

#3

Zero waste: problems become opportunities

**Waste prevention
and management**

Interreg
Mediterranean



GREEN GROWTH

Project co-financed by the European
Regional Development Fund

September 2019



Zero waste: problems become opportunities

Waste prevention
and management

About the Circular Economy White Papers

This White Paper is part of a series of thematic Circular Economy White Papers presenting the contributions of the Interreg MED Green Growth community to the transition towards a circular economy, in the areas of:

- 1) Resource Efficiency
- 2) Green and Smart Public Services
- 3) Waste Prevention and Management
- 4) Competitiveness and Innovation.

*A circular economy is
'where the value of products,
materials and resources is
maintained in the economy
for as long as possible,
and the generation
of waste minimised'.*

European Commission 2015¹

The thematic White Papers are complemented with a transversal White Paper and accompanied by a set of Policy Recommendations and Legal Recommendations in the same thematic areas. The elaboration of the White Papers has been led and developed by the SYNGGI project based on contributions from modular projects of the Interreg MED Green Growth Community², through dedicated Thematic Working Groups on the four thematic areas.

1. European Commission (2015). Closing the loop - An EU action plan for the Circular Economy.
2. <https://green-growth.interreg-med.eu>
3. European Commission (2019) Sustainable Products in a Circular Economy - Towards an EU Product Policy Framework contributing to the Circular Economy

Waste Prevention and Management and the Circular Economy

The transition to the circular economy is a shift from the linear take-make-waste economic model to a model where the economic value of the resources is fully utilised and the burden on global natural resources is reduced. Ideally, all waste is prevented or recycled in a circular economy. As such, products are designed in a way that materials and components can be restored and re-introduced (looped) into the economy, from production and consumption to reusing, repairing, re-manufacturing, refurbishing and recycling. Figure 1 gives a holistic overview of the entire agro-food value chain, demonstrating how the circular economy concepts can work within this sector. In transitioning to a circular economy, it is useful to distinguish between the technical and the biological cycles. The technical materials are non-renewable fossils and mineral-based materials

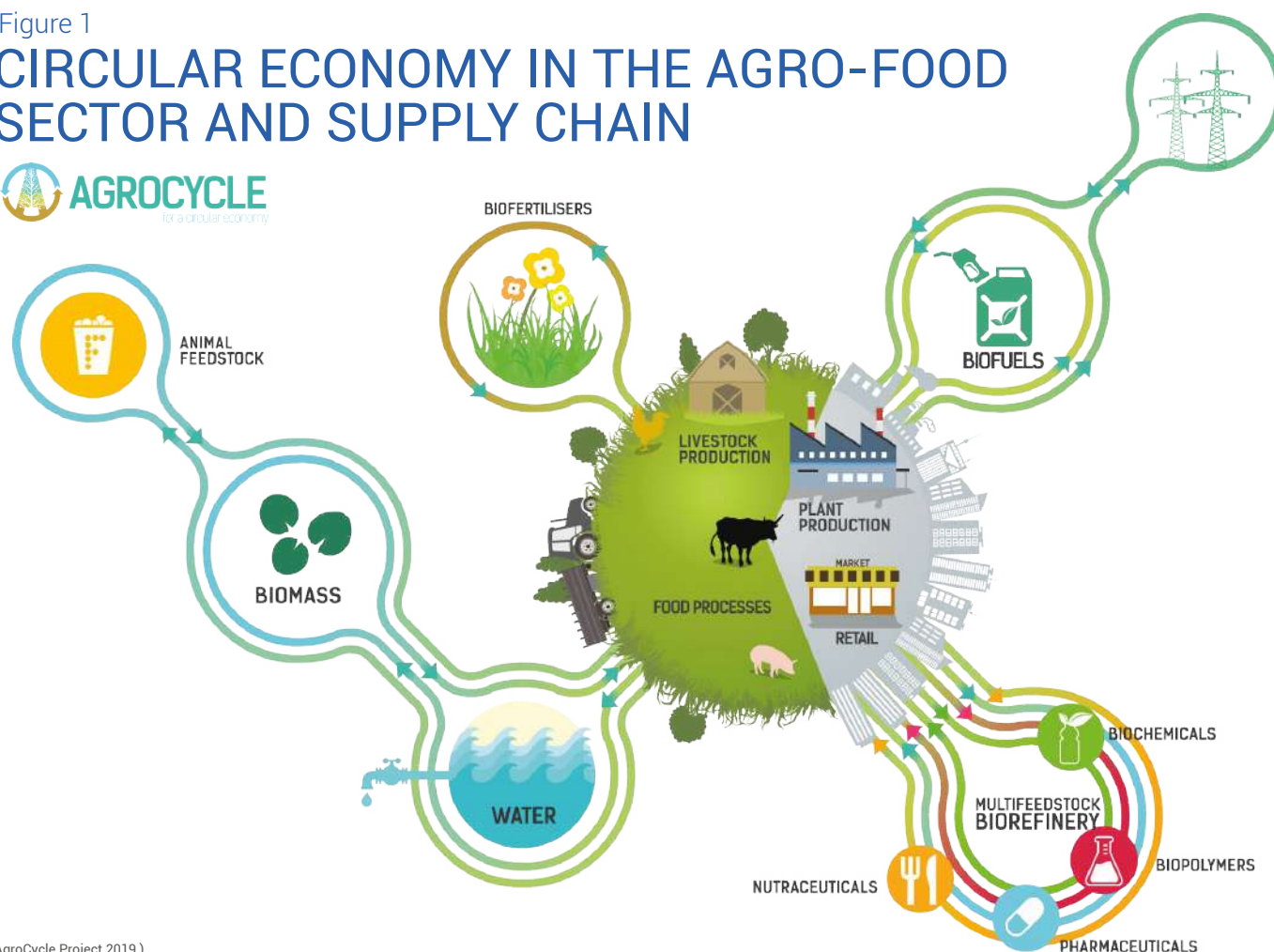
such as metals or plastic, and therefore the aim is to loop these materials into the economy for as long as possible in order to utilise their full value potential³.

