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CAUSES OF FOOD WASTE IN INTERNATIONAL SUPPLY CHAINS

A report by Feedback and the
Rockefeller Foundation

**FEED
BACK**

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EXECUTIVE SUMMARY

Food production is the single biggest impact humans have had on the planet's ecosystems to date. The growing demand for food is responsible for more than 80% of deforestation, 70% of fresh water consumption, is the largest single cause of biodiversity loss, and produces more than 30% of global greenhouse gas emissions. Despite the impact our agricultural system has on the planet, at least a third of the food grown globally is currently wasted. This is enough to feed three billion people – more than enough to feed not just those currently suffering from malnutrition, but also the additional 2 billion people expected to inhabit the planet by 2050.

In response to demand for action on food waste, the United Nations set a target of halving food waste by 2030. However, this target – and the cascade of national and industry commitments to meeting it – focus on consumer and retail food waste whilst neglecting the waste that occurs in the supply chain. This failing is driven, in part, by a lack of available data on supply chain waste. Food businesses are not incentivised to measure and publicly report the amount of food waste that occurs in their operations, and suppliers fear loss of business should they speak out about problems that cause them to waste food.

This report looks at supply chain waste by summarising Feedback's research in Peru, Senegal, South Africa, the UK and a major European port. Its findings show that a concentration of power in the groceries sector has allowed supermarkets to dictate the terms and conditions by which food is grown, harvested, and transported, and that this concentration of power has given supermarkets the power to force suppliers to waste food through stringent cosmetic specifications and unfair rejections of food. While retailers generally set trading standards and buying contracts, suppliers generally bear the cost of waste, leading to 'moral hazard' issues wherein mismatched incentives cause unnecessarily high costs.

The findings in this report highlight the need for greater research to be conducted on food waste in supply chains. The findings also suggest a need to investigate how business culture in buying departments of food businesses drives food waste. Buyers appear to have incentive structures that encourage the shifting of costs and waste upstream, adversely affecting supply chain efficiency.

The report also demonstrates current industry solutions to prevent food waste and makes a series of recommendations to businesses and governments to implement policies to reduce food waste across the supply chain. These recommendations include: relaxation of cosmetic specifications, the development of an industry standard to regulate produce rejections, the promotion of minimum guaranteed prices through retailer supply chains, the development of secondary markets for rejected produce, and public reporting on supply chain food waste by retailers and other large produce buyers.

INTRODUCTION

The aim of this report is to shed light on the causes of food waste in supply chains, a largely neglected area of research. Whilst there are numerous food supply chains where waste occurs, such as restaurant, hotel, catering and wholesale supply chains, this report focuses predominantly on supermarket supply chains.

Rationale for research: lack of attention to food waste in the supply chain

There is very little research and data on food waste in the middle of food supply chains, with most research to date focusing instead on post-consumer waste or, to a lesser extent, waste directly leaving supermarket stores. Yet within Europe alone, two thirds of food waste occurs within supply chains (FAO, 2011).

There are two main reasons for the scarcity of research on supply chain waste. Firstly, businesses are not currently incentivised to measure the amount of waste in their business so there exists a dearth of data available for analysis. As a result, there is a lack of transparency from supermarkets on the amount of waste that arises in their supply chains (only one supermarket in the world to date has published data on waste in its supply chain waste). Secondly, many businesses supplying supermarkets operate within a 'climate of fear' which prevents them from speaking out about some of the major causes of food waste, as they fear repercussions from the supermarkets.

Scope of research: food waste in the fresh produce supply chains of UK supermarkets

This report focuses on food waste, rather than food loss, although supply chains are of course affected by both, for different reasons. Food loss is defined as food that is unintentionally removed from the supply chain, e.g. due to a breakdown in cold chain logistics, poor harvesting methods, or other infrastructural issues that can lead to spoilage. Food waste, conversely, can be defined as mature food crops intended for human consumption that are either discarded or left to spoil because of actions and decisions taken by stakeholders across the supply chain (farmers, brokers, exporters, importers, retailers, and consumers). The report looks at fresh produce (fresh fruit and vegetables), as the short shelf life of these food types makes them particularly susceptible to waste problems (Consumers International, 2012).

