

**Incentive Systems for Food Waste Reduction in the
Dutch and Canadian Processing Sector**
Bachelor's Thesis

By

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Preface

This research paper was written by Marie Schnelle, a fourth-year student in the program “International Food Business” at Aeres University of Applied Sciences. This assignment is the last step in concluding my bachelor’s degree. The results of the thesis shall contribute to close the data gap on food loss and waste in the processing sector and be helpful for policymakers as well as companies concerned with this topic. I would like to thank my thesis coach, Nieke Westerik, for supporting me and providing me with her professional feedback for this research.

While reaching out to companies in the targeted countries, it became clear that the interview goals described in the “Research Proposal” were not attainable. The responsiveness was significantly lower than anticipated and the interviewing process for the companies that were willing to answer the questions changed from a vocal to a written form. Therefore, some parts of the chapter “Materials and Methods” had to be rewritten. As all sub-questions could be answered through the literature research, the findings of this section are thus more extensive than the ones from the interviews.

Table of Contents

PREFACE	III
SUMMARY.....	1
1. INTRODUCTION.....	2
1.1. THE FOOD WASTE CHALLENGE.....	2
1.2. WASTE GENERATION.....	6
1.2.1. IN THE NETHERLANDS	6
1.2.2. IN CANADA	7
1.3. FOOD LOSS IN THE PROCESSING SECTOR.....	8
1.4. THE RELEVANCE OF THIS RESEARCH.....	9
2. MATERIALS AND METHODS.....	12
3. RESULTS.....	12
3.1. LITERATURE RESEARCH	12
3.1. INTERVIEWS	24
4. DISCUSSION OF RESULTS	27
5. CONCLUSION AND RECOMMENDATIONS.....	33
REFERENCES	35
APPENDIX 1 – INTERVIEW QUESTIONS:.....	40
APPENDIX 2 – INTERVIEW RESPONSES.....	41

Summary

The generation of food loss and waste is a topic that gained increasing attention over the past years. The most prominent estimate is that a third, or 1.3 billion tons, of the human food produced is wasted every year. The massive overproduction of food products on the one side and the malnutrition of 821 million people worldwide creates issues reaching from ethical conflicts to economical losses and huge environmental impacts such as greenhouse gas emissions and soil depletion. Many different national and international organizations try to tackle those issues and aim to reduce the impact that wasted food has in all parts of the value chain. This research was conducted to find information on how effective and impactful those organizations and incentive systems are on a national level. The Netherlands and Canada were chosen as target countries. Additionally, incentives and policies made on the level of the European Union (EU) were considered as they can have an influence on the operations of Dutch companies. In both countries, the food processing industry causes the most waste after the consumer. Therefore, the objective of the research is to find an answer to what impact incentive systems for food waste reduction have on the Dutch and Canadian processing sector. The results retrieved from a literature research showed that there are various legislative incentives on food waste reduction planned or already executed in both countries as well as on the EU level. Next to that, private and civil society initiatives offer support to processing companies by providing expertise, helpful networks and funding for research projects, staff training and improvements in the companies' operations. Innovation and new product development that contribute to reducing waste are highly encouraged and supported as well. Interviews performed with two Dutch and one Canadian company revealed that those programs are not as much made use of as expected. Those processing companies did indeed state that they take product loss reducing measures but are hardly supported in their efforts by and outside organization. There are ambitious support and incentive programs for processing companies available. However, the results of this study suggest that there is a disconnection of these programs and the companies that could benefit from them. The impact these systems have on the businesses is therefore very limited at this point. More communication and collaboration is needed to effectively implement loss reducing measures, not only in the processing sector, but in the whole food chain.

1. Introduction

1.1. The Food Waste Challenge

First general Information

One of the greatest challenges the world is currently facing is the massive overproduction of food while at the same time 821 million people still suffer from malnutrition (food aid, 2019). According to the World Bank (2018), 30 percent of the food that is being produced globally is lost or going to waste without ever being ingested by humans. This accounts for about 1.3 billion tons of waste every year (The World Bank, 2021). In addition to wasting nutrients and scarce resources such as water, land, and energy, food waste also creates an ethical problem. Rising population numbers and shifts in dietary habits in emerging countries will put more pressure on the global food supply (Bräutigam, Jörissen, & Priefer, 2014). This pressure can lead to increased land use and intensification of agriculture. This will result in higher greenhouse gas (GHG) emissions, deteriorating soil quality, loss of biodiversity, and excess water usage (Alexander, et al., 2017). One ton of food waste generates around 1.9 tons of CO₂-equivalents. It has been found out that the products that are wasted the most are vegetables, fruits, and bakery products. However, the greatest greenhouse gas emissions are generated by meat products, thus have the biggest negative impact on the environment (Bräutigam, Jörissen, & Priefer, 2014). The overall challenge for the global food system is to provide enough food for the growing world population while at the same time achieve environmental sustainability (Alexander, et al., 2017).

Discrepancy of Food loss and Waste Levels (FLW) around the World

Next to the arising environmental issues, FLW also increases the degree of food insecurity many millions of people are facing every day. Even though there is so much food in abundance for some parts of the population that it has to be thrown out, it does not reach those who need it (van der Werf & Gilliland, 2017). Gustavsson et al. (2011) estimated that in Europe and North America 95-115kg per capita/year of food waste is caused by the consumers. This stands in great contrast to the per capita consumer waste in sub-Saharan Africa and South/Southeast Asia, where only 6-11kg/year is discarded (Gustavsson, Cederberg, Sonesson, van Otterdijk, & Meybeck, 2011). These numbers represent the vast discrepancies of food loss and waste levels in different parts of the world. In medium and high-income countries, food that still would be edible is thrown out excessively. In such countries, food products that are produced and exceed the demand get discarded (Gustavsson, Cederberg, Sonesson, van Otterdijk, & Meybeck, 2011). However, even in developed countries, about 15 million people are undernourished.

The level of postharvest and supply chain technologies increases with the development stage of a country (Parfitt, Barthel, & Macnaughton, 2010). The same applies to the diversification of diet and the level of urbanization. Developing countries have a rudimentary post-harvest infrastructure and poor harvesting and growing techniques. This leads to losses at early stages in the supply chain before the food can even reach the consumer. Since industrialized countries do have an advanced infrastructure, most of the produced food reaches retail and the consumer. Therefore, the most waste occurs

here at the consumer level (Parfitt, Barthel, & Macnaughton, 2010). Various trends are influencing loss and waste generation along the food supply chain. Urbanization and the contraction of the agricultural sector led to a decline in the proportion of people working in agriculture. It is expected that by 2050, 70% of the world's population will live in urban areas (Parfitt, Barthel, & Macnaughton, 2010). As city residents cause twice as much food waste as the rural population, it can be expected that waste numbers will continue to rise (Hoornweg, Bhada-Tata, & Kennedy, 2013). Increased household incomes are causing a dietary transition. There is a shift towards shorter shelf-life and more vulnerable products. The increased globalization of trade opens up export opportunities for agricultural products. But it also presents a threat for internal markets as competition from cheaper imports increases (Parfitt, Barthel, & Macnaughton, 2010).

Definition Food Loss and Waste

Food loss is usually defined as the decrease of edible food mass at the production, post-harvest, and processing stages of the food supply chain. Food products lost at the retail and consumption stage are referred to as food waste (Parfitt, Barthel, & Macnaughton, 2010). Food loss and waste (FLW) numbers are furthermore measured when the products are directly meant for human consumption. Feed and inedible by-products are not included in such measurements (Gustavsson, Cederberg, Sonesson, van Otterdijk, & Meybeck, 2011).

Food Loss and Waste in the Supply Chain (SC)

FLW occurs at all stages of the food supply chain. During the harvest, products can be lost on the field and/or in the barn. During transport and storage, the products can be damaged and/or contaminated during loading and microbial deterioration can happen. At the post-harvest stage, crops can be lost during sorting and spoil, same applies for livestock products (van der Werf & Gilliland, 2017). In food processing and packaging, the inedible portion of the food gets thrown out as well as food products that do not meet specifications. On the retail level, food spoilage can occur through damage and sitting too long on the shelves. The products get furthermore discarded when the "best before" or "sell by" dates have been exceeded. For the last three steps in the supply chain, namely retail, foodservice and household, similar causes for food waste apply. Those are inedible food preparation wastes, plate scrapes, leftover food, and spoilage of products (van der Werf & Gilliland, 2017).

FLW Hierarchy

There has been a food use hierarchy identified which is used to get the most value out of every food product. At the top, is the most favorable practice, namely "Source reduction and prevention". In this stage, food waste is prevented before it can be created by having the right design and processing features. The next level is called "Food recovery". Here, edible food that is supposed to get discarded is given to those who need it. This can be done, for example, by donating such products. On the following level, food is transformed into animal feed. Safe and fresh scraps are given to animals so that they can make use of it. Food waste can also be used for industrial purposes. Fats, oils, and grease, for example, can be turned into different products or energy. The very last step in the food use hierarchy is to dispose of the products. This end-of-life treatment

has no valorization, and no additional value is derived from the waste (Bagherzadeh, Jeong, & Inamura, 2014).

The applicability of different actions connected to the food use hierarchy is influenced by the characteristics of FLW. The distinction between avoidable and unavoidable waste is important as, for example, the prevention stage only focuses on avoidable waste. Additionally, food that is discarded along the supply chain and used for, i.e., animal feed is not even seen as waste rather than as a by-product (Corrado & Salla, 2018).

Definition “Incentive System”

As the research will revolve around incentive systems, it must be clear what is considered as such. In general, an incentive can be any factor that motivates a person or organization to do something. In economic terms, this can reach from tax benefits over other monetary benefits to subsidies. There can also be negative incentives that punish people or organizations financially when they take the wrong actions (Krugman, 2020).

