FOOD WASTE
SCOPING STUDY

CIRCLE ECONOMY

Tevi

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PATHWAY 1

SYSTEM MAPPING - PRODUCTION

How much usable food never leaves the producer, what does it consist of and what is its carbon footprint?

A third of all food produced never ends up on people's plates. In the UK alone, nearly 15m tonnes of waste are created in the production and consumption of food[1]. In order to create a sustainable and just food system that does not waste, insights into the food waste streams arising across the value chain—from farm to fork—are needed. In other words, 'you can't manage what you can't measure'. This research pathway is concerned with a baseline assessment of the upstream value chain of farming and food production.

The research challenge

The food industry in Cornwall is one of the most important industries in the county contributing more than 11% of total employment in primary agricultural activities only as well as 29% of total employment when also considering secondary agrifood jobs, such as food services and accommodation[2]. The Cornish food system can be divided into three main categories: food producing stakeholders, food processing and distributing stakeholders and food consuming stakeholders. All three categories have their own impact on how much food is lost or wasted along the way.

At the producer stage, food losses mostly refer to usable food that never leaves the producer—for example, overproduction that is not harvested or remains unsold. Key to understanding the material flows of food at the producer level is to create an understanding of who the producers are and what their input and output volumes are. To ensure a holistic, systematic but also pragmatic approach towards building this understanding, this scoping document aims to uncover existing approaches, data and insights around food losses at the producers' end of the value chain and build recommendations on how to close knowledge gaps and gather the insights required to take action on the challenge of food loss reduction.

Key questions investigated in this document are thus:

- How much food is lost at the producer level?
- What are the causes of these food losses?

Scoping methodology

In order to reach the desired oversight of the challenge and provide relevant recommendations for scoping of further research, the research team interviewed five stakeholders in Cornwall to gather information about the local food system and current food loss reduction efforts. To supplement the insights gathered in interviews, an initial review of extant research was conducted with a focus on papers and reports from prominent organisations in the food loss and waste field nationally and globally. Circle Economy's existing expertise and experience collected through various projects could be leveraged in navigating this research and setting priorities. An overview of these resources is available in **Annex A**.

[1] Wrap. (2018). Food surplus and waste in the UK key facts. Retrieved from: wrap.org.uk

[2] Lobley et al.. (2011). University of Exeter, Center for rural policy research. A Review of Cornwall's Agri-food Industry. Retrieved from: Exeter website

FOOD STREAMS AT THE PRODUCTION STAGE

The cornish food system - Production

The cornish production food system is characterised by different types of key production chains. These are crop cultivation, dairy farming, fishing and meat and poultry farming. Within these production chains the main stakeholders include crop and dairy farmers as well as those supporting them with harvesting, transporting, storage and preparation for sale. Similarly, for seafood as well as meat and poultry production, the main stakeholders are livestock farmers as well fishers and depending on the local context, also stakeholders involved in preparing the seafood and meat for further processing and resale.

Food production activities in Cornwall are characterised by strong seasonality. This is linked to both the local climate as well as seasonal consumption patterns. The spring and summer months are not only crucial as main growth seasons for crop cultivation, they also register the highest numbers of tourists that come to Cornwall and therefore surges in demand.

Drivers of production level food waste and losses

In Europe, on average, 33% of all food losses and waste is wasted at the production stage[3]. In the UK, this figure is roughly 14% and represents 7.2%[4] of all food harvested. Based on the conducted interviews, usable food that never leaves the farm is often the result of overproduction. Our preliminary research suggests that the main reason for this overproduction is the inflexible procurement requirements of supermarkets (for example, stringent quality and cosmetic standards or take-back clauses and non contractual practices such as last-minute order changes[5]). Interviewees stated that farmers may overproduce food by as much as 125% to ensure they can fulfill at least 60% of their contracts—that is, over 50% of this food can be lost.

From the literature, other common drivers of food losses include unforeseen climatic conditions and inadequate food management practices, skills or knowledge (for example, poor use of mechanical harvesters on farms).

Measurement and assessment of food losses

While there is wide agreement that food losses and waste is undeniably an issue to be tackled in Cornwall, little data exists that is specific to the region. According to the nationally-accepted food waste reduction approach ('Target-Measure-Act'), stakeholders should first set a target for reduction and measure a baseline for food losses and waste, taking into account underlying drivers, before they take action. Through our interviews and desk research, we also found a number of sources that quantify food losses, both globally and nationally. The metrics, however, that are used to quantify losses differ widely. For instance, metrics are based on different scales or categorisations of food losses. In addition, major data gaps remain on a local level with little to no data reported for the county of Cornwall, for instance. Often, a solution to such data gaps is to scale down national level data. However, there are two features that distinguish the Cornish food system and suggest deviation from the national baseline: Cornwall's comparably stronger restaurant and catering sector, as well as the lack of separation of organic waste, unlike other counties in the UK.

[3]WRI. (2019). Reducing food loss and waste: A global action agenda. Retrieved from: WRI website
[4]WRAP. (2019). Food waste in primary production in the UK. Retrieved from: WRAP website

[5] WRI. (2019). Reducing food loss and waste: A global action agenda. Retrieved from: WRI website

According to WRAP's most recent estimates on food waste at production level, gathering farm-level data is 'perhaps the most difficult to quantify', due to the 'uncertainties of the natural world' and fluctuating customer demand. In terms of measurement methods, they would ideally need to be conducted through direct measurement by trained researchers, as 'current experience shows that asking farmers to measure food waste volumes through questionnaires results in underestimated waste levels'. Due to the scale of such an undertaking, however, neither the UK nor any other nation or entity has managed to undertake such a thorough assessment. [6] As a result, any reported waste levels should only be taken to give an indication of the scale rather than be exact figures.

A key research ambition towards measuring and assessing food losses in Cornwall should therefore be to provide a more nuanced overview of the dominant value chain configurations in each of these four chains of food production and map the associated flows of input materials and output products. If available, this overview can then be complemented with indicative mass flow data to allow for more refined diagnosis of individual waste streams. Tevi's food waste challenge network can be a vital asset in this process as it brings together relevant stakeholders who can, collaboratively, create an overview of the key flows.

Enabling measurement

To define common metrics, local farmers and growers need to align on how to measure food surplus and food losses. The Cornish county could benefit from having one inclusive, central organisation that oversees the transition towards a more sustainable and just food system, by aligning stakeholders, creating a common language and enabling measurement methodologies.

[6]WRAP. (2019). Food waste in primary production in the UK. Retrieved from: WRAP website

PROPOSED METHODOLOGY

There is clearly a need for further insight and data on the food losses and waste challenge specifically in Cornwall. Yet, collecting and compiling all the relevant data points in detail requires significant investments of time and resources with insights only available in the distant future. At the same time, stakeholders are looking for pragmatic ways to inform how to start addressing the challenge now.

Therefore, we recommend a dual approach to this pathway that ensures the required data is gathered to monitor progress and track the ongoing efforts, whilst also collecting key insights that enable stakeholders to prioritise solutions and start applying them.

The onus of driving the former and diving deep into the Cornish food waste flows remains with the county's academics and statistics department. Nonetheless, Tevi along with the challenge network are optimally placed to identify and gather those key data points that can pragmatically inform priorities.

In order to equip Tevi with a practical path forward, we proposed a list of next steps for Tevi and the challenge network in order to generate key insights needed for further prioritisation on the next page.

