise awareness on the issue, develop climate change adaptation strategies for the project areas, assess the vulnerability of the pilot areas and estimate the future climate changes in the three areas of focus and their selected agricultural areas.

4.6 Amari Hybrid Energy Project at Crete²⁷

Amari is a hybrid system that combines effectively wind energy and hydro pumped storage technology. It secures high quality and cost efficient renewable energy production, while reducing the imports of fossil fuels. The hydroelectric production enhances the island transmission grid, contributes to the reduction of wind power variability and uncertainty and delivers further services to the system, such as frequency control, voltage control, spinning reserve, standing reserve, black start, remote automatic generation control, grid loss compensation and emergency control action.

4.7 MoRe²⁸ - *energy production from olive pits*



MoRe (Market of Olive Residues for Energy) was a project under the Intelligent Energy Europe initiative. The project aimed at addressing the problems of olive oil producers, offering a way to solve the problem of waste by using it for energy purposes. The core of the project was the creation of chains for energy from olive residues, by involving public and private players, identifying problems and solutions and actions.

There are three selected best practices in Greece for this project which are located in Chania, Crete:

- ▶ ABEA, a company which developed a heating system with biomass and oil extracting system from pomace.
- ▶ BIOMEL, a company which developed pomace oil extracting system using pits as well as trades pits to the UK.
- ▶ GIANNOULIS CRAFT – BASED UNIT, has developed a district heating central system in buildings with pits. The system can be applied for heating factory buildings, boiling water and for pomace drying.

²⁶ <http://adapt2clima.eu/en/>

²⁷ <https://ec.europa.eu/eipp/desktop/en/projects/project-33.html>

²⁸ <https://ec.europa.eu/energy/intelligent/projects/en/projects/more>

4.8 WATBIO²⁹ - *universities cooperate for biomass projects*

WATBIO project funded by FP7 and coordinated by the University of Southampton and brought together 22 partners from the scientific, technical and commercial fields, with experience on biomass crop development. The overall purpose of WATBIO is to increase the efficiency of plant breeding to provide improved biomass crops suitable for growing on drought-stressed marginal lands. The University of Crete participates in this initiative.



4.9 Creta Farms and the Investment Plan for Europe³⁰ - *investing in technology and innovation for healthier food*



Creta Farms is a good example of financing research, development and innovation in the agri-food industry. Creta Farms, founded in 1970 and based on Crete, is today one of the biggest cold-cuts companies in Greece. The company developed an innovation and introduced new product lines in cold cut meat and dairy food, based on its 'oliving technology'. This technology removes the saturated fat from meat and injects extra virgin olive oil, which contains unsaturated fat. The meat gets healthier, as it reduces the levels of 'bad' cholesterol, by being healthy at the same time. In May 2016, the company signed an agreement with the European Investment Bank to receive funding under the Investment Plan for Europe (EFSI) to invest and develop further its technological advancements and diversify and complement its financing base outside Greece.

4.10 B.I.C of Crete³¹

B.I.C. of Crete is another initiative taking place on the island of Crete. Established in 2014 by the Holy Metropolis of Ierapetra and Sitia, Crete, and the participation of other public and private bodies, B.I.C. of Crete offers consulting services to private companies, especially SMEs, local authorities, and public sector parties to enhance their competitiveness and efficiency. It supports competitiveness in the region, helps to introduce new technologies and provide SMEs with access to foreign markets. Among its objectives are the scientific technical support of enterprises, the provision of incubator services and the supply of education and training services.

²⁹ <http://www.watbio.eu/partners/>

³⁰ https://ec.europa.eu/priorities/sites/beta-political/files/investment_plan_booklet_en.pdf

³¹ http://www.bicofcrete.gr/?page_id=876

4.11 Cosmetics Biomass³²

Another potential good practice can be the sustainable sourcing of cosmetic ingredients, which includes the use of bio-based raw materials. To avoid waste and to use by-products of agriculture in the best possible way, a material and energy management (MEM) system of bioeconomy needs to be established. Crete can serve as a model region for the evaluation of biomass which is suitable for cosmetic ingredients, given its advantageous climate and rich flora.

