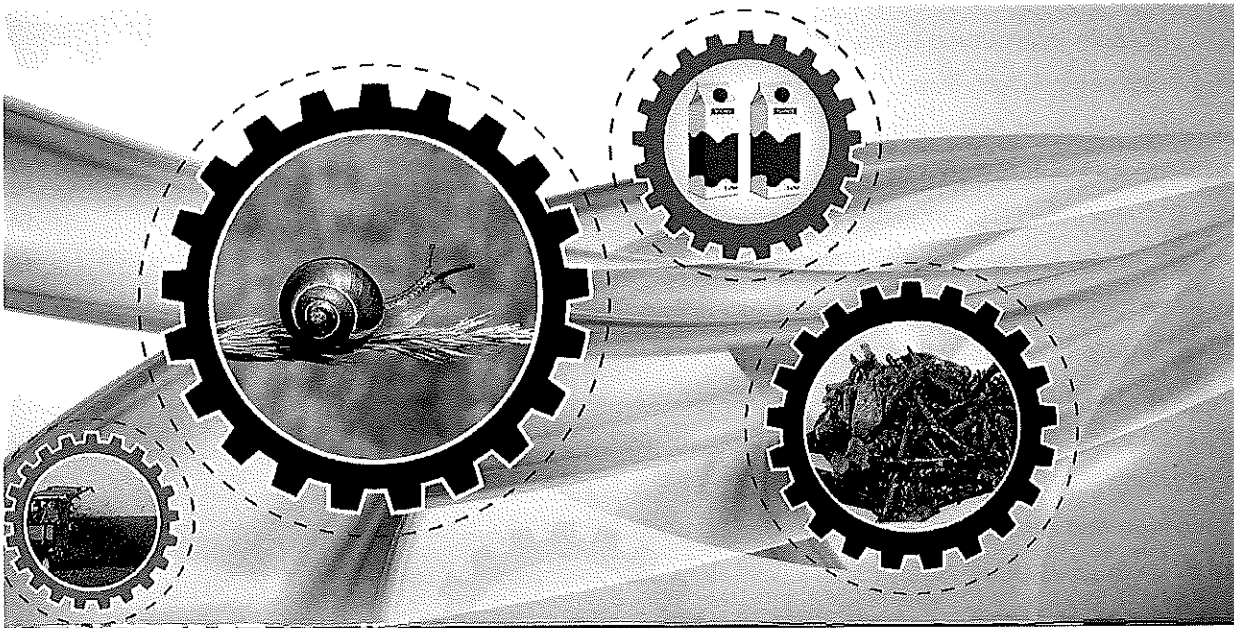


# SinCE-AFC

## Project Partner 6, Regional Action Plan

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SinCE-AFC Regional Action Plan for the Promotion and Development of Circular Economy Opportunities  
for Entrepreneurship in the Agri-Food Sector in Donegal

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## Section 1.0 Introduction

To fulfill the project requirements under the SinCE-AFC INTERREG Europe project, the Local Enterprise Office Donegal (LEO) engaged Mabbett & Associates Ltd (Mabbett) as the external experts to develop an Action Plan aimed at the identification of, and actions to promote, opportunities for entrepreneurship in the Circular Economy (CE) in Donegal. A key element of the Action Plan will be the lessons learned from the cooperation and knowledge sharing from and with the other partner regions in the project (as referenced in Section 6.1 of this Plan) in order to improve the policy instrument and activities at local level.

The overall objective of the project is to improve policies in the field of regional innovation strategies by facilitating horizontal mechanisms that support and enhance SMEs entrepreneurship in the agri-food sector, through the exploitation of CE opportunities.

In preparing the Action Plan and in particular in response to the stakeholder engagements, both public and private, a number of key challenges were identified to the adoption of the CE as a key element of the agri-food sector in the county and region. These were:-

- The need for significant positive national and local policies to support the CE,
- The need for greater awareness and knowledge of the CE,
- The need for greater innovation in the agri-food sector based on CE principals and models,
- The need for greater engagement and involvement of all stakeholders in the delivery of CE policies and actions at local and regional level,
- The enhanced promotion of the economic and entrepreneurial opportunities in the CE at local and regional level, and
- The need to create new business start-ups and jobs in the CE at local level.

While acknowledging these significant challenges, the Action Plan will focus on one key action which will aim to develop a robust local CE framework which will foster ideation, opportunity identification and collaboration at local and regional level.

Our key action is the development of a local CE Framework within the county and will have three components:

- The implementation of a CE Coordination Group,
- The development of a CE Registry and portal for business,
- Facilitate collaboration and piloting of new CE opportunities.

## Section 2.0 Policy Context

### 2.1 Policy Review

#### 2.1.1 Operational Programme

As mentioned, this Action Plan has been prepared under the INTEREG Europe funded SinCE-AFC project, with a mission to involve agri-food SMEs in the CE in both Donegal and the adjoining regions to the east and south.

LEO Donegal/ Donegal County Council, under the Border, Midland and Western Regional Operational Programme (OP), aims to address Policy Instrument 4, Thematic Objective 3 –

*Enhancing the competitiveness of small and medium sized enterprises in the agricultural, fisheries and aquaculture sectors. The two key policy instruments under this thematic objective are/were*  
*3a - promoting entrepreneurship, the exploitation of new ideas and fostering the creation of new firms, including those through business incubators, and*  
*3d – supporting the capacity of SMEs to grow in regional, national and international markets and to engage in innovation processes.*

The key objectives of this policy instrument were to enhance the competitiveness of small and medium enterprises through in-company innovation and investment and to accelerate the start-up and expansion of new start-up firms and to create new employment opportunities. Within the county and the region these instruments are delivered primarily by Enterprise Ireland nationally and the Local Enterprise Offices at local level.

Thus the Action Plan has a strong focus on enabling small and micro businesses gain competitive advantage through the adoption of CE principles and on the promotion of new start-ups based on identified CE opportunities. However from the research carried out under the SinCE-AFC project and across the partner regions, the key challenge to delivery of the actions is the relatively low levels of awareness and knowledge of the CE, its models and opportunities.

#### 2.1.2 National Policies

Key European, Irish and sector-specific policies and strategic plans for the agri-food sector and CE were reviewed to lay out the wider context within the Action Plan has been developed. The list of papers/policies reviewed are included in Appendix 3 and the following section gives a summary of those which have specific relevance to Donegal and the agri-food sector.