Objective	Outcome / Output	Activities
1. Build hypotheses on flows that make up the food system based on existing knowledge and production data available on the national level.	A range of hypotheses derived from national data and available information on the cornish food system is developed. Subsequently, these can be tested with key stakeholders across the challenge network and beyond.	We recommend for hypotheses to be developed in regards to: • The total **volume of losses** (relative to actual demand) • The **key product groups** within which food losses occur • The key **causes** of food losses • **Dynamics and fluctuations** in food losses • Current **management and/or disposal** of food losses Hypotheses should be developed by exploring how nationally available insights can be matched with the (largely qualitative) pockets of knowledge on the Cornish context. We suggest developing separate hypotheses for each of the key food chains of crop cultivation, dairy production, meat and poultry as well as seafood. A more detailed categorisation will improve the quality of insights. A proposal for food categorisations is listed in **Annex B**. Data on the carbon footprint of 29 different food types can be found with 'our world in data'.[7] The hypotheses should be formulated such that they can be tested through interviews and/or questionnaires sent to key stakeholders.

[7]Our world in data. (2020). Environmental impacts of food production. Retrieved from: https://ourworldindata.org/environmental-impacts-of-food

2. Collect new data and insights from key production stakeholders in the Cornish food system.	This step is aimed at testing whether the hypotheses developed apply to different types of cornish stakeholders. Based on this a refined understanding of key production flows, surplus generation and food losses can be developed and summarised in a more detailed system map.	Based on the developed hypotheses, we recommend to develop **questionnaires and interview guides** as fit to test the hypotheses and collect the relevant information. This represents a farmer-led approach to gathering data and could also be explored in partnership with, for instance, WRAP and 'Innovative Farmers'. Together, they are already piloting a farmer-led approach to gathering data on food waste in the apple, carrot, egg, tomato and wheat sectors in England.
3. Consolidate collected information on the Cornish production level food system in a system map overview.	Based on the collected information, a refined system map can be created to guide further research,enable the prioritisation of opportunities and target setting. An initial draft of such a system map (without quantified flows) can be found in **Annex C**.	The main activities under this step will consist of consolidating collected insights and data. The provided system map should be detailed out to account for the input and output flows of the different producing stakeholders. Where available, this system map should be supplemented with quantified data on associated material flows. Then, a collaborative session can be hosted with Cornish SMEs to introduce the data collection process and reflect on key issues driving food losses in their context.
4. [Highly recommended] Set targets for food loss reduction	Shared targets are imperative to aligning stakeholders under a common direction and goals and form the basis of any coordination.	Based on the different streams identified reduction scenarios can be defined by the associated stakeholders and judged in terms of their feasibility. Based on this overall targets for the Cornish food system can be set.

PATHWAY 2

SYSTEM MAPPING - PROCESSING AND DISTRIBUTION

How much food is wasted by processors, distributors and consumer-facing businesses, what does it consist of and what is its carbon footprint?

A third of all food produced never ends up on people's plates. In the UK alone, nearly 15m tonnes of food is lost or wasted from farm to fork[1]. In order to create a sustainable and just food system that does not waste, insights into the food waste streams arising across the value chain are needed. In other words, 'you can't manage what you can't measure'. This research pathway is concerned with the downstream value chain of processing and distribution of food.

[1] WRAP. (2018). *Food surplus and waste in the UK key facts.* Retrieved from: WRAP website

The research challenge

The food industry in Cornwall is one of the most important industries in the county, contributing more than 11% of total employment in primary agricultural activities only, as well as 29% of total employment when also considering secondary agrifood jobs such as food services and accommodation[2]. The Cornish food system can be divided into three main categories: food producing stakeholders, food processing and distributing stakeholders and consumer-facing stakeholders. All three categories have their own impact on how much food is lost or wasted along the way.

This pathway aims to dive deeper into the food processing stakeholders—more specifically the question: *'how much food is wasted by food processing stakeholders, what does it consist of and what is its carbon footprint?'*

Scoping methodology

In order to reach the desired oversight of the challenge and provide relevant recommendations for scoping of further research, the research team interviewed five stakeholders in Cornwall to gather information about the local food system and current food waste reduction efforts. To supplement the insights gathered in interviews, an initial review of extant research was conducted with a focus on papers and reports from prominent organisations in the food waste field nationally and globally. Circle Economy's existing expertise and experience collected through various projects could be leveraged in navigating this research and setting priorities. An overview of these resources is available in **Annex A**.

[2] Lobley et al.. (2011). University of Exeter, Center for rural policy research. A Review of Cornwall's Agri-food Industry. Retrieved from: Exeter website

FOOD WASTE STREAMS AT THE PROCESSING AND DISTRIBUTION STAGE

The Cornish food system - processing and distribution

Given the focus on local small and medium-sized enterprises (SMEs), the main stakeholders to study under this research pathway can be divided into three overarching groups: food processors, value chain enablers and consumer-facing stakeholders. Among food processors, we identify a variety of manufacturing businesses producing processed food products for local demand or export. Value chain enablers are predominantly logistics operators, delivery services, as well as food surplus redistribution organisations such as food banks.

Lastly, among consumer-facing stakeholders, we identify specialty shops such as cheesemongers, fishmongers, butchers, bakeries, fruit and vegetable shops, farmers' markets as well as small supermarkets. This category also includes restaurants, bars, cafes and canteens that prepare and serve food to the consumer directly.[3]

Similar to food production, food processing and distribution is highly affected by seasonality. This is typically due to a high number of tourists visiting Cornwall—covid-19 period excluded—and driving up demand as well as the climatic constraints within which local input products are available.

To answer the questions in this pathway, an overview of stakeholders in the Cornish food system and what their input and output flows are is crucial. To better understand the actors involved in the Cornish food system, an initial overview of the main stakeholders in the food industry is provided in **Annex C**. The primary objective of this research pathway is then to build on this by further quantifying this map. Where possible, this overview should include indicative mass flow data to allow for a more refined diagnosis of individual waste streams.

Measurement and assessment of food waste at processing and distribution level

Of the overall amount of food losses and waste in the value chain, about a quarter is wasted at the processing stage. This food waste is less centralised and therefore more difficult to measure and valorise[4]. In the UK, as in most high income countries, food waste occurs closer to consumption than it does higher up in the chain. Specifically, food manufacturing, retail and consumer-facing businesses account for roughly 26% of all food losses and waste, second only to households, which are responsible for close to 60% of all food losses and waste in the UK [5]. Statistics to prove this are not available on a county level, but it is assumed that this general trend can be observed in Cornwall as well. However, the significant importance of the tourism sector, coupled with the fact that there is no organic waste collection in Cornwall, may have implications on the contribution of different stakeholders to the food waste issue, particularly the hospitality sector.

[3] Lobley, M., Reed, M., Metcalf, R., & Stephens, J. (2006). Food production, distribution and processing in Cornwall and the Isles of Scilly. Retrieved from: Exeter website

[4] WRI. (2019). Reducing food loss and waste: A global action agenda. Retrieved from: WRI website

[5] WRAP. (2019). Food waste in primary production in the UK. Retrieved from: WRAP website

Enabling measurement
To define common metrics, local stakeholders need to align on how to measure food surplus and waste. The Cornish county could benefit from having one inclusive, central organisation that oversees the transition towards a more sustainable and just food system, by aligning stakeholders, creating a common language and enabling measurement methodologies. The Tevi Food waste challenge network is well positioned to initiate and facilitate this process.

PROPOSED METHODOLOGY

There is a clear need for further insight and data on the food waste challenge in Cornwall. Yet, collecting all the relevant data points requires significant time and resource investments, with insights only available in the future. At the same time, stakeholders are looking for pragmatic ways to inform how to start addressing the challenge now.