To understand why food is wasted, an examination of the 'system' within which food is wasted was necessary. Much of the fresh fruit and vegetables that arrive on supermarket shelves in Europe and North America comes from long and complex supply chains requiring a global lens through which to analyse the way in which food waste is caused.

To add depth and necessary detail to this global lens, the UK market is used as a principal case study throughout the report. More than half of the food consumed in the UK is imported, meaning that 64% of the greenhouse gas emissions for our food take place on foreign soil. Around 29% of the food consumed in the UK comes from Europe, with 17% from other continents. The UK imports 45% of its vegetables and 90% of its fruit. This reliance on other markets means it is crucial that UK businesses maintain relationships and look after suppliers in order to safeguard the UK's food security. However, this study has found signs that overseas suppliers are turning away from the UK market due to stringent cosmetic specifications and unfair trading behaviour by supermarkets that leads to good food being wasted.



Kenyan fresh produce rejected for cosmetic reasons

Research hypothesis: food waste caused by a concentration of power

The hypothesis of this report is that an overwhelming concentration of power at the buyer end of the food system causes an inefficiently high level of food waste. Supermarkets' market power enables them to put pressure on suppliers and intermediaries to bend to frequently changing demands and requirements. A lack of sufficient oversight and regulation to tackle this market failure allows supermarkets to dictate the terms of business, thereby transferring risks and costs up the supply chain.

These increased risks and costs result in large amounts of unnecessary food waste. The cost of this food waste is almost always borne by suppliers, which means that supermarkets are not incentivised to change their policies to reduce this waste. This market failure is a type of 'moral hazard,' where, because the market actor with the ability to reduce costs is different from the actor bearing the burden of these costs, an unregulated market leads to higher-than-efficient cost levels.

In a perfectly competitive market, with legal safeguards and regulation against abuses of market power and where information on waste is transparent, accurate, and available to market participants, supply chain waste would be lower than current levels. Deviations from this basic model for a sustainable food system are examined in this report.

Structure of report

This report looks at both the causes of food waste and the current solutions employed by various actors in the supply chain. The report begins by discussing the causes of food waste found in relation to the results obtained through this research, which include: cosmetic specifications; unfair trading practices such as spurious rejection claims; price volatility; and behaviour and culture in supermarket distribution centres and stores. Each of these causes are accompanied with case studies from Feedback's research in Peru, the UK, Senegal, South Africa, and a major European Port.

The destination of surplus food is then looked at to understand the way in which the management of surplus food plays a role in exacerbating the scale of waste in the supply chain. Various solutions employed by the industry to prevent or deal with food waste are then discussed prior to drawing conclusions and recommendations to prevent food waste across the supply chain.

METHODOLOGY

This report highlights the underlying causes of food waste occurring in supply chains through a series of semi-structured qualitative interviews, field trips and general research and investigation. The research was conducted over a twelve-month period in five countries across three continents and attempts to fill in gaps in knowledge on how and why waste occurs in food supply chains.

Wherever possible, Feedback obtained original documentation as evidence. Where this was not possible we were given details or shown documents and given the assurance of the interviewee as to the veracity of any claim. We then cross examined or cross referenced this information to check details. Generally, any claim is backed up by compelling primary evidence and/or multiple independent sources.

Given the project budget, time frame, resources available and skillset of the researchers involved, it was not possible to carry out a comprehensive quantitative analysis of any kind on supply chain food waste. Similarly, due to time constraints and a targeted approach to supply chain actors, the research did not include any formal interviews with supermarket representatives, spokespeople or PR staff.