The Irish Government's Waste Action Plan for a CE (2020) (WAPCE) presents Ireland policy direction for waste management and transition towards circular practices. The document outlines challenges and actions relating to seven key product value chains, three of which are of particular relevance to the agri-food industry: food waste, treatment facilities and by-products.

A key target outlined in the WAPCE is to reduce food waste by 50% by 2030, which is to be achieved by:

- Regulating food waste collection practices;
- Supporting pilot and trial projects aimed at food waste;
- Developing sustainable food chains in the agri-food sector with the support of the Department of Agriculture, Food and the Marine (DAFM);
- Developing opportunities for anaerobic digestion and composting of food waste.

Waste infrastructure actions outlined in the WAPCE focus on developing in-country recycling infrastructure and further coordinating regional waste management plan.

Finally, the WAPCE sets out goals to promote the appropriate use of by-products regulations to minimise the volume of waste materials entering waste facilities, which could be put to other productive uses.

**The Irish Government's Climate Action Plan (2019)** outlines a number of actions specifically targeting the agri-food sector. Significant emphasis is placed on reducing nitrogen emissions by replacing CAN fertiliser, nitrogen use efficiency and improved nutrient management planning.

The CAP further suggests:

- Turning renewable biological resources and residual side-streams into value-added bio-based products.
- Develop and stabilise indigenous supply of biomass and anaerobic digestion
- Establish new environmentally friendly branding to improve awareness and Knowledge Transfer Groups.

Additional strategic actions recommended by the CAP include:

- Developing decarbonisation zones in each local authority,
- Revising waste legislation to incorporate CE requirements and strengthen regulatory frameworks and structure for waste collection and management system,
- Establishing "end-of-waste" criteria for certain bio-wastes.

**The EU Farm to Fork Strategy (2020)** highlighted the circular bio-based economy as a largely untapped potential for the agri-food sector. The strategy places particular emphasis on reducing the dependency of the agri-food sector on pesticides and antimicrobials, and to reduce excess fertilisation. One such action is to support bio refineries which have the potential to generate bio-fertiliser utilising bio-waste or agricultural co-products. This initiative is put forward in conjunction with the plan to review the Use of Pesticides Directive to prioritise greater use of safe alternatives to chemical pesticides.

Additional opportunities highlighted by the strategy included:

- Facilitating the placing on the market of sustainable and innovative feed additives,
- Supporting the potential for food waste and by products to be incorporated into biogas production through anaerobic digestion, and particularly supporting the development of local cooperatively developed anaerobic digestion units.

**Teagasc' CROP 2030 Strategy** further emphasised the creation of circular agriculture by:

- Harnessing Ireland's potential for replacing nitrogen fertiliser with agri-food wastes and by products,
- Developing Ireland anaerobic digestion capabilities utilising agricultural feedstock.
- Providing support for pilot projects which demonstrate viable circular models and production methods.

**The DAFM Food Waste 2025 Strategy** outlines targets and expected growth for the agri-food sector while managing and sustaining natural resources as production increases. Additional emphasis is placed on improving productivity through sustainable processes, with a drive for Ireland to become a world leader in low carbon, high quality sustainable food.

**The Irish Government's Circular Economy Bill 2021** made provision to establish a Circular Economy Fund which may be used to:

- To assist, support or promote the development of initiatives by producers to prevent or reduce waste arising from their activities
- To assist the establishment, equipping and, where appropriate, the operation of waste re-use or recovery activities

**The National Statement on Bioeconomy (2018)** provided a number of actions to foster the development of CE opportunities, including:

- Improving the coherence between sectoral strategies,
- Establishing networks of representatives of commercial entities and relevant public bodies to inform future development,
- Promoting collaboration between research institutions and academia,
- Improve the awareness of the bioeconomy and its economic potential.

## Section 3.0 Current Operating Environment

### 3.1. County Donegal - High-Level Scan

- Donegal boasts the largest fishing port in the country and benefits from a large seafood and marine sector.
- Within this sector there is an observed trend of reduced fish volumes and reduced fishing waters, resulting in a need to add value to the existing fish stocks and co-products generated from processing.
- Seafood and the blue economy benefit from a number of high value reuse opportunities (including pharmaceuticals, nutraceuticals) resulting from its wastes and by-products (chitin, chitosan).
- Some companies have started to develop circular opportunities from marine products, such as Bio-Marine Ingredients, Oilean Glas Teo and Donegal Seaweed.
- Additional opportunities exist to develop a circular blue (i.e. sea/water-based) bioeconomy in Donegal, by extracting value and implementing circular models from fishery wastes and by-products.
- Donegal is also home to significant agricultural production and livestock farming – with just over 9,000 farms and approximately 25,087ha of county land area farmed. Information surrounding agricultural size and capacity is relatively dated however, with the most recent data referenced being from 2010 and 2014.
- Donegal is home to a 4MW Anaerobic Digestion plant which was designed to accept and treat biodegradable agricultural waste and food wastes. The plant is used by several agri-food businesses in Donegal as a disposal route for wastes and by products, but the plant remains under utilised and is currently undergoing a restructuring.
- Food waste from hospitality in Donegal is largely seasonal, in part due to the county's role as a popular tourist destination. The local food & drink sector has grown as Donegal is developing into a destination for food tourism.
- County Donegal is part of the Connacht Ulster Waste Region, combining 9 local authorities. There are currently six main waste management companies operating across County Donegal that offer household waste and food collections, including:
  - DM Waste;
  - Donegal Waste and Recycling;
  - EnviroGrind, which also specializes in gypsum composting;
  - Logan Waste;
  - Panda Waste;
  - Sharkey Waste.

Additionally, there are 6 licensed recycling centres around the county, managed by Bryson Recycling, which accept food waste.

- The county benefits from a growing technology and research sector, which is further strengthened by the Atlantic Technological University (ATU), CoLab Innovation Centre, Donegal SCALE-X technology accelerator.
- ATU is one of the primary providers of third level education in Donegal. The university offers a number of programmes and courses which relate to the agri-food sector, such as food product innovation, food science, agricultural science or food tourism, and the university has recently

incorporated sustainability-related modules within these courses. The university has also previously supported several successful networks and synergy opportunities between businesses and research.