However, the biological cycle is one of importance to the agro-food industries and related supply chains. The biological cycle is renewable and characterised by the principle of cascading use (see Figure 1). This means, for example, that biomass from agriculture, the food industry or forestry is treated in bio-refineries and valorised as nutrients that can be turned into new bio-based products in a number of value-chains.

Figure 1: Circular Economy in the Agro-food Sector and Supply Chain. (AgroCycle Project 2019 <http://www.agrocycle.eu>)

Figure 1

CIRCULAR ECONOMY IN THE AGRO-FOOD SECTOR AND SUPPLY CHAIN



(AgroCycle Project 2019)

A 2014 scoping study⁴ analysed which materials have the biggest impact from a circular economy perspective and identified the following priority materials: agricultural products and bio-waste, wood and paper, plastics, metals and phosphorous. This led to the identification of priority products and sectors, which the study found to include, amongst others, packaging and food. Managing the life cycle of these natural resources, from extraction through the design and manufacture of products, to what is considered as waste, is essential to green growth and part of developing a resource-efficient, circular economy where there is no waste.

Waste prevention and management must therefore play a key role in this transition away from the linear model towards a sustainable system with minimal or zero waste as well as including high-quality secondary resources.

Although not part of the EU's Circular Economy Strategy, animal by-products (ABPs) (livestock waste) are no less important. The EU regulation on animal by-product waste⁵, the most stringent in the world, divides this waste into categories according to the risk they pose. Recycling of livestock waste and other animal products considered to be waste materials into animal feed, for example, can bring major benefits to the economics of livestock production and the environment in the EU.

The new Fertilising Products regulation⁶, undergoing the final steps of the legislative process, introduces harmonised rules for organic fertilisers manufactured from secondary raw materials such as agricultural by-products and recovered bio-waste. The new regulation includes the following points:

- To substantially reduce significant market entry barriers for more sustainable and circular products;
- To impose new limits on hazardous substances for all fertilisers, including virgin raw materials and lowering the risk of material cycles containing dangerous levels of certain toxic elements;
- To implement end-of-waste criteria, thereby contributing to the smooth functioning of the interface between chemicals, products and waste legislation and giving investors more legal certainty.

For certain recovered wastes, for instance struvite, ... within the implication of Directive 2008/98/EC of the European Parliament and Council, a market demand for Struvite's use as a fertilising product has been identified. Therefore, in compliance with all the requirements of this Regulation, these products cease to be regarded as a waste within the significance of Directive 2008/98/EC, and should, therefore, be possible for fertiliser products containing or consisting of these such recovered waste materials to access the internal market⁷.

However, in order to move forward to increase waste prevention, recycling and reuse rates in the Mediterranean, the key challenge is to implement circular economy policy principles into existing waste management approaches, legislation and directives in the Member States and regions. This white paper sheds light on where those approaches, legislation and directives should focus.

4. IVM et al (2014). Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains.

5. Regulation (EC) No 1774/2002

6. <http://ec.europa.eu/transparency/regdoc/rep/1/2019/EN/COM-2019-190-F1-EN-MAIN-PART-1.PDF>

7. Regulations (EC) No 1069/2009 and (EC) No 1107/2009 CE marked fertilising products amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 (COM(2016)0157 – C8-0123/2016 – 2016/0084(COD)) http://www.europarl.europa.eu/doceo/document/TA-8-2019-0306_EN.html

The Interreg MED Green Growth Community and its contribution to waste prevention and management for a circular economy

The objective of the Interreg MED Green Growth community is to promote sustainable development in the Mediterranean area. This is based on sound management of natural resources and by fostering innovation through an integrated and territorially based cooperation approach. Within this Interreg MED Green Growth community there are two modular projects that are driving circular solutions in one of the biggest industries in the Mediterranean (the agro-food industry) and are contributing to the promotion of waste prevention and management:

- **RE-LIVE WASTE** (Improving innovation capacities of private and public actors for sustainable and profitable REcycling of LIVEstock WASTE). The overall project objective is to improve the innovation capacities of public and private actors involved in the management of waste from intensive livestock farming (representing a major source of pollution, an environmental challenge for society and an economic problem for farmers),

through stronger cooperation amongst the quadruple helix actors (academia, civil society, public authorities and the private sector). The project contributes to two key sectors in the Mediterranean regions (agriculture and livestock), by favouring innovative applications, which will make the livestock sector more productive, sustainable and competitive. The project tests pilot plants which transform livestock waste into organic high-value commercial fertilizers, contributing to smart and sustainable growth and to the creation of new business and market opportunities. The conversion of waste into high-value commercial fertilizers (an increasingly important issue for the quadruple helix stakeholders) is addressed by the project through a transnational network and by the design of a shared strategy to raise awareness. RE-LIVE WASTE contributes to reach the EU2020 strategy, addressing the targets related to employment and innovation as well as climate change and energy. Figures 2 and 3 below show the bio-digestate and struvite precipitation plants in action in Italy and Cyprus.

Figure 2: Bio-digestate in Arborea (Italy) to be treated in the Struvite precipitation plant

Figure 3: Struvite precipitation plant in Cyprus



Figure 2



Figure 3

• **REINWASTE:** (REmanufacture the food supply chain by testing **IN**novative solutions for zero inorganic **WASTE**). The project aims to bring a tangible contribution to the reduction of inorganic waste at source, favouring the adoption of greener innovative concepts in the agriculture and food industry, with a special focus on SMEs.

REINWASTE contributes to overcoming the persistent lack of knowledge on the available solutions and the diversity and fragmentation of inorganic waste prevention procedures through a tailored mix of knowledge transfer services, based on a common open innovation model that will be tested by a Mediterranean network that includes regional bodies, Research and Innovation centres and clusters, and agro-food business associations.

Responding to consumer awareness, environmental regulations and market competition, REINWASTE aims to help agro-food enterprises improve their production processes, reducing environmental impacts of inorganic waste by focusing on the most efficient and sustainable tenets of the waste hierarchy: 1. Waste prevention, 2. Material recovery, 3. Recycling and 4. Waste valorisation. In this regard, REINWASTE aligns with the circular economy model in the waste sector.

