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**COLLABORATIONS FOR REDUCING FOOD WASTE:
 REQUIREMENTS FOR SUCCESSFUL RELATIONSHIPS BETWEEN
 FOOD PRODUCERS AND VALUE-CREATING BUSINESSES**

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Abstract

Despite increased global food production and calorie intake, food insecurity remains a pressing issue. Reducing food waste could mitigate undernourishment in developing regions by preserving resources and reducing environmental impacts. This paper explores the potential of integrating auxiliary retailers into food supply chains to manage food waste effectively. Through qualitative research in Leeuwarden, Netherlands, the study identifies the most suitable produce supply actors for such a supply chain and outlines factors necessary for successful partnerships. Findings suggest that while small scale producers already employ various waste reduction strategies, larger producers would benefit more from these partnerships, creating new revenue streams and reducing waste disposal costs. This research offers theoretical and practical insights into sustainable food waste management, emphasising the importance of local context and innovative strategies.

Key words: Food waste, auxiliary retailers, food supply chain, sustainability

INTRODUCTION

World food production and calorie intake per capita have increased significantly over the past century. Despite this, food insecurity persists globally (Van Der Werf & Gilliland, 2017). Reducing food waste by half in developed regions could significantly reduce undernourishment in developing regions; as the demand for excessive food production decreases, more resources in the Global South are preserved (Munesue et al., 2014). This could potentially benefit millions of people and lead to decreases in land and water usage, and greenhouse gas emissions associated with food production in developing countries (Munesue et al., 2014).

Due to great financial and environmental costs linked to food waste, reducing it emerges as a leading global strategy for achieving a sustainable food future, given its potential impact on resource conservation and addressing future food demands (Lipinski et al., 2013).

Scholars recognize that to decrease the volume of wasted produce, various stakeholders must collaborate to find solutions (Lever & Sonnino, 2022; Ishangulyyev et al., 2019). One such approach is to incorporate a secondary vendor, also known as an auxiliary retailer, who redistributes surplus and visually imperfect vegetables received from growers to consumers or other outlets (Hezarkhani et al., 2023). This is important because it not only helps reduce food waste, but also supports farmers by creating an additional revenue stream for produce that might otherwise go unsold.

This phenomenon sparked my curiosity, and I wanted to explore this topic further. Timing for such research is ideal, because the financial and environmental costs of food waste are increasingly recognized, and there is a growing global movement towards sustainable food systems. This urgency, combined with the availability of innovative solutions and heightened awareness of food security issues, creates a prime opportunity to

make impactful changes. Moreover, this is a novel approach because it leverages the concept of auxiliary retailers to redistribute surplus produce, a strategy that uniquely addresses both food waste reduction and economic support for farmers. By creating additional revenue streams for produce that might otherwise go unsold, this method innovatively bridges gaps in the food supply chain and promotes sustainability.

That said, while Hezarkhani et al. (2023) highlight the potential value of incorporating an auxiliary retailer to reduce food waste, they do not provide concrete guidelines on implementing such a supply chain. The purpose of this paper is to identify the most suitable food producers or distributors for such supply chains and determine the elements that contribute to successful business relationships between these producers/distributors and auxiliary retailers that can transform surplus, otherwise wasted produce, into valuable resources. Therefore, the research question guiding this study is:

What food producer/distributor is the most suitable for a supply chain with an auxiliary retailer, and what is necessary for this relationship to be successful?

To answer the research question, the study employed a qualitative research design. The research involved conducting semi-structured interviews with food producers and distributors in Leeuwarden, Netherlands. Participants were purposefully selected based on their connection to the local market and agricultural landscape, and data was collected through a combination of in-person, phone, and online interviews over a one-month period.

The study found various strategies that food producers/distributors employ to minimise food waste. These findings include insights into pragmatic planning, discounting practices, personal consumption integration, and the repackaging of surplus produce into new products. These findings guide the discussion about which produce supply actor would be the most suitable for supply chains with auxiliary retailers and, therefore, highlight the necessary factors for establishing successful business relationships aimed at sourcing surplus produce.

The significance of relational elements, logistical considerations, and economic factors in fostering successful relationships between producers and auxiliary retailers is emphasised.

Theoretically, this research challenges prevailing assumptions by revealing that food producers of all scales actively employ diverse strategies to mitigate food waste.

Furthermore, this research builds upon the framework of Hezarkhani et al. (2023), illustrating how small scale producers innovate waste reduction strategies, aligning with the concept of auxiliary retailers, while larger producers can benefit from new revenue streams.

Practically, this research shows that integrating auxiliary retailers in the food supply chain presents an opportunity for larger scale producers to transform almost wasted produce into new revenue streams, contributing to sustainability goals and promoting a circular economy, while policymakers should focus on facilitating such partnerships to optimise waste management practices.

THEORY

Food Waste

One-third of the world's edible fruits and vegetables are wasted annually, totaling about 1.3 billion metric tons (UN World Food Programme, 2011). Food waste is acknowledged as a critical issue that demands attention due to its economic implications, and ethical considerations regarding global hunger and resource distribution (Okayama & Watanabe, 2024). It also contributes significantly to environmental issues by wasting the resources used in food production and generating potent greenhouse gases, with global food waste accounting for 6 to 8 percent of human caused emissions (WWF, n.d.).

Food Waste in Developed Countries

Developed regions generate considerably higher food waste compared to developing regions (Van Der Werf & Gilliland, 2017). Consumers tend to accept aesthetic imperfections related to change of colour, but not those related to shape and physical aspects of fresh produce (Lagerkvist et al., 2023). This leads to high standards from food retailers, and imperfect or "ugly" fruits and vegetables are often rejected due to not meeting exact specifications regarding size, shape, or appearance, leading to food waste (Yuan et al., 2019; Tu et al., 2018).

In the European Union, around 129 Mt of food waste is generated across the food supply chain with fruit and vegetables being wasted the most (Caldeira et al., 2019). It is estimated that the largest share of food waste occurs at the consumption level (46%), followed by primary production (25%), processing and manufacturing (24%), and distribution and retail (5%) (Caldeira et al., 2019).

Taking the UK as an example of a developed country, research shows that the food retail sector generates around 366 kilo tons of food waste per year, with small grocery stores producing more waste proportionally than large supermarkets due to unpredictable demand

from top-up shopping, and fresh fruits and vegetables are the top contributors to food waste (Parfitt et al., 2010).

Approaches to Managing Surplus Food

In a traditional food supply chain, excess produce at the farm is lost and occurs due to market dynamics and inefficiencies in the supply chain (Hezarkhani et al., 2023). Unused food that goes unconsumed transforms into waste (Alexander & Smaje, 2008; Garrone et al., 2014)). Managing this waste involves various actions like disposal in landfills, recycling, and recovery (Ruetgers, 2020). Most surplus food ends up being discarded, with a significant portion being directed to landfills, which is both the simplest and most harmful disposal method available due to its negative effects on climate change (Stuart, 2009; Mena et al., 2011).

To decrease the volume of wasted produce, approaches involving collaboration among various stakeholders must be employed, involving governments, non-profit organisations and private sector businesses (Lever & Sonnino, 2022; Ishangulyyev et al., 2019). There are various alternatives to sending surplus food to the landfill such as charitable redistribution (surplus food is sent to organisations supporting low-income individuals), food sharing via social networks (online platforms like Too Good To Go and Foodsharing.de facilitate food sharing within the sharing economy framework), and selling through social supermarkets (that provide discounted surplus food to food-insecure individuals, offering food access and support services) (Ruetgers, 2020).