- Údarás na Gaeltachta has invested in business centres with opportunities for leasing space with ultra-fast internet connectivity, physical space, and office areas. The GTEIC centre in Gweedore in the west of Donegal is another potential hub as a resource for business start-ups or new products/processes to be designed.
- Cill Ulta, in collaboration with Údarás na Gaeltachta and a number of other partners, have initiated the development of an integrated rural bioeconomy hub in the Northwest of Donegal. The focus is to develop biological and technological innovation to foster innovation within the local CE.
- Ireland's biopharmaceutical sector has grown rapidly and is now producing €36bn in exports. There is potential for increased alignment between the biopharmaceutical sector and current or future bioeconomy actors.
- There is a growing strategic integration of the North-West City Region, which will result in increasing collaboration and joint policymaking between Donegal County Council and Derry City & Strabane District Council. There is also increased investment and new focus on improving transport and connectivity between Donegal County Council, the North-West City Region, and the rest of Ireland which may positively impact the development of entrepreneurial opportunities.

### 3.1.2 Notable Information Gaps and Challenges

There is a significant gap in available data and information surrounding the volume of bio-resources, waste and by-product streams generated within the agri-food sector in Donegal.

- The information held by the Connacht Ulster Waste Region is not considered up to date, with most recent data ranging from 2012 to 2014. However, it is acknowledged that there is currently a consultation in progress surrounding amendments to the existing regional waste plans.
- Waste in Ireland is primarily managed by private waste management companies which provide little visibility on tonnages of materials collected or processed.
  - Waste Management Collectors have to submit annual returns to County Councils who licence waste management facilities and registrations. Data contained in these returns include total waste volumes uplifted but is primarily used for enforcement and audit purposes. The information contained in these returns is at present rarely used for information purposes, as it is considered commercially sensitive.
  - Waste collection companies uplifting curb side waste must submit overall tonnage of mixed municipal waste, recycled waste, and food waste uplifted. While this data can be retrieved, it is not currently regularly analysed or used for information purposes.
  - As a result, many counties lack visibility on overall tonnages of wastes or types of wastes handled within their boundaries, as the waste data is either difficult to retrieve or only used for enforcement purposes.
- Sector data, as well as waste and by product information is rarely available by county and only available at national level through EPA websites or sectoral bodies such as Teagasc.
- Establishing end-of-waste status for certain waste streams or co-products remains a challenge, even for wastes or co-products for which further revalorisation methods exist.



- The knowledge gap around resource availability creates a significant barrier to identifying new uses for these waste and by-product streams or to assessing economic viabilities of circular opportunities.
- High value reuse opportunities, such as extracting chitin from seafood by-products or incorporating spent grains into new food products, require a significant and stable supply of materials. Greater visibility around the types and volumes of organic wastes and by-products generated in Donegal will significantly help generate new circular opportunities.
- The control over procurement criteria decisions at County level is limited. Procurement rules and guideline are set at European or National level, limiting the scope of local councils to amend public procurement procedures to incorporate circular and sustainable criteria. However, future amendments are planned at European and National level to develop green procurement plans and enable Councils to incorporate targets for sustainability within procurement decisions.

## Section 4.0 Strategic Action Plan

### 4.1 Strategic Level Action Plan

In preparing the Action Plan and in particular in response to the stakeholder engagements, both public and private, a number of key challenges were identified to the adoption of the CE as a key element of the agri-food sector in the county and region. These were:

- The need for significant positive national and local policies to support the CE,
- The need for greater awareness and knowledge of the CE,
- The need for greater innovation in the agri-food sector based on CE principals and models,
- The need for greater engagement and involvement of all stakeholders in the delivery of CE policies and actions at local and regional level,
- The enhanced promotion of the economic and entrepreneurial opportunities in the CE at local and regional level, and
- The need to create new business start-ups and jobs in the CE at local level.

While acknowledging these significant challenges the Action Plan will focus on one key action which will aim to develop a robust local CE framework which will foster ideation and opportunity identification at local and regional level.

Our key action is the development of a local CE Framework within the county and will have three associated sub-actions as outlined in summary and detail below.

<b>Action 1: Develop strong local CE framework to foster ideation and opportunity identification.</b>	
<b><i>1.a Implementation of a CE Coordination group for Donegal</i></b>	Establish a CE Coordination Group which will support the embedding of CE within the county's decision making and drive the CE at local level.
<b><i>1.b Development and communication of a Donegal Circular registry and portal for businesses.</i></b>	Set up an industrial symbiosis registry for the agri-food sector, and which may later be expanded to other sectors.
<b><i>1.c Facilitate the collaboration between business, entrepreneurship, and research to enable pilot testing and development of circular opportunities</i></b>	Set-up and pilot an Innovation Voucher scheme for the CE that will develop research and testing opportunities through the ATU or other technology hubs – offering access to expertise, knowledge and technological facilities.

#### 4.1.1 Details of Each Action:

<b>Action 1.a.</b>
<b><i>Implementation of a CE Coordination group for Donegal.</i></b>
<b><i>Rationale:</i></b> <p>From the research carried out as part of SinCE-AFC and the shared experiences from the other regions, the lack of awareness and engagement among stakeholders at local level was identified as a key weakness in driving the CE agenda at local level. It was also identified that in regions and cities where there had been significant success e.g. Bologna, that strong co-ordination was a key element in the success of projects.</p>
<b><i>Nature of the Action:</i></b> <p>The development of a CE Coordination Group will support the embedding of CE within the county's decision making. The Group should aim to incorporate representatives from key stakeholders such as industry sectors, public policy, research (such as ATU) etc.</p> <p>The coordination group should facilitate identified circular entrepreneurial opportunities and enable companies or entrepreneurs to navigate the local and national regulations, and support to businesses and entrepreneurs identify relevant funding streams where available.</p> <p>To facilitate this, the CE Coordination Group will identify how Donegal County Council can make use of the Irish Government's CE Fund, and to liaise with County Council to prioritise projects which have significant CE potential.</p>
<b><i>Stakeholders:</i></b> <p>Key agency will be Donegal County Council who will lead on the project. Other key agencies and stakeholders within the region will be TEAGASC (farm advisory/development service), IFA (farmers representative organisation), Atlantic Technological University (ATU), LEADER companies, BIM (marine and fishing development agency), University of Ulster and Derry City &amp; Strabane District Council.</p>
<b><i>Timeframe:</i></b> <p>This action can be completed within a 12 month period. Initial meeting is envisaged among the stakeholders by October 2022 with agreed Terms of Reference in place and the group operational by March 2023.</p>
<b><i>Costs and Funding:</i></b> <p>Only costs envisaged will be the existing executive time input of approximately 10 working days over the year and some minor overhead costs associated with meetings. These costs will be covered from existing revenue stream.</p>

**Action 1b.*****Development and communication of a Donegal Circular registry and portal for businesses.******Rationale:***

The agri-food businesses contacted as part of this project highlighted a desire to collaborate and partner where possible – with both other businesses and with third level research. To facilitate this collaboration, and to identify new opportunities, the Coordination Group should set up an Industrial Symbiosis Registry for the agri-food sector which will be a central repository for the CE in the county.