Therefore, we recommend a dual approach to this pathway that ensures the required data is gathered to monitor progress and track ongoing efforts, whilst also collecting key insights that enable stakeholders to prioritise solutions and start applying them. The onus of driving the former and diving deep into the Cornish food waste flows remains with the county's academics and statistics department. Nonetheless, Tevi along with the challenge network are optimally placed to identify and gather key data points that can pragmatically inform priorities.

In order to equip Tevi with a practical path forward, we propose a list of next steps for Tevi and the challenge network, following a similar approach to the one described in the scoping document on pathway 1, in the table on the next page.

Objective	Outcome / Output	Activities
1. Build hypotheses on flows that make up the food system based on existing knowledge and processing and distribution data available on the national level.	A range of hypotheses derived from national data and available information on the cornish food system is developed. Subsequently, these can be tested with key processing and distributing stakeholders across the food system to improve insight.	We recommend for hypotheses to be developed in regards to: • The relative **share of food waste** out of total input volumes, ideally on product level • The **key processes or distribution stages** within which waste is generated • The key **causes** of waste generation • **Dynamics and fluctuations** in throughput volumes and waste generation • Current **management and/or disposal** of generated waste (see **Annex A** for a list) Hypotheses should be developed by exploring how nationally available insights can be matched with the (largely qualitative) pockets of knowledge on the Cornish context. We suggest developing separate hypotheses for each of the key stakeholder groups, food processors, value chain enablers and consumer facing stakeholders. Hypotheses are ideally at the product category level, for more detailed insight. A proposal for food categorisations is listed in the **Annex A**. Data on the carbon footprint of 29 different food types can be found with 'our world in data'.[6] The hypotheses should be formulated such that they can be tested easily through, for instance, interviews and/or questionnaires to key stakeholders.

[6] Our world in data. (2020). Environmental impacts of food production. Retrieved from: https://ourworldindata.org/environmental-impacts-of-food

2. Collect new data and insights from key processing and distributing stakeholders in the Cornish food system.	This step is aimed at testing whether the hypotheses developed apply to different types of cornish stakeholders. Based on this a refined understanding of the key input and output flows of processing and distributing stakeholders can be developed and summarised in a more detailed system map.	Based on the developed hypotheses, we recommend to develop **questionnaires** and **interview guides** as fit to test the hypotheses and collect the relevant information. This represents a stakeholder-led approach to gathering data and could also be explored in partnership with industry associations or third party support. We recommend following national guidelines to gather county-wide data from the three stakeholder groups, as outlined in WRAP's food waste reduction UK roadmap and toolkit[7]. These provide detailed resources for SMEs to measure and track food waste, as well as sector specific guidance on measuring and reporting food surplus and waste. Host a collaborative session with Cornish SMEs to introduce the data collection process and reflect on key issues driving food waste at their businesses.
3. Consolidate collected information in a system map overview.	Based on the collected information a refined system map can be created to guide further research, enable the prioritisation of opportunities and target setting. An initial draft of such a system map (without quantified flows) can be found in **Annex C**.	The main activities under this step will consist of consolidating collected insights and data. The provided system map should be detailed out to account for the input and output flows of the different processing and distributing stakeholders. Where available, this system map should be supplemented with quantified data on associated material flows.
4. [Highly recommended] Set targets for food waste & surplus reduction	Shared targets are imperative to aligning stakeholders under a common direction and goals and form the basis of any coordination.	Based on the different streams identified reduction scenarios can be defined by the associated stakeholders and judged in terms of their feasibility. Based on this overall targets for the Cornish food system can be set.

[7] WRAP. (2020) Food waste reduction roadmap and toolkit. Retrieved from: https://wrap.org.uk/sites/files/wrap/food-waste-reduction-roadmap-toolkit.pdf

PATHWAY 3

IDENTIFYING PREVENTION SOLUTIONS

How can SMEs identify and adopt the right food waste reduction and prevention innovations or strategies for them?

For SMEs in Cornwall to take action on food waste, they need to identify and prioritise which solutions and strategies can deliver the highest impact and are feasible within the local context. Navigating these solutions, however, often requires time and energy that most SMEs cannot afford and as such, is something they would benefit from receiving guidance on.

The research challenge

Food waste is considered by many to be a solvable issue, with many technical solutions already on the market and a lot of knowledge already available. However, the deployment of these solutions—and the mobilisation of capital and resources to overcome barriers to their deployment—remains a key challenge globally.[1][2][3] In Cornwall, Tevi's Sustainable Food Challenge Network is one of the first examples of structural support dedicated to addressing this issue.

Navigating the solutions available and prioritising which would make sense for an SME in Cornwall is a challenge for a couple of reasons. First, while academic and practitioner literature have all documented solutions to food waste to varying degrees—from global agendas[4] to national roadmaps[5] [6]—none to date has specifically focused on the Cornish context. Second, the resources needed to conduct research represent an additional burden to individual SMEs and would benefit from a more coordinated approach to avoid duplication of efforts.

To provide such guidance to SMEs in Cornwall, we recommend to:

1. Uncover existing innovations and recommendations for SMEs in the UK to prevent food waste,
2. Evaluate their potential impact and product/market fit to the region of Cornwall; and
3. Identify and develop roadmap for adoption, including how to overcome key adoption barriers

A key prerequisite for this pathway are the outcomes of research pathways 1 and 2. According to widely accepted food waste reduction frameworks, a stakeholder should only take action on food waste once they've measured a baseline and set a target for reduction.[7]

Scoping methodology

In order to reach the desired oversight of the challenge and provide relevant recommendations for scoping of further research, the research team interviewed five stakeholders in Cornwall to gather information about the local food system and current food waste reduction efforts. To supplement the insights gathered in interviews, an initial review of extant research was conducted with a focus on papers and reports from prominent organisations in the food waste field nationally and globally. Circle Economy's existing expertise and experience collected through various projects could be leveraged in navigating this research and setting

[1] Interview with WRAP as part for another Circle Economy project
[2] Stuart, T. (2009). Waste: Uncovering the global food scandal.
[3] Eva Gladek. The Next Web. (2019). Panel: Closing The Food Loop. Panel video retrieved from: The Next Web website

[4] WRI. (2019). Reducing food loss and waste: A global action agenda. Retrieved from: WRI website
[5] WRAP. (2020) Food waste reduction roadmap. Retrieved from: WRAP website
[6] ReFed. (2016). A roadmap to reduce US food waste by 20 percent. Retrieved from: ReFed website
[7] WRAP. (2020) Food waste reduction roadmap. Retrieved from: WRAP website

priorities. An overview of these resources is available in Annex A.

FOOD WASTE PREVENTION AND REDUCTION MECHANISMS

Current knowledge and gaps to fill

Numerous reports and toolkits exist to support food producers and businesses to prevent food waste. UK resources are largely relevant, as are resources from Europe and North America to some extent. In all of these regions, commercial food waste is also an important issue and parallels can be drawn to varying degrees from cultural, institutional and technical standpoints. However, local context is also important and to date, no toolkit or initiative has targeted the Cornwall SME community in particular. For application in this context, these resources should, therefore, be supplemented with a local perspective and ensure Cornish SMEs' participation in their development.

Which strategies exist and what resources are available for SMEs?

WRAP's food waste reduction UK roadmap[8] and toolkit[9] provide detailed resources for all stakeholders along the UK food chain to reduce their food waste. The 'Act' chapter of the toolkit [pages 16–21] includes guidance on how to reduce food waste within businesses' own operations as well as on working with suppliers and helping consumers reduce their own food waste through business-level decisions. Resources to find out more about strategies to reduce waste at operation-level are listed on Boxes A & B of page 16.
Additional guidance and tools for businesses is also provided, including an action plan for the Hospitality Sector[10] and a 'Whole chain food waste reduction plan toolkit' to enable businesses to work together across the supply chain to take joint actions that reduce food waste from farm-to-fork.