Furthermore, surplus food can be sold at a low cost, attracting consumers without significantly impacting regular sales (Ruetgers, 2020). Retailers can create dedicated sections for surplus food, enhancing their sustainability image and reducing waste disposal costs (Ruetgers, 2020).

Marketing Ugly Produce

Despite visual imperfections, fruits and vegetables classified as ugly are still perfectly edible and possess the same nutritional value as their visually appealing counterparts (Yuan et al., 2019; Tu et al., 2018). There is a growing trend to market ugly produce instead of discarding it by incorporating dedicated product lines and specialised retailers (Hezarkhani et al., 2023; Yuan et al., 2019).

Hezarkhani et al. (2023) examine three scenarios for including ugly produce in supply chains: traditional supply chain where the ugly produce is lost at the farm; incorporating ugly produce in the traditional supply chain where it would be sold in the market along with the regular produce by the main retailer; and working with an auxiliary retailer where, if the main retailer decides not to market the ugly produce, the grower can work with an auxiliary retailer to sell the ugly produce in the market. The auxiliary retailer, in this context, refers to a secondary vendor or intermediary who redistributes surplus and visually imperfect vegetables received from growers to consumers or other outlets (Hezarkhani et al., 2023). There is a significant financial benefit to the grower who offers the ugly vegetables and surplus produce to an auxiliary retailer (Hezarkhani et al., 2023).

Value-Creating Businesses and Auxiliary Retailers

To further explore relationships between growers and auxiliary retailers, initiatives and campaigns in the European Union are examined. Various parties in the EU have focused on reducing food waste by promoting the use of imperfect produce (Yuan et al., 2019). Businesses and organisations, such as Espigoladors in Spain (Espigoladors, 2024), Intermarché in France (Intermarché, n.d.), Snact (Snact, n.d.), and the "Love Food Hate Waste" campaign in the UK (Love Food Hate Waste, 2024), have found ways to redistribute and utilise imperfect produce to create new products and minimise the food waste associated with otherwise unused fruits and vegetables. For example, Snact processes surplus produce

to create fruit jerky and banana bars, creating a product line that is brought to the market (Snact, n.d.), while Espigoladors first redistribute the produce, and create jams, creams, juices, and other products with the produce that is left over (Espigoladors, 2024).

Successful Relationships in the Food Supply Chain

Strategic supply chains are increasingly adopted as a means to gain a competitive advantage (Fawcett et al., 2008). Collaboration in supply chain management can lead to benefits such as increased inventory turnover, increased revenue, and cost reduction across the chain (Fawcett et al., 2008).

For more sustainable food systems, connections between farmers and retailers must be strengthened (Lever & Sonnino, 2022). Reliability, responsiveness and flexibility are recognised as crucial in successful partnership formation between food growers and retailers, and long-term relationships produce various benefits. For example, growers can help the retailers market the products effectively, while the retailers can provide guidance to growers to provide a better product-market fit (Orgut & Lodree, 2023; Suhartini et al., 2017).

Furthermore, relationship quality is recognized as a crucial determinant of high-performing food supply chains (Naude & Buttle, 2000; Srinivasan et al., 2011). The importance of building and maintaining trusting relationships is highlighted as significant for supply chain performance (Mesic et al., 2018). Moreover, high levels of commitment and economic satisfaction next to exercising non-coercive power and reputation positively influence supply chain relationships. Overall, investing in strong, cooperative relationships can benefit the entire supply chain (Mesic et al., 2018).

Development of the Research Question

The literature demonstrates that there are alternative ways to manage surplus food within the food supply chain rather than sending it to landfill, such as charitable redistribution, sharing via social networks and selling the produce with a discount, to animal

feed or through social supermarkets. This indicates that the way of handling food waste might be dependent on the context.

Moreover, some authors suggest that incorporating an auxiliary retailer in a food supply chain can bring value to otherwise wasted produce, but provide no concrete guidelines on characteristics of such a supply chain, and under which circumstances it can be established. In order to find which produce supply actor would be the most suitable for such a supply chain, it needs to be clarified where the food waste actually appears with food producers and distributors, what the characteristics of that waste are, and how it has been handled so far.

Successful business relationships benefit both product/service providers and client companies (Bharadwaj et al., 2010), and thus, producer/distributor would be considered suitable for such a supply chain if the value can be created both for the producer/distributor and the auxiliary retailer.

Furthermore, based on the research by Mesic et al. (2018), we know that relationship quality is crucial to high food supply chain performance. While the literature so far has been focusing on the relationship of producers and distributors with the main retailer, little is known what is needed to make a relationship between a producer/distributor and an auxiliary retailer dealing with food waste successful.

Therefore, with this study, I am aiming to contribute to the literature by exploring what factors determine successful business relationships between food producers/distributors and auxiliary retailers in food supply chains, by answering the research question:

What food producer/distributor is the most suitable for a supply chain with an auxiliary retailer, and what is necessary for this relationship to be successful?

METHOD

Research Design

The literature suggests that food producers might benefit from a relationship with an auxiliary retailer to increase and extend the value of the produce and avoid landfill (Hezarkhani et al., 2023). The aim of this research is to find which produce supply actor would be most suitable for such a supply chain and what needs do food producers/distributors have to provide auxiliary retailers with otherwise wasted produce. This aim calls for a qualitative approach, which helps better understand the human experience (Cleland, 2017). Qualitative research aims to gather and analyse non-numerical data in order to gain an understanding of individuals' social reality, including understanding their attitudes, beliefs, and motivation (Hecker & Kalpokas, 2024). This method is crucial to understand the viewpoint of food producers and distributors, in order to understand the nature of local food supply chains and how the food waste in these supply chains can be minimised. As the research question is exploratory in nature, semi-structured interviews were chosen as the data collection method. Semi-structured interviews are open-ended, allowing for flexibility. Having less structure helps to see elements that would form patterns, while still allowing for comparisons between respondents. This is due to a set general framework to the data collection process (Hecker & Kalpokas, 2024).

The research is set in the Netherlands, in the city of Leeuwarden. Leeuwarden is the capital of Friesland province, which has one of the largest proportions of farmland in the Netherlands (CBS, 2021). This suggests a suitable research setting, as many food producers and distributors are present in the area (Venema et al., 2021).

Participants Selection

The participants in this study were primarily selected purposefully. Participants are selected who can best inform the research question and enhance understanding of the

phenomenon under study. Purposive sampling is used to find a specific group of individuals for data collection and analysis (Heath, 2023), and was therefore chosen as the appropriate method to answer the research question.

Participants must be connected to the local market and agricultural landscape of Leeuwarden and the surrounding areas. This criteria ensures that there is a short supply chain between grower/producer and local retailers, presenting a greater potential for a relationship with an auxiliary retailer in the same area. The literature suggests that small grocery stores produce more food waste proportionally than large supermarkets (Parfitt et. al., 2020), and therefore, I prioritise small to medium-scale producers and retailers, omitting large chains. This is also to ensure that a seamless relationship between food producers/retailers and auxiliary retailers is feasible in the given geographical area. For the sake of this study I established two categories to define the food producers and retailers: small (1-4 employees) and larger (4+ employees).