***Nature of the Action:***

The establishment of an industrial symbiosis registry for the agri-food sector in the county.

The registry is likely to include the various agri-food businesses operating in Donegal and highlight the types of resources used, the waste or by-products streams generated by each business, and where possible, the estimated volumes generated. This will provide visibility around the potential capabilities and scale of opportunities which can be explored. Additional resources to include in the registry may be good practice information surrounding production and management processes, similar to Sharebox.

As part of this data collection process, Donegal County Council should request as part of any future tendering process that waste management companies operating in the county provide analysis of data on waste tonnages and waste destination for all waste collected within the County

***Stakeholders:***

Key agency will be Donegal County Council who will lead on the project. Consideration should be given to including this registry as part of the Donegal Food Coast initiative see [www.donegalfoodcoast.ie](http://www.donegalfoodcoast.ie)

Other key agencies and stakeholders within the region will be TEAGASC (farm advisory/development service), IFA (farmers' representative organisation), Atlantic Technological University (ATU), LEADER companies, BIM (marine and fishing development agency), University of Ulster, Derry City & Strabane District Council, the Economic Development Unit in Donegal County Council.'

***Timeframe:***

Work can commence on this immediately and will involve the setting-up of small working group from within the CE Coordination Group. The objective would be to have a populated registry in place within a nine month period.

***Costs and funding:***

Time input from existing executives from key stakeholders of approximate value of €45,000 over 12 months funded from existing revenue.

Research carried out on behalf of the CE Coordination Group – 20 days @ €900/day = €18,000, funded from existing Operational Programme supports.

<b>Action 1c.</b>
<i>Facilitate collaboration and piloting of CE opportunities</i>
<p><b>Rationale:</b> As previously highlighted a key challenge among all the SinCE-AFC partner regions in driving the CE is the lack of case studies, best practice and operating commercial models to demonstrate to both the private and public sector the commercial opportunities and benefits from the CE.</p> <p>This action will seek to drive collaboration, innovation and pilot testing of new products, models and processes which will add value at local and regional level.</p>
<p><b>Nature of the Action:</b></p> <p>Develop a partnership between the Local Enterprise Office, ATU, the CoLab at the ATU, national enterprise agencies such as Enterprise Ireland and Udaras na Gaeltachta and potentially the future Cill Ulta Bioeconomy Hub, to provide access to research and development facilities for CE entrepreneurs.</p> <p>There is an opportunity to set up circular innovation research vouchers for entrepreneurs in partnership with ATU and the future Cill Ulta Bioeconomy Hub. The voucher fund would be similar to the existing national innovation voucher scheme and would offer entrepreneurs grants to be used for research, development, and testing of opportunities through the ATU or other CE technology hubs - offering access to expertise, knowledge and technological facilities.</p> <p>Further collaboration between business and research may also be facilitated by allowing private sector companies part-fund innovation vouchers to support the investigation and piloting of CE concepts that may benefit their business activities.</p> <p>This action will integrate with the establishment of the registry which will highlight opportunities and potential areas for collaboration and further research.</p>
<p><b>Stakeholders:</b></p> <p>Key agency will be Donegal County Council – Local Enterprise Office, Economic Development and Environment Sections, TEAGASC, ATU, LEADER companies, BIM, Enterprise Ireland, Udaras na Gaeltachta.</p>
<p><b>Timeframe:</b></p> <p>The piloting of this action can be completed within a 12 month period. Initial meeting is envisaged with key the stakeholder i.e. Enterprise Ireland, by September 2022 with agreed Terms of Reference for the piloting of the scheme by January 2023 with the objective of three vouchers approved by June 2023.</p>
<p><b>Costs and funding:</b></p> <p>The CE innovation vouchers would be funded by the Central Government CE Fund or directly from the existing national Innovation Voucher Scheme administered by Enterprise Ireland. The criteria used for the voucher application process may include considerations of potential for job creation, waste reduction, etc.</p>

## **Section 5.0 Targeted Opportunities for Entrepreneurs**

A key element in the meaningful engagement with the private sector is an ability to demonstrate and show examples of both exiting businesses operating in the CE sector and in providing them with insight into the current opportunities in the sector. This was a key element in the preparation of the Action Plan and the information gathered will be used pro-actively to support the key action.

The opportunities presented below are taken from worldwide examples of circular business innovations which could be replicated in County Donegal, accounting for the bio-resources available within the County and the reported interests and opportunities highlighted through the business engagement. However, as the current quantity of bio-resources in the County is difficult to determine due to a lack of available data, the viability of these opportunities will need to be further investigated.

The implementation of the Strategic Action Plan will foster additional CE opportunities through increased awareness, and cooperation between public, private and third sectors within the county.

The section below is designed to address the following support points:

- Identification of business opportunities in the CE in the food and agri-food sectors appropriate to Donegal
- Innovative concepts to engage entrepreneurs in the CE to enable them to build their capacity to exploit new business opportunities.