To limit the production of inorganic waste, REINWASTE identifies and tests solutions in 3 Agro-food/chains:

- Horticulture in Andalusia – Spain
- Meat sector in Provence-Alpes-Côte d'Azur – France
- Dairy sector in Emilia-Romagna – Italy



Challenges and opportunities addressed by the interregional green growth community projects



Moving from a linear economic model in a traditional sector such as Agro-food to a circular model is not automatic, as there are significant challenges that the sector must face in order to implement sustainable changes. The increasing demand for food worldwide is affecting the natural resource consumption and leading to the production of vast quantities of by-products and agro-food-wastes, which need to be treated in an environmentally friendly manner. Specifically, to appease the high food demand within the Mediterranean region, cattle and pig livestock farming has intensified over the last 40 years, resulting in large quantities of waste that are required to be effectively managed. Intensive cattle and pig farming produces large quantities of organic waste and residues that represent an important economic problem for farmers and an environmental issue that needs to be minimized. The challenge remains to continue to increase the valorisation of many of these organic fractions from the agroindustry into bio-based secondary products or bio-energy in order to reduce the impact of sewage disposal or to recover nutrients that compete with mineral fertilizers.

Specifically, with focus on individual case studies, some particular challenges include:

- In a case study in **Bosnia and Herzegovina**, the Butmir dairy farm produces 60 mc/day of manure. In this case the nitrogen produced from the site is 2.5 times higher than the EU Nitrate Directive regulation.
- In a case study in **Sardinian** (the Producers cooperative Arborea), the daily production of anaerobic digestate is 2,300 m³ (1.000.000 m³/y). At present, the Cooperative has an availability of 6000 Ha of agricultural surface devoted to receive this digestate. The entire surface is classified as vulnerable to nitrates with a maximum N yearly application of 170 Kg/Ha. The nitrogen applied on this surface is in excess of what the land can handle and thus falls outside of the nitrogen levels of the EU Nitrate Directive.
- In **Spain**, 84million m³ of slurry is produced, mainly spread on fields as fertilizer, however the volume exceeds the agricultural needs in production areas. Implemented in 2017, there are regional regulations for limiting the way slurry can be applied. Some municipalities have further added more regulations (that include timing of applications, restricted areas, etc.), thereby necessitating the treatment of the slurry.
- In **Cyprus** in 2013, a total manure production was estimated at around 1,591,862 t/y. Only 16% of this manure was processed meanwhile the majority (84%) was left untreated.

Furthermore, at the primary production level the challenge remains within the management of inorganic fractions, specifically in relation to plastics (films, nylon, greenhouse coverings, mulching plastic covers, agro-chemical packaging and food packaging, silage film and plastic baling nets, etc.), which are still difficult to recover and that are currently disposed of by landfill and other environmentally sensitive routes (uncontrolled, abandoned or incinerated).

For instance, the plastic used as protection material in greenhouse horticultural production represents approximately 6% of the total waste produced in intensive agriculture and the remaining 94% corresponds to organic residues. The estimation (done as part of the REINWASTE project) for 35,000 hectares dedicated to horticultural production in greenhouses in Andalusia, Spain, shows that more than 90,738 tons of inorganic waste (with a volume of 187,050m3) is produced every year (figure 4).

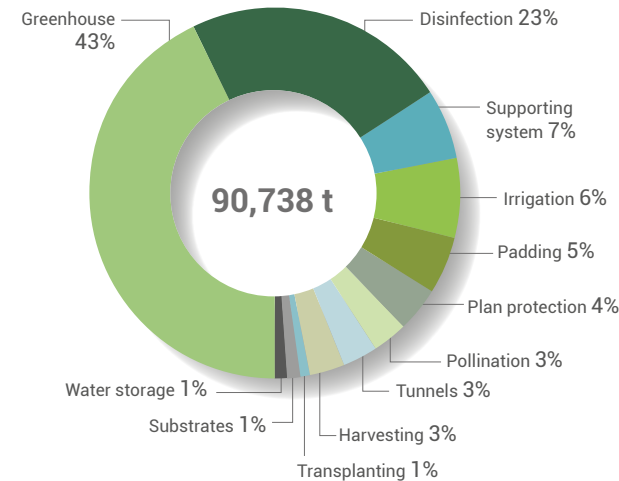
The maintenance of the cover structure and the plastic for disinfection are the aspects with a greater weight significance in greenhouses (43% and 23%, respectively). The materials used to carry out the above-mentioned tasks, and the main residues produced, correspond to the metals from the structures of the greenhouses (41%) and the low-density plastics (LD) used in the covers (38%). It is important to highlight that 5% of the weight produced corresponds to polypropylene (raffia and supporting elements), which pose significant difficulties in the management of organic wastes (figure 5).



Figure 6: Examples of inorganic waste produced from greenhouse cover structures

Figure 4
DISTRIBUTION OF WASTE GROUPED BY THE FUNCTION OF THE FARMS IN ALMERIA, SPAIN (ANNUAL)

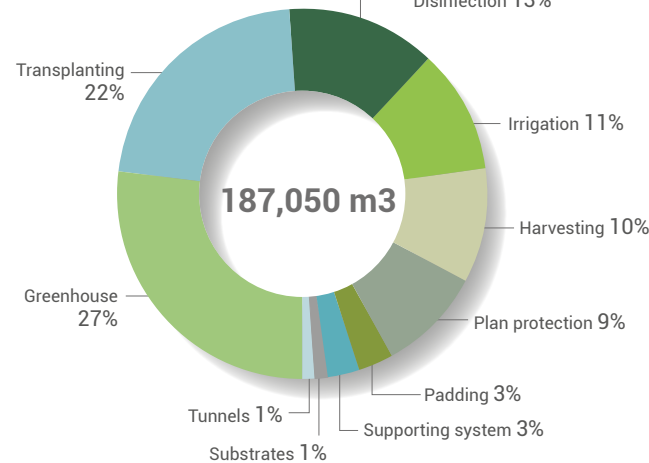
INORGANIC WASTE IN GREENHOUSES (Weight)



■ Shading 0%

Source: REINWASTE project, estimation produced by IFAPA.