Coccia (2019) distinguishes in their article intrinsic and extrinsic incentives for employees in an organization. Translated to a company level, intrinsic incentives include tangible and intangible tokens of recognition for superiority in a certain field or the best performance for a specific job. Tangible incentives can be associated with awarding either a title, badge, certificate, or a trophy. Both tangible and intangible tokens help building the company reputation and how it is perceived by external entities (Coccia, 2019).

Extrinsic incentives are mainly of monetary value as well as providing opportunities for growth and advancement. This could occur in form of loans, subsidies, or financing grants for company activities. These incentives are responsible for creating a continuing commitment to furthering innovation and development of the company. (Coccia, 2019).

This research aims at finding incentives influencing the activities of whole companies and furthering their advancement rather than individuals. As such progresses are mainly stimulated through monetary motivators (Yigitcanlar, Sabatini-Marques, Moreira da-Costa, Kamruzzaman, & Ioppolo, 2019), the mechanisms explored in the research can be described as extrinsic ones (Coccia, 2019). The focus lies furthermore on encouraging innovative practices of processing companies. For this part, governments play an important role in promoting investments and reducing financial risks in research and development processes (Yigitcanlar, Sabatini-Marques, Moreira da-Costa, Kamruzzaman, & Ioppolo, 2019).

Incentive systems considered in this research will be policies and regulations drawn up by the governments, and private initiatives that can be joined voluntarily, as well as certification schemes. The study of Osorio and Sauma (2015) showed that a mix of compensating for expenses incurred by sustainable practices and promoting increased performance proved to be most successful in incentivizing companies to adapt their practices (Osorio & Sauma, 2015). Therefore, next to the economic incentives of monetary value, this research will also look at systems that include providing support through technical knowledge or the opportunity to collaborate with other experts in the

field of FLW. As the Netherlands is part of the European Union (EU), decisions and actions regarding the treatment of FLW is greatly influenced by legislation made at EU level. Such policies will also fall under the term “incentive systems” in for this research.

FLW in the European Union and North America

Avoidable food waste has a negative economic impact on both the farmer and consumer. Controversially, financial gains from reducing FLW generation do not outweigh the costs associated with such practices (Gustavsson, Cederberg, Sonesson, van Otterdijk, & Meybeck, 2011). The costs linked to this issue are estimated to be 143 billion Euros in the EU alone (Stenmark, Jensen, Quested, & Moates, 2016). Not only the production of food that eventually goes to waste is expensive, but also the treatment when it gets thrown out is costly. About 50% of the waste in the European Union goes into landfill, which is the last step to treat waste, as it simply gets put into the ground and no economic or nutritional value gets retracted from it (Bräutigam, Jörissen, & Priefer, 2014).

In the European Union, the most food waste occurs in households, which are 47 million tons (53%). The second greatest producer of FLW is the processing industry with 17 million tons (18%). Food service yields 11 million tons (12%) of FLW per year, the primary production with 9 million tons (11%). The wholesale and retail sector wastes the least food products at 5 million tons (5%) (Stenmark, Jensen, Quested, & Moates, 2016). However, more EU member states (MS) need to quantify their food waste. The study of Stenmark, Jensen, Quested, and Moates (2016) shows that depending on the sector, only few countries submitted data about their FLW of sufficient quality. Some examples are, that only four countries (France, Germany, Lithuania, UK) submitted data about their processing sector, while 11 countries (Denmark, Estonia, Germany, Greece, Italy, Luxembourg, Slovenia, UK) handed in numbers from the wholesale/logistics/retail sector. The aforementioned data should be regarded with some uncertainty as only about a quarter of the, as of 2016, EU-28 MS contributed their data. Based on this, the numbers were scaled up to an overall European level (Stenmark, Jensen, Quested, & Moates, 2016). These numbers will probably have changed and need to be adapted, since the United Kingdom is no longer a part of the EU.

In North America, 168 million tons of FLW with a value of US\$278 billion is generated every year (Commission for Environmental Cooperation, 2017). The numbers vary greatly as the more developed countries such as Canada and the United States waste the most at the consumer stage. As Mexico is regarded a less developed country, it loses the most food products at the post-harvest stage (Commission for Environmental Cooperation, 2017). Canada, Mexico, and the United States work together under the Commission for Environmental Cooperation to address FLW in North America. The Strategy on Short-lived Climate Pollutants is a commitment to consult on strategies to reduce avoidable food waste. This will also help to reduce GHG emissions caused by methane coming from landfills (Commission for Environmental Cooperation, 2017).

All research attempting to measure FLW, and its counteraction in both mentioned regions have different sources, data, and metrics to measure it. Studies based on direct measurements of FLW could contribute to having more specific estimations on a broad

scale. Stakeholders of the food supply chain play furthermore a key role in providing data about FLW generation (Corrado & Salla, 2018).

1.2. Waste Generation

The current research focuses on FLW at the processing level in the Netherlands versus in Canada, and the initiatives to reduce FLW. In the following, FLW generation in these two countries will be described in greater detail. There will also be more information about food loss in the processing sector.

1.2.1. In the Netherlands

As part of the UN SDGs, the Dutch government aims to reduce food waste by 50% until 2030 (Government of the Netherlands, 2021). In line with this global problem, there is also a lack of data on FLW existent in the Netherlands. It is known that consumers waste the most and contribute 30 to 50% to the overall creation of FLW. In 2019, households wasted 34.4kg per person. This is already a decrease of 17% compared to 2016, where it was 41.2kg, and a decrease of 29% compared to 2010, where the consumers still threw out 48kg. Overall, 9.5% of purchased food is wasted (Government of the Netherlands, 2021).

The products discarded most by the Dutch consumer are bread, dairy products, vegetables, fruit, and potatoes (Dooren, 2019). In the whole agrochain of the Netherlands, it is estimated that losses at a value of €2 billion occur (Ministry of Agriculture, Nature and Food Quality, 2010). Most of this waste gets burned, which creates no further value and 20% is being reprocessed into animal feed. Other ways in which the FLW is treated are composting and converting it into biomass.

In the production and processing sector, losses occur mostly due to inefficient practices. The agricultural policy aims at promoting efficient production processes (Het Groene Brein, 2021). The Dutch Alliance for Sustainable Food creates partnerships between the government and the business community. They are working on cutting down food losses from farmers, factories, supermarkets, and the hospitality sector. The government makes additional funding available for research on how to reduce and prevent FLW (Government of the Netherlands, 2021).

Another initiative is the Netherlands Nutrition Center, which gives tips to consumers on how to reduce food waste. Businesses help consumers by, for example, selling smaller portion sizes and providing information on the shelf life of their products (Government of the Netherlands, 2021). Next to the actions on a national level, the Netherlands is also affected by decisions and policies made by the European Union. The EU has its own plan for food waste reduction and works tightly with its member states to achieve its goals (European Commission, 2021). However, sustainability requirements for food production are already higher in the Netherlands than the overall EU regulations addressing this topic (Het Groene Brein, 2021). This is mainly achieved through private initiatives. Therefore, the Dutch government tries to have similar requirements on the

EU floor to level the field for Dutch export companies. Regional and national government initiatives are nevertheless still lacking a common strategy to effectively put the right actions for FLW reduction into place (Het Groene Brein, 2021).

Other activities led by the government, as of 2010, are aimed at reducing and preventing food waste. The study “Food Waste, Value of Food in the Agrochain”, is planned to give a complete picture of many aspects of FLW in the Netherlands (Ministry of Agriculture, Nature and Food Quality, 2010). This study is done by LEI Wageningen UR. Another document existing is the Policy on Sustainable Food. It describes the vision of the government on sustainable production and consumption of food. Finally, there is also the collaboration for best practices in the agrochain. Wageningen UR recorded several agrochain collaborations that were successful in reducing FLW (Ministry of Agriculture, Nature and Food Quality, 2010).

It is very difficult to link waste back to different stages in the food supply chain (Het Groene Brein, 2021). Many initiatives in the private and public sectors are starting to measure and trace waste generation. However, much more has to be done regarding sufficient and reliable data collection (Het Groene Brein, 2021). This is a crucial step in order to understand FLW generation in greater depth and find the appropriate measures to decrease in the whole food supply chain.

1.2.2. In Canada

Food loss and waste is valued at CAD 27 billion per year. This equals 2% of the Canadian GDP. Approximately 58% of the food produced is lost or wasted and it accounts for 396kg of FLW per capita per year (Commission for Environmental Cooperation, 2017). As in other industrialized countries the consumer wastes the most food. 50% of the CAD 27 billion is caused at the household and consumer level. Canadians spend increasingly less of their income on food. While it was still 19% in 1961, this percentage fell to 9% by 2009 (Government of Canada, 2021). This again corresponds with the findings, that people in developed countries can spend less of their income on food products because food becomes more affordable, excess amounts are being bought and thrown away unused instead of consumed (Commission for Environmental Cooperation, 2017). Vegetables and fruits are wasted the most in Canada with 13% of fruits and vegetables grown are left unharvested or are discarded right after harvest. Land application, composting, anaerobic digestion, and animal feed are the primary destinations for these losses (Government of Canada, 2021).

The high waste and loss rates of fruits and vegetables can also be related to changes in the Canadian diet. People are consuming more vegetables and fruits, both fresh and processed. Due to Canada’s population distribution (majority lives at the Southern border to the US) food has to be transported great distances from the rural areas where it is produced to the urban areas along the border (Commission for Environmental Cooperation, 2017). This and the import and export structures of Canadian agricultural products make the supply chain and the sufficient distribution of food products more complex. In 2015, Canada had US\$33 billions of food imports and US\$41 billion worth of agri-food exports (Commission for Environmental Cooperation, 2017). Therefore, it is

even more difficult to reliably track and measure FLW throughout the whole supply chain.

While 58% of food produced is lost or wasted, 32% of this food could be rescued. Especially in the processing and manufacturing sector, many food products could be saved. 4.82 tons of food lost during processing is avoidable (Commission for Environmental Cooperation, 2017). This amount has an approximate value of CAD20.96 billion. The next biggest area where much food waste could be avoided is at the consumer end. 2.38 million tons and CAD10.27 billion could be saved (Commission for Environmental Cooperation, 2017).