**Targeted Strategic Opportunity: Valorisation of Nutrient-Rich Waste and By Products**

<p><b>1. Establish a Regional Nutrient Partnership for Agri-Food.</b></p>	<p>A partnership group can include representatives from key businesses, industry sectors (Irish Farmers' Association, BIM, Bord Bia), local government and regulators (EPA). The partnership group may be set up after the Donegal Circular Industrial Symbiosis Registry (Strategic Action 1.c).</p> <p>Specific focus of this partnership will be to group the various Donegal businesses which generate nutrient rich by-products and wastes: including seafood and fisheries, agriculture, food producers, etc.</p>
<p><b>2. Quantify potential bio-resources within Donegal</b></p>	<p>Through the partnership group and Circular Economy Coordination Group, work with agri-food businesses to quantify the volumes of potential organic resources which can be utilised in the production of bio-fertiliser (this may include food waste, limestone from shellfish, seaweed, etc).</p>
<p><b>3. Undertake a fertilizer quantification study</b></p>	<p>Work with Donegal agri-food producers and farms to understand how much fertiliser is used in the county, where current chemical fertilisers are sourced from or imported. This step is necessary to determine the volume of organic bio-fertiliser that will be necessary to replace chemical fertiliser.</p>
<p><b>4. Incentivise production of bio-fertiliser in Donegal</b></p>	<p>Using the partnership group and Circular Economy Coordination Group to incentivise the development of county-based bio-fertiliser production utilising regional bioresources.</p>
<p><b>5. Consider a Cap and Adapt model to boost the take-up of bio-fertiliser</b></p>	<p>Develop a set of sector targets for the removal of chemical fertilisers and uptake of bio-fertilisers.</p>

## Suggested Opportunities for Entrepreneurship in Donegal

<p><i>Utilisation of Brewery/ Distillery by-products (such as spent grains) for integration into food products.</i></p>	<p>Spent grains or other brewery or distillery by-products can be incorporated into food products such as breads, baked goods, biscuits, etc. This opportunity may complement Donegal's growing food &amp; drink sector and the county's reputation as a food tourism destination.</p> <p>Additionally, more high-value applications may be developed focusing on the extraction of protein and fibre content from the spent grains.</p>
<p><i>Extraction of phenolic compounds from spent grain or other bio-resources (potatoes, apple pomace, etc) for cosmetic or pharmaceutical use.</i></p>	<p>Many of the reported types of bioresources, waste and by-product streams from Donegal businesses are sources of phenolic compounds. These compounds are micronutrients with a variety of antioxidant and health benefits. These wastes and by-product streams could present a low-cost source of phenolic compounds which can then be developed into higher-value products.</p>
<p><i>Utilisation of fish processing wastes and fish mortalities for high value-added product.</i></p>	<p>Oil, calcium, protein, or collagen can be extracted from waste and by-products from the seafood and aquaculture industry. This presents a potential source of high-value materials which can be utilised as nutraceuticals and higher value products</p> <p>This may also include the utilisation of seaweed recovered from production lines.</p>
<p><i>Extraction of limestone and other nutrients from shellfish</i></p>	<p>By-products from shellfish (i.e., shells from oysters or mussels) contain a variety of nutrients which can be incorporated into fertilisers or animal feed. Shells can also be reprocessed into a variety of higher values products, such as 3D printing filaments, road marking paint or packaging materials.</p>
<p><i>Utilisation of local bio-resources to manufacture bio-packaging.</i> <i>Alternative:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Production of a bio-packaging replacement for polystyrene boxes within seafood supply chains.</i></li> </ul>	<p>Donegal benefits from bio-resources which can be processed into bio packaging materials, including potatoes, seaweed fibres, seafood shells. The development of suitable technology and processes to achieve this present a significant opportunity for collaboration between start-ups, Research &amp; Technology hubs, and industry.</p> <p><i>Polystyrene boxes are highlighted by several seafood companies as a problematic material to replace. There is an opportunity to develop a bio-packaging sustainable and reusable packaging alternatives, utilising the bio-resources available in Donegal.</i></p>
<p><i>Utilisation of gypsum as growing substrate for mushrooms and mycelium.</i></p>	<p>Donegal benefits from an established gypsum recycling operation, Enviro Grind, has been highlighted previously by Interreg's SinCE-AFC programme. Gypsum is frequently utilised as a mushroom substrate additive, and there is an opportunity to develop a partnership between gypsum recycling activities and mushroom production to supply the county's hospitality industry. Alternatively, mushrooms and mycelium can also be used as a local and sustainable raw material for novel bio-packaging.</p>
<p><i>Development of returnable packaging and distribution networks within Donegal for the agri-food supply chain.</i></p>	<p>While many businesses operate throughout Ireland and export to the UK and Europe, there are opportunities within county-based supply chains (from producer to processor and/or to retailer) to develop a returnable packaging network.</p>



	<p>Business to business supply chains provide more control over the packaging materials than in business to consumer settings. This would allow the packaging materials to be more easily collected and reused.</p> <p>This may be particularly targeted at smaller scale supply chains. These opportunities relate to the packaging design, the distribution and collection network, and washing and return systems (where necessary).</p>
<p><i>Development of indigenous animal feed or innovative food products utilising food waste and insect production.</i></p>	<p>Food waste and organic by-products can be utilised as a feed for high protein insect production, which in turn can be used as animal feed (including fish feed or poultry feed) or innovative food products for human consumption. This may present an opportunity for partnership or collaboration with ATU through the institute's courses and research departments.</p>
<p><i>Utilisation of non-table grade potatoes for high value reuse, including:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Artisan alcohol production.</i></li> <li>▪ <i>High value potato starch or cellulose.</i></li> </ul>	<p>The Irish Farmers Association estimates that around 30,000 tonnes of potatoes are wasted each year as rejects or considered non-table grade. County Donegal is one of the largest producers of potatoes in Ireland, and this presents an opportunity to convert non-table grade potatoes into higher value products.</p> <p>There is an opportunity to create a synergy between the distilleries and Donegal-based potato producers and create an alcohol product which can be marketed as a circular artisan product. This opportunity further complements Donegal's image as a food tourism destination.</p> <p>Highlighted by case studies from previous SinCE-AFC projects, non-table grade potatoes can be utilised as a source of high-value starch (effectively replacing corn starch in food production) or micro fibrillated cellulose for industrial applications.</p>

## Section 6.0 Context Review

### 6.1 Consideration of SinCE-AFC Good Practices

The wider network of SinCE-AFC Good Practices to date have targeted opportunities which sit relatively low in the waste hierarchy and primarily focus on utilising wastes and co-products within recycling or waste to energy processes. Listed below are Good Practices, researched by the Project Partners which focus on strategic initiatives or higher value reuse opportunities.