'Reducing food loss and waste: Setting a Global Action Agenda', a report spearheaded by the World Resources Institute and with contributions from key organisations working on food losses and waste–including WRAP and NRDC–suggests 'Priority to do's' to prevent food waste for each stakeholder along the food value chain (Figure ES-2 on pages 8–13).[11] Also included in the report are:

- A list of underlying drivers of food waste (for example, suboptimal packaging or lack of awareness) and which countries they are most relevant to (low or high income countries) (Appendix C in the report).
- A non-exhaustive list of possible interventions to address each underlying driver (for example, improving packaging design to allow for incremental consumption or conducting food loss and waste audits and communicating the results) (Appendix C in the report)

ReFed's roadmap for food waste reduction in the US highlights 12 prevention solution categories (for example, manufacturing line optimisation), broken down into more specific actions for different stakeholders (for example, 'manufacturers can enhance existing worker training programs to include a food waste identification component and develop programs to reward proactive employee behavior'). Each solution also includes an indication of diversion potential, timeframe, economic value and market penetration.[12]

Prioritising interventions

Three key aspects should inform the prioritisation of interventions.

First, a baseline assessment is a key prerequisite of this pathway which is part of pathways 1 and 2. According to a widely accepted food waste reduction approach ('Target-Measure-Act'), stakeholders should first set a target for reduction and measure a baseline for food waste, taking into account underlying drivers of waste, before they

[8] WRAP. (2020) Food waste reduction roadmap. Retrieved from: WRAP website
[9] WRAP. (2020) Food waste reduction roadmap and toolkit. Retrieved from: WRAP website
[10] WRAP. (2020) Hospitality and food service roadmap. Retrieved from: WRAP website

[11] WRI. (2019). Reducing food loss and waste: A global action agenda. Retrieved from: WRI website
[12] ReFed. (2016). A roadmap to reduce US food waste by 20 percent. Retrieved from: ReFed website

take action. Doing so will help prioritise which strategies to focus on and maximise impact.

Second, local context matters. The relevance of different strategies will differ in Cornwall compared to the rest of the UK, as will relevance to different businesses within the region. In Cornwall, for example, the importance of the hospitality and tourism sectors lends commercial food waste a seasonality that, while perhaps not unique to the region, is not specifically accounted for in existing resources.

Third, regardless of how good of a fit a food waste prevention strategy might be, an implementation plan should identify and address potential barriers to implementation. Some overarching barriers to food waste prevention identified in the US, for example, include:

- A misalignment of costs and benefits–whereby businesses see limited reason to implement a new technology or process if another part of the supply chain receives the benefit (e.g. standardised date labeling which benefit consumers more immediately than they do the implementing businesses);
- A lack of social license, whereby consumer expectations constrain businesses from some waste prevention strategies such as offering imperfect foods;
- Information gaps, mainly around where waste actually occurs; and
- Organisational silos (as the implementation of prevention solutions requires collaboration between different departments, whose awareness of the cost implications of waste may differ).

In Cornwall, other potential barriers include:

- A general lack of awareness or understanding of what prevention actually entails—people know prevention should be the priority but this is seldom implemented in practice, with a lot of people jumping to composting or creating energy from waste and falsely assuming they 'have done their bit'[13].
- The near complete lack of infrastructure to connect the food and beverages industry together might also present additional challenges. Networks like the food waste challenge network are therefore imperative for an effective approach to identifying and prioritising solutions.

PROPOSED METHODOLOGY

In order to expand on the listed approaches and available solutions and carry out this pathway, we suggest the approach outlined in the next page.

[13] Interview with Steffen Boehm, conducted on November 26th, 2020

Objective	Outcome/output	Proposed activities
1. Identify strategies for SMEs to prevent food waste	List of food waste prevention strategies for different stakeholders in the value chain, including indicative data on their (potential) impact and potential barriers to overcome	Literature review of existing actions/interventions, to be reviewed by experts for completeness Host a collaborative session with Cornish SMEs to reflect on key issues driving food waste at their businesses (based on pathways 1&2) and to ideate potential solutions to them.
2. Prioritise strategies for Cornish SMEs	A roadmap and action plan for food waste reduction for Cornish SMEs	Develop criteria for SMEs to take into account in pursuing strategies for waste prevention. • These should include to what extent the strategy is **addressing an underlying driver** of food waste [based on the drivers uncovered through pathways 1 and 2]. Other criteria could include financial feasibility, excitement within the participating SMEs. • These should specify the **impact of solutions from an ecological, economic and social perspective** • These specify different aspects of **feasibility**, i.e. commercial viability, operational feasibility, product life feasibility (considering perishability) Host a (third) collaborative ideation session with challenge network members to (1) assess and choose the strategies relevant to them against the chosen criteria and (2) to develop a plan to implement them, including how to overcome potential barriers Do a literature review and/or conduct interviews with experts to come up with recommendations to overcome barriers to adoption. Networking with experts or solution owners from different regions is recommended.

PATHWAY 4

RECOVERY AND RECYCLING INFRASTRUCTURE

What infrastructure is needed to harness food surplus locally and create a more environmentally sustainable, economically thriving and socially equitable food system?

Understanding what can be done to valorise the food that can no longer fulfill its intended purpose—and what infrastructure is needed to do so—is crucial to closing the loop on the Cornish food production system.

The research challenge

Not all food waste is entirely avoidable. For example, some foodstuffs include inedible parts that are usually discarded during the preparation and consumption phases—think of avocado pits or orange peels. Additionally, despite best efforts, prevention measures might not be 100% effective—for instance, forecasting might never be entirely accurate and mistakes can occur during food preparation.

Sending this food to incineration—as is currently assumed to be the case in Cornwall—is a missed opportunity, as food scraps can still be put to valuable use. In some cases, this is not only a missed opportunity but a hindrance with clearly felt negative impacts: incinerators, for example, suffer from the amount of organic waste that makes it into their operations. In additional, anaerobic digestion (AD) plants in the UK currently use crops that are specifically grown for energy—rather than unavoidable organic waste.[1] These crops, in turn, take up valuable land that could otherwise be used to grow food for people.

Valorising food surplus allows us to do more with less. But where to start? And what infrastructure to invest in? Given these questions, the we suggest to focus on:

1. Making an **adjusted projection of the food waste volumes** (described in pathways 1 and 2) that can still be expected after sources of it have been reduced as described in pathway 3.

2. **Identifying infrastructural needs** to support recovery and recycling strategies for Cornwall SMEs to valorise food surplus and identify relevant stakeholders

3. **Prioritising** which strategies are most relevant to and most feasible for Cornwall's SMEs to valorise food surplus

Pathway dependencies

With these objectives in mind, measuring current food waste and surplus volumes and identifying key leakage points and causes along the chain (pathways 1 and 2) are key to this pathway. Additionally, prevention strategies (pathway 3) should be prioritised over recovery and recycling options and their impact should inform the scale of infrastructure needed for recovery and recycling. Food waste figures may be significantly reduced

[1] Stuart, T. (2009). Waste: Uncovering the global food scandal.

once prevention strategies are implemented, thereby reducing demand for recycling infrastructure in the future.