INORGANIC WASTE IN GREENHOUSES (Volume)



■ Pollination 0%

■ Shading 0%

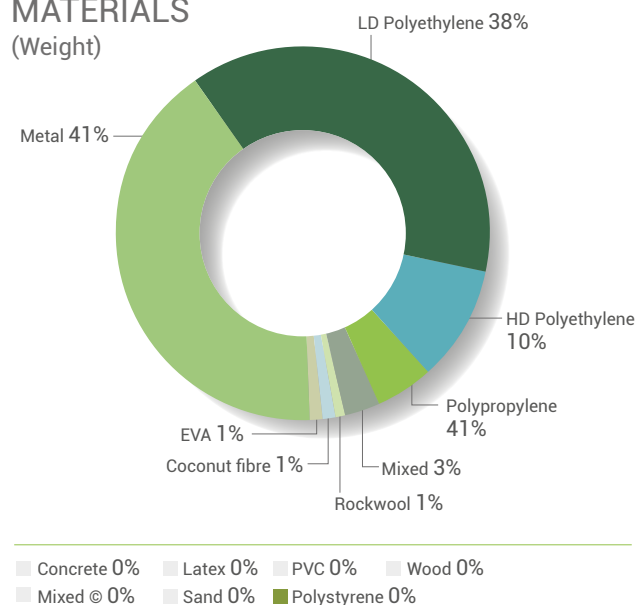
■ Water Storage 0%

Figure 5

ESTIMATION OF THE RESIDUAL MATERIALS PRODUCED IN 35,000 HAS OF INTENSIVE FARMING

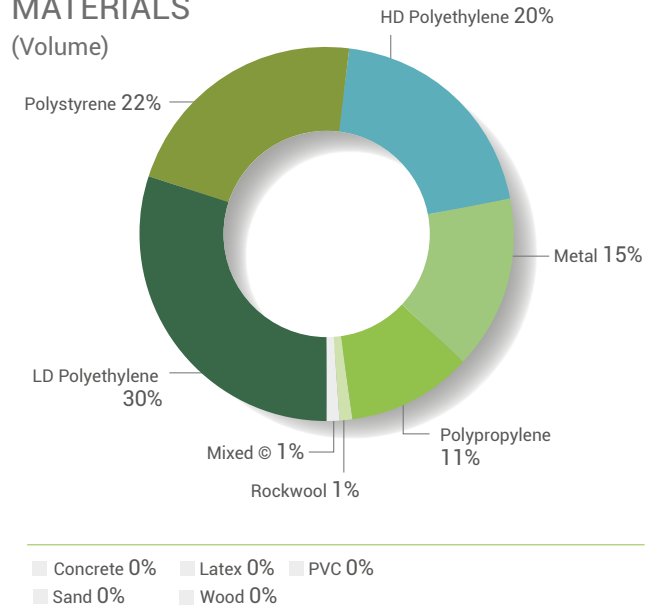
MATERIALS

(Weight)



MATERIALS

(Volume)



Source: REINWASTE project, estimation produced by IFAPA.

Further along the Agro-food value chain, reducing inorganic waste has a number of challenges specifically with relation to improving inorganic material recovery at farm, industry and consumer levels. The Environmental Implementation Review for Italy (2019)⁹ (where both RE-LIVE WASTE and REINWASTE are undertaking their pilot activities) shows that approximately 331 thousand tons of inorganic waste is produced by the agricultural sector (which includes agriculture, forestry, hunting and fishing), and accounts for 0.2% of the total inorganic waste produced in Italy.

Data from 2016 shows that the type of hazardous and non-hazardous waste and their quantities that are prevalently produced by the agricultural sector in Emilia Romagna Region (Italy) are:

- Hazardous wastes: chemical wastes (46%) and exhausted oils (26.11%)
- Non-hazardous wastes: sludge (37%), plastics waste (6.4%), wood and plant residues (17%), faeces, urine and manure (5.2%)
- Special waste (10.2%)

The following are the specific challenges that the community projects are tackling:

- To promote the standardised product (fertilizer) for recognition as a fertilizer at EU level¹⁰
- To pursue inorganic waste prevention along the Agro-food value chain through a robust transformation in supporting food production and process re-manufacture, in terms of optimising the use of materials and the re-design of products.
- To achieve zero inorganic waste in the Agro-food sector
- To produce Struvite from slurry and biogas digestate to support the new marked fertilising products and to aid in amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009

9. http://ec.europa.eu/environment/eir/pdf/report_it_en.pdf

10. In the "European Parliament legislative resolution of 27 March 2019 on the proposal for a regulation of the European Parliament and of the Council laying down rules on the making available on the market a CE marked fertilising product" (first reading), it is stated that:

part 1. The Commission is empowered to adopt delegated acts in accordance with Article 44 (...) for the purposes (...) of facilitating internal market access and free movement for EU fertilising products: (a) which have the potential to be the subject of significant trade on the internal market, and (b) for which there is scientific evidence that they: (i) do not present a risk to human, animal or plant health, to safety or to the environment, and (ii) ensure agronomic efficiency.

Solutions provided by the Interreg MED Green Growth community projects

The achievement of circular economy solutions in the waste sector relies on the implementation of strategies and processes that can help to overcome the aforementioned challenges. Some of the following strategies and solutions that have been implemented show how waste challenges can be overcome, providing new opportunities in the Agro-food sector.

Mapping and Testing the Best Available Technologies and Methodologies

Datasets that are produced to map out the Best Available Technologies (BATs) and Key Enabling Technologies (KETs) and products can help to identify the most promising zero-waste solutions. In the REINWASTE project this

has been done through capitalising on previous project results, as well as results from research and innovation centers and international actors in relevant green sectors. REINWASTE demonstration actions offered to 30 companies from 3 value chains (meat in Sud-Provence-Alpes-Côte d'Azur, milk in Emilia-Romagna and horticulture in Andalusia) have provided knowledge on BATs and KETs that demonstrates sustainable solutions. Some solutions identified for the horticultural sector are, for instance, bio-based materials such as biodegradable strings for horticultural plots, compostable trays for fruit and vegetable packaging, the use of long-lasting plastic covers, and the implementation of new inorganic waste management models and inorganic waste traceability systems.