Confidentiality

During the course of this research, Feedback repeatedly encountered a climate of fear, with many individuals saying they were afraid to speak out about issues due to fear of the repercussions of somebody finding out and them losing business or suffering reputational damage. Other individuals later withdrew their participation at the request of their employer or a more senior member of staff within their organisation.

Due to this climate of fear, confidentiality assurances, encryption of files and safeguards over protecting sensitive information were paramount to this work. Far from being unnecessary or excessive, this proved vital to gaining access to certain locations and to individuals who would have otherwise been too scared to involve themselves in the research.

Research participants were given written assurances over confidentiality and over the protection of research information through encryption, where requested. Information relating to research was not shared externally and also not shared internally within Feedback outside of the research team, with all research material appropriately firewalled and password protected.

Beyond the overt prevalence of experiences of fear within the industry, there was also a general acceptance of many of the problems faced simply as 'business as usual'. This has led the industry to regard large amounts of waste as incidental and inevitable, meaning that the concept of waste has become, to a large extent, institutionalised. This posed an initial challenge to the research, as many of those we spoke to that work within the food sector initially claimed that waste doesn't exist or is inevitable, only later conceding many areas where waste occurs.

COUNTRY SPECIFIC METHODOLOGIES

United Kingdom

A total of 42 formal and face to face interviews were conducted over a period of seven months. These interviews were semi-structured to allow for information to be gathered from participants outside of a pre-defined set of questions. Almost all participants asked for their contributions to be anonymised. Two field trips were conducted.

The focus for the UK side of this research has been on the middle actors within food supply chains (broadly defined as businesses and individuals operating between producers and retailers), and to what extent they cause and/or are affected by food waste.

A total of 265 individuals/companies were contacted as part of the UK based research. Of those contacted 91 did not respond and 33 responded but later withdrew participation in the research.

Of the 141 individuals/companies who engaged with this research, 70 were spoken to via short interviews (less than 20 minutes in duration) by phone, VOIP chat, email or in person and 71 longer interviews were conducted (42 face to face).

Buyers, importers and packaging companies had the highest levels of non-response or later declining to participate. Surveyors and inspectors and academics had the highest levels of response and in depth participation.

Interviewees included: academics, aggregators, buyers, campaigners, civil servants, consultants, drivers, exporters, importers, inspectors, insurers, lawyers, overseas producers, politicians, policy experts, packers, port authorities, researchers, ripeners, surveyors, shippers, spot buyers, trade bodies, UK producers, waste disposal staff and other actors within supply chains.

Of the 46 importers that were contacted for this research, only 7 were willing to participate in the research, and only 3 formal interviews were conducted. A total of 23 surveyors/inspectors were contacted, with 20 willing to participate and 12 formal interviews conducted.

Several industry conferences and events were attended where we spoke in a less formal context with experts within the industry and gained further insight into how business is conducted, what issues are present in business relationships, and what the sector is currently doing to address waste problems.

Peru

Feedback visited sixteen suppliers across a period of two weeks and studied a range of products including asparagus, citrus fruits (including mandarins, tangelos and grape fruit), onions, squash, avocados, grapes and pomegranates. Semi-structured interviews were conducted with each of the suppliers based upon a predefined set of questions and took place during site visits to packing facilities and farms. Interviews were scheduled with the assistance of a regional partner The Sustainable Markets Intelligence Center (CIMS) based in Costa Rica.

Senegal

A field trip was designed and executed in Senegal in October 2016 during which Feedback, in partnership with local think-tank IPAR, conducted a series of interviews with mango producers and exporters, as well as government and industry officials. In total 17 interviews were conducted. Two of these interviews were conducted with producer organisations that represented collectively over 2,000 small scale producers to give an idea of scale of the wider sample represented by this research. The major limitation to this sample was geographical as field research was not conducted in the region of Casamance due to travel warnings at the time of study. Casamance is reported to be the most productive region of Senegal with regards to mangos as well as the region with the greatest volume of FLW. Not conducting research in this region is regrettable, but presents an immediate opportunity for future research.