4.12 Innovation and Entrepreneurship Unit, University of Crete³³

Another good practice is the Innovation and Entrepreneurship Unit of the University of Crete. Through specialised courses, mentoring, research and social networking with the business sector, the unit provides students with good practices, methods and tools in the field of innovation and entrepreneurship. The aim of the Innovation and Entrepreneurship Unit is to provide knowledge and capabilities to students in order to better combine the academic with the innovation and market world. Among others, students have the chance to develop business plans and prototypes on topics of innovative entrepreneurship.

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.

Still at an early stage, but with high potential. The implementation of the Regional Innovation Strategy in Crete is still at a very early phase. The region seems to be very active not only in the participation in European networks, related to bioeconomy themes, but also in applying to EU-funded projects, such as projects under Interreg or Horizon 2020. Having said that, the region envisages to continue in a similar way. More specifically, it especially wishes the cooperation with other regions, and plans to apply for EU-funded projects.

No problems in the facilitation of projects. The region's experience with the participation in several projects, has shown that there are no problems in the development or in the participation in different projects. The procedures have been followed with no problems.

Bringing the research and market worlds together is a bet for the future. As mentioned in earlier sections, Crete has an important and high research potential. What has been reported as a bottleneck is the missing link between the research community and the

³² A. Wanninger, H.E. Katerinopoulos, G. Christoforou, R. Kohlen, Th. Köhler, K. Poth, F. Schulze Spüntrup (2015), Sustainable Sources for Cosmetic Ingredients – Evaluation of the Biomass of Crete as a Model Region, SOWF-Journal, 141, 1 / 2.

³³ <http://www.dasta.uoc.gr/innovation/>

companies. This is mainly due to a lack of cooperation culture between the two sectors. It has often been the case that the research sector has approached at times several businesses to fund their ideas, but the other way round was hardly ever the case. These are two different worlds (people sitting at a lab all day, unaware of the real market needs versus people who are aware of the market needs but cannot innovate alone) that need to be brought together. This mindset change will be a bet for the future. In other cases, the private / company sector is usually reluctant to innovate. The word innovation still 'scares' companies, as they fear the risk of investments in the field. In addition to that, the overall environment of financial crisis poses some challenges for the future. The financial capability of many companies is low and banks are also often reluctant to lend for risky investments.

Need for a database of available material. The collection of all available material, such as projects, initiatives, ideas, good practices would be very helpful to bring the bioeconomy forward. Such a database is currently missing, but would contribute in showcasing the potential and added value of such practices in future.

To conclude, the regional authorities seem committed to implement the bioeconomy priorities in the region, promote cooperation, participate in networks and cooperate with other regions, as well as participate in relevant projects. The fact that the RIS3 priorities reflect the regional, and European, priorities is an advantage and enhances this commitment. The aim for the future should focus on a change of mindset, bridging the world of research with the world of the market, as well as unfreeze the market constraints towards new ventures. This will be the only way forward for a better deployment of the bioeconomy opportunities and of demonstrating the region's dynamic.

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Relevant websites:

- <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/region-kriti>
- <http://www.hcmr.gr/en/about-us/missions-objectives/>

- <http://www.forth.gr/index.php?l=e>
- http://www.liaison.uoc.gr/index.php?option=com_content&view=article&id=277&lang=en) and <http://www.innovationcenter-crete.gr/>
- <http://www.nagref-her.gr/en>
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- <https://rio.jrc.ec.europa.eu/en/library/strategic-partnership-agreement-research-technology-development-and-innovation>
- <https://rio.jrc.ec.europa.eu/en/library/national-strategic-framework-research-and-innovation-2014-2020>
- <https://rio.jrc.ec.europa.eu/en/library/action-plan-implementation-national-strategy-research-technological-development-and>
- https://www.google.com/maps/d/viewer?mid=1p3gL7nvL6b19tAuW8KARU47_h7E&ll=35.25215533460261%2C24.919688500000007&z=
- <https://rio.jrc.ec.europa.eu/en/organisations/national-council-research-and-technology-n crt>

Project websites:

- <http://www.pacmanproject.eu/>
- http://cordis.europa.eu/project/rcn/205933_en.html
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Nb: There will soon be a website dedicated to the implementation progress of the Regional Innovation Strategy (RIS3) Crete.

Interviews and Contact details:

The interviews were held under a teleconference in the form of a small focus group.

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