Good Practices with focus on strategic initiatives or higher value reuse opportunities	
Title of the Good Practice/ Project Partner/Good Practice Owner	Learning Opportunity
<p><u>The ICESP Italian Circular Economy Stakeholder Platform</u> PP3/ENEA (National Agency for New technologies, energy and sustainable economic development)</p>	<p>The Italian Circular Economy Stakeholder Platform (ICESP) is promoted by ENEA (as a mirror initiative and integrated with ECESP (European Circular Economy Stakeholder Platform). ICESP is a network whose goal is to create a national convergence of initiatives, experiences, criticalities and expectations on the circular economy that Italy should represent in Europe, promoting the “Italian way of making circular economy”. ICESP’s objectives:</p> <ul style="list-style-type: none"> <li>• to promote circular economy in Italy,</li> <li>• map Italian good practices,</li> <li>• implement a permanent operational instrument to facilitate inter-sectoral dialogue and synergies between the Italian actors.</li> </ul> <p>The ICESP members are representative of local and central public administration, educational, research and innovation systems, companies, professional associations and representatives from civil society. All members adhere to the ICESP Charter, which defines the objectives, composition, fields of interest and operational tools of the platform.</p> <p>The platform is organized into 7 working groups, each with specific expertise on issues related to the circular economy.</p> <p>Currently, ICESP is comprises 94 organisations as signatories and a working group of 177 organisations who are expert participants. Of these 60% are companies and trade associations, 20% from research and innovation sectors, 11% are public institutions, 9% are citizens and part of the Third sector.</p>
<p><u>The BioDistrict of the Bolognese Apennines</u> PP3/ Local Action Group (LAG) Bolognese Apennines</p>	<p>The objective of the Local Development Strategy developed by the GAL Appennino Bolognese is to make the hilly-mountainous territory competitive, attractive and usable, through the creation of an integrated development system, the promotion of sustainable tourism and the enhancement of the agri-food quality supply chains. SMEs are encouraged to compete on an equal level with other geographical areas, enhancing their specificities and their most appealing aspects. A project capable of generating economic circularity and obtaining lasting and self-generating results was developed. The identified operating instrument is the institution of a Biological District: an innovative synergic system of a geographic area suited to organic farming where farmers, citizens, tour operators, institutions, associations and public administrations follow the agreement for the sustainable management of local resources, starting from organic production and consumption model (short chain, purchasing groups, bio public canteens). In the Biodistrict, the promotion of organic products is combined with the promotion of the territory and</p>

	its peculiarities, to achieve a comprehensive economic, social and cultural development. The project has two phases - Feasibility study and the application for the recognition of the territory in the Biological District.
<u>ECOPartner – Public-private for eco-innovation in promoting the circular economy</u>  PP8/The National Centre for Sustainable Production and Consumption (NCSPC)	This good practice was initiated by the Romanian National Centre for Sustainable Production and Consumption Association, in partnership with the Geneva Association for the Development of the Circular Economy in Switzerland and the Association of Clusters in Romania, within the ECOPartner project. This project aims to promote eco-innovation among Romanian companies, including cluster members, to contribute to strengthening the capacity of Romanian experts to provide services in the field of eco-innovation and to create models of collaboration and support for business and policy makers. The Romanian Network for Eco-innovation, the Green Club of Entrepreneurs, the Handbook for Eco-innovation and the online eco-innovation portal - Data Hub - guide the application of the concept of eco-innovation in companies, at the regional and national level, present models of good practices, success stories and other documentary resources.
<u>Reuse of food waste in new food products and utilize livestock waste for energy production</u>  PP2/ Tsakiris Family	The Tskakiris Family has adopted Circular Economy actions to eliminate livestock and food waste generated in their facilities. More specifically, the livestock wastes are used as raw material for energy production utilising the generated biogas. Furthermore, the remaining biomass is used as fertiliser in the company owned agricultural crops. In addition, the eggs after their expiration date are not disposed to sanitary landfill, but are sold to another company to generate new products after specific treatment.

<b>Good Practices highlighted by SinCE-AFC which have served as reference for targeted opportunities</b>	
<b>Title of the Good Practice/ Project Partner/Good Practice Owner</b>	<b>Learning Opportunity</b>
<u>The manufacture of potato starch from surplus potatoes</u>  <b>PP6/Meade Potatoes</b>	<p>Meade process out of spec and surplus potato stock and uses cutting edge technology to produce premium quality food grade starch. The system is currently working towards complete carbon neutrality using wind energy and solar panels. A water filtration system is also used to help them achieve BRCGS accreditation. Irish consumers now have access to a healthy, more sustainable alternative to imported starch and food manufacturers have easy access to an Irish ingredient, which will enhance their own products.</p>
<u>The recycling of waste gypsum</u>  <b>PP6/Envirogrind</b>	<p>This system eliminates the need for gypsum and plasterboard waste to go to landfill. It can provide in excess of 95% recovery of gypsum waste while resolving the issues of high moisture content and contamination to achieve a very high quality product, sized to the customer's requirements. This allows the product to be re-used thus reducing pressure on raw material resources and environmental impact of mining operations. Recycled gypsum can be used as a soil fertiliser (calcium sulfate) which improves soil structure and creates oxygen conditions which are essential to improve soil and plant health. It improves the ability of soil to drain. Increased water use efficiency of crops is important during a drought. Gypsum helps to keep phosphorus and other nutrients from leaving fields. The use of this mineral is an economic way to cut run off pollution of phosphorus. Adding gypsum to the soil reduces erosion by increasing the ability of soil to soak up water after precipitation. Gypsum application also improves soil aeration and water percolation through the soil profile. Gypsum is an important ingredient in the compost used for growing mushrooms commercially.</p>
<u>The utilisation of nutrient rich waste as organic fertiliser</u>  <b>PP5/Baromfi Coop Kft. (Poultry Coop Ltd)</b>	<p>The consortium developed an environmentally friendly and energy-saving process, the so-called "organic material treatment centre" that performs industrial-scale, controlled extraction and sterilization of deep-litter poultry manure.</p> <p>The company produces a multi-composition, individually formulated organic Bio Fermentum product, free of pathogens and weed seeds through closed system technological processes. The process begins with a controlled fermentation. Then, after drying and sterilization, the matured uncovered chicken manure is used as a raw material for the production of products with various contents. The products can be used in arable crops, open-air and sprouted vegetable production, ornamental plant production, vineyards, fruit and strawberry plantations, nurseries and grassland.</p> <p>The investment significantly reduces carbon emissions and increases the fertility of soils, using a number of state-of-the-art technical solutions not previously used in this form.</p>

The Action Plan and opportunities presented in Sections 4.0 and 5.0 considers those good practices which provide long-term strategic embedding of CE principles and those which help enable higher-value or value-added opportunities.