Scoping methodology

In order to reach the desired oversight of the challenge and provide relevant recommendations for scoping of further research, the research team interviewed five stakeholders in Cornwall to gather information about the local food system and current food waste reduction efforts. To supplement the insights gathered in interviews, an initial review of extant research was conducted with a focus on papers and reports from prominent organisations in the food waste field nationally and globally. Circle Economy's existing expertise and experience collected through various projects could be leveraged in navigating this research and setting priorities. An overview of these resources is available in Annex A.

FOOD WASTE RECOVERY AND VALORISATION MECHANISMS

The next step in the food waste hierarchy

Having explored options to reduce and prevent food waste, the next step in the food waste hierarchy revolves around valorising food surplus through recovery and recycling.[2][3] Recovery strategies involve redistributing food that is suitable for consumption to other people (in need or otherwise), while recycling strategies involve repurposing food waste into animal feed, compost or energy.

Different strategies will entail different infrastructural needs. How much investment this infrastructure will require depends on which strategies Cornish stakeholders, for instance within the food waste challenge network, prioritise, as well as on the way they are implemented. A synthesis of the most relevant strategies can be found below.

[2] O'Sullivan Christina. (2018). Food waste hierarchy. Feedback Global. Retrieved from: Feedback Global website
[3] ReFed. (2020). Food waste is a solvable problem. Retrieved from: ReFed website

Recovery Strategies

Feeding people (in need or otherwise)

Different strategies exist to 'rescue' food and redistribute it to people before it goes to waste. Below is a non-exhaustive–though fairly representative–overview of these strategies:

Processing: Value-added processing[4] transforms foodstuff that would otherwise go to waste into food products or meals with longer shelf lives. This is usually the case of surplus produce at farm level or food products nearing their expiry date in restaurants or shops. Examples of value-added processing include turning surplus tomatoes into tomato sauce or turning berries into jams[5].

Donations: Donating food surplus–either to food banks or directly to individuals in need–is another way to ensure the food that can no longer be sold benefits people in need, especially in consumer-facing businesses.

Discounted sales: By discounting products that would otherwise go to waste, SMEs can provide an incentive to customers to purchase this food. Different ways to do so include:

- Through apps like Too Good to Go[6], which allows restaurants, cafe owners and more to advertise 'Magic boxes' to consumers at a cheaper price close to closing time. Magic boxes are 'surprise' bags of food that was not sold at the end of the day.
- Through physical or online marketplaces for near-expiry products or for products that have gone beyond their sell-by date (but not beyond their use-by date), such as GoodAfter[7].

[4] ReFed. (2020). Food waste is a solvable problem. Retrieved from: ReFed website
[5] Lembachar, Y., (2020). The Dutch Startups Rescuing Food from the Bin. Gone with the Waste. Retrieved from: GW website
[6] Too Good to Go (2020). Company website. Retrieved from: TGTG
[7] GoodAfter (2020). Retrieved from: GoodAfter website

- By discounting products near closing time at shops, through 'happy hour' shopping[8] or dynamic pricing[9], for example.

Recycling Strategies

Feeding animals, composting and producing energy

Recycling strategies are those that most often come to mind in terms of valorising food waste, despite being lowest on the food waste pyramid. These include:

Repurposing food waste into animal feed for farmers, which can be done through a dehydration process or by growing black soldier fly larvae, which can then be added to animal feed, for example

Composting, which can be done at various scales and speeds, depending on the conditions and set up of the composting operations.

Anaerobic digestion, which is a process that allows transforming food waste into biogas that can be used as a source of energy.

Important caveats of food rescue and recovery

Redistributing food to people, especially people in need

There is a concern that making people—particularly people in need—reliant on the food wasted by other stakeholders is not sustainable in the long term and might also disincentivise businesses from greater prevention efforts. This further highlights the need to rigorously go through the food waste hierarchy and to prioritise prevention efforts first.

Ensuring food waste does not simply get passed down the value chain

Another caveat of 'single intervention points' is ensuring the food that gets sold or donated, for example, actually gets consumed and that food waste does not simply travel further down the chain, unnecessarily adding more emissions to its footprint along the way[10]. Some have expressed doubts[11] about the effectiveness of food waste apps such as Too Good to Go to actually reduce food waste, for example, though a study by the Wageningen University found positive results[12]. Regardless, this highlights the importance of adopting a systems-wide approach to food waste and to design a food recovery and recycling strategy with positive impact in mind.

[8] Broom Douglas. (2019). 900 Finnish supermarkets are redefining 'happy hour' to reduce wastage. World Economic Forum. Retrieved from: WEF website

[9] NLTimes. (2019). Albert Heijn to combat food waste with "dynamic discounts". Retrieved from: NLTimes website

[10] Insights from other Circle Economy projects

[11] Undark Magazine. (2019, October 23). *Food sharing apps won't solve our massive food waste problem.* Retrieved from: Undark website

[12] van der Haar, S., & Zeinstra, G. G. (2019). *The impact of Too Good To Go on food waste reduction at the consumer household level: An explorative study* (No. 1975). Wageningen Food & Biobased Research. Retrieved from: WUR website

INFRASTRUCTURAL NEEDS

Different strategies will entail different infrastructural needs. This is further influenced by the way these strategies are implemented. For example:

- Strategies can leverage existing infrastructure (e.g. cooperating with existing food banks and their existing logistics networks) or require new infrastructure entirely.
- New infrastructure can be fairly low cost (e.g. setting up composting heaps near farmers' markets, such as in Brasil,[13] or setting up an app to connect food surplus with beneficiaries) or it can be highly sophisticated (e.g. large-scale, centralised anaerobic digestion plants).
- Strategies can be implemented in a decentralised, distributed way (e.g. on-site composting vessels) or in a more centralised way, pooling together food surplus from different streams to realise economies of scale.

In most cases, some of the main issues around food recovery that infrastructure can help resolve to varying degrees involve[14]:

- Matching software (how can we match food surplus donors with beneficiaries or food surplus sellers with buyers?)
- Transportation (how can we transport food surplus from one place to another?);
- Food handling and storage (how can we make sure food, especially perishable food, survives the journey, especially if it needs to be consumed by other people?)
- In the case of value-added processing, processing facilities would also be required (how can we transform food into other food products with longer shelf lives?)

For recycling, similar issues need to be resolved, to varying degrees. For example, keeping food safe for consumption might be of lesser concern if it is destined to be transformed into energy. Additional infrastructure needs relate to the different processing facilities or technologies needed to process food waste into animal feed (e.g. dry heating or AD facilities), i.e. answering the question 'how can we process food waste into animal feed, compost or energy?'

Who needs to drive the change?

While some of these strategies can be implemented by SMEs themselves (investing in on-site composting vessels, for example), most will require the involvement of external stakeholders, from innovative startups to community organisations, food banks and potentially the government and larger investment funds. These are also important factors to consider in assessing which strategy to pursue.

Cornwall: A disconnected value chain

According to interviews with local stakeholders, little to no infrastructure currently exists in Cornwall to meaningfully connect and organise the food and drink value chain.

While *some* infrastructure exists to channel food surplus from supermarkets to food banks–important institutions in a region that struggles with food poverty–, there is no obvious infrastructure in place for restaurants or hotels to channel their waste to people in need or to animals in need. There is also nothing to support taking food scraps back to agriculture, no digital infrastructure to match inputs and outputs from agriculture and little to no extension services for farmers. Some isolated examples do exit, with The Hive[15] being the main example that comes to mind.

[13] C40 Cities Climate Leadership Group. (2020). Cities100: Composting waste in São Paulo to boost the circular economy. Retrieved from: C40 Cities Knowledge Hub

[14] ReFed. (2016). A roadmap to reduce US food waste by 20 percent. Retrieved from: ReFed website

[15] The Hive is a charity that collects surplus food from farms and prepares meals for people in need.