The true cost of FLW is mostly not accurately measured. As previously described, in Canada there are insufficient measurement methods, a lack of collaboration, and sending the waste to landfill is easier (Nikkel, Maguire, Aalto, & Bome, 2019). Additionally, landfill fees are very low and since western society has created a culture of accepting FLW, the true costs of waste are not internalized. The decomposition of food waste in landfills produces methane which contributes to GHG emissions and has a substantial influence on climate change (Nikkel, Maguire, Aalto, & Bome, 2019).

The great lack of data causes the magnitude of FLW to be often underestimated. However, this materiality can influence its governance, the system in which it is part of and the behavior of the actors dealing with it (van Bommel & Parizeau, 2018).

In general, there is a Food Policy existent for Canada. It is a roadmap for a healthier and more sustainable food system. The policy also includes a challenge to fund the most innovative solution for FLW reduction, the Food Waste Reduction Challenge. (Government of Canada, 2021).

Overall, there are many levels and layers to consider. The municipal, provincial and federal governance of FLW all play a role in targeting the issue (Commission for Environmental Cooperation, 2017). When modifying the policies on waste to make them more effective, the efforts should be monitored by a major stakeholder. However, it is not clear yet who or what that could be (Abdulla, Martin, Gooch, & Jovel, 2013).

1.3. Food Loss in the Processing Sector

Currently, 39% of the food losses measured in the EU come from the manufacturing/processing industry (Raak, Symmak, Zahn, Aschemann-Witzel, & Rohm, 2017). Manufacturers can improve their prevention strategies by identifying avoidable food waste and taking action. They can, for example, make their staff/employees more aware of the issue, encourage standards of cleanliness, and optimize production yields (Green Best Practice Community, 2021).

Companies operating in this sector also start thinking about reusing or recycling food waste when there is a risk for food surplus. Depending on whether this surplus is still suited for human consumption, there are different ways to deal with it. The excess products could either be reused, redistributed, or eventually dealt with in food waste management (Garrone, Melacini, Perego, & Sert, 2016). Such overproduction highly

contributes to food losses. 30% of extra products are generally necessary to compensate for unexpected events and to maintain food security. Yet 50% of excess products are currently processed (Raak, Symmak, Zahn, Aschemann-Witzel, & Rohm, 2017). This overproduction stems mainly from market and consumer demands. An example of this is health and quality standards. If a product does not fit in the tightly set requirements of a supermarket, it gets either directly rejected or discarded later on (Raak, Symmak, Zahn, Aschemann-Witzel, & Rohm, 2017).

1.4. The Relevance of this Research

FLW Reduction Programs by the UN

All those issues led nations, organizations, and country alliances to take action and draw up programs to tackle problems related to FLW generation. The UN Environment Program (UNEP) raises awareness as well as catalyzes action at regional, national, and international level for their sustainable food systems (SFS) program and its activities. The main focus areas are organizing national round tables for SFS as well as tackling climate change issues, urbanization, and current food systems all around the world. The program promotes sustainable food system thinking. This includes connecting food and agriculture through common policy-making (UN environment program, 2021). The initiative “No more Food to Waste” responds to various concerning facts such as that FLW consumes 20% of freshwater and 30% of the world’s agricultural land. The report also stated that if FLW were a country, it would be the third biggest CO₂ in the world (No more Food to Waste, 2015).

Other Global and EU Initiatives

Many different initiatives to reduce FLW may be eligible for funds that support actions to combat climate change, such as the Green Climate Fund and the Global Environment Facility. The SAVE FOOD initiative, for example, is a food supply chain case methodology drawn up by the FAO. It aims to collect primary and empirical data about the causes of food loss in developing countries (FAO, 2021). Secondly, the Global Food Loss Index (GFLI) was set up by the Statistics Division of the FAO. It models country and regional food loss by using food balance sheets (FAO, 2021). Lastly, the Food Loss and Waste Protocol Accounting and Reporting Standard (FLW standard) was initiated by the World Resources Institute (WRI) (WRI, 2021). It aims to provide a global reference in reporting FLW data and can benefit countries as well as companies as it is meant to help measuring any fraction of FLW in the food supply chain.

One recent initiative funded by the European Commission was the FUSIONS project. “FUSIONS” stands for “Food Use for Social Innovation by Optimizing Waste Prevention Strategies”. It was a project that ran from August 2012 to July 2016 with the aim to significantly reduce food waste (FUSIONS, 2016). It had 21 partners from 13 countries to create a European Multi-Stakeholder Platform. The project aimed to contribute towards the creation of guidelines for a common food waste policy for EU-27 and to harmonize the monitoring of food waste in the member states. A final report with “recommendations and guidelines for a common European food waste policy framework” was published in July 2016 (FUSIONS, 2016). This report was later cited on the website of the European Commission concerning food waste and further

transformed into new action plans regarding FLW reduction (European Commission, 2021).

Initiatives at a National Level

There are ongoing private-public partnerships that tackle the issue at a country level. Such commitments are a good way to create timely and specific targets to embed into national investment plans. The countries must commit to leadership and enabling investments on a national level to respond to the individual needs in the nation concerning FLW (Bagherzadeh, Jeong, & Inamura, 2014).. Policies that promote a change towards a sustainable food system have to fit the environment of the respective region or country and have to enable the right investments into infrastructure, transportation, and the food industries (Bagherzadeh, Jeong, & Inamura, 2014).

Other regulations do not come from the government but the private sector. Their standards can be significantly higher than the ones set by legislation (Bagherzadeh, Jeong, & Inamura, 2014). Forecasting frameworks and better traceability in the supply chain help to track and identify extensive causes of loss and waste generation. Such information can facilitate the optimization of production and inventory management towards a reduction of FLW (Kibler, Reinhart, Hawkins, Mohaghegh Motlagh, & Wright, 2018).

Issues with the Mentioned Initiatives

Some of these actions lack a long-term vision and their impact on the reduction of food waste usually remains unknown. Furthermore, it is difficult to evaluate the evolution of FLW generation as historical data about this topic is not available. Many countries have legal frameworks that focus on waste in general, but not specifically on food waste, although it has been identified as an issue that needs to be addressed (Bagherzadeh, Jeong, & Inamura, 2014). Examples of such countries are Australia, Finland, New Zealand, or Germany. In Japan and Ireland however, there are specific frameworks that are aimed at food waste reduction. Governments play a key role in providing official statistics and initiatives to collect data (Bagherzadeh, Jeong, & Inamura, 2014).

Different studies show that there is insufficient monitoring of food waste generation in areas other than at the household level (Kibler, Reinhart, Hawkins, Mohaghegh Motlagh, & Wright, 2018). Waste management is generally the responsibility of local governments and municipalities. The corresponding legislation however is mostly made by the Ministries of Environment. A different set of policies can support “alternative food systems”. By promoting urban agriculture, farmers' markets, or food composting, food waste generation can be lowered as well (Kibler, Reinhart, Hawkins, Mohaghegh Motlagh, & Wright, 2018).

Issues with the Measurement of FLW

There is a greater tendency that FLW gets measured more frequently the closer it gets to the consumer. The estimates vary further greatly between different regions and countries. This creates a high variability in the numbers and estimates. It highly depends on where and how the data has been collected. Therefore, a universal and statistically comprehensive methodology is necessary to directly measure FLW (van der

Werf & Gilliland, 2017). The generation of food loss and waste has a negative impact on all three parts of the triple-bottom-line, which are namely the environment, the economy, and society (Stenmark, Jensen, Quedsted, & Moates, 2016).

The reviewed literature all come down to one central issue. No matter where in the world, reliable data about FLW generation, its impact on the triple bottom line, and, most relevant for this research, different systems to tackle FLW, are widely absent. There are hardly any universal measuring schemes available and governments, as well as non-governmental organizations, struggle to collect sufficient sets of data on FLW (Kibler, Reinhart, Hawkins, Mohaghegh Motlagh, & Wright, 2018).

In the rare case that comprehensive studies have been conducted, their focus is mainly on food waste creation at the consumer level as it can be seen in the studies by Aschemann-Witzel et al. (2015) or Schanes, Dobering and Gözet (2018). Thorough information on how effective counteractions are, or whether companies work with incentive systems is barely existent. To examine what types of systems are most effective in reducing FLW and what attitude companies connected to the food business have towards such incentive systems, much more data collection in this field is necessary.

In Europe as well as in Canada, it could be seen that after the consumer level, most food products are lost at the processing stage (Nikkel, Maguire, Aalto, & Bome, 2019; Raak, Symmak, Zahn, Aschemann-Witzel, & Rohm, 2017). Therefore, to reduce this data gap in a sector other than the consumer and household level, it has been decided that the central question for this research paper will be:

“What impact have incentive systems on food waste reduction in the Dutch and Canadian processing sector?”

To find an answer to this main question, four sub-questions have been chosen.

1. What types of incentive systems to reduce FLW in the processing sector exist in the Netherlands, as a member state of the EU, versus Canada?
2. What types of companies are benefitting from such systems?
3. What types of food-waste reducing measures are being supported by these incentive systems?
4. In what ways are the systems supporting the processing companies?

2. Materials and Methods

To formulate an answer to the main question, fundamental information on what varieties of incentive systems for food waste reduction are available, which institutions offer them, and which companies can access them had to be retrieved from various sources. For this purpose, four sub-questions were created that facilitated collecting sufficient data on these topics. In the following, it will be described what research methods were used to answer all sub-questions and subsequently the main question.

Literature Research

The research consisted of two parts. The first part was a literature search that aimed to answer the first two sub-questions:

1. What types of incentive systems to reduce FLW in the processing sector exist in the Netherlands versus Canada?
2. What types of companies are benefitting from such systems?