In addition to the BATs and KETs, Action Plans to reach targets set by S3 (Smart Specialisation) for the agriculture and food industry, and for the identification of other regional systems in the Mediterranean area, provide the essential requirements to extend the advanced scouting methodology developed by REINWASTE. Related targeted plans of transferability are also elaborated within the project.



Pilots, Results and Key Success Factors

The RE-LIVE WASTE project pilot actions are currently studying the level of effectiveness of the technology applied to the pilot plants in transforming livestock waste into organic high-value commercial fertilizers (such as Struvite), contributing to smart and sustainable growth and to the creation of new business and market opportunities. The RE-LIVE WASTE project outputs include 4 demonstrative Struvite Precipitation (SP) plants, and policy guidelines to stimulate innovation adoption and set-up a common suitable legal framework for struvite as fertilizer.

Testing innovative products and technologies in pilot actions as part of the REINWASTE project, in 30 production companies and industries for each sector in each country, will provide the companies with the most suitable advanced solutions to be introduced into their production chains to reduce inorganic waste. The testing will also include business and feasibility plans. For instance, in the horticultural greenhouse sector, some bio-based materials can already be offered to substitute inorganic materials, such as biodegradable and compostable strings and clips for plant staking or biodegradable mulching plastic films (Figure 7). Other possibilities include the valorisation of difficult management wastes such as thin plastics, or the use of long-lasting plastic covers. Tests will bring back more sustainable and greener production systems. A sustainability analysis, which includes a socio-economic and environmental survey, as well as a market analysis and feasibility study for launching a new REINWASTE service to systematize the offer-demand of innovative solutions, will be carried out.

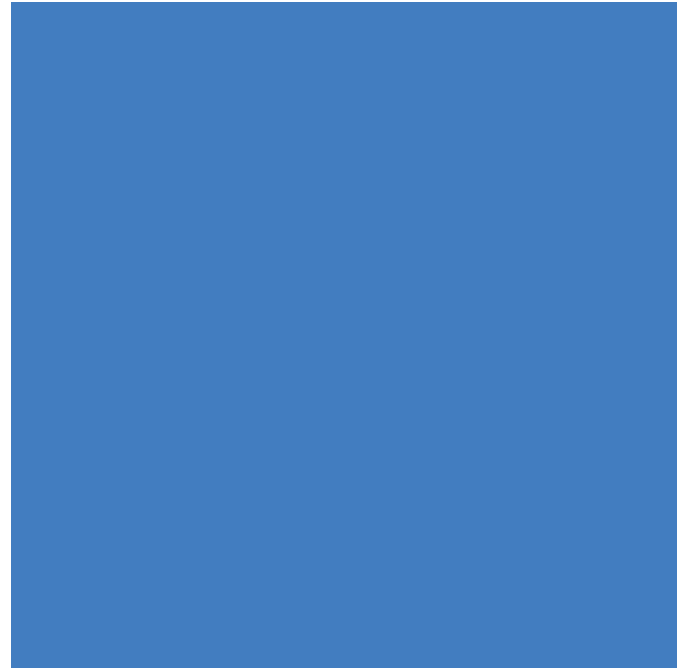


(Top) Compostable clips
(Bottom) Biodegradable mulching film
Figure 7: Identified BATs and KETs
in the horticultural sector

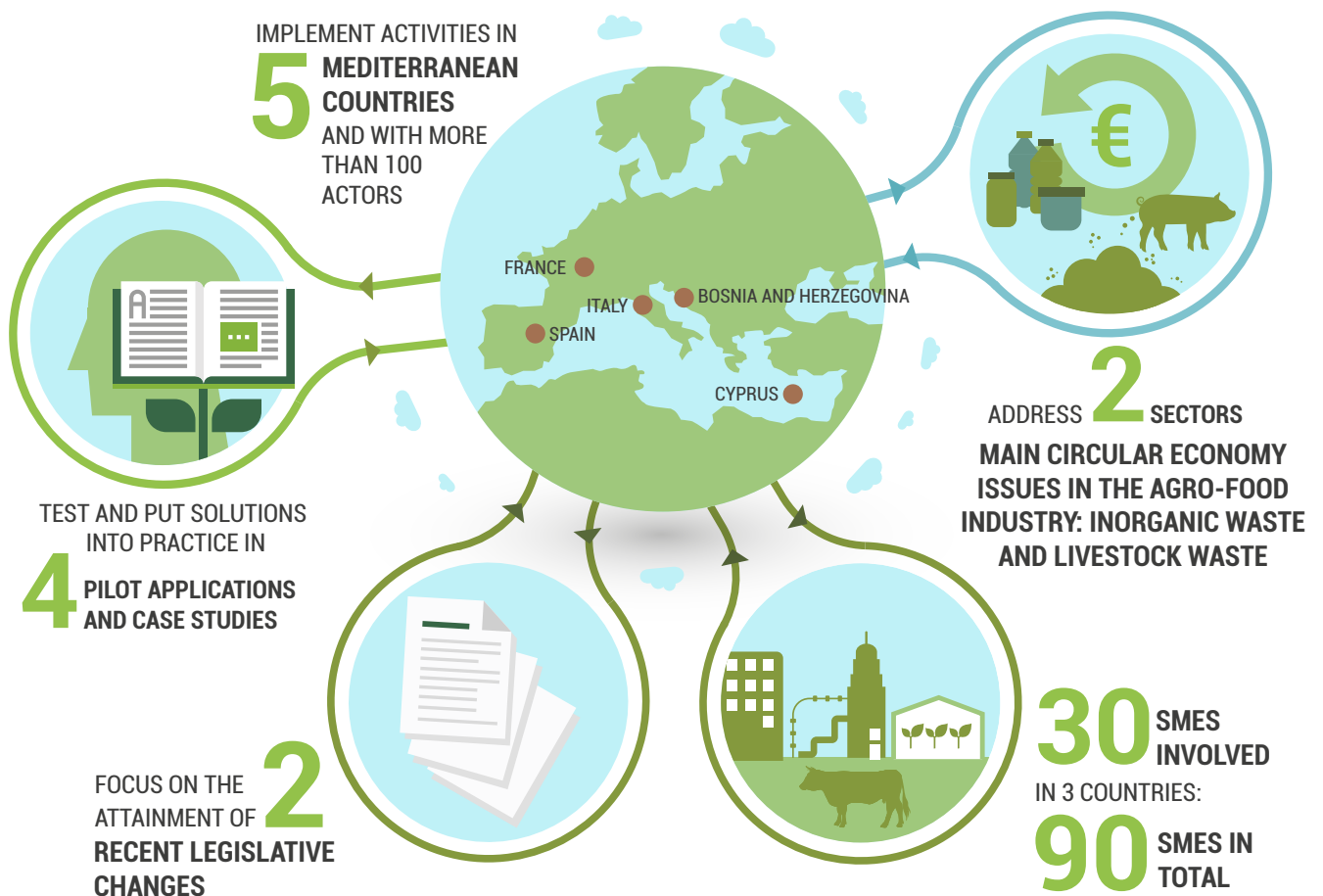
A common approach from the projects of the Interreg MED Green Growth Community is to apply, test and validate solutions in sectors and regions, and thus provide evidence on what works in terms of promoting waste prevention and management and Green Growth in the Mediterranean region, in a manner that is highly context-specific and at the same time regionally scalable and replicable.