Participants were primarily approached in the markets of Leeuwarden, which were predominantly food distributors. To find local food producers, personal networks were approached as well as extensive search on Google search engine was conducted. Finally, after the interviews, participants were asked for referrals to employ a snowball sampling method to help recruit new participants by referring other participants to form part of the sample (Hogan et al., 2009). It proved useful as food producers are sharing networks with other food producers and distributors in the area.

Research Ethics

In this research, I followed strict rules to protect the rights and well-being of all participants. This includes being transparent about the study and its goals, getting permission from everyone involved, and keeping their information private. By sticking to these guidelines, I assured that this research is trustworthy and respectful. For further information

about research ethics, consult the Information Sheet and Informed Consent Form, which can be found in **APPENDIX A**.

Data Collection

Data for the research was collected in three different ways: 1) interviews with food producers were conducted via Google Meet, 2) interviews with food producers/distributors were conducted in-person in the markets of Leeuwarden, 3) interviews with food producers/distributors were conducted on the phone. The data collection was executed in one month's time from April to May 2024. The Interview Guide can be found in **APPENDIX B**. In total 16 semi-structured interviews were conducted with food producers/distributors of different sizes. The List of Participants is summarised in **APPENDIX C**.

Online interviews. Two interviews were conducted using Google Meet. These interviews took 21-45 minutes and explored the presence of food waste, strategies used by the participants to minimise it, and the needs the food producers have to establish successful business relationships with auxiliary retailers to create value out of otherwise wasted produce. The interviews followed a previously established semi-structured interview guide, which guided the interview and allowed for additional questions based on the answers given by the participants, enabling me to explore every situation and individuals' motivations in detail. These interviews were recorded and detailed notes were taken during the interviews to capture first impressions of the data.

In-person and phone interviews. Seven interviews were conducted via phone and seven interviews were conducted in-person in three weekly markets in Leeuwarden. Majority of interviews took 5-10 minutes, with three lasting up to 20 and other two less than 5 minutes. While online interviews allowed for more flexibility to explore individuals' motivations, due to the research setting (unscheduled calls and in the market) with limited time for conversation, the main goal of these interviews was to find out about participants'

food waste, ways they are tackling it, and what they would find necessary in case they worked with an auxiliary retailer. During these interviews, detailed notes were taken and the most important quotes were written down to ensure accurate data gathering. Supplementary comments were made after the interview was finished to provide maximum data retention.

Data Analysis

To analyse the data, I had to prepare the collected input to perform a thematic analysis. These two steps are explained more in detail below.

Preparing the data. The first step was to transcribe the audio recordings of the interviews and write-up the notes of the in-person and phone interviews. These were consolidated in one data file, which I familiarised myself with by reading the transcripts and notes multiple times. To organise the data in a meaningful and systematic way, I conducted a thematic analysis.

Thematic analysis. I used the interview transcripts to create first-order codes based on the quotes of the interviewees. First-order codes in this case are shorthand labels that would describe the content (Caulfield, 2023). *Different amounts of waste, Local distribution of potatoes, Sold as brand product, Succession planting, and Stamppot from unsold produce* are some examples of first-order codes. For example, if a participant said: *“The amount of waste highly varies per harvest,”* I created a code name for *Variable waste per harvest*. If they said: *“We do not throw out anything that is still edible,”* I created a code name for *Edible items not discarded*.

I treated the notes of the in-person and phone interviews in a similar way. Where applicable, direct quotes were used to create codes, otherwise I used a summary of what the interviewee said. For example, a note that says *“The waste they have gets sent to a compost factory,”* was given a code name for *Waste sent to compost factory*. In a similar way, a note that says *“They have no waste,”* was given a code name for *No waste*. Describing the

interview content this way allowed me to gain a condensed overview of the main points and common meanings that recurred throughout the data.

The first-order codes allowed for patterns to emerge and could be grouped in broader themes by combining several first-order codes. Examples of second-order codes include *New products*, *Personal use*, *Certainty of sale*, and *Composting*. For example, first-order codes *Waste sent to compost factory* and *Leftovers composted* were combined to create the second-order code for *Composting*. Codes *Given to animals*, *Livestock feed* and *Waste directed to animals* were aggregated in second-order code for *Animal feed* and so forth. Moreover, first-order codes *Waste* and *No waste* became themes in their own right with other codes like *Edible items not discarded* incorporated into them. Some codes that did not appear relevant or did not appear often in the data were discarded (e. g. *Biological produce* appeared in only one interview and is not relevant). Organising the data in this manner provided hints for the answer to the research question.

FINDINGS

The purpose of this research is to find which produce supply actor would be the most suitable for a supply chain with an auxiliary retailer, and what needs food producers/distributors have to establish a successful business relationship with an auxiliary retailer to source surplus, otherwise wasted produce. However, before addressing this question, it is first necessary to understand what currently happens with the surplus produce and what producers/distributors would benefit the most from a supply chain with an auxiliary retailer. Thus, the findings in this study focus first on documenting what happens with the waste from surplus produce, and based on the need for tackling the waste, necessary factors for a successful relationship with an auxiliary retailer are recorded. A complete overview of findings can be found in **APPENDIX D**. Findings Summary. Visualisation of findings can be observed in Figure 1. Findings Diagram.

Ways of Avoiding Waste

Participants in the study revealed diverse strategies for addressing food waste within their operations, with some commonalities emerging among their approaches. The strategies are organised in three main groups: Market Sensibility, Personal Use, and Own Auxiliary Retailer.

Market Sensibility

Pragmatic planning. Three participants of small scale emphasise the importance of pragmatic planning to minimise waste. Strategies included purchasing only what customers require and rotating stock efficiently across multiple markets. Participant MSC1 claimed: “We only buy what customers need and sell in four markets per week,” indicating that they prioritise meeting customer demands while minimising their waste, thus ensuring efficient operations.

This finding is similar to participant SP1 who stated: “We always buy exactly what we need and sell everything”. They also added that they are ecologically conscious and only purchase produce from eco-farmers who have no waste, therefore tackling the food waste before the produce reaches the retailer itself.

Pragmatic planning is not only common within retailers. Participant FP1, who is a small scale producer explained: “We grow plants in succession and always have a customer lined up because we mostly work with regular customers,” indicating that they in a similar manner to food retailers plan their operations in an efficient way to ensure minimum waste. They continue, “We also have multiple points of sale so we mostly end up with one crate of vegetables with some mould on it,” which is in line with the finding of participant MSC1 who also sells the produce in multiple locations to ensure maximum sales of produce with minimum amount of waste.

Discounting. Two larger scale retailers identified offering discounted prices to customers as a means of minimising waste. Participant MSZ2, who is a larger scale distributor asserted: “It is a shame to throw a lot out so we pass these deals to customers,” suggesting that even though waste is not ideal, finding ways to minimise it by offering deals to customers is a practical approach that benefits both the distributor and consumers. They continue: “When the customer gets a good price for different vegetables or fruit they always come back for more,” which indicates that discounting imperfect produce can not only minimise food waste but also enhance customer loyalty.

Discounting was also indicated as the main means of tackling food waste by participant SP2, who also is a larger scale retailer: “I already fight food waste by selling the vegetables with discount.”

Personal Use

Consumption. Five small scale participants integrated unsold produce into their personal consumption or community sharing networks, utilising it for home-cooked meals, animal feed, or donations to neighbours.

Participant MSZ5 told me: “If they [vegetables] are not sold we make stampot or give away to friends and neighbours or feed it to our pigs.” They also indicated that they have little amount of waste, thus they use any leftover produce in their households. In a situation where there is too much produce, they share it with their friends and neighbours, ensuring that nothing goes to waste. If the produce is damaged or otherwise inedible, they forward it to animal feed.