European port, warehouse and AD plant visits

Field trips were conducted where a researcher visited a European port, a European food storage and packing warehouse, and an anaerobic digestion plant. A total of 32 individuals and companies were met as part of this field work and 12 formal interviews were conducted. Where possible, photographic and video evidence was collected. However, due to confidentiality concerns, none of this will be published at this stage.

Due to the extremely sensitive nature of these visits, and to protect the identity of individuals and businesses involved from repercussions, the location of the port, as well as the names of individuals and companies Feedback spoke to, will not be revealed in this report. This is an example of the severity of the climate of fear spoken about in this report: even in identifying the country in which this port is located there is a risk that businesses and individuals' identities may be linked to testimonies. The same level of risk was not present with stakeholders in Peru, Senegal and the UK due to the larger nature of their markets.

South Africa

An initial scoping study was conducted to identify the main export products and key stakeholders. On review of the results of this study it was found that there existed very little waste in the export market due to a highly developed secondary market which prevented surplus food from being dumped. However, it was found that food waste was experienced further down the supply chain on arrival at European Ports due to rejections.

A secondary study was undertaken by Pinpoint Sustainability in which over 20 fresh producer growers, exporters and associations operating in South Africa were contacted by phone and email, of which 50% responded with insights and information. Documented evidence, which is discussed later in this report, was provided by one grower to demonstrate the way in which rejections affect their businesses.

CAUSES OF FOOD WASTE

Cosmetic specifications

The size, shape, and colour of food is crucial to the relationship between producer, intermediary middle actors in the supply chain such as exporters and importers, and final purchasers such as supermarkets.

“

For supermarkets, what matters is how something looks, not just edible quality. At the end of the day we waste a lot of perfectly edible food.

”

UK importer

Within the global food system these standards are often referred to as cosmetic specifications, which are dictated through documents provided by retailers and intermediary purchasers and form part of the quality requirements in contractual agreements, according to producers and exporters. Producers use these specifications to choose which varieties of crop to plant and when and how to harvest produce. The specifications ultimately determine what food can and cannot be sold based upon its external appearance. However, as this section of the report will show, there are several problems with cosmetic specifications. Here are the main findings of this section:

- Cosmetic specifications generated systemic overproduction of food
- Cosmetic specifications are used as a front for unfair trade, meaning that purchasers are able to use these standards to evade penalisation in countries where legislation against unfair trading practices exists (such as the UK), as well as getting around more general contract law
- Cosmetic specifications are being used to restrict market access when demand is lower than supply
- Retailers do sell lower grade produce to consumers when high-quality supply is not available, demonstrating that consumers are not the only driver for cosmetically ‘imperfect’ fruit and vegetables being rejected
- When pre-arranged contractual supply to supermarkets does not match consumer demand, the stringency of application of cosmetic standards is ramped up as part of a business response to the excess supply

Systemic overproduction

Much like production lines in factories that mass produce cars or flat pack furniture, producers of fresh produce are held to exacting standards in terms of consistency and appearance in the form of cosmetic specifications. The crucial difference between a vehicle assembly line and field of broccoli is, however, that outside influences are much harder to control within the latter. Yet in recent decades, supermarkets have led consumers to expect uniform fresh produce in an attempt to maintain a competitive edge in the groceries sector.

Throughout the supply chain, food is discarded because it does not meet the aesthetic requirements of supermarkets. Starting at the farm during the harvest process, farmers will grade produce based on its appearance via a selection process in the field. Food that does not meet the standards required is either separated for sales to secondary markets (at a fraction of the price expected from primary sales), or is left unsold in the field. Further grading happens upon arrival of the food at packing facilities, where produce is packaged prior to being transported. Here the food is handled on a product line and, again, food deemed unsuitable is removed from the chain.