The type of literature review executed is best described as “semi-systematic” (Snyder, 2019). It aimed at giving an overview over incentive systems and programs in the selected countries. The findings of the review covered a broader field of research as it considered scientific articles as well as government documents and identified possible issues surrounding these incentive systems (Snyder, 2019). The literature review was also necessary to compare previous findings of what is already been done in the field of incentive systems to where support systems are still lacking and do not reach eligible companies and what therefore needs to be improved (Randolph, 2009; Baarda, 2019). Deriving from these conclusions, recommendations for further research were given.

By using tables, the findings from different types of sources were displayed in a structured way and gave a clear summary of the incentives available to food processing companies (Snyder, 2019). The focus lied on official government documents. These documents were accessed through the official websites of the Government of the Netherlands, the European Union, and Government of Canada. Scientific and peer-reviewed articles were searched through Google Scholar. The articles and official government documents that were taken into consideration should not be created earlier than the year 2016. This time frame was chosen to get an overview of the most current incentive systems. As it is highly important for semi-structured approaches to have a detailed plan of which topic areas will be covered, the following search terms were used to gather as much information as possible (Snyder, 2019).

- “EU” AND “Food loss reduction”
- “Food waste policies” AND “the Netherlands” OR “Canada” OR “EU”
- “Incentive systems” AND “food waste reduction” AND “Netherlands” OR “Canada” OR “EU”
- “Food loss” AND “manufacturing” OR “processing”
- “Food waste/loss policies” AND “manufacturing” OR “processing”
- “Certifications for food loss reduction”

Qualitative Research through semi-structured Interviews

The third and fourth sub-question were answered by conducting semi-structured interviews. This research method was chosen to compare and connect the information gathered in the literature review and what is applied by companies in reality (Bell, Bryman, & Harley, 2018, p. 357). The aim was to find indications on how well these systems work in practice and whether the companies could give implications in how far they do or do not make use of the incentives. The interviews were formulated in such a way that follow-up questions were possible, if necessary. It also gave the interviewees room to elaborate and explain themselves rather than responding to yes or no questions like it would be the case in an entirely structured interview (Oun & Bach, 2014). The responses given in the interviews were put into context with the gathered data from the literature review and are forming the answer to the sub-questions and the main research question (Silverman, 2014, p. 5).

The most important criterium all interviewees had to fulfill was that they are working for an organization that is operating in the food processing sector. For this purpose, different sources available to the researcher were contacted and asked to participate in the interviews through convenience sampling. This was done by asking several teachers as well as fellow students of Aeres UAS and Dalhousie University who most likely have a connection to food processing companies. Four to five small-to-medium-sized enterprises (SMEs) per respective country, the Netherlands and Canada, were targeted to be interviewed.

The choice to go with these types of companies was made because they are usually easier to get in contact with than big corporations. The individuals to whom the question was asked should have furthermore been directly involved in the production activities of the organization as well as having a connection to the managing departments. Someone in the position of an operations or general manager should have had all the necessary information to answer the questions. Somebody from the sales department, for example, might not have had access to all the essential data. The responses were treated entirely anonymously, and it was not asked to expose any confidential information.

The interviews were taking place by sending out the questions in a written format so that the contacted persons could answer them on their own time and whenever it suited them best. This way of interacting with the interviewees avoided interrupting their day-to-day operations and gave them the opportunity to answer the questions more thoroughly than in a time-restricted interview setting (Bell, Bryman, & Harley, 2018, p. 458).

The interview questions were formulated to complement the sub-questions and cause the interviewees to share the type of information that would be valuable for answering the sub-questions as well as the main question (Bell, Bryman, & Harley, 2018, p. 440). Corresponding to sub-question three "What kind of food waste-reducing measures are getting supported?" questions of whether the companies are actively working to reduce food loss and if they get supported by another organization were asked. The fourth sub-question, "In what ways are the systems supporting the processing companies?", was answered by determining if the companies have seen an improvement

after applying loss-reducing measures and to what extent they were being supported by an outside organization. Naturally, it could happen that some of the companies do not receive any support in their loss-reducing measures or do not even seek to take action in this field. It was still asked then whether they find such incentive systems helpful and necessary and if they have any opinions regarding this topic. The responses were written down by the interviewee and sent to the interviewer through email. The answers were not displayed word by word in the results section but rather written down descriptively so that they form an answer to the sub-questions (Baarda, 2019). The full answers by each company can be found in the appendix.

3. Results

This research has been divided into two parts. The first part answers the first two sub-questions through literature research. The second part contains interviews conducted with processing companies in the Netherlands and Canada. The outcome of these interviews aims at answering the third and fourth sub-question as well as adding to findings from the literature research.

3.1. Literature Research

1. *What types of incentive systems to reduce FLW in the processing sector exist in the Netherlands, as a member state of the EU, versus Canada?*

Canada

Table 1 Incentive Systems - Canada

What	By whom (Government/Private/Civil Society)	For whom	How	Budget/ Means of Support	Time Frame	Source
Food policy for Canada	Government of Canada	Canadian processing, retail, and food service sector	Action Area 4: reduce food waste across all actors in the food chain	CAN\$134.4 million of which CAN\$26.3 million are dedicated to FLW reduction	2019-2024	(Government of Canada, 2020)
Food Waste Reduction Challenge	Agriculture and Agri-Food Canada (FAAC), under the Food Policy for Canada (Governmental)	Canadian processing, retail, and food service sector	Encouraging more solutions to waste reduction in Canada	CAN\$20 million	2021-2023	(Agriculture and Agri-Food Canada, 2021)

What	By whom (Government/Private/Civil Society)	For whom	How	Budget/ Means of Support	Time Frame	Source
Funding for Research and Innovation	Canadian Agricultural Partnership (Federal, provincial and territorial governments)	Processing companies in all of Canada	Investment to support growth, innovation, sustainability and competitiveness of the agriculture and agri-food sector	CAN\$3 billion of which CAN\$466 million are dedicated to “Innovative and sustainable growth in the sector”	2018-2023	(Government of Canada, 2018)
Process optimization studies and waste assessment	Provision Coalition in cooperation with the Canadian Government (Civil Society)	Processing companies in all of Canada	Developing tools and giving guidance how to conduct food waste assessments in processing facilities	Food Loss and Waste Solutions: <ul style="list-style-type: none"> - Innovative Technologies and Best Practices – Study Results - Food Loss and Waste Toolkit - KPI Dashboard 		(Garcha, 2017) and (Government of Canada, 2019)

What	By whom (Government/Private/Civil Society)	For whom	How	Budget/ Means of Support	Time Frame	Source
Food and Organic Waste Policy Statement	Government of Ontario (province-specific)	Ontario-based processing companies	Sets policies and targets for the whole agri-food sector	Formulating targets for the processing companies regarding waste reduction	2018-2028	(Government of Ontario, 2018)
Input efficiency and waste reduction	Canadian Agricultural Partnership – Ontario (Civil Society or Private)	Ontario-based companies: <ul style="list-style-type: none"> - operating in meat processing, bakeries manufacturing, fruit and vegetable preserving or dairy product manufacturing sector - having less than 200 employees - are either implementing advanced manufacturing technology, 	To increase the efficiency of raw material inputs and reduce waste in the agri-food processing facilities.	Takes over 25% of the costs for training programs and processing optimization Up to CAN\$75,000 per company	Applications will be accepted between April 3, 2018, and March 30, 2023	(Canadian Agricultural Partnership, 2021)

What	By whom (Government/Private/Civil Society)	For whom	How	Budget/ Means of Support	Time Frame	Source
		automation or robotics - or are an indigenous partner business - or are operating in northern Ontario				

The Netherlands (EU)

Table 2 Incentive Systems - EU and the Netherlands

What	By whom (Government/Private/Civil Society)	For whom	How	Budget/Mean of Support	Time frame	Source
EU – Revised Waste Legislation	European Commission	Member States (MS) of the European Union	Calls on MS to reduce Food Waste at each stage of the food chain, monitor FLW levels and report back progresses made	Legally binding targets for every MS will be released in 2023	2018-2025 and 2050	(Official Journal of the European Union, 2018)

What	By whom (Government/Private/ Civil Society)	For whom	How	Budget/Mean of Support	Time frame	Source
Green Deal: Circular Economy Action Plan Farm to Fork Strategy Biodiversity Strategy	EU Commission	All food companies with emphasis on small- to medium sized processing enterprises	All strategies work towards the goal of cutting per capita food waste by 50% by 2050	Initiative by Commission to improve corporate governance frameworks: requirement for food companies to include sustainability in their strategy Tax incentives are planned to foster transition	2019-2050	(European Commission, 2019)
Agenda against food waste (NL)	Task Force Circular Economy in Food (Civil Society and Government)	Dutch food companies	Aims to reduce food waste and cut it in half compared to the 2015 numbers through the initiative “Samen tegen Voedselverspilling” (United against Food Waste)	€7 million	2018-2022	(Wageningen University & Research, 2018)

What	By whom (Government/Private/ Civil Society)	For whom	How	Budget/Mean of Support	Time frame	Source
Rabo Innovatielening	Rabobank (Private)	Innovative ideas and new businesses in the food sector	Offering loans to businesses with innovative ideas for products or services	€25,000- €150,000		(Rabobank, 2021)
Regionale Ontwikkelings- maatschappij – ROM	Regional development agencies	Agricultural or horticultural businesses, food processing companies, technological enterprises, logistical service providers	To strengthen the regional and local economy, investing in innovative, fast- growing businesses	The budgets vary per province In 2020, a total of €440 million was invested by the different ROMs		(Kamer van Koophandel, 2021) And (BOM, 2021)
Rijksdienst voor Onderdemend Nederland (RVO)	Netherlands Enterprise Agency (Government)	Dutch companies	Supports businesses that focus on innovation and sustainability	Offers expertise when it comes to finding the right financing for innovative projects		(RVO, 2021)
Samen tegen Voedselverspilling – Vouchersystem	Foundation “Samen tegen Voedselverspilling“ (Civil Society)	Dutch companies operating in the food industry	Stimulating companies to prevent and reduce food waste in their operations	€5,000-17,500	2015-2030	(Samen tegen Voedselverspil ling , 2021)

What	By whom (Government/Private/ Civil Society)	For whom	How	Budget/Means of Support	Time frame	Source
Topsector Agri&Food	Private Sector Initiative	Agrifood businesses	Stimulate knowledge and innovation through financing research projects	Financing research and innovation projects		(Topsector Agri&Food, 2021)
Food Heroes	ZLTO in cooperation with partners from the agricultural, creative, and scientific sectors in North-West Europe	Vegetables and fruits sector, male animal production, fishery	Stimulates innovative projects and invests in businesses	€5.7 million	2016-2020	(ZLTO, 2021) And (Food Heroes, 2020)

A thorough description of the content of tables one and two will be given in the following. Simultaneously, sub-question two will be answered in this paragraph.