Making a meal was also mentioned by participant MSB1, who creates the packages of cut vegetables, they asserted: “If those packages are not sold we make a stampot out of it.” Creating new products of otherwise wasted vegetables in their case is the primary way of tackling waste and if any is left, they use it in their business to treat their employees with a healthy meal.

Participant FP2 share their leftover produce with the volunteers of their farm. They said: “Everything we grow is sold in the store, if it is a little bad we give it away to our volunteers.” They make sure that the produce they grow is sold, and do not throw away anything that can be still utilised in one way or another, rewarding people who work in their farm with free, sometimes slightly damaged vegetables. They asserted: “We do not throw out anything that is still edible.”

Animal feed. Four participants said they sent their food waste to their own animals as feed. Mainly small scale producers repurposed surplus produce as animal feed, highlighting its value in reducing waste.

Participant MSZ5 ensures that their customers have the best quality product available. As they own a homestead, they can use a part of their grown produce as animal feed: “We don't bring the misshapen ones [vegetables] to the market so they always go to the animals.” Participant FP4 too ensures that the customers can purchase top-quality products: “The only waste is if the quality is worse but then we give them to our cows and pigs or eat ourselves.” Participant FP5 too indicated they feed their own animals with the unsold produce: “We have no waste, if there is any, we give it to our cows and chickens.”

Own Auxiliary Retailer

New products. Innovative approaches, such as repackaging or processing expiring produce into new products, were employed by two participants to extend the shelf life and marketability of otherwise wasted items.

Participant FO2 told me: “When I see that the fresh mushrooms are not going to get sold, I usually turn the oven on and dry them immediately, so I basically don't have any waste,” which demonstrates awareness of waste and willingness to utilise creative solutions to minimise it. As a small scale producer, they have the flexibility to process the unsold produce at their own merit, ensuring that nothing gets wasted. They continue: “The dried product is used for risotto and just sold like that, it is our brand product,” which showcases creativity in coming up with ways to tackle food waste. Drying the otherwise wasted mushrooms, provides the produce a second chance of being valuable, and is successfully marketed through adding additional ingredients to create a ready-made risotto package.

A small scale retailer MSB1 revealed that they have no waste. While showing me around their vegetable store, they reported: “Those packages we make out of vegetables that are soon to expire.” To minimise the losses of their business, they sell already cut and packaged vegetables, which is their brand product. This approach to tackling waste provides the customer with additional value, i. e. not having to cut vegetables at home. This way, the

less attractive vegetables can be cut and sold, providing benefits for both the customer and the business.

Ways of Disposal

Participants indicated various ways of disposing the surplus produce waste and they are organised in two main groups: Sustainable and Unsustainable. Sustainable disposal is considered disposal of waste in a way that creates an additional value, e. g. composting is a way to recycle nutrients and improve soil health (*Composting 101*, 2024), whereas using surplus produce as animal feed allows for less crops to be grown intended for animal feed, and it reduces the negative environmental impacts if the waste was sent to landfill (*Using Surplus Food in Animal Feed*, n.d.).

Sustainable Disposal

Composting. In total six participants pointed out that the unsellable produce ends up being composted. While composting appeared as the most common way of tackling food waste among the participants, they generally regarded it as a last resort, preferring to prioritise sales or alternative uses where possible.

All participants indicated that they send leftover produce to compost only after they have employed the aforementioned strategies. For example, participant MSC1, next to planning their purchasing based on customer demand, forwards the unsold produce to composting. They tell me: “We have very little waste and that gets sent to the compost factory.” Similarly, participant MSZ2, who primarily utilises discounting as a waste tackling practice, sends otherwise unsellable produce to compost: “If it really cannot be sold it goes to compost.”

Animal feed. Participant FO1, who is a larger scale food producer, sells their produce to a company that supplies animal feed in bulk. They state: “Currently I am selling bad

potatoes for 4, 5, 6 cents per kilogram to animal feed.” For them this is beneficial, as there is a large amount of waste and selling it for animal feed brings additional value.

Unsustainable Disposal

Disposal. Disposing the vegetables is the least preferable option due to its environmental impact and economic inefficiency and was mentioned by one participant.

Participant MSH1, who is a larger scale food retailer, explained: “We throw out two and a half containers of vegetables every week.” They do not employ any other strategies for tackling waste and are generally unaware of ways how additional value can be created out of otherwise wasted produce.

Volume and Availability of Waste

To evaluate whether a participant is suitable for a supply chain with an auxiliary retailer, the volume and availability of the wasted produce was assessed.

Varying amounts of waste. Every participant of the study who has food waste stressed that the amount of wasted produce is highly variable and mainly depends on purchasing and consumer demand. Food producers stressed that the amount of food waste can be affected by weather conditions and diseases. As participant FO1 puts it: “It is different every year. Last year was very bad with the disease so many potatoes had to be removed from the field.” In their case, this produce was forwarded to compost and eventually put back into the soil.

All participants who have food waste unanimously pointed out that food waste varies from week to week. Participant MSZ2 said: “It is hard to predict what is going to be on the market, it is different every week.” Even though produce that is available year-round gets sold in predictable amounts every week, for some vegetables, the volume is hard to predict and is often a subject to waste. Participant MSZ5 stated: “It is very different every time.”

Participant SP2 too said: “I do not have waste every week, it is very hard to say what is going to be left over.”

No waste to sell. Ten participants indicated that they have no food waste that could be used for another purpose. These include participants who create new products out of the potentially wasted produce (FO2, MSB1), participants with very low waste and alternative solutions like composting and animal feed (MSC1, FP1, FP2, FP4, FP5) and participants who indicated they have no food waste at all (MSZ6, FP3, SP1).

Participant SP1: “We always buy exactly what we need and sell everything, our farmers also have no waste.”

Amount of potentially wasted produce. Most small scale food producers and retailers who have food waste indicated they have none to a couple of crates of unsold vegetables per week. Most of these vegetables are either damaged or rotten and have to be sent to compost. As participant MSZ4 stated: “We mostly end up with one crate of broken vegetables because most can be sold.”

The case is different for larger producers and retailers. For example, participant FO1 could not estimate a definite volume of food waste, as it is highly variable, but also said: “It is definitely more than a couple kilograms,” which he later clarified is a large volume, as they sell the food waste to a commercial animal feed company.

Similarly, participant MSH1 explained that the volume of waste is rather large. While they stated: “It is different vegetables every week and sometimes a lot,” they also estimated the aforementioned two and a half containers of food waste.

Needs for Successful Relationships

Participants who have food waste indicated three main elements that they would find necessary for a successful business relationship with an auxiliary retailer: Relational, Logistical, and Economic Elements. Participants with low waste and alternative solutions like composting and animal feed, as well as participants with waste to sell are included in the findings.

Relational Elements

Certainty of sale. The most important aspect for a successful relationship between the parties is the certainty of sale, as indicated by all of the participants. Simply put, if there is no agreement between them and the auxiliary retailer, the produce cannot be prepared for a sale.

Participant MSZ5: “You come pick it up, that can be arranged.”

Participant SP2: “Sure, if I have an agreement that they get picked up then it is all good.”