As is shown in the case studies that follow, on average, 80% of mangos grown in Senegal are deemed unacceptable for export to Europe – not because of safety, integral quality or shelf life, but because of the way they look. Minor skin blemishes that pose no risk to the quality of the fruit, and that would be difficult to detect by the customer eye, are reason enough for mangos to be removed from the value chain. In Peru, Feedback heard from onion producers who regularly waste 8.5% of their crop in a ‘good year’ and up to 60% in a bad year because of the shape, size and colour of their products. Previous research conducted by Feedback show that these are not isolated incidents but that the issue of cosmetic specifications causing waste on farm is a global phenomenon.

It is common practice for farmers to overproduce food to ensure that they can meet the expected volume of produce orders in line with these specifications. This is important as it shows the way in which food waste is a symptom of overproduction, insomuch as food is currently being grown around the world without any intention of it being eaten by humans. This normalised level of surplus food causes an excessive use of natural resources, highlighting entrenched inefficiencies in the global food economy.

This system of categorisation and specification for food betrays a lack of understanding and acknowledgement of the unpredictability of regional climates, temperature, rainfall, sunlight and other factors. Unlike products leaving manufactured production lines, the organic nature of food as a living, breathing organism makes it inherently more difficult to manage and control.

Case studies: Normalised overproduction

YELLOW ONIONS - PERU

Yellow onions are exported from Peru to both the European and US markets, allowing a variety of different sizes and shapes of onion to be exported. However, despite this spread of different markets and outlets, onions that are ‘too small’ or ‘misshapen’ for the export market are frequently wasted regardless of being of a good integral quality¹. To prevent the spread of disease or pests from the onions rotting in the fields, they are buried in the desert near the fields or pack houses.

Feedback conducted two in-depth interviews with exporters of yellow onions. They claimed to waste an average of 8.5% of their onions each year due to cosmetic specifications. This waste amounted to 3,570 tonnes for the two businesses but could rise as high as 25,200 tonnes on bad years (60% of total production) when there is an oversupply of onions on the global market. Exporters argued, “If prices are high then the market will take anything. If they are low due to oversupply, then cosmetics are enforced.”

When global supply is low, cosmetic specifications are relaxed to allow more produce to enter the same markets. Nevertheless, to minimise risk of under-supplying cosmetically perfect onions, both suppliers reported overproducing yellow onions annually. The unpredictability of cosmetic standards compounds the risks for farmers created by price volatility in global commodity markets. During glut years, farmers not only must confront low prices; cosmetic specifications drive higher food waste levels, too, the costs of which they shoulder. This exacerbates boom-and-bust cycles, potentially impacting farmers’ resilience and livelihoods.



Yellow onions - Peru

“

Onions have to be certain sizes for the different markets. In the US the onion must be big and have a round circumference and flat shape. Other markets want medium size onions. The smallest onions and misshapen onions are discarded

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Peruvian Yellow onion producer

CITRUS FRUITS - PERU

Peruvian producers of citrus fruits, including mandarin, tangelo, and grapefruit, also report that cosmetic specifications lead to produce being rejected from the export market. It is not uncommon for suppliers to expect a 50% exportability rate for products like tangelos. In addition to problems relating to the shape and size of fruit, citrus fruits faced rejection because of minor blemishes and surface markings on the skin of the product. These markings were generally cosmetic scratches or black spots that did not threaten the internal quality or longevity of the fruit.

There is a local market in Peru for citrus fruits, but this can often be saturated by rejected produce from the export market, leading to very low prices, typically offering little or no profit to the supplier. Some suppliers were able to sell all of their surplus fruit, while others reported that, when local market prices were too low, they were forced to bury their produce, as it was not economically viable to pay the additional costs to transport the food to the local market. Burying rates range from 10 to 40% of total production.