The lack of data on commercial food waste makes it difficult to understand whether a private company currently offers food waste management as a service to SMEs or what generally happens to that waste.

Opportunities

While no infrastructure exists yet to facilitate the valorisation of food surplus, existing networks and organisations provide some interesting opportunities to tap into. For example:

- Existing food hubs in Cornwall could be used as a way to move surplus food from one place to another, playing a coordination role and making people aware of where there is surplus and need.
- Cornwall just negotiated a new contract for waste collection and there will be changes in how and when waste is collected. The infrastructure put in place (e.g. in terms of processing the waste) could potentially be leveraged for processing commercial food waste as well.
- Tevi is acting as a convening organisation to connect the food and drink sector together and put people in touch with each other to find solutions
- For dairy, there could also be much more of a link with public procurement (e.g. surplus bits of cheese that are not fit to be e.g. packaged could easily go to hospitals and canteens through public procurement)

This is by no means an exhaustive list, nor are these necessarily all feasible options, but more of such opportunities should be explored within this pathway.

Barriers and enabling conditions

In addition to the physical infrastructure needed to support food surplus valorisation, it's also important to consider the enabling environment within which they operate:

- In Cornwall, where the importance of community is significant, recovery and recycling strategies could focus on benefiting Cornish communities. **Capacity-building** will be key in that respect.
- From a **legal and institutional** perspective, once it is legally defined as 'waste' it may be more or less difficult to redistribute or use food surplus and should be further investigated.
- **Culturally**, there is a general consensus that food waste is an issue to be tackled and the Covid-19 crisis raised the issue further in the local, collective psyche. However, prevention measures are not often top of mind to most people–households and commercials alike–and it is mostly recycling solutions that often come top of mind.
- Finally, Cornwall is a large county, where transport is expensive and takes a long time. Overcoming this kind of **financial barriers** will be key in ensuring the success of food surplus valorisation efforts.

This is again not an exhaustive list. Other barriers to recycling solutions include, for example, the cost of disposal; higher transportation and logistics costs; material supply assurance; packaging and contamination; access to financing; end-market development; and permitting and siting.[16] This pathway should identify more of these barriers and a way to overcome them.

PROPOSED METHODOLOGY

Summing up the different research avenues explored, we suggest to carry out this pathway by following the approach in the table on the next page

[16] ReFed. (2016). A roadmap to reduce US food waste by 20 percent. Retrieved from: ReFed website

Objective	Outcome/output	Proposed activities
1. Identify where in the chain and how much unavoidable food waste will still need to be tackled once preventative measures have been implemented [This may emerge from pathway 1 and 2]	An estimated figure at each level of the chain or at levels that are relevant *Why?* It is crucial to take prevention measures into account in planning for infrastructure. This is a very big issue in the UK[17], where waste-to-energy plants, for example, had to import waste from other countries to keep running as a result of basing their infrastructure planning on original waste data without taking into account the success of recycling efforts over time. There is simply not enough local waste to power them anymore.	Calculate estimates based on data obtained through pathways 1 & 2 and combine with a projection of reduction targets achieved once prevention strategies have been implemented in pathway 3
2. Identify infrastructural needs to support recovery and recycling solutions and key barriers to overcome for implementation in Cornwall	Table of recovery and recycling strategies, complete with infrastructure needs, including cost estimations, impact for diversion and barriers to consider	- Compile a more complete list of the different ways different recovery and recycling strategies can be implemented based on literature - Conduct interviews with experts to assess preliminary feasibility at local level of different recovery and recycling strategies - Conduct a more comprehensive literature review of the infrastructure needed to support preliminary selection of recovery and recycling strategies
3. Prioritise interventions according to relevance and fit with the Cornwall region and develop a plan to overcome barriers	Food waste reduction roadmap for recovery and recycling	Develop criteria for success. These criteria should include specific indicators for environmental, economical and social sustainability, as well as relate to the volume estimated in step 1. Evaluate interventions against criteria and develop a roadmap for implementation.

[17] Insights from another Circle Economy project

RECOMMENDATIONS

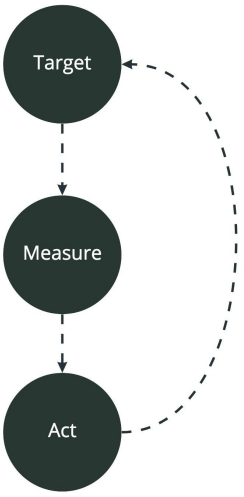
PROPOSED COURSE OF ACTION

The food system in Cornwall, like many other food systems around the world, is complex and involves different stakeholders across a wealth of different food value chains and a diversity of products.

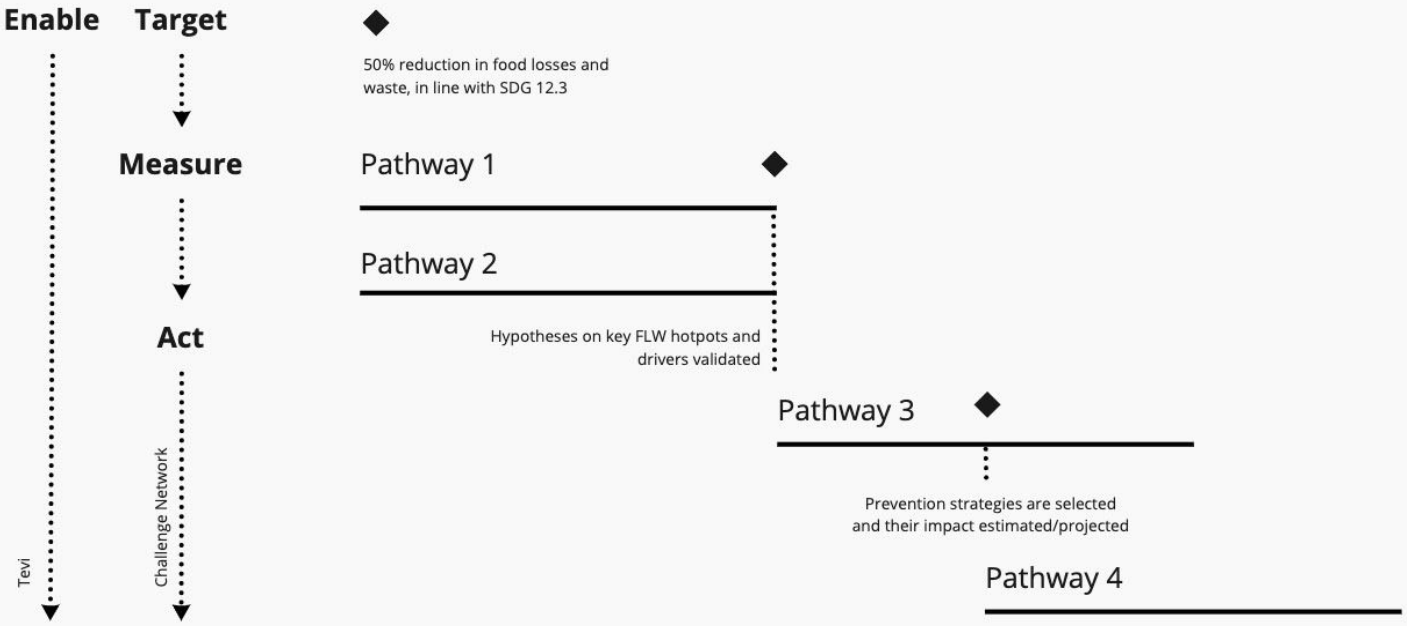
To guide action, we recommend applying WRAP's tried and trusted **'Target-Measure-Act'** approach. According to this approach, stakeholders should start by setting a high-level **target** for reduction, then go on to **measure** a baseline for food waste, taking into account underlying drivers of waste, before they take **action**, following the Food Recovery Hierarchy. Doing so helps prioritise which strategies to focus on and to maximise impact. Adopting this framework would also align Cornwall's efforts to the national and global food loss and waste reduction agenda.