Logistical Elements

Pickup. All participants indicated that the leftover produce must be picked up by the auxiliary retailer, whether at their location or the weekly market where they sell their produce. Participant FO1 stated: “You have to pick them up just like animal feed, we do not really bring the potatoes anywhere,” as they sell their produce from their location, and as animal feed they sell is being picked up by the company, they expect the same from the potential auxiliary retailer. As participant MSZ4 puts it: “Picking up at the market is the easiest because we are here every week.” It is the most beneficial for the producers and retailers if an auxiliary retailer collects the produce where it is located.

Time investment. Participant SP2 told me about a negative experience they had when working with an auxiliary retailer, as they explained: “I used to work with a company that picked up older produce but it took a lot of time sending emails.” They stated that the

relationship would be successful only in a case when the pickup agreement is clear and takes no additional time investment as a traditional business to consumer sale.

Routine planning. Participant MSH1 pointed out that planning for routine is important: “If we know there is someone to come pick the vegetables up then we can set it aside.” This is the case as they are occupied with their primary operations and the easiest way for them to sell the leftover vegetables is to have a set schedule for pickup.

Economic Elements

Beneficial price. Some small scale producers and retailers who employ various strategies to tackle food waste, such as composting and animal feed, indicated that in a situation they would work with an auxiliary retailer, it would be at a price point that is beneficial for them. Participant MSZ4 pointed out: “We agree there is somebody to pick them up, it has to be for a price that is worth it.”

Discounted price. On the other hand, both larger scale participants with food waste indicated they would provide a discounted price for the produce, as they are interested in decreasing the cost of the waste (MSH1) or minimising opportunity cost, namely the potential revenue loss associated with disposing of unsold produce (FO1). Participant MSH1 insisted: “For a discounted price with pickup.”

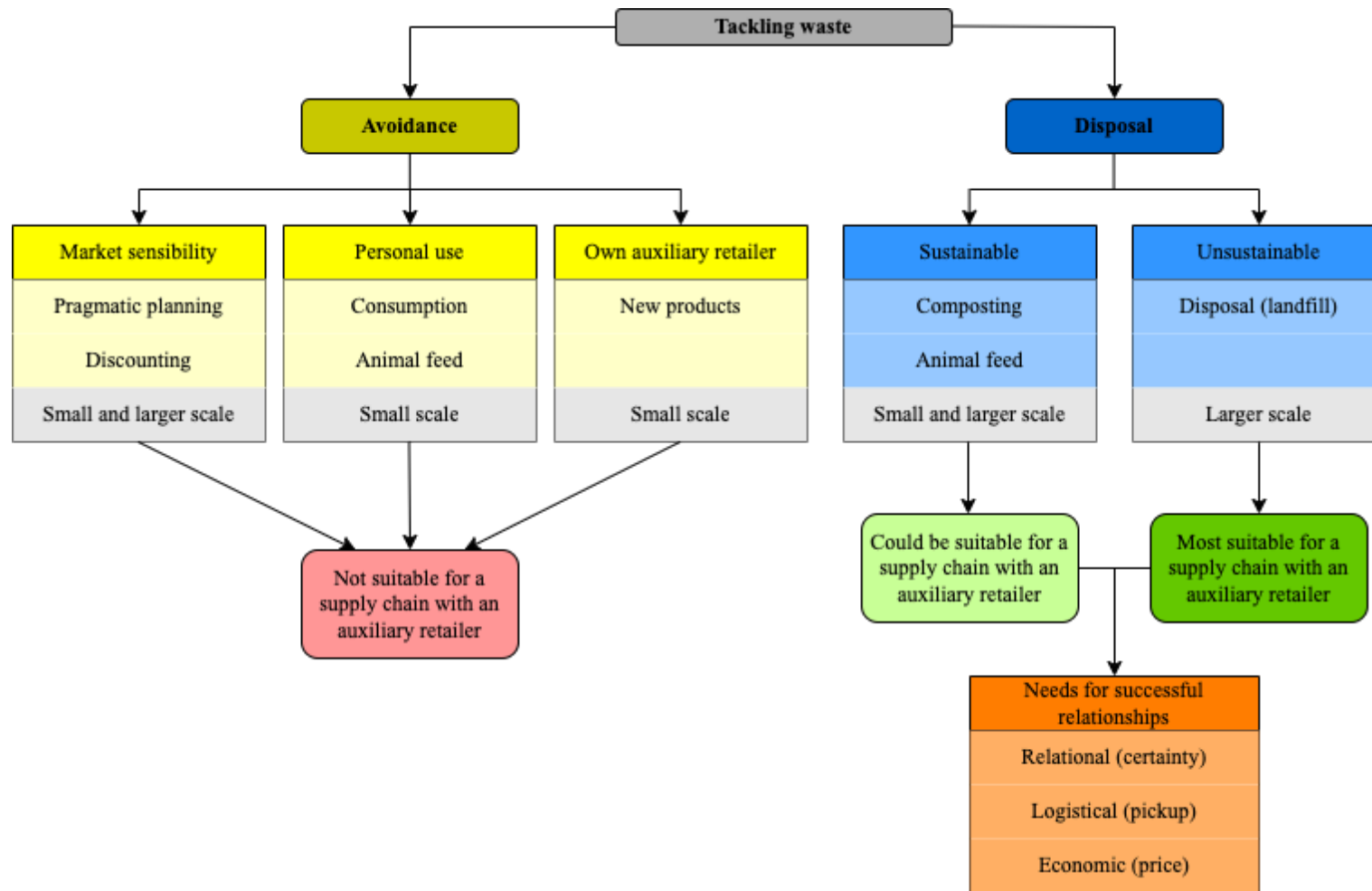


Figure 1. Findings Diagram.

DISCUSSION

This research originated from the urgency to reduce food waste to minimise the negative impacts that wasted produce has on global sustainability. The purpose of this study was to understand what is necessary for food producers/distributors to establish successful business relationships with auxiliary retailers to source surplus, otherwise wasted produce. To find an answer to the research question, food producers/distributors of different scale in Leeuwarden and its surrounding areas were interviewed about their food waste to examine whether they would be suitable for a supply chain with an auxiliary retailer. Then, they were questioned about factors that would affect successful business relationships between them and the auxiliary retailers.

My study changes the way we view repurposing food waste at the retail level, because it appeared during my research that disposal of waste to the landfill in small to medium scale food retail rarely occurs. Next to selling almost wasted produce to their customers for a discounted price, food producers/distributors presented a handful of other strategies to avoiding waste such as better planning, personal consumption, creating new products, composting, and animal feed. This suggests that not every producer/distributor would benefit from a supply chain with an auxiliary retailer, as many solutions for different scale producers/distributors already exist. My study defines the ideal actor for such a supply chain.

Approaches to Managing Surplus Food

The theory of Hezarkhani et al. (2023) assumes that in a traditional food supply chain any excess produce on the farm level is lost. My findings challenge this assumption, as every food producer who was interviewed for my study, indicated at least one strategy of tackling food waste within their farms. While smaller scale producers indicated small scale solutions, such as personal consumption and own animal feed, larger scale producers utilised their waste to create value by sending the lost produce to commercial animal feed facilities. This is

important, because it presents a potential for minimising waste and maximising resource efficiency in food supply chains. By recognizing and implementing strategies employed by both small scale and larger scale producers, we can move towards a more resilient agricultural system that not only reduces food waste but also contributes to environmental sustainability.