2. What types of companies are benefitting from such systems?

Canada

Food Policy for Canada:

In June 2019, Canada's Minister of Agriculture, Marie-Claude Bibeau, launched together with Parliamentary Secretary Jean-Claude Poissant and different stakeholders in the food system Canada's first federal food policy (Agriculture and Agri-Food Canada, 2019). To support initiatives that contribute to the success of this policy, \$134.4 million were made available to be invested in different areas of the policy. Of this total amount, \$26.3 million is devoted to reducing food loss and waste generation across the whole food supply chain (Government of Canada, 2019). In the time from 2019 to 2024, actions will be especially focused on four key areas (Government of Canada, 2020). One of those points is to reduce food waste. A systematic reduction approach will be utilized to transform practices in the processing, retail, and food service sector. Advice on how to best execute the tasks necessary for this action area will be taken from the Canadian Food Policy Council. The policy furthermore supports through various initiatives, which will be explained in greater detail later in this report, new ideas that contribute to a positive outcome and the progress of this plan. The policy makers paid special attention to the alignment of this federal policy and the UN SDG number 12 and its statement "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses" (United Nations, 2021).

Food Waste Reduction Challenge:

The Food Waste Reduction Challenge was created by Agriculture and Agri-Food Canada (FAAC) in collaboration with field experts to finance and support the most original ideas to reduce food waste in processing, retail, and food service (Agriculture and Agri-Food Canada, 2021). It is part of the Food Policy for Canada and works in accordance with its policy goals. The two challenge streams that are currently (2021) happening are Stream A "Business models that prevent food waste" and Stream B "Business models that divert food waste, food by-products and/or surplus food." The applicants are going through three stages. The concept application had to be done by January 2021, the market demonstration results are expected to be handed in by November 2021 and the grow and scale in market stage will be concluded by Spring 2022. The winners of Streams A and B will be announced in Summer 2023. Different grants will be distributed amongst the 30 semi-finalists (approx. \$100,000 each), the finalists (approx. \$400,000 each) and the winners of stream A and B (\$1.2million each). The number of winners and prizes can still vary as they will depend on the applications received. Applications for streams C and D, "Technologies that extend the life of food" and "Technologies that transform food waste" will be accepted until August 2021. The whole challenge has \$20 million available to give out to various participants and winners of the four challenge streams.

Canadian Agricultural Partnership

The Canadian Agricultural Partnership is a \$3billion investment over the course of five-years (2018-2023) by federal, provincial, and territorial governments (Government of Canada, 2018). The partnership simplified and streamlined programs and services so that they are easier to access for companies. The costs are shared with the governments on the three different administrative levels. This has the advantage of adapting the funding to region-specific projects. Those programs are tailored to fit the different needs of the diverse regions and information about them can be accessed through the respective provincial websites. Another tool that helps businesses to find relevant resources and programs is the website “AgPal” (AGPal, 2021). It was created by the Partnership and can be used to access information through keyword search. The key areas that are nation-wide supported by the Partnership are:

- Growing trade and expanding markets
- Innovative and sustainable growth in the sector
- Supporting diversity and a dynamic, evolving sector

The second point “innovative and sustainable growth in the sector” is the most relevant for this research. It consists of two programs of which one is the “Agri-science program”. It is a up to \$338 million initiative that is designed to speed up the pace of innovation. It supports cutting edge research and activities done prior to commercializing a product. The other program is called the “Agri-innovative program” and has \$128 million available. It funds activities that lead to the success of a product after putting it on the market. This includes the adoption and/or demonstration of innovative products, technologies, processes, or services which are expanding the competitiveness and sustainability of the Agri-sector (Government of Canada, 2018).

Process optimization studies and waste assessment:

The Provision Coalition is a team of food industry experts that help businesses to sustainably transform processing companies with the aim of having “lower costs, higher output, smaller environmental impact, less waste, stronger messaging, more market share, and greater revenues” (Garcha, 2017). The coalition focusses on people, business strategy, operations, supply chains, data and storytelling. It also maintains a Food Waste Stakeholder Collaborative which encourages discussion and collaboration to address FLW in the processing sector (Government of Canada, 2019) . This kind of incentive system centers around collaboration and expert knowledge. When participating in the coalition, the businesses receive access to the Food Loss and Waste Toolkit and the Key Performance Indicator (KPI) Dashboard (Provision Coalition, 2021). These resources are meant to help processing companies to measure and reduce food waste in their operations.

Food and Organic Waste Policy Statement

A possible regulatory approach has been proposed by the province of Ontario (Government of Ontario, 2018). It released its own Food and Organic Waste Policy Statement in 2018. Its targets are to reduce food loss in industrial and commercial facilities by 50 to 70% and recover resources from waste by 2025.

Large processors that generate more than 300kg of waste every week should track where the loss is generated in their operations and conduct regular audits to measure the

amount and type of loss. Another requirement should be to take steps to prevent and reduce the identified losses (Government of Ontario, 2018).

There are many programs available connected to waste and food waste practices across the provinces. However, the one that apply to this research's topic, namely food processing companies, is described in the following.

Input efficiency and waste reduction:

This program is aimed at Ontario-based companies. They should be operating in the meat processing, bakeries manufacturing, fruit and vegetable preserving or dairy product manufacturing sector. Other requirements are that they have less than 200 employees and are either implementing advanced manufacturing technology, automation or robotics, or are an indigenous partner business or are operating in northern Ontario. Examples of how companies that are meeting one or more requirements can receive support is receiving a cost share for input and waste management, metering and monitoring equipment or one-time training of key personnel. The program can take over 25% of those incurring costs and provide in monetary values up to \$75,000 per eligible company (Canadian Agricultural Partnership, 2021).

The Netherlands (EU)

EU – Revised Waste Legislation

On May 30th, 2018, the European Commission adopted a revised waste legislation. This document aims at sustainably managing waste material and transforming it in such a way that protects and, preferably, improves the environment as well as human health and ensures efficient use of natural resources. One part of the legislation is specifically concerned with food loss and waste management. Directive 31 and 32 aims at the reduction of FLW and its targets should be set to decrease FLW by 30% by the year 2025 and by 50% by 2050. It also emphasizes that reporting back the progress made by every MS is essential for the Commission to establish a common measurement scheme for FLW levels in the EU. For this purpose, different actions have been set in place to achieve on the one hand sufficient reporting and on the other hand fulfilling the 2025 and 2050 targets (Official Journal of the European Union, 2018).

Green Deal:

The Green Deal describes ambitions for a circular economy in the EU. The “Sustainable products” policy is aiming at a common product design that enables and supports the circular use of such. This includes the circular use of food products at every stage of the supply chain. The Green Deal further states that European food should become the new global standard for sustainability (European Commission, 2019). These ambitions are laid out in greater detail in the “Circular Economy Action Plan” and the “Farm-to-Fork Strategy” of the EU.

This strategy states that quantifying FLW is one of the main priorities next to identifying causes of it at the production stage. The Farm to Fork Strategy targets food-related topics in greater detail and is one of the programs under the overall Circular Economy Plan (European Commission, 2020) . Point 2.3 of this document tackles the action of

stimulating sustainable food processing, wholesale, hospitality, and food service practices. The Commission aspires to promote sustainable and socially responsible circular business models, which are tightly linked to prevention and reduction of FLW and is specially aiming at small- to medium-sized enterprises (SMEs). Point 2.5 of the strategy addresses FLW reduction directly. A new methodology which has been laid out in a decision (Official Journal of the European Union, 2019) delegated by the European Commission on May 3rd, 2019, to supplement Directive 2008/98/EC (Official Journal of the European Union, 2008) on waste in the EU. This methodology was published to measure food waste and the data from the member states, which are expected by 2022. The data will form the basis for legally binding targets for FLW reduction across the EU. The coordination of actions formulating and fulfilling those targets on the EU level will support actions taken on national levels. It is further stated that those ambitions are in accordance with policies on “the recovery of nutrients and secondary raw materials, the production of feed, food safety, biodiversity, bioeconomy, waste management, and renewable energy” (European Commission, 2020). An initiative is prepared by the Commission to improve corporate governance frameworks. It will contain a requirement for the food industry that companies will have to include sustainability into their corporate strategy. Furthermore, tax incentives are planned that should foster the transition towards a sustainable food system in EU member states. The tax systems should also contribute to a different pricing of food products. It should realistically reflect the “real costs in terms of use of finite natural resources, pollution, GHG emissions and other environmental externalities“ (European Commission, 2020).

Agenda against food waste

Looking at a national level, there are several programs led by the Dutch government in cooperation with independent initiatives. The “Agenda against food waste” was launched in 2018 and is running over a period of four years (Wageningen University & Research, 2018). The Dutch Ministry of Agriculture, Nature and Food provided €7 million to support activities, such as innovation, research monitoring and education, that contribute to the achievement of halving food waste in the Netherlands by 2030. A task force to assist this agenda has been formed and consists of 25 influential companies in the food industry. Those members are, for example, Rabobank, the Ministry of Agriculture, Nature & Food Quality, McDonald’s Netherlands, Voedingscentrum, Hutten Catering, Protix, and Wageningen University & Research. According to the article, this is the first time that such a large-scale partnership that encompasses the entire food chain in the Netherlands has been created. Together, they started a collective initiative called “Samen tegen voedselverspilling” (United against food waste).