Together, the featured projects have:

- Implemented activities in 5 Mediterranean countries: Cyprus, Bosnia-Herzegovina, Spain, Italy and France and with more than 100 actors
- Tested and put solutions into practice in 4 pilot applications and case studies
- Addressed 2 main circular economy issues in the Agro-food industry: Inorganic waste and livestock waste
- Focused on the attainment of 2 recent legislative changes
- Involved 30 SMEs in 3 countries (90 SMEs in total)



TOGETHER, THE FEATURED PROJECTS



Factors that are external to a project, programme or initiative within the circular economy ambit can vary from region to region, country to country, or indeed from sector to sector. These factors can include contextual variables such as: policy framework, stakeholder engagement, the socio-economic situation, etc. With regards to waste prevention and management in the Mediterranean within the Agro-food sector, the following external factors have enabled the projects to be successful:

An Enabling Environment conducive to innovation

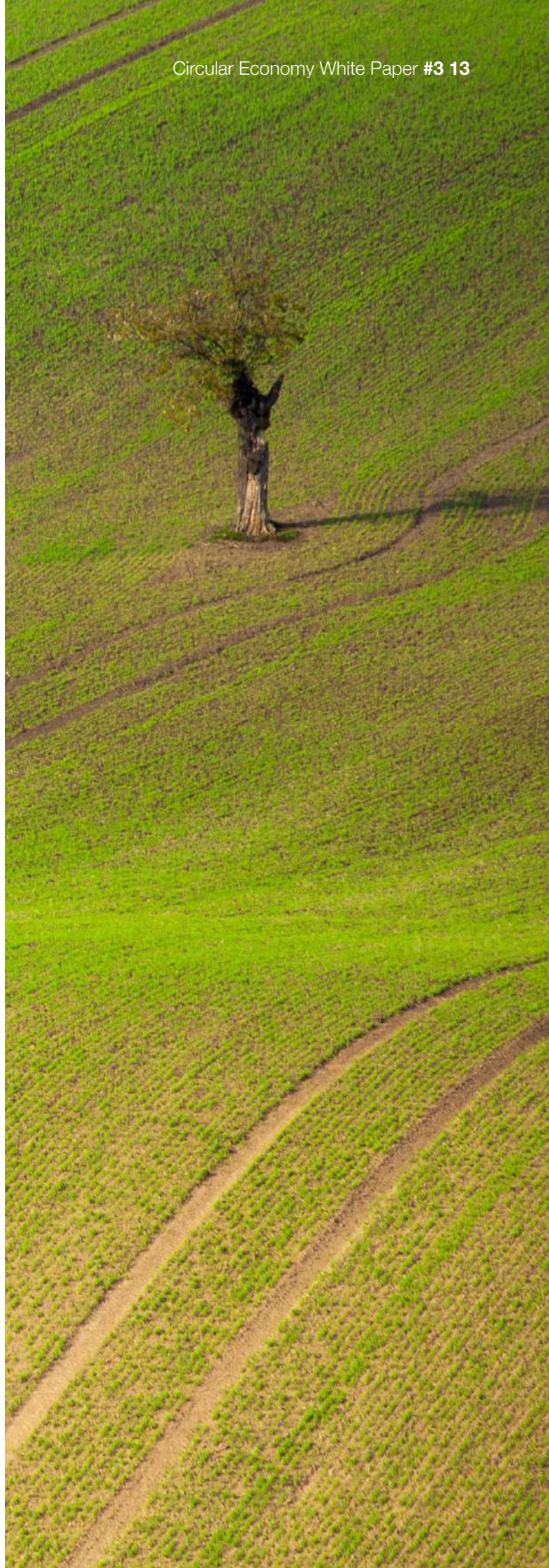
Waste prevention and management in the Mediterranean is afforded the opportunity to operate within a European legal framework. The ability to be working within a legal framework that allows for innovation and adaptation, as well as innovative frameworks in some EU countries, pushes the adoption of legal measures within other member states and provides an enabling environment where innovation can take place. Furthermore, operating within a favourable context-policy framework that is moving in the same direction as waste prevention and management in circular economy project provides the grounds for innovation to occur. For instance, the current proposal for regulation to lay down the rules for a CE mark for fertilizer products amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009, now includes the recognition of fertilisers derived from livestock waste, such as Struvite. This change in the enabling environment allows the sector to innovate and drive the circular economy process.