Furthermore, Stuart (2009) and Mena et al. (2011) argued that lost surplus food ends up being discarded, with a significant portion being directed to landfills. This was, indeed, the case with one distributor, who disposed of the food waste by sending it to landfills. At the same time, six participants indicated that the lost surplus food is composted, therefore creating additional value, as compost can be utilised to recycle nutrients and improve soil health. This is a crucial finding, because it shows that implementing sustainable waste management practices within food supply chains is viable. By diverting surplus food from landfills and instead composting it, we not only reduce environmental harm but also harness the potential of organic waste to enrich soils and support agricultural productivity.

Moreover, the literature indicated that selling almost lost produce for a discounted price as a separate offering within one's business could be adopted as a waste avoiding strategy (Ruetgers, 2020), and my findings closely align with the literature. In fact, discounting was indicated as one of the most common ways of tackling waste between food distributors. This confirms that this strategy is a practical and effective approach to reducing food waste while also benefiting businesses economically. This alignment between literature and findings highlights the feasibility of discounting as a waste avoidance strategy, emphasising its potential to mitigate waste and promote sustainability.

Lastly, while the literature indicated charitable redistribution, food sharing via social networks and selling through social supermarkets as alternative strategies to sending food waste to the landfill (Ruetgers, 2020), there were no parallels found with this knowledge in

my study. This might be due to the context of the Netherlands, as there are certain systems for social benefits in place and digital platforms for food sharing that are predominantly used by hospitality businesses. This suggests that alternative waste reduction strategies may vary significantly based on regional social and economic structures, highlighting the need for localised approaches to effectively address food waste.

Food Supply Chain with an Auxiliary Retailer

The theory of Hezarkhani et al. (2023) suggests that a food supply chain with an auxiliary retailer would aid in decreasing the waste from ugly vegetables. My findings add to this theory by clarifying that not only ugly vegetables but almost lost produce can create value in such a supply chain. This is important because it broadens the scope of potential waste reduction strategies, demonstrating that a wider range of imperfect and surplus produce can be effectively utilised.

Hezarkhani et al. (2023) do not specify what food producers would be suitable for a food supply chain with an auxiliary retailer, and my findings add to this theory. I found that small scale producers/distributors have very little amount of food waste, as opposed to the findings of Parfitt et. al. (2010), and they have various ways of tackling it to decrease their financial losses. This could be due to the fact that small scale producers/growers are usually family businesses and they cannot afford to waste their produce as it directly impacts their take-home pay, thus, they invent diverse creative solutions to make sure that no produce goes to waste.

Interestingly, small scale producers/distributors demonstrated a waste tackling strategy that resembles the theory of Hezarkhani et al. (2023) by becoming their own auxiliary retailers. As per literature, an auxiliary retailer is defined as one who redistributes surplus and visually imperfect vegetables received from growers to consumers or other outlets (Hezarkhani et al., 2023). In my findings, small scale producers/distributors used their

unsold, almost wasted produce to create new products and redistribute them through other outlets, namely branded products, creating new revenue streams from almost wasted produce. This waste tackling strategy does include a level of flexibility in one's business, as the waste must be kept in close sight and the producer/distributor is responsible for creating the product. This is a major finding, as it highlights the innovative capacity of small scale producers to adapt and create value from surplus produce waste, demonstrating that with the right approach and entrepreneurial spirit, food waste can be transformed into profitable opportunities. This also suggests that empowering small scale producers with resources and knowledge to develop such strategies could significantly contribute to reducing food waste on a broader scale.

The findings suggest that small scale actors are not the ideal candidate for a supply chain with an auxiliary retailer, as the waste volume is low and they already tackle it in various ways. On the other hand, this was not the case with larger scale producers/distributors, as they, in general, have more waste and small scale solutions are not suitable for their operations.

Larger scale producers/distributors showed various waste disposal strategies, and while composting and commercial animal feed are more sustainable than disposal to landfill, these producers/distributors could financially benefit from selling their almost wasted produce to an auxiliary retailer. This is an important finding, because this can grant producers/distributors with access to new revenue streams, reduce opportunity costs, and contribute to a circular economy where food resources are utilised more efficiently and effectively. However, in this scenario, it's crucial to assess the existing waste disposal approach and determine if the increased financial gain justifies the potential drawbacks. Specifically, if the producer does not send their food waste to commercial animal feed facilities, we need to evaluate whether as a result more animal feed that does not derive from

food waste has to be produced to fill the gap in the animal feed demand. Therefore, producers/growers with sustainable food waste disposal strategies are categorised as actors who could be suitable for a supply chain with an auxiliary retailer but are not the most ideal.

Finally, the distributor who sends his food waste to the landfill, would benefit from a supply chain with an auxiliary retailer the most, as that would eliminate their waste disposal costs and bring them an additional revenue stream while reducing a large volume of waste. These benefits align with the theory of Hezarkhani et al. (2023), and thus I complement this knowledge by clarifying that producers/distributors who do not have any waste avoiding strategies, would be the greatest beneficiaries from a supply chain with an auxiliary retailer.

Needs for Successful Relationships

From the literature we knew that high levels of commitment and economic satisfaction next to exercising non-coercive power and reputation positively impact supply chain performance (Mesic et al., 2018). To an extent, my findings align with the literature, as I found that for successful relationships producers/distributors want to be certain that the sale is going to take place. This is closely related to the findings of necessary time investment and routine planning, as both of these aspects demand commitment and exercising non-coercive power with one another for successful business partnership. Moreover, my findings confirm the need for economic satisfaction. In addition, while Mesic et al. (2018) asserted that exercising coercive power and conflict negatively affect positive relationships, there were no parallels with this knowledge in my findings. This could be due to the fact that only one of participants had had previous experience with an auxiliary retailer and it is hard to predict any hardships before they have taken place. Lastly, my findings add the need of logistical elements specific to the supply chain with auxiliary retailers, which emphasise the importance of efficient coordination between various actors. This is important because addressing these logistical challenges can enhance the reliability and responsiveness of the

supply chain, ultimately leading to better supply chain performance.

Theoretical Contribution

Firstly, this research significantly contributes to the theoretical understanding of food waste management within the food supply chain. Contrary to the assumptions of Hezarkhani et al. (2023), who argued that excess produce at the farm level is typically lost in traditional food supply chains, my findings indicate a more nuanced reality. Food producers, regardless of scale, employ various strategies to mitigate food loss, such as personal consumption, composting, and converting waste into animal feed. These insights challenge the prevailing theory by illustrating that both small and larger scale producers actively seek to repurpose surplus produce, thereby suggesting the potential for reimagining traditional food supply chains.

Secondly, my research expands on the theoretical framework by Hezarkhani et al. (2023), who assert that food producers would benefit from supply chains with auxiliary retailers. My findings reveal that small scale producers and distributors, who typically generate minimal food waste, already employ creative waste reduction strategies that align with the auxiliary retailer concept by creating their own products. In contrast, larger producers, who face greater volumes of food waste, stand to benefit more from the auxiliary retailer model by converting waste into new revenue streams, particularly if their current waste disposal practices are less sustainable.

Practical Implications

The findings of this study have significant practical implications for reducing food waste through the integration of auxiliary retailers in the food supply chain. For larger scale producers/distributors, partnering with auxiliary retailers presents a valuable opportunity to transform almost wasted produce into new revenue streams, thereby enhancing economic viability while contributing to sustainability goals. On the other hand, small scale producers,

who already implement diverse waste reduction strategies, may not see as much benefit from such partnerships due to their lower volumes of surplus. Nonetheless, empowering these small scale actors with resources to further innovate and maximise the value of their waste could still play a crucial role in broader food waste reduction efforts. Policymakers and industry stakeholders should focus on creating supportive frameworks that facilitate these partnerships, optimise logistical elements, and encourage the adoption of effective waste management practices across different scales of food production and distribution.