There are many different programs and support systems available under the overall initiative of “United against food waste”. They are described in the following.

Rabo Innovatielening

The first support system is a credit program by the Dutch Rabobank called “Rabo Innovatielening”. It offers financial support beginning at €25,000 to up to €150,000 for innovative ideas and new businesses in the food sector. The loans are aimed at business and product ideas that contribute to sustainability, digitalization, and vitality of the Dutch food industry (Rabobank, 2021).

Regionale Ontwikkelingsmaatschappij (ROM)

The “Regionale Ontwikkelingsmaatschappij”(ROM) (Regional Development Agency) can be found in almost every province of the Netherlands. It provides risk capital to businesses that are innovative, fast-growing and are operating on a regional level (Kamer van Koophandel, 2021) . The ROMs can also become shareholders in those companies after providing the capital. It aims to further improvements within the organization and stimulate them to establish themselves in the region. Six of these ROMs have also started the Business Innovation Program Food. Businesses who are either active in the agricultural or horticultural sector, are a food processing company, a technological enterprise or are providing logistical services are eligible to participate in the program (BOM, 2021). The program is made to support a business in successfully developing an inventive idea and setting up a strong business case. The ideas must revolve around waste reduction and getting more value out of raw materials or using them more efficiently in the agri-food sector. The program promises strong networking with other companies as well as investors. It prepares the businesses to have a perfect starting position to make their idea/product successful. The investment budget of the different ROMs varies per province. In 2020, a total of €440 million were invested into businesses that fit the criteria (Kamer van Koophandel, 2021).

Rijksdienst voor Ondernemend Nederland (RVO):

The Rijksdienst voor Ondernemend Nederland (RVO) (Netherlands Enterprise Agency) offers expertise and support when it comes to financing options for Dutch businesses. This service is commissioned by the Dutch government, the EU, Dutch provinces, and municipalities. They offer a wide range of financing and subsidies options that are administered by different ministries of the European Union. This can again help supporting enterprises that would like to realize an innovative business idea or product (RVO, 2021).

Samen tegen Voedselverspilling – Voucher

The voucher system of United against Food Waste is meant to stimulate companies to prevent and/or reduce food loss in their operations. The vouchers can be used to get advice from other industry experts, to have advantageous research projects about their company carried out or to receive support when creating new, inventive product. Other areas where these vouchers can be applied are for product tests or for the involvement of a business consultancy agency. The voucher takes over half of the costs of that project, test, research or hiring process. The minimal value that can be received is €5,000 and can get up to a maximum of €17,500 (Samen tegen Voedselverspilling , 2021).

Topsector Agri&Food:

The program of Topsector Agri&Food offers to set up their own research projects where agrifood businesses can apply and participate in. The outcome of the research can be beneficial for the partaking companies and help them to advance their businesses further. It also offers prospects for international collaborations and sharing knowledge and expertise among experts. Businesses would not have to finance this all by themselves and can receive co-financing from Topsector Agri&Food (Topsector Agri&Food, 2021) .

ZLTO:

ZLTO started the project Food Heroes for the duration of 3.5 years (ZLTO, 2021). The project partners come from agricultural, creative, and scientific sectors in North-West Europe (Netherlands, Belgium, Germany, France, United Kingdom, and Ireland). Their aim is to get more value out of waste streams in the vegetable and fruits sector, from male animal production and from fishery. The focus lies on second- or third-class products that are mostly rejected by supermarkets. Such products cost the producer more money than they can earn with it. “Food Heroes” wants to further innovative and unconventional ideas to deal with these products and get the most value out of them. Within the project, a contest had been taken place where three companies from the fruits and vegetables sector, animal production and fishery were announced the winners of the “Food Heroes Award”. This contest went from 2016 to 2020 and had a total budget of €5.7 million of which €3.42 million were funded by the EU.

3.1. Interviews

The interviews were conducted with three companies active in the food processing industry. Company A is located in the Dutch town of Meppel and processes fresh fruits and vegetables. Their product range includes salad mixes, ready to eat meal salads and cut vegetables intended for further preparation. Their customers include companies that sell their products in the canteens, restaurants and partially private consumers. The company offers individualized product development and production for other companies. Company B is also operating in the Netherlands as an industrial bakery. Their products get freshly produced every day and supplied to supermarkets. Company C is located in Prince Edward Island, Canada. They focus on making canned products out of tuna, lobster, trout and mussels. The products can either be directly purchased on their own website, through online partners or in various grocery stores across Canada and the United States. All three companies state to be operating environmentally sustainable and are working on reducing the impact their operations have on the environment.

Five interview questions were chosen to conclude answers to sub-questions three and four.

3. What types of food-waste reducing measures are being supported by these incentive systems?

The first question that was asked to all companies was whether they are actively working to reduce losses in their company or not. If the answer was yes, it was further asked what kind of measures they are taking. The question aimed at getting a first general overview of what is being done, without asking for a connection to incentive systems.

Company A stated to run a program to be able to use food waste in other products. Company B answered that reducing food waste is the main task of the department the interviewee works at. The department is responsible for the organization and improvement of processes within the bakery. The main focus in production and packaging lies on preventing problems with the machinery as disruptions often result

in food waste. An example for that would be bread being burned after being in the oven for too long. The bakery is highly automated, so the technical department is crucial to fixing problems as fast as possible. Next to that, the training of the bakery's operators is very important. The staff can detect and prevent errors the fastest. When delivering fresh bread to the supermarkets every morning, old bread from the day before is brought back to the bakery. After collecting these leftovers as well as dough that cannot be used for human consumption anymore, everything is sent to a company that turns this bread into animal feed. Supermarkets are also starting to sell some of the older bread, but 95% is still coming back to the bakery. If these amounts become too big, the company tries to communicate the issue with the distribution centers in order for them to take action. This communication proved to be difficult from the distribution centers' side, so it does not occur very often.

Company C puts efforts into eliminating plastic throughout the supply chain. They are searching for alternative packaging, new partnerships and alternative measures for shipping. An example could be using recyclable containers instead of wrapping pallets in plastic. They also use fish species that are otherwise not as valuable. This means adding value to broken pieces that would go to waste and diversifying the species processed in the products. The company is not focused on the popular species like, for example, wild tuna. They are part of the program "1% for the planet!" and are B-corp. certified.

The second interview question then asked if the companies do get supported by an outside organization or by the government.

Both company A and B stated that they do not receive any support from outside organizations in regard to their waste reducing measures. Company C states that they do receive support for the overall company practices, but the funding is not related to sustainable measures taken.

4. In what ways are the systems supporting the processing companies?

The third question dealt with the impact the aforementioned measures have on the companies. It was inquired if there were noticeable changes in costs, turnover or efficiency of the overall production processes.

Company A is currently investigating the impact their waste reducing measures have on the company. Therefore, they could not provide any additional data. Company B says that preventing losses in the production processes prevents additional costs. Every kilogram of bread that is thrown out stands for throwing out good ingredients and other resources. Even turning it into animal feed means transforming food fit for human consumption into a product that is not intended for humans anymore. The main reason for that, according to the interviewee, is that consumers are "too spoiled" to eat bread that has been sitting on the shelves for two days, even though it is still edible. Preventing waste also means for this company to prevent wasting valuable time. The production lead times are very tightly scheduled and having to produce a certain product again means delaying production in an already short time frame. Company C stated to have increased costs, equitable wages and increase in labor due to innovating and producing

new packaging that had not been on the market. This encouraged new business developments.

Question four asked what kind of support the companies are receiving from the incentive systems. As all of them are not specifically supported in their efforts to reduce food waste, the question was not directly applicable for them. However, company B and C mentioned some incentives and other funding that do have an impact on their operations.

As already mentioned earlier, company A does not receive any support. Same applies for company B. Although the company noted that the supermarket chains they are delivering to are quite demanding and want their suppliers to be involved in sustainability as well. Therefore, they are participating in a few programs together with said supermarkets. One of these programs includes the involvement of the organization “Ecovadis”¹. The interviewee from company B thinks that processing companies are more pressured into action from their customers. The supermarkets they are supplying expect from their partners to act sustainably and take measures to improve their impact on the environment. It is nevertheless clear to them that reducing food waste is also in their best interest. Company C receives funding from Atlantic Canada Opportunities Agency (ACOA) and their Atlantic fisheries fund as well as government grants for venture capital investments. Requesting and working with these grants are however not motivated by furthering sustainable activities but aimed at strengthening the overall fisheries industry in Atlantic Canada.

The last question was asked to explore what the opinion of those companies on incentive systems in general are. Whether they think there should be more or less of them. This should already give an implication of what could be changed to improve the support systems and to increase their reach to more processing companies.

Company A stated that such systems are not necessary for them. Company B thinks that a supporting system would help to reduce food waste overall. This would also mean to change the food supply chain as a whole. The different companies have to work together by communicating and sharing more information. This is especially important for those companies that are not directly in contact with the final consumer. They need stay informed of possible improvements and ways to reduce waste. The interviewee thinks that financial incentives and regulations would be the best way to achieve this kind of cooperation in the supply chain. Most companies are quite reluctant to share information or are not interested in working together. In her opinion, the development of a shared strategy to reduce waste on their own will not occur very soon. Company C said that there are not any incentive systems for them in particular but for people in Atlantic Canada, or in their specific case the province of Prince Edward Island. There should be more people looking for ways to process products out of bycatch as there is currently a lack of a lens for innovation. Most companies operating in that area are outdated and more focused on operating economically than being environmentally

¹ Ecovadis is an internationally operating company specialized in helping businesses to manage their up- and downstream value chain network (Ecovadis, 2021).

friendly. In their (interviewee's) opinion, incentive systems need to be reevaluated for what they are incentivized.