Alignment of global issues to the projects' objectives

One of the most relevant external factors is that waste (inorganic and organic) is a topical issue, which results in an increase of awareness and interest by all stakeholders involved in the project, as well as external companies and stakeholders related to agricultural production and industrialization.

Effective Stakeholder Engagement

The involvement, interaction and effective engagement of all the stakeholders in the waste value chain, who are sensitive to inorganic waste matter (REINWASTE project example), makes it possible to approach the issue of waste from a multi-stakeholder point of view, which has guaranteed an integrative approach to the solutions, ensuring the correct decisions have been made. The REINWASTE project also promotes improvement in the knowledge regarding the types and quantities of inorganic wastes produced in each value chain. This knowledge permits stakeholders to choose the best solutions to eliminate, substitute, recover or recycle these wastes. Furthermore, through promoting consumer awareness of the non-consumption of plastic packaging, such as through reuse and recycling, can lead to shared responsibility of the economic and environmental models.



The Interreg MED Green Growth Community modular projects within waste prevention and management (REINWASTE and RE-LIVE WASTE) focus on the two main areas facing waste generation problems: inorganic and organic (livestock) waste. The engagement of stakeholders that cover the entire Agro-food value chain, the close collaboration among many different partners in the implementation of the projects and the demonstration of innovative circular waste solutions provides evidence that the transition towards a circular economy makes sense from both an ecological and economic perspective.

Circular Economy Monitoring Indicators

According to the European Commission's Monitoring Framework for the Circular Economy Action Plan adopted in 2018¹¹, there are two key challenges for the future in terms of waste management:

- (a) to reduce the levels of waste generation and
- (b) to align waste management objectives with those of the circular economy.



To achieve this, the EU has laid out the following Circular Economy targets:

The EU Circular Economy Targets Related to Waste Management

- To reduce landfill to a maximum of 10% of municipal waste by 2030.
- To prepare 65% of municipal waste for re-use and recycling by 2030.
- To prepare 75% of packaging waste for re-use and recycling by 2030.
- To introduce waste prevention programmes.
- To develop a common EU methodology to measure food waste and define relevant indicators.
- To promote an efficient use of bio-based resources through a series of measures, such as guidance and dissemination of best practices of the cascading use of biomass and support for innovation in the bio-economy within the field of clean technology bio-waste and residues.
- To take action to encourage the recovery of critical raw materials, and prepare a report on best practices and options for further action at the EU level.

Furthermore, within the monitoring framework document, in terms of waste prevention and management, the indicators identified by the Commission are:

- Waste generation (as an indicator for consumption aspects);
- Recycling rates (the share of waste which is recycled);
- Specific waste streams (packaging waste, biowaste, e-waste, etc.).



How the INTERREG MED GREEN GROWTH COMMUNITY PROJECTS are assisting in these identified indicators.

WASTE GENERATION

The EU municipal waste generation per capita has dropped by 8% between 2006 and 2016 to an average of 480 kg per capita per year. The quantity of waste generated still correlates to a certain degree with GDP per capita. Therefore, the data on total waste generation (including industrial and commercial waste but excluding major mineral waste) per unit of GDP shows a decrease of 11 % since 2006.

Within the Agro-food sector in the Mediterranean, waste generation data (amount/volume and type of waste produced) can be obtained. For instance, the REINWASTE project has obtained data from strategic agricultural sectors in Europe.

RECYCLING RATES

Between 2008 and 2016, EU recycling rates for municipal waste increased from 37% to 46%⁹.

Focusing on the Livestock sector in the Mediterranean, the recovery and transformation of livestock waste into Struvite for high-quality fertilizers can give an indication of recycling rates in this sector. Specifically, within the RE-LIVE WASTE project, the installation of 3 new and 1 upgraded demonstrative Struvite Precipitation (SP) plants provides demonstrable indicators for this sector.

SPECIFIC WASTE STREAMS

In terms of the indicators impacting the Agro-food sector, between 2008 and 2015, the recycling rate for packaging waste (excluding plastic packaging) increased in the EU from 62% to 66%; it increased in almost all Member States. For plastic packaging, the average recycling rate in the EU is significantly lower, at 40 %, even though there have been improvements in recent years⁹.

These indicators set by the European Commission focus mainly on municipal waste, however within the Agro-food sector data is generated to report against these indicators. For instance, the total amount of waste treated and transformed per day per pilot plant (RE-LIVE WASTE) can be included within the waste generation indicators.

CALL TO ACTION

Bringing about a paradigm shift in the Agro-food sector, that has been accustomed to the take-make-waste linear model, is not an easy task. Action is required, successful case studies are needed and achievable monitoring indicators are necessary to support the sector toward the circular economy model.

A Call to Action from the Interreg MED Green Growth Community

The Interreg MED Green Growth community, through the implementation of projects that are shifting from linear to circular economy models, bring forward a number of calls to action for stakeholders in the Agro-food sector, from consumers to policy makers, to act on the following points:

- To bring forward positive change messages to consumers
- To better use/spread funds and subsidies
- To spread the different management models to a wider audience
- To continue to exchange experiences



Consumers

The management of inorganic waste is everyone's responsibility. Therefore, all actors that make up the different value chains, beginning with the producer and ending with the consumer, must respond jointly in respect to an environmentally friendly waste management solution.

Companies (SMEs)

The key point should be to demonstrate that waste reduction and recycling is a profitable business and that the use of waste materials is more convenient than that of raw materials. Furthermore, zero inorganic waste should be pursued in Agro-food value chains, beginning with waste reduction, recycling, reuse and valorization of actions.

For companies (SMEs) that produce inorganic waste, such as farmers and Agro-industries, there is a call to action to know and have available innovative solutions at sustainable costs in order to prevent the production of inorganic waste. In addition, it is necessary to have a network of widespread and efficient recovery plants that can make the recycling of inorganic waste advantageous from an environmental and economic point of view. Furthermore, it is necessary to ensure that the use of recycled material is safe and convenient compared to the use of raw materials.