To account for the system's complexity, we recommend following an **iterative** approach in applying the Target-Measure-Act approach.

This means the level of detail in targets, measurement and action will grow as new information becomes available and as understanding for the complex system dynamics matures. In the specific case of Tevi's collaborative exploration of food waste in Cornwall, this iterative approach also makes optimal use of the diversity of stakeholders the network has access to.



An overview of the proposed course of action is provided in the figure below. The rest of this document provides more information as to why different pathways are prioritised in terms of sequencing, as well as more information about the systems perspective we suggest to keep in mind across pathways.



Step 1: Target

Align stakeholders under a high-level target and shared goal

Setting an initial common target will unite the network around a shared ambition. To align Tevi's efforts to the broader food sustainability agenda, we suggest setting a network-wide target of 50% food loss and waste reduction, in line with SDG 12.3 (*to halve per capita global food waste at the retail and consumer levels and to reduce food losses along production and supply chains, including post-harvest losses*[1]).

Targets should be refined throughout the Target—Measure—Act process as more insights are gained.

Step 2: Measure

Pathways 1 and 2

> ***"Measuring the problem and collecting data is really important. At the moment we really don't know what the extent of the problem is. Quantifying food waste wherever it happens—that would be a powerful message to show how much we are wasting and where. In conjunction, you can only collect data if you entice people, as it's a bit of a time investment to do so. Why would anyone measure something if it's not clear what the benefit is to them?'***
> ***— Steffen Boehm, University of Exeter Business School***

A systems perspective

Pathways 1 and 2 both relate to measuring food losses and waste at different points of the value chain. We recommend adopting a systems perspective and pursuing both pathways concurrently, at the level of the entire Cornwall food system.

If time and resources do not allow, we still recommend using a systems perspective, honing into a specific value chain (or product group) instead (for example, meat or dairy, fisheries, horticulture, potato farming etc.).

A value chain or systems perspective will provide Tevi a holistic picture of where food losses and waste arise. It will uncover where action is most urgently needed and where infrastructure, research and policy can serve a vital role. Crucially, it will also uncover issues that require a whole-supply chain approach—for example, where food loss or waste at one stakeholder level is driven by policies or practices higher or further down the value chain.

Regardless of system level, pathways 1 and 2 should be pursued in parallel.

Starting with a sub-system

If resources do not allow to pursue pathways 1 and 2 at the entire Cornwall food system level, factors to consider in prioritising which *sub-system (*or food product value chain) to start with to maximise impact include:

- **Solvability: How complex would solving the issue be?** Food products with shorter, less complex supply chains that involve a smaller number of stakeholders will likely require less coordination and would benefit from a more agile approach. Fruit and vegetables sold at local farmers' markets, for example, that only involve local farmers will be significantly less complex than a manufactured product sold in shops with roots in supply chains around the world.

[1] United Nations. (nd). Sustainable Development Goals. Retrieved from: https://sdgs.un.org/goals/goal12

- **Scale: Where do we expect food loss or waste to be highest?** Available UK figures as to food losses and waste per food categories, both on farm[2] and post-farm gate[3], can inform which food products in Cornwall are also more likely to be lost or wasted.

- **Personal fit: Who is in the Challenge Network and where does their appetite lie?** If the Challenge Network consists mostly of dairy producers, it could make sense to kick off work on dairy products, for example.

Prerequisites for getting started

- *If starting with a sub-system: An assessment of which food product or value chain to start with, using the criteria above*
- *Identifying representatives of key stakeholder groups along the value chain*
- *Establishing a regular stakeholder meeting to check in on progress and kick-off work on subsequent pathways, when relevant*

Step 3: Act

Pathway 3, then 4

In taking action, we also recommend adopting a systems approach and involving stakeholders along the value chain in co-creating solutions and identifying actions to implement.

We suggest starting out with pathway 3 as, according to the Food Recovery Hierarchy, prevention strategies should be prioritised over recovery and recycling (or food surplus valorisation) options, which pertain to pathway 4. When more insights have been gained into the prevention strategies the challenge network will be pursuing, work on pathway 4 can naturally start.

The (projected) impact of prevention strategies identified in pathway 3 should then inform the scale of infrastructure needed for recovery and recycling in pathway 4. This is due to the fact that food waste figures may be significantly reduced once prevention strategies are implemented, which would reduce demand for recycling infrastructure in the future. In the UK, for example, waste to energy plants now have to *import* waste from the rest of Europe because there is not enough residual waste locally to power them. Indeed, recycling efforts have largely succeeded in the UK, but their success was not taken into account in infrastructure planning.

[2] Feedback Global. (2011). Farmers talk food waste. Supermarkets' role in crop waste on UK farms. Retrieved from: Feedback Global website

[3] WRAP. (2009). Household food and drink waste in the UK. Retrieved from: WRAP website

In short, Step 3 can be broken down into:

- **Step 3.1: Prevent — Pathway 3**

Prerequisite for getting started: *Validated hypotheses on key food waste hotspots and underlying drivers in Cornwall, as outlined in pathways 1 and 2*

- **Step 3.2: Valorise— Pathway 4**

Prerequisite for getting started: *An adjusted projection of food waste volumes that can still be expected after prevention solutions of pathway 3 are implemented. This estimate informs the scale of infrastructure needed for recovery and recycling (or food surplus valorisation).*

Throughout: Enable

Finally, the collaborative, multi-stakeholder approach described in this document hinges on a need for organisational support to guide stakeholders and bring together all different sources of information. In addition to this coordination role, there is a need to interpret, structure and consolidate the information compiled and feed it back to key stakeholders to act upon.

The Cornish county could therefore benefit from having one inclusive, central organisation that oversees the transition towards a more sustainable and just food system, by aligning stakeholders, creating a common language and enabling measurement methodologies, for example. Naturally, Tevi is well placed to take on this role, due to the existing relations with the network and strong ties to experts at the University of Exeter and the private sector.

ANNEX A

LIST OF REFERENCES AND ADDITIONAL RESOURCES

REFERENCED IN THE SCOPING PAPERS

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ADDITIONAL INNOVATORS AND CASE STUDY SOURCES

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Ellen MacArthur Foundation. (2019). Cities and the circular economy for food. Retrieved from: EMF website

Gone with the Waste. (2020). The Dutch startups rescuing food from the bin. Retrieved from: GW website

ReFed. (2020). The food waste innovators database. Retrieved from: ReFed website

C40 Cities. (2020). How to manage food waste and organics on the path towards zero waste - an implementation guide. Retrieved from: C40 Cities KnowledgeHub.

ADDITIONAL RESOURCES

The WRAP Food waste reduction roadmap and toolkit provides detailed guidance for SMEs in the UK to measure and report on their food waste, including a Data Capture Sheet and Reporting Template, UK measurement and reporting guidelines and sector-specific guidance.

SouthWest Foodhub is a Community Interest Company working in partnership with the government's Crown Commercial Service to deliver a new dynamic approach to public sector food procurement known as the Future Food Framework, which will help small and medium sized producers in the region to sell directly to public sector institutions.