4. Discussion of Results

1. What types of incentive systems to reduce FLW in the processing sector exist in the Netherlands, as a member state of the EU, versus Canada?

The first overall finding from all results suggests that especially the governments of both countries and the EU are taking actions to reduce FLW or are planning to do so soon. The issue of high FLW generation is addressed in revised legislative approaches, as it can be seen in the policy statement of the EU or incorporated in new policy agendas like in the Food Policy for Canada. In all three instances, in Canada, the Netherlands and on EU level, civil societies are forming by involving industry experts and consulting them to find viable solutions for the identified problems of FLW. The issue of not having a common FLW measuring scheme in the EU (FUSIONS, 2016) which was discussed in chapter one, is addressed in the revised waste legislation and measures are currently taken to establish a uniformly usable scheme for all EU member states. In Canada, the waste problem is addressed at different administrative levels. It reaches from federal to provincial and territorial levels. It shows that the programs acknowledge the differences in locations and communities and want to adapt their reduction strategies accordingly.

The same applies to the Netherlands as there are different development agencies (ROMs) that are supporting regional and innovative businesses in the Dutch provinces. This step is important to have effective FLW on all administrative levels. It stands out that in both countries partnerships of different stakeholders in the food industry have formed to tackle the issue. This corresponds with the findings of chapter one where the need for more collaboration for sufficient data exchange is mentioned and called for (Kibler, Reinhart, Hawkins, Mohaghegh Motlagh, & Wright, 2018). Private initiatives are also happening, especially in the Netherlands. These initiatives are also supported by big corporations and provide eligible businesses with knowledge, valuable networks, workshops, and various financing options.

Legislative action as an incentive system is planned in the EU and already executed in parts of Canada. The Food Policy for Canada formulated waste reduction targets. Those should be achieved through mainly monetary incentives as it can be seen in the Reduction Challenge. As a province, Ontario has already published a specific "Food and Organic Waste Policy Statement". Considering that the number of businesses operating in this province is the highest in all of Canada (Varrella, 2020), the policy most probably has an impact on many processing companies and can be seen as an example approach that could be adapted and applied by other provinces as well.

The EU as well as the Netherlands as a single country formulated similar targets. These targets are all mainly based on the UN Sustainable Development Goals which aim to cut FLW by 25% by 2030 and by 50% until 2050 (United Nations, 2021). However, the definitive way to do so on EU level is not yet set. The European Commission is first

waiting for the data from the MS on which legally binding targets will be based on. The collection will take until 2022 and the formulation of a fitting legislation will require additional time.

2. What types of companies are benefitting from such systems?

The kind of companies that can benefit from the programs/systems depend mainly on the individual requirements of the systems. Some programs focus on enhanced practices, some on new ideas that can increase the sustainability of a company. The more specific a program or challenge gets, the more specific the entry requirements are. Naturally, federal legislations and policy incentives target a broad sector and are aimed at every business in the food processing industry. Legislations made on a provincial or regional level apply to companies located in that area. This can be seen in the “Food and Organic Waste Statement” of Ontario or the regional development agencies (ROMs) in the Netherlands.

Linking it back to chapter one, regional initiatives or programs targeting a specific community are highlighted in the food policies of both researched countries and the EU (Bagherzadeh, Jeong, & Inamura, 2014). The diversity and different dimensions of these regions are considered which again increases the effectiveness of the FLW reducing measures. In the case of Canada, indigenous businesses play a major role when it comes to fostering innovation and providing support and are therefore particularly addressed in the policies.

In the Green Deal agreement of the EU, small- to medium-sized enterprises (SMEs) are specifically mentioned and aimed at with support programs. This goes in line with another finding where big and partially even international corporations are often the ones already involved in supporting incentive programs for innovation and growth. They are also parts of partnerships that designed other incentive programs, for example United against Food Waste. As these big companies already have their own capacities and resources for improvements regarding FLW reducing measures, legislative as well as financial incentive systems target mostly SMEs.

3. What types of food-waste reducing measures are being supported by these incentive systems?

The responses of the interviewed companies did reflect the answers that were anticipated before starting the research. All companies stated that they are not supported by one of the outside organizations, that are mentioned in chapter 3.1., when it comes to taking loss reducing measures. However, information to answer this question could be found in the literature review. The incentive systems and programs that have been described in the first part of this research had also several measures listed that would be supported by such. This includes the use of different machinery to reduce product loss and the application of different work techniques and training of the working staff. A great emphasis also lies on furthering innovative ideas and the development of new, sustainable products.

The quantification of FLW is one of the major concerns in the literature study of chapter one (van der Werf & Gilliland, 2017). Many incentive systems aim to support measuring activities in processing companies. These types of studies and projects should lead then to a reduction of FLW. This means that not only the act of reduction is reinforced but also the way that leads to decreased losses. This includes research, investments, innovation, adaptation, and implementation of applicable measures.

Even though the companies are currently not subsidized by other organizations, two of them stated they are maintaining loss-reducing measures, nonetheless. One of the Dutch companies mentioned that they feel the need, or are even “pressured”, to reduce their product losses, mainly by other stakeholders in the food chain, for example the supermarkets they are supplying their products to. The measures that are taken can be best identified by categorizing them in the food waste hierarchy (Bagherzadeh, Jeong, & Inamura, 2014). In the prevention phase, company B is checking regularly on the machinery as disruptions cause a lot of product loss. They also train their staff to operate the machinery correctly which prevents losses as well. Company A had just recently research carried out where they determined at what stages in their processing steps product loss can be reduced and even prevented. Re-selling products, for example bread, at a cheaper price from the day before can be seen as a way of recovering food products before they go to waste.

Company A is planning to reuse food by transforming their greens and vegetable losses into other food products. Company B is turning old bread and dough that is not fit for human consumption anymore into animal feed. These activities prove that the measures companies are taking individually are very well in line with what incentive systems and support programs as well as new legislation are encouraging. However, there is a lack of connection and communication between these programs and the companies that would benefit from them. A possible cause could include that the programs are not visible enough to the companies. If it is difficult to even find the programs and apply to or sign up for them, the companies cannot make full use of them.

Another issue that leads to this disconnection could be that the programs are not as attractive to the companies. If the perceived effort to participate is too great and does not equal the benefits, businesses might be reluctant to participate. Regardless of the first implications of why there is a lack of participation in the support programs, it must be stated again that the interviewed sample was very small. Conclusive statements with definite answers on why this issue exists cannot be derived from the responses of these three companies.

Company C is also involved in sustainable activities, but they are more focused on new packaging that is less harmful to the environment. In terms of waste reduction, they also make efforts by processing species of fish that are not as popular and mostly rejected by the customers. They are getting supported by funds granted by the government. However, these grants are meant to support Atlantic Canada’s fisheries overall rather than specifically encouraging sustainability enhancing measures.

4. In what ways are the systems supporting the processing companies?

To answer this question, it will be again mostly relied on findings from the literature research as the companies have overall stated that they are not being supported by incentive systems. The most prominent way of support is through monetary incentives. This reaches from (co-) financing research projects, the training of staff or the implementation of new machinery to winning grants in waste management challenges and investing in new innovative product ideas. Partnerships and collaborations also offer the opportunity for collaboration, also on an international level, and the contact to industry experts that can provide helpful knowledge and insights. Workshops, like Topsector Agri&Food offers, give companies the chance to improve themselves and gain more experience in applying loss reducing actions.

The interviewed companies answered the question of what impact their own reduction measures have on the overall operations of the organization. Company A stated to still be investigating the impact as they just have started implementing FLW reducing procedures. Company B identified to have reduced extra costs because of their preventative activities regarding food loss. Preventing errors from happening also helps avoiding overtime as faulty products resulting from such errors have to be produced all over again. Such processes cost a lot of extra time that can be avoided when preventing errors in the production process in the first place.

However, these measures and their impact are again not a result from external support systems. There is some degree of incentive behind these actions as, for example, company B is required to maintain a certain level of sustainability for their customers. The supermarkets company B is delivering to expect sustainable activities from their suppliers. Product loss reduction is part of these forms of activities. This proves again that even though collaboration happens at a partnership level to introduce new incentives, collaboration between companies that have to (and/or are eager to) take FLW reducing measures is not really happening to the degree that it is very effective. It comes more often to companies feeling pressured into taking such actions to comply with standards set by their B2B (business-to-business) customers.

Scope of Results

The findings of this research about incentive systems can be used by companies who seek support for their efforts of reducing FLW in their operations. Especially the first part of chapter three summarizes what support systems can be found in Canada and the Netherlands as well as on the EU level. As some of these programs are still running and participation is taking place right now, the findings can be used as a basis for further research when the final results and the impact of these programs is being analyzed.

The implications on the lack of communication and the still existing unawareness of processing companies about those systems can furthermore be a good impulse for the providers to modify their communication channels and take steps to reach more businesses.

Critical Reflection of Research Method:

Process:

The process of researching all relevant information went for one part better than for the other. The literature search revealed a plethora of information on governmental incentives as well as incentive programs provided by civil and private initiatives. The materials and methods section contained the plan of using the search engine Google Scholar to retrieve the kind of information needed. This strategy did not work out as planned because websites of support programs as well as governmental policy released were not listed in that search engine. Therefore, most information was found via common search engines and accessed through official government websites or credible websites of relevant organizations and partnerships.

Reviewing publications of new policies and other legislative documents proved to be very helpful. Much information could be retrieved from these sources and gave implications for further progress in this field. Scientific papers that could be accessed through scientific databases reviewed very specific cases of food processing and FLW reducing actions. These were not as relevant for this research since the aim was to create a comprehensive overview of various incentives and its impact on processing companies.

The second part of the research proved to be more challenging. Contacting companies and getting a response was a slow process. Over time it showed that the response rate was more positive when the questions were sent out in writing to the companies rather than setting up a meeting for an interview. In that way they could answer the questions when it fit best in their own schedule.