EU funding Agencies

It is recommended that funds and subsidies be made available for proper waste management as the first step towards value chains restructuring and adapting to greener practices in the Agro-Food industry.



Policy Makers

More awareness regarding proper waste management is necessary along the whole value chain. Policy makers have the responsibility to support industries and territories with effective policies aimed at achieving real progress towards a circular economy.

Furthermore, with the lack of specific indicators for one of the main industries in the EU (the food sector), there is a call to action to modify the current set of circular economy indicators. Building on the work of the Interreg MED Green Growth Community projects, the following indicators are proposed for monitoring the transition towards a circular economy with specific focus on waste prevention and management in the Mediterranean region. These can be applied at local, national and regional levels.

- Best practices examples illustrating the avoidance of double packaging.
- Increased number of enterprises using waste raw materials in their industrial processes.
- Increased number of technologies available for the efficient recycling of waste.
- Increased number of enterprises recycling/reusing their waste in a profitable way.
- Increase in company investments in innovative solutions to minimize inorganic waste compared to the baseline.

- Data on KPI (Key Performance indicator) as a result of the pilot actions carried out in production and industry companies, which can be used to estimate the willingness of the companies to restructure their production process to greener production in order to reduce inorganic waste:

- Number of companies implementing any technological or managerial/ organisational solution within the project duration
- Number of companies willing to implement any technological or managerial/ organisational proposed solution.
- Investment costs to be mobilized by the companies to remanufacture their own productive system in the logic of inorganic waste minimization.
- Average RoI (Return of investment) of the proposed solutions.
- Policies to increase company expenses in innovative solutions to minimize inorganic waste compared to the baseline.
- Overall recycling rates, including those of other important waste/residue streams (Slurry; Biogas digestate from livestock waste).
- Recycling rates for specific waste.



REFERENCES

European Commission (2019)

Sustainable Products in a Circular Economy -
Towards an EU Product Policy Framework
contributing to the Circular Economy

European Commission (2019)

The EU Environmental Implementation Review 2019.

Country Report Italy. http://ec.europa.eu/environment/eir/pdf/report_it_en.pdf

European Commission (2018)

Monitoring framework for the circular economy.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:29:FIN>

European Commission (2015)

Closing the loop -
An EU action plan for the Circular Economy.

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614>

European Commission (2017).

Public Procurement for a Circular Economy.
Good Practice and guidance.

http://ec.europa.eu/environment/gpp/pdf/Public_procurement_circular_economy_brochure.pdf

IVM et al (2014). Scoping study to identify potential circular economy actions, priority sectors, material flows and value chains.

CONTACTS

Interreg MED Green Growth Community / SYNGGI project:

Website: <https://green-growth.interreg-med.eu>

Contact: **Mercè Boy Roura** (Lead Partner)

BETA Tech Center at Universitat de Vic

Universitat Central de Catalunya (Spain)

merce.boy@uvic.cat / medgreengrowth@uvic.cat

RE-LIVE WASTE:

Website: <https://re-livewaste.interreg-med.eu>

Contact: **Laura Chessa** (Lead Partner)

University of Sassari (Italy), laurachessa@uniss.it

REINWASTE:

Website: <https://reinwaste.interreg-med.eu>

Contact: **Rafael Fernandez Gomez** (Lead Partner)

AGAPA (Spain), reinwaste.agapa@juntadeandalucia.es





About the Interreg MED Green Growth Community and the SYNGGI Project

The Interreg MED Green Growth community is a thematic community of projects in the framework of the Interreg MED programme, which is a transnational European Cooperation Programme for the Mediterranean area. The Interreg MED Green Growth community counts with 15 projects working on different topics related to green growth such as sustainable agro-food systems, eco-innovation, green manufacturing, green public procurement, waste management and smart cities, among others.

The specific objectives of the Interreg MED Green Growth community are:

1. Empowered Green Growth community for Mediterranean and non-Mediterranean stakeholders:

creation of a solid community that acts as a hub to collect project results, disseminate and capitalize them among partners, consortia, stakeholders and countries.

2. Upgrading Green Growth community networks: the community creates bridges and seeks collaboration with networks, institutions and programmes inside and outside the Interreg MED cooperation area to transfer the knowledge and results of the projects and to promote synergies among initiatives in the Mediterranean region.

3. Capitalization Support: capitalization and transfer activities are performed to outreach the project results and potential replication of projects to other countries. Common policy outcomes are produced to contribute to the vivid legal framework that needs constant revision and input.

It is the first time that on such an extended scale, more than 150 partners from the quadruple helix (public authorities, industry, academia and civil society) from 12 countries are exchanging knowledge in the field of green growth in the northern and eastern area of the Mediterranean region. The Interreg MED Green Growth community counts with partners from Albania, Bosnia-Herzegovina, Croatia, Cyprus, France, Greece, Italy, Malta, Montenegro, Portugal, Slovenia and Spain. The total budget of the funded projects under the Interreg MED Green Growth community is approximately 34 million Euros.

For the Green Growth thematic of the Interreg MED programme, SYNGGI – “Synergies for Green Growth Initiative – Energising the Impact of Innovation in the Mediterranean” is the project managing the Interreg MED Green Growth community (2016-2019). The SYNGGI project acts as a dynamic network to unify project results, support MED stakeholders and create a fruitful and collaborative environment for all implicated bodies. The methods that are used within that framework aim to stimulate sharing of project results and findings and enhance the cross-sectoral innovation practices among key Mediterranean stakeholders. The community disseminates the projects’ results and good practices to stakeholders and policy-makers from the Interreg MED cooperation areas and beyond. Moreover, strong emphasis is given in the capitalization process, with the objective to create common policy outcomes to contribute to the vivid legal framework that needs constant revision and input, such as the EU Circular Economy Action Plan and other environmental policies.

Interreg
Mediterranean



GREEN GROWTH

Project co-financed by the European
Regional Development Fund

*“Technical Information
elaborated by WE&B
with the collaboration of
all modular projects
together with
the coordination of
CT BETA-UVic/UCC”*