ANNEX B

A BRIEF GLOSSARY OF FOOD SURPLUS, LOSSES AND WASTE

Food losses refer to food that is lost in the early phases of the value chain, before it reaches the retailer or the consumer.

Food waste, on the other hand, refers to the loss of unused food during the retail and consumption stages.

Food recovery hierarchy. The food recovery hierarchy prioritises which actions to take in order to reduce food losses and waste. It starts with prevention–making sure food waste does not happen in the first place–, followed by recovery–redistributing food surplus to humans, in need or otherwise–, then recycling. Within recycling, redistributing food to animals takes precedence over composting, which in turn takes precedence over turning food waste into energy. The least preferable solution is sending food scraps and waste to

Food surplus valorisation. Food surplus valorisation refers to the recovery and recycling strategies outlined in the *Food Recovery Hierarchy.*

Food waste management and disposal practices[1].

- Anaerobic digestion
- Composting/aerobic processes
- Incineration/controlled combustion
- Land application
- Landfill
- Sewer/wastewater treatment
- Not harvested/ploughed-in
- Other (including unmanaged disposal)
- Redistribution to people (e.g. through a charity or commercial redistributor)
- Animal feed
- Bio-based materials/biochemical processing (e.g. feedstock for other industrial products)

[1] WRAP. (2020) Food waste reduction roadmap and toolkit. Retrieved from: WRAP website

Food categories. A number of official food categorisations exist. In the European Union, the following categorisation applies[2]:

EU Category Code	EU Category
01	Dairy Products
02	Egg and Egg Products
03	Meat and Meat Products, Game and Poultry
04	Fish, Shellfish and Molluscs
05	Fats and Oils
06	Soups, Broths and Sauces
07	Cereals and Bakery Products
08	Fruit and Vegetables
09	Herbs and Spices
10	Non-alcoholic Beverages
11	Wine
12	Alcoholic Beverages (other than wine)
13	Ices and Desserts
14	Cocoa and Cocoa Preparations, Coffee and Tea
15	Confectionery
16	Nuts and Nut Products, Snacks
17	Prepared Dishes
18	Foodstuffs Intended for Special Nutritional Uses
19	Additives
20	Materials and Articles Intended to come into Contact with Foodstuffs

[2]Food Safety Authority of Ireland Abbey Court. 2001. Guidance Note on the EU Classification of Food. Retrieved from: FSAI website

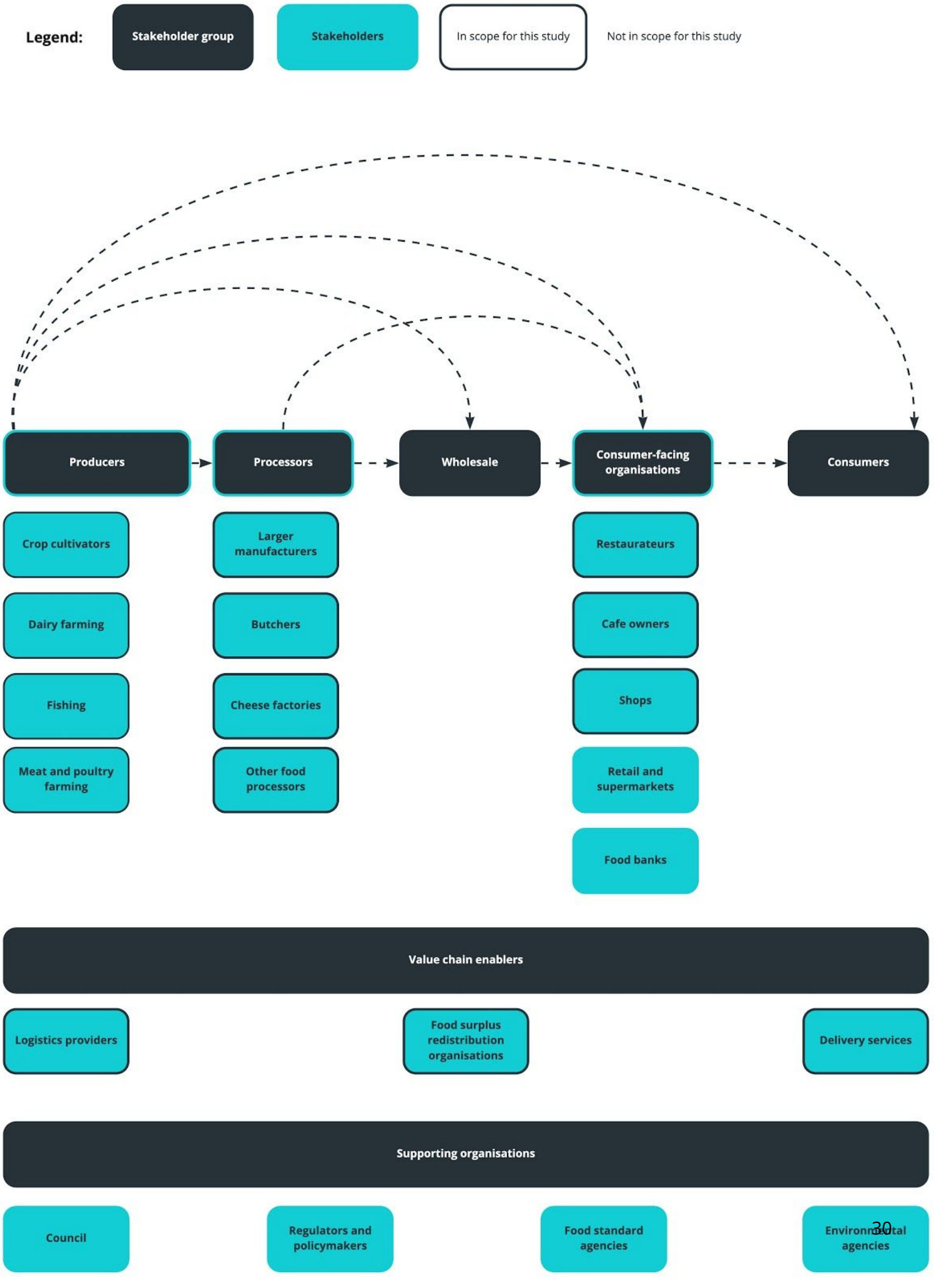
ANNEX C

THE CORNWALL FOOD SYSTEM

The forestry, food and drink and agriculture sectors are more significant in Cornwall than in other regions. Food production in Cornwall is dominated by a small number of large, national producers, which coexist with a much higher number of local SMEs. The food processing and manufacturing sector is the most economically important sector in the Cornish food economy. In terms of primary production, agricultural production is most significant, particularly the dairy and meat sectors (which contribute 68% to all value from farm produced), followed by horticulture (10%) and potatoes (6%)[1].

The graphic on the next page provides an overview of key stakeholder groups and stakeholders in the Cornwall food systems and highlights those in scope for this scoping exercise.

[1]Lobley, M., Reed, M., Metcalf, R., & Stephens, J. (2006). Food production, distribution and processing in Cornwall and the Isles of Scilly. Retrieved from: Exeter website


Legend:
Stakeholder group
Stakeholders
In scope for this study
Not in scope for this study
Producers
Processors
Wholesale
Consumer-facing organisations
Consumers
Crop cultivators
Dairy farming
Fishing
Meat and poultry farming
Larger manufacturers
Butchers
Cheese factories
Other food processors
Restaurateurs
Cafe owners
Shops
Retail and supermarkets
Food banks
Value chain enablers
Logistics providers
Food surplus redistribution organisations
Delivery services
Supporting organisations
Council
Regulators and policymakers
Food standard agencies
Environmental agencies

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