A disadvantage of this method was that there was no option for follow-up questions that naturally arise when having a vocal interview. Overall, more companies are needed for a comprehensive result. The responses that could get secured for this research are a first overview of what is done or can be done for the sector. Strong connections to the actual incentives and sufficient information about their impact is still lacking. This issue also arises because the interviewed companies are not taking advantage of those options of incentive systems (yet).

Methodology:

There are certain limitations to this research and its results. Firstly, the responses of the companies cannot be taken as a representation of the whole food processing sector in the respective countries. Aiming to get as many companies as stated in the materials and methods section was too ambitious. Especially trying to include Canadian companies proved to be more difficult than anticipated. To get a more thorough insight into that sector, research conducted directly in Canada or being involved in a Canadian company would be more effective. Nevertheless, all responses still give a first insight of what is currently done or not done in terms of FLW reduction. The companies had partly similar approaches and the overall state of not being supported by other incentive

systems can give an indication of where communication and collaboration is still lacking.

The timing of when the interview inquiries were sent out might also play a role in the responsiveness of the companies. All of them were contacted in the beginning and mid-summer of 2021. Not only were many employees and responsible people in the company on summer vacation, but the covid-pandemic has shifted the focus of numerous businesses, regardless of where they are in the world. They might simply not have the capacity to respond to such research inquiries when they have other business-related issues to worry about.

Another limitation was that many programs that were identified are still quite “young” or are still in progress. They all started after 2018 and even new regulations and policies were released after this date. This means that results and hard data on how effective these systems are and how beneficial for the companies and their FLW reduction is not available yet. The best example for this is the Farm to Fork Strategy of the European Union. The European Commission calls on all member states to collect data about their FLW generation and reduction. This data is expected to be submitted to the EU by 2022, which is still at least six months to go from now on.

5. Conclusion and Recommendations

This research was conducted to answer the question of what impact incentive systems for food waste reduction have on the Dutch and Canadian processing sector. The research aimed to give a structured overview for processing companies which incentive systems affect them as well as trying to find first-hand information on how effective these systems are through interviews.

The first method of the study applied demonstrated that there are many systems and programs available that tackle the task of food waste reduction from different angles and with different incentives. One incentive that can influence businesses are various regional and national policies that aim at the encouragement of food loss and waste reduction in processing companies. Receiving (co-)funding for research projects, for the improvement of machinery and processes from private or civil society organizations is another way for companies to become incentivized. The same applies to participating in workshops and other networking events on food waste reduction.

The interviews revealed that the willingness to act sustainably and reduce product losses during processing activities was present in all of the inquired companies. Such practices are mostly already executed by them, but not supported by the previously researched incentive systems. The findings suggest that there is a disconnection between the programs that are offered and the companies to whom those systems apply. More communication between the incentive providers and the companies who need them is necessary.

Additionally, the research also showed that the countries and the EU are not as far yet to be able to release data about the impact of loss reducing measures and new legislative proposals. Most of them have only been drawn up in the past two to three years. This time frame is not long enough to gather comprehensive data from companies about reduction successes or failures on national levels. As far as the current research was able to determine, the impact of incentive systems on companies in the Dutch and Canadian processing sector is at this point very limited and further research is needed to find the deeper causes for the lacking effectiveness.

Recommendations:

Short-term:

The results of this research should give the people of influence, i.e., policy makers and organizations offering the programs, an impulse to rethink their way of communicating the policies, support systems and their targets. There should be more research in regard to why companies have mostly little to no knowledge of those programs and what could be done to increase the awareness for them. It should further be investigated if the programs offer the right kind and number of incentives to the companies. If the processing companies perceive the benefits such systems offer as too little, they might be more reluctant to participate. More communication within the sector and the food supply chain is needed to develop an overall strategy and get more companies to

collaborate. Giving the right motivation to companies to share their data with other businesses is another step towards a loss-reducing food chain.

Long-term:

With the upcoming legally binding waste reduction targets which will be introduced in the EU after the evaluation of the collected data in 2022, there should already be more discussion about how each economy and every company will be able to comply to these targets. Companies need to be made aware that this change is going to come and give them a chance to start adapting their processes in order to meet these targets. Another point of research is the analysis of the results from the different reduction challenges and programs that are currently still in progress. Once all programs are finished, it should be re-evaluated what impact they had on the different companies and countries. This applies to the Canadian action points on food waste reduction that are running until 2024 as well as the long-term goals of the EU and the Netherlands that are set to 2030 and 2050.

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Appendix 1 – Interview Questions:

Sub-question 3: What kind of food waste reducing measures are being supported by these incentive systems?

- Are you currently actively working to reduce food losses and waste in your company?
- If yes, what kind of measures do you take?
- If no, are there specific reasons why not?
- Do you get supported/subsidized etc. by another organization or the government? (If possible, please indicate by whom you get supported)

Sub-question 4: In what ways are the systems supporting the processing companies?

- What impact did the waste reducing measures have on your company? (decreased/increased costs? Better turnover? Greater efficiency?)
- In how far do you get supported by an outside organization/the government? (Knowledge, money, information, network, certifications, publicity etc.)
- Do you appreciate such systems? Should there be more or less? Why?

Appendix 2 – Interview Responses

Greens and Salads Meppel (Company A)

1. Are you currently actively working to reduce food losses and waste in your company?

If yes, what kind of measures do you take?

Yes we are running a program for the development of waste in other products.

If no, are there specific reasons why not?

2. Do you get supported/subsidized by another organization or the government? If possible, please indicate by whom you get supported

No.

3. What impact did the application of waste reducing measures have on your company? (Decreased/increased costs? Better turnover? Greater/less efficiency?)

At this moment we are investigating

4. In how far do you get supported by an outside organization/the government? (In terms of knowledge, money, information, network, certifications, publicity)

We are not supported.

5. Do you appreciate such incentive systems? Should there be more or less? Why?

That is not necessary for us.

Filled in by Hilde Tamminga, Bedrijfsbureau Bakkerij Holland (Company B)

1. Are you currently actively working to reduce food losses and waste in your company?

Yes, we are taking various measures to prevent food waste within our company.

If yes, what kind of measures do you take?

- Reducing food waste is actually one of the tasks of the department I work at, as we are the main people responsible for the organization and improvement of processes within the bakery. In production and packaging there is the main focus in preventing problems with the machinery, as disruptions often result in food waste (ex. Bread is burned after being in the oven for too long). The bakery is highly automated, so our technical department is very important in making sure problems are

fixed as soon as possible and also the training of our operators is very important.

- We deliver daily fresh bread to supermarkets, and when we bring the bread in the morning, we take back the leftover bread from the day before. This bread is collected and then send to a company that turns the leftover bread (and also dough that can't be used for human consumption anymore) into animal feed. Supermarkets are now starting to sell a little bit of older bread too, but 95% of the leftover bread still comes back to the bakery. In cases where we receive extreme amounts of leftover bread, we try to communicate this to the distribution centers, so that they can take action. Although this communication is quite difficult from their side, so doesn't occur very often.

If no, are there specific reasons why not?

2. What impact did the application of waste reducing measures have on your company? (Decreased/increased costs? Better turnover? Greater/less efficiency?)

- Preventing losses in our production process prevents costs, as every bread of kilogram of dough that is thrown away, means throwing away good ingredients and other resources. Even when this is turned in animal feed, it means that you are turning food for humans into animal feed, because consumers are too spoiled to eat bread that has been in the store for 2 days (but is actually fine to eat).
- Our lead time is very short, so preventing waste also means that we prevent wasting precious time. We normally receive our orders around 16.00, start producing at 17.00. At 22.00 the next day, the bread has to be packaged, orderpicked and ready for transport. Having to produce bread again, because for instance the decoration wasn't done correctly, means we waste time in our already short time window.

3. Do you get supported/subsidized by another organization or the government?
If possible, please indicate by whom you get supported

- No.

4. In how far do you get supported by an outside organization/the government?
(In terms of knowledge, finances, information, network, certifications, publicity)

- The supermarket chains we deliver to are quite demanding, so 'sustainability' is also a topic they want us to be involved in. We also participate in a few programs together with them, one program also includes some support from the organization Ecovadis. I think we are more pressured into action, then supported, although of course reducing food waste is also in our best interest.

5. Do you appreciate such incentive systems? Should there be more or less? Why?
 - Not applicable.
 - But I do think that a supporting system would help to reduce food waste overall, although this would mean changing the entire supply chain. Different companies must work together, communicate and share information, so that companies that are not in direct contact with the consumer, are still aware of possible improvements or ways to reduce waste. Although I think that financial incentives or regulations would be the best way to achieve this. Most companies are quite scared to share information or are not interested in working together, so such a shared strategy to reduce waste will not occur very soon.

Scout Seafood Canning (Company C)

1. Are you currently actively working on working to reduce food losses and waste in your company?

Eliminating plastic throughout the supply chain, alternative packaging, new partnerships, alternative measures for shipping – i.e. pallets wrapped in plastic vs. recyclable containers. You utilize species that otherwise aren't as valuable-adding value to broken pieces etc. what would otherwise go to waste, diversity of species in products – not focused on topped “loved ones” i.e. wild tuna etc., 1% for the planet, b-corp certified

2. What impact did the waste reducing measures have on your company?

Increased costs, equitable wages, increase in labor, producing new packaging that wasn't on the marketplace (→ innovation), encouraged new business development

3. Do you get supported/subsidized by an outside organization/the government?

Yes

4. In how far do you get supported by an outside organization/the government?

Funding from ACOA – Atlantic fisheries fund, also government grants VC investment – this wasn't sustainable motivated

5. Do you appreciate such systems? Should there be more or less? Why?

There aren't incentive systems to SCOUT, but there are for people in PEI. Looking for people to produce products for bycatch, lack of a lens for innovation – outdated, not actually environmentally friendly, more economically focused; don't exist in PEI, don't have actual waste loss, incentive systems need to be reevaluated for what they are incentivized