## **6.2 Business Engagement**

To further understand the local context within the agri-food sector in Donegal, several agri-food businesses, industry organisations and public bodies were contacted to provide insight into the local challenges and opportunities for CE. The list of contacted businesses and organisations is included in Appendix 2.

These businesses represented a cross-section of the activities and sectors operating in Donegal, including breweries, distilleries, bakeries, drinks manufacturing, fisheries, seafood processing, poultry and farming. Additional engagement was undertaken with industry representatives.

### **6.2.1 Current Reported Landscape**

Most businesses have a good understanding of sustainability and where wastes and by-products arise. Several had already identified potential circular improvement opportunities, while other expressed an interest in developing new projects. CE as a concept is generally understood as part of sustainability.

Bord Bia's Origin Green sustainability programme in particular was reported to have had a positive impact on how business understand and prioritise sustainability within their business practices.

Wastes and by-products reported by the businesses include:

- Poultry dung;
- Fallen fish;
- Fruit pomace;
- Spent grain;
- Spent hops;
- Waste botanicals;
- Waste flour;
- Food waste (hospitality and consumers)
- Hides and carcasses.

These waste and by-product streams are often nutrient rich and sugar rich. The majority of the identified wastes were reportedly utilised as land spread, animal feed or sent to anaerobic digestion treatment at the Glenmore Facility.

The contacted businesses all had to some degree implemented sustainable initiatives - such as

packaging reductions, energy efficiencies and local sourcing of ingredients or materials where possible. Fewer had reported implementing practical CE initiatives which enabled a waste stream or by-product to be revalorised, or which enabled collaborations to utilise waste or by-products from other businesses.

All of the contacted businesses reported an interest in developing, engaging and collaborating in CE opportunities should these be identified. There was a significant interest in identifying way to increase the value of these waste and by-product streams beyond composting, animal feed and anaerobic digestion.

## **6.2.2 Reported Challenges and Barriers to improving Circularity**

### **Legislation**

A recurring challenge to implementing a CE project within the agri-food sector was reported to be around the relevant legislation and regulatory requirements associated with the use and transport of wastes and by-products.

The current waste regulation and limitation of end-of-waste regulations prevent many by-products from being utilised within composting processes or in higher value processes. In one example, the transport of by-products and waste between the same company-owned sites for a potential higher-value reuse required the company to apply for waste management licences and waste facility permits, creating an economic and regulatory burden which prevented the project from going forward.

This regulatory and financial burdens companies need to address in order to develop circular opportunities on-site or to process by-products from other businesses act as a disincentive.

The fragmented approach to waste collection and variations in local provisions presents another barrier to improving waste sorting and understanding where alternatives can be implemented.

In addition, animal feed regulation was also highlighted as presenting challenges for local reuse of organic by-products. Specifically, a lack of understanding of the requirements for organic products to be sent to animal feed can create a barrier for collaborations between businesses generating by-products and local businesses who may wish to utilise these.

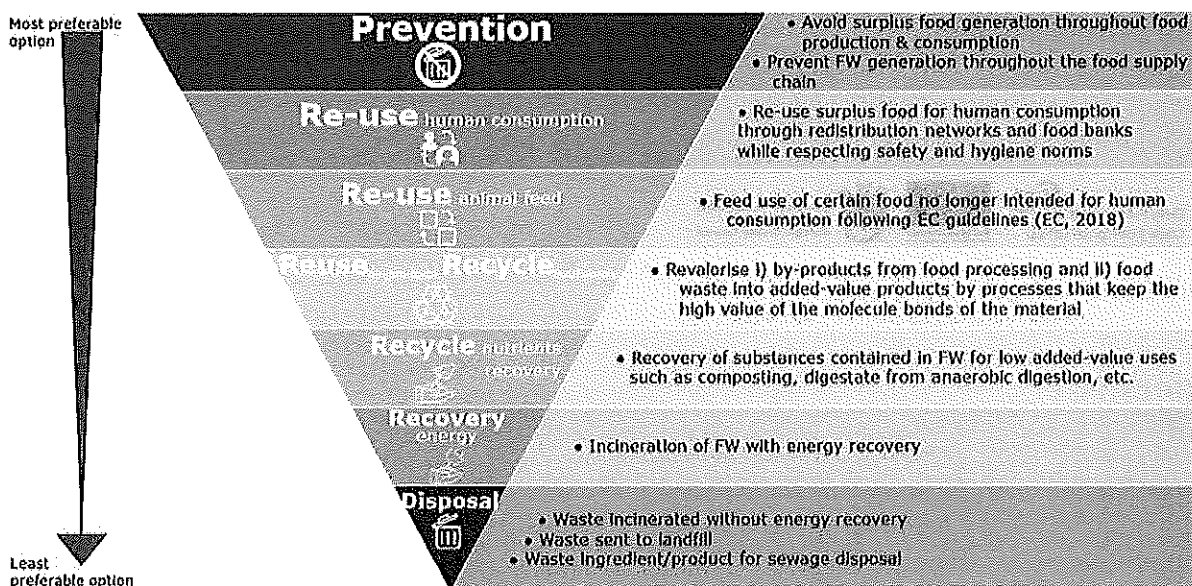
Several businesses highlighted challenges with local planning policies when seeking to develop new economic opportunities which utilise co-products or waste streams. In some cases, these challenges posed by local planning conditions for processing sites resulted in potential businesses setting up operations in different counties, while still serving Donegal consumers and supply chains, effectively resulting in loss of local job opportunities and local economic revenue.

## Knowledge and Awareness Gap

While most of the business has a good understanding of sustainability and the concept of CE, fewer reported having identified specific opportunities relating to their activities. Those companies who have reported developing circular products highlighted a difficulty in communicating their products to a wider audience within the county and scaling up.