Limitations and Future Research

The main limitation of this research lies in its contextual specificity, which restricts the generalizability of the findings. As the literature suggests multiple food waste management strategies that were not found in this study, the significant influence of local context on the effectiveness and implementation of these strategies must be highlighted.

Furthermore, this study mainly focused on small and medium scale food producers/distributors, omitting large supermarket chains. While the literature suggests that large supermarkets produce proportionally less waste (Parfitt et al., 2010), this group of distributors might present unique challenges and opportunities for food supply chains with auxiliary retailers that is worth exploring in future research.

As the results of this study cannot be universally applied, future research should explore the characteristics of food supply chains with auxiliary retailers across different regions and varying sizes of food producers/distributors, including large retailers. Similar research in different geographical and socio-economic contexts could provide a more comprehensive understanding of the global applicability of these strategies.

Another limitation of this study is that it assessed the relationship from the perspective of food producers and distributors, without considering the needs of auxiliary retailers. This exclusion could impact the criteria for selecting food producers/distributors

who would be suitable for integration into a supply chain with an auxiliary retailer.

Additionally, this focus may influence the types of food waste that could be effectively utilised to create further value. Understanding the requirements and constraints of auxiliary retailers is crucial for developing comprehensive food waste management strategies that benefit all parties involved in the supply chain. As the perspectives of auxiliary retailers are crucial for a holistic understanding of the supply chain dynamics, addressing these limitations in future research could enhance the effectiveness of strategies to reduce food waste and improve supply chain relationships.

CONCLUSION

This study highlights the urgency of reducing food waste to mitigate its environmental impacts and contributes valuable insights into the dynamics of integrating auxiliary retailers into food supply chains. By exploring food waste management strategies of food producers and distributors in Leeuwarden, this research challenges the assumption that surplus produce is inevitably disposed of in the landfill. Instead, it reveals a range of innovative waste reduction strategies employed by both small and larger scale producers, including personal consumption, composting, and creation of new products.

The findings show that while small scale producers typically manage their waste effectively through diverse strategies, larger scale producers would significantly benefit from partnerships with auxiliary retailers. These partnerships can transform almost wasted produce into new revenue streams, presenting as well as economic as sustainability benefits. Moreover, the study identifies that the partnerships with auxiliary retailers would bring the most substantial benefits to producers/distributors that are currently sending food waste to landfills, as they could reduce disposal costs and gain additional income.

Theoretically, this research changes the way we view food waste management within traditional food supply chains. By documenting various strategies employed by producers/distributors to mitigate food waste, the study challenges existing theories that assume surplus produce is primarily lost. It introduces the concept of small scale producers/distributors acting as their own auxiliary retailers and showcases the potential for economic opportunities from surplus produce, thus broadening the scope of sustainable food waste management strategies.

The practical implications of this research are significant for policymakers and industry stakeholders. I emphasise the need for supportive frameworks that facilitate partnerships between larger scale producers and auxiliary retailers, optimise logistical

elements, and encourage sustainable waste management practices. I also suggest that empowering small scale producers with resources to further innovate could still contribute to broader food waste reduction efforts.

However, the study's contextual specificity limits the generalizability of its findings, highlighting the importance of local context in the effectiveness of food waste management strategies. Future research should explore these strategies' scalability across different regions and include the perspectives of auxiliary retailers to develop a more comprehensive understanding of supply chain dynamics.

In conclusion, this research contributes to a reimagined approach to food supply chains, where both small and larger scale producers actively repurpose surplus produce, creating a more sustainable and resilient agricultural system. The integration of auxiliary retailers offers a promising avenue for reducing food waste, enhancing economic opportunities, and supporting environmental sustainability.

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APPENDIX A.

Information Sheet and Informed Consent Form

Study title: COLLABORATIONS FOR REDUCING FOOD WASTE: REQUIREMENTS FOR SUCCESSFUL RELATIONSHIPS BETWEEN FOOD PRODUCERS AND VALUE-CREATING BUSINESSES

Dear participant,

Thank you for your interest in participating in this research. This letter explains what the research entails and how the research will be conducted. Please take time to read the following information carefully. If any information is not clear kindly ask questions using the contact details of the researchers provided at the end of this letter.

WHAT THIS STUDY IS ABOUT?

- This study is being conducted to understand what food producers and / or distributors need in order to create successful business relationships with businesses who would like to make use of otherwise wasted produce, in an attempt to minimise food waste. The researchers are seeking to get responses from six to ten participants.
- You are asked to participate in this study as a food producer and/or distributor in the Friesland region.
- This research is not funded by any other party.

WHAT DOES PARTICIPATION INVOLVE?

- Your participation involves one 30 to 45 minute online interview. After the interview, there may be follow up questions or clarifications the researchers inquire about that require minimal time to respond.

DO YOU HAVE TO PARTICIPATE?

- You are welcome to participate but it is not required. Your participation is strictly voluntary and consent is required.
- You may withdraw from participating in the interview at any point before the data you provide is analysed and included in the study. You may choose not to answer questions without consequences or providing reasons.

ARE THERE ANY RISKS IN PARTICIPATING?

- There are no identified risks of participating.

ARE THERE ANY BENEFITS IN PARTICIPATING?

- There are no direct benefits of participating in the study. The research hopes to contribute to further knowledge on the topics of circularity, minimising food waste, local context development and sustainable entrepreneurship.

HOW WILL INFORMATION YOU PROVIDE BE RECORDED, STORED AND PROTECTED?

- The interviews will be recorded and transcribed for coding and analysis purposes. None of your individual information will be disclosed to anyone outside of the researcher, thesis supervisor and co-assessor.
- The information provided will only be used for this study and the thesis directly related to this.
- The data from this study (consent forms, recordings, interview transcripts) will be retained on the researcher's Google Drive of the University of Groningen account until the thesis has been submitted and sufficiently graded.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY?

- The information provided will be used in conjunction with other participant data for a researcher's thesis as a part of Sustainable Entrepreneurship master's program.
- The study results will be presented in a conference to sustainable entrepreneurs in the region as well as the Campus Fryslân Conference in 2024.
- The study, with anonymised data, will be available at the UG library, together with other master theses.
- If such a situation arises that the researcher gets contacted by a business with an interest to inquire about a business relationship, the researcher will get in touch with the participants to make sure they are willing to share their contact information.
- This study will not be published in a journal.

ETHICAL APPROVAL

- This research study has obtained ethical approval from the Campus Fryslân Ethics Committee.
- The researchers will uphold themselves to relevant ethical standards.

INFORMED CONSENT FORM

- Please sign the informed consent form below. This means that you have the intention to participate and you may withdraw at any time.

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION?

Stefanija Duntava s.duntava@student.rug.nl

INFORMED CONSENT FORM

Study title: COLLABORATIONS FOR REDUCING FOOD WASTE: REQUIREMENTS FOR SUCCESSFUL RELATIONSHIPS BETWEEN FOOD PRODUCERS AND VALUE-CREATING BUSINESSES

Name participant:

Assessment

- I have read the information sheet and was able to ask any additional question to the researcher.
- I understand I may ask questions about the study at any time.
- I understand I have the right to withdraw from the study before the data I provided is analysed and included in the study without giving a reason.
- I understand that at any time I can refuse to answer any question without any consequences.
- I understand that I will not benefit directly from participating in this research.