The lack of knowledge around local circular solutions providers or possible circular collaborators was repeatedly highlighted as a challenge to overcome. While many understood the principle of CE, through the reuse of waste and by-products, many of the reuse options identified by the businesses are those which are low value added or feature the bottom of the waste hierarchy: land spread or anaerobic digestion (Figure 1). There are few opportunities currently identified which provide high value- added opportunities.

Figure 1: Food Waste Hierarchy (from European Commission Joint Research Centre, 2020)



While there is a demand for and interest in sustainable and circular products and innovations from businesses, many SMEs do not have the time or resources to identify where circular opportunities may lie. Understanding where opportunities for collaboration outside of their specific business sector or activity was further highlighted as a key challenge.

Limited knowledge of suitable or available funding mechanisms for potential circular projects was also a notable limitation for businesses wishing to progress or develop CE projects. This knowledge gap varied from business to business, with some reporting having benefited from


local enterprise and sectoral support, while others reported not being aware of available funds.

Finally, during the engagement with representatives from various departments within Donegal County Council, it was reported that improving the awareness of CE within the Council would be beneficial. These varying degrees of understanding within Council departments may affect the implementation or support for CE opportunities brought forward by businesses.

## Signature

Location/Date: Letterkenny, \_\_\_\_\_

Signature:

  
\_\_\_\_\_  
Grace Korbel, Acting Head of Enterprise

Stamp of Organisation:

  
Oifig Fiontair Áitiúil  
Local Enterprise Office

  
European Union



Comhairle Contae  
Dhún na nGall  
Donegal County Council

## Appendix 1



## Mapping of Action Plan against project Sub-Objectives for Agri-food CE in Donegal

Actions	Promotion of entrepreneurial CE opportunities.	Identification of local CE business opportunities	Innovative concepts to engage entrepreneurs in CE, building for new development and	Enhance stakeholder involvement in activity	Potential policy changes to enhance the Action Plan.	Promotion of social inclusion and new CE-related jobs.
<b>Action 1: Develop strong CE communication channels to foster ideation and opportunity identification</b>						
1.a Implementation of a Circular Economy	X	X		X	X	
1.b Set up of CE coordinator role.	X	X	X	X		X
1.c Development and communication of a Donegal	X	X	X	X		
<b>Action 2: Include awareness and competency building training on CE in key areas (finance, business support services, education).</b>						
2.a Information sharing and awareness of Circular Economy among key stakeholders and	X		X			X
2.b Provide education and information around business support organisations.	X	X		X		
2.c Facilitate the collaboration between business, entrepreneurship, and research to enable pilot testing and development of funding mechanisms.	X		X	X		X
2.d Communication and development of		X	X			X
<b>Action 3: Embed CE within County Donegal's economic planning</b>						
3.a Creation of Decarbonisation zones (e.g., in existing and new planned business parks) with	X	X	X			
3.b Undertake an economic and job potential assessment of CE in Donegal.			X		X	X
3.c Develop a Donegal CE brand for products and services to increase visibility, market awareness and provenance factors for Donegal	X	X		X		
3.d Include consideration of circular economy products/services within Donegal County Council		X		X		

**Mapping of Action Plan against project Sub-Objectives for Agri-Food Circular Economy in Donegal**

<b>Actions</b>	Promotion of entrepreneurial CE opportunities.	Identification of local CE business opportunities	Innovative concepts to engage entrepreneurs in CE, capacity building for new business opportunities.	Enhance stakeholder involvement in activity development and delivery.	Potential policy changes to enhance the action plan.	Promotion of social inclusion and new CE-related jobs.
<b>Action 4: Review of local policy to ensure consistency around County Donegal's strategic support for Circular Economy and Sustainability.</b>						
4.a Undertake a Strategic Assessment of Donegal County Council's Policies.				X	X	
4.b Incorporate sustainability and circular impacts within the next Local and Economic Development Plan.				X	X	X
4.c Include circular economy criteria and principles within grant funding.	X		X	X	X	

## Appendix 2: Contacted Businesses and Organisations

A total of 12 businesses, industry bodies, and public organisations were contacted, including:

- Bord Iascaigh Mhara  
Website: <https://bim.ie/>
- Cill Ulta  
Website: <https://cillulta.ie/>
- Glenborin Farm Produce  
Website: <https://glenborinfarmproduce.com/>
- Irish Fish Cannery  
Website: <https://irishfishcannery.ie/>
- Kinnegar Brewing  
Website: <https://www.kinnegarbrewing.ie/agegate>
- Letterkenny Institute of Technology  
Website: <https://www.ATU.ie/>
- MOWI - Marine Harvest  
Website: <https://mowi.com/contact/mowi-ireland/>
- O'Donnell's Bakery  
Website: <https://odonnellsbakery.ie/>
- Sliabh Liag Distillers  
Website: <https://www.sliabhliagdistillers.com/>
- Údarás na Gaeltachta  
Website: <https://udaras.ie/en/>

### **Appendix 3: References and Policies Reviewed**

- Agri-Food Strategy 2030 [Draft]
- BIM Statement of Strategy 2018-2020 - Enabling Sustainable Growth
- European Commission Circular Economy Action Plan (2020)
- Connaught Ulster Waste Region - Annual Report 2016
- Connaught Ulster Region - Waste Management Plan 2015-2021
- Department of Agriculture, Food, and the Marine - Food Wise 2025
- Donegal County Council Climate Adaptation Strategy - 2019
- Donegal County Council Local Economic and Community Plan 2016-2022
- EPA Non-Household Waste Characterisation Campaign Report 2018
- EPA National Waste Prevention Programme: Preventing Waste, Driving the Circular Economy (2019)
- EU Farm to Fork Strategy
- Government of Ireland Information Note – Incorporating Social Considerations into Public Procurement
- Government of Ireland Climate Action Plan (2019)
- Government of Ireland A Waste Action Plan for a Circular Economy (2020)
- Government of Ireland Circular Economy Bill - 2021
- Irish Farmers' Association - Value of Agriculture Factsheets (2020)
- Mapping and Analysis of Biomass Supply Chains in Andalusia and the Republic of Ireland (2020)
- SinCE-AFC - The Agri-Food Circular Economy E-Book (2021)
- Teagasc CROPS 2030 Strategy.
- Teagasc Sligo/Leitrim/Donegal Advisory Region Strategic Plan 2015-2020