Confidentiality and Data Use

- I understand that none of my individual information will be disclosed to anyone outside the study team and my name will not be published.
- I understand that the information provided will be used only for this research and publications directly related to this research project.

Future involvement

- I wish to receive a copy of the scientific output of the project: YES / NO
- I consent to be re-contacted for participating in future studies: YES / NO

Having read and understood all the above, I agree to participate in the research study: YES / NO

Date

Signature

To be filled in by the researcher

- I declare that I have thoroughly informed the research participant about the research study and answered any remaining questions to the best of my knowledge.
- I agree that this person participates in the research study.

Date

Signature

APPENDIX B.

Interview Guide

Extended Version (for Online Interviews)

Introduction

1. Which role best applies to you?

Food producer [] Food distributor [] Food producer and distributor []

2. How many employees do you have?

Understanding food waste

Table 1

Interview questions

<i>For producers</i>	<i>For distributors</i>
3. What crops do you grow?	What products do you sell?
4. What is done with these crops?	Where are these products sold and to whom?

5. How much waste do you have from your operations (unsellable produce)?
6. What is currently done with this waste?
7. Do you see potential for this waste to be used for creating value outside of your farm?
Why / why not?

Understanding the value of the waste

8. Would it be more valuable for you to sell the wasted produce for a discounted price rather than wasting it?
9. Consider a scenario where you collaborate with a local business to sell these otherwise wasted vegetables. What would be the most important factors for you to be able to sell these vegetables?

10. Are there any other factors that are crucial for you to be able to sell these vegetables - that it is valuable for you?

Shortened Version (for In-person and Phone Interviews)

Introduction

1. Which role best applies to you?

Food producer [] Food distributor [] Food producer and distributor []

2. How many employees do you have?

Understanding food waste and its value

3. How much waste do you have from your operations (unsellable produce)?
4. What is currently done with this waste?
5. Do you see potential for this waste to be used for creating value outside of your farm?
Why / why not?
6. Consider a scenario where you collaborate with a local business to sell these otherwise wasted vegetables. What would be the most important factors for you to be able to sell these vegetables?

APPENDIX C.

List of Participants

Table C1

List of Participants

Participant code	Sampling method	Type	Category	Interview length	Data collection
<i>Online interviews</i>					
FO1	Snowball	Producer	Larger	21-45 min	Audio recording, notes
FO2	Purposive	Producer and distributor	Small	21-45 min	Audio recording, notes
<i>In-person interviews</i>					
MSC1	Purposive	Distributor	Small	5-10 min	Notes
MSZ2	Purposive	Distributor	Larger	5-10 min	Notes
MSZ4	Purposive	Producer and distributor	Small	5-10 min	Notes
MSZ5	Purposive	Producer	Small	5-10 min	Notes
MSZ6	Purposive	Distributor	Small	<5 min	Notes
MSB1	Purposive	Distributor	Small	5-10 min	Notes
MSH1	Purposive	Distributor	Larger	11-20 min	Notes
<i>Phone interviews</i>					
FP1	Purposive	Producer	Small	5-10 min	Notes
FP2	Purposive	Producer	Small	5-10 min	Notes
FP3	Purposive	Producer	Small	<5 min	Notes
FP4	Purposive	Producer	Small	5-10 min	Notes
FP5	Purposive	Producer	Small	5-10 min	Notes
SP1	Purposive	Distributor	Small	11-20 min	Notes
SP2	Snowball	Distributor	Larger	11-20 min	Notes

APPENDIX D.

Findings Summary

Table D1

Findings Summary

Participant code	Type	Category	Have food waste?	Ways of tackling the food waste now	Needs for successful business relationship	Illustrative evidence
<i>Online interviews</i>						
FO1	Producer	Larger	Yes	Animal feed	Certainty of sale, beneficial price, pickup	Currently I am selling bad potatoes for 4, 5, 6 cents per kilogram to animal feed; I have a benefit to separate the edible ones to sell for more, that is interesting; You have to pick them up just like animal feed, we do not really bring the potatoes anywhere
FO2	Producer and distributor	Small	No	New products		When I see that the fresh mushrooms are not going to get sold, I usually turn the oven on and dry them immediately, so I basically don't have any waste; The dried product is used for risotto and just sold like that, it is our brand product
<i>In-person interviews</i>						
MSC1	Distributor	Small	Yes	Pragmatic planning, compost		We only buy what customers need and sell in four markets per week; We have very little waste and that gets sent to the compost factory
MSZ2	Distributor	Larger	Yes	Discounting, compost	Certainty of sale, beneficial price, pickup	It is a shame to throw a lot out so we pass these deals to customers; When the customer gets good price for different vegetables or fruit they always come back for more; For some you can cut the bad parts off and still sell it to customer not bulk; If it really cannot be sold it goes to compost
MSZ4	Producer and distributor	Small	Yes	Compost	Beneficial price, pickup, planning ahead, certainty of sale	For biological it is different because people look less at the attractiveness, we mostly end up with one crate of broken vegetables because most can be sold; Picking up at the market is the easiest because we are here every week; We gather from other farmers also and it is hard to predict what is going to be on the market,

						it is different every week
MSZ5	Producer	Small	Yes	Animal feed, compost, personal use	Certainty of sale, pickup, discounted price	If they are not sold we make stamppot or give away to friends and neighbors or feed it to our pigs; You come pick it up, that can be arranged, but it is very different every time; We don't bring the misshapen ones to the market so they always go to the animals
MSZ6	Distributor	Small	No			We do not have any waste
MSB1	Distributor	Small	No	New products, personal use		Well, actually we do not have any waste. See, those packages we make out of vegetables that are soon to expire; If those packages are not sold we make a stamppot out of it
MSH1	Distributor	Larger	Yes	Dispose	Certainty of sale, pickup, discounted price, planning ahead	They are all sorts of vegetables and fruit; We throw out 2.5 containers of vegetables every week; Sometimes these vegetables come a little bad and we cannot sell them; Discounted price with pickup, then we can set it aside
<i>Phone interviews</i>						
FP1	Producer	Small	No	Pragmatic planning, compost		We grow plants in succession and always have a customer lined up because we mostly work with regular customers; We also have multiple points of sale so we end up with one crate of vegetables with some mold on it
FP2	Producer	Small	No	Personal use, compost		We do not throw out anything that is still edible; Everything we grow is sold in the store, if it is a little bad we give it away to volunteers
FP3	Producer	Small	No			We have no waste
FP4	Producer	Small	No	Animal feed, personal use		We have our regular customers we bring the products to; The only waste is if the quality is worse but then we give them to our cows and pigs or eat ourselves
FP5	Producer	Small	No	Animal feed		We have no waste; If there is any waste we give it to our cows and chickens
SP1	Distributor	Small	No	Pragmatic planning, personal use		I am an activist so our company only buys from eco-farmers; These people are very waste conscious so we always buy exactly what we need and sell everything; Our farmers also have no waste
SP2	Distributor	Larger	Yes	Discounting	Little time investment, discounted price	But I already fight food waste by selling the vegetables with discount; I used to work with a company that picked up older produce but it took a lot of time sending e-mails; I do not have waste every week, it is very hard to say what is going to be left over