MANGOS - SENEGAL

Actors from across the mango sector argued that cosmetic specifications were currently too strict, preventing good edible mangos from being exported. In some cases, a proportion of the surplus 'imperfect' fruit was sold to the local market, but many producers said that they were unable to sell all of their fruit, despite it being of a safe and edible quality. One producer's cooperative interviewed suggested that if cosmetic specifications were relaxed to allow for a greater variance of different colour, shape and size mangos, they would be able to export 50-60% more of their product. They argued that the "export potential is reduced because of cosmetic specifications".

Overall, Feedback estimated that an estimated 65% of mangos in Senegal are wasted every year (88,000 tonnes). The large volume of fruit left in the field as a result of cosmetic specifications increased the prevalence of fruit fly, which leads to further losses. This shows the way in which an issue of food waste can have a knock-on effect on levels of food loss in a country.

LIMES (EUROPEAN PORT WAREHOUSE)

Feedback visited a warehouse and packing facility at a European port which stored, inspected, repackaged and sent a variety of fruits on to supermarkets across the continent. The facility processed many different products including pineapples, bananas, grapes, papaya, physalis, watermelons and limes.

Limes from Mexico were checked and outgraded on a production line before being sent on to a European supermarket depot. At least 30% of the imported product was rejected due to superficial skin/surface damage or colouration and sent to anaerobic digestion. When asked why the product was being removed, staff said it was for purely visual reasons and had nothing to do with the quality or taste of the product, an assessment confirmed later by an independent expert who has worked within fresh produce and cosmetic specifications for over five years and examined video footage and photos Feedback collected of the outgrading process.



Mangos - Senegal

Staff are not told whom the fruit is being packed for. However, this particular client wanted the limes to be more than 50% green and not to have any superficial skin damage. The limes that were rejected were fresh and had the same nutritional value as those accepted. Yet they were wasted because they had small areas of skin damage or scarring and were around 50% to 70% yellow. Outside the same warehouse, approximately fifty plastic waste containers held similarly discarded produce, each able to hold approximately one tonne of fresh produce.

Unfair Trading Practices: Rejections and inconsistently applied cosmetic specifications

Whilst cosmetic specifications create normalised levels of food waste and overproduction at the early stages of the supply chain, suppliers interviewed for this research claimed that cosmetic specifications are also used by supermarkets and intermediary suppliers as a device to reject food as a way of shifting the risk and costs of fluctuating demand. In effect, cosmetic specifications are used as a front to allow supermarkets to change and ultimately cancel orders for seemingly justifiable reasons.

The causes of supply chain food waste often have multiple layers. In this case, when food is rejected, the perfunctory reason for the rejection given by the recipient upon receipt of goods is that the produce did not meet the cosmetic specifications required and so cannot be sold. The deeper reason for many of these rejections is however linked to fluctuations in supply and demand within the market that create an economic cost to purchasers, who then pass this risk back up the supply chain through an abuse of their dominant position.

Such rejections are recorded as 'claims,' and, on paper, they appear to be a legitimate reason for refusing payment for goods that have not met the necessary requirements for sale. However, suppliers report to rarely receive any evidence of problems with their produce from their clients, whether they are intermediary buyers or supermarkets. Where evidence is provided, it is often unsatisfactory and does not provide adequate proof that the product a) belongs to the supplier in question, and b) that it has been destroyed and not resold on the open market.

Rejections can occur at any stage of the supply chain, with a final check usually on arrival at a supermarket depot. By the time the food has reached this point, it has often travelled great distance and has accumulated a significant value of embodied energy in the process. This waste – associated with food that makes this journey through the supply chain and is then rejected at the point of arrival at the final purchaser – is arguably more damaging, both environmentally and economically, than outgraded food that never leaves the field. Confronting buyers about this behaviour would be tantamount to commercial suicide within the current climate of fear. The quote (on the right) from a fresh produce insurance firm testifies to how deeply entrenched this fear is, and how the inability of suppliers to challenge rejection claims causes wider issues in the industry beyond just waste.

A similar problem is reported in a case study on raspberries later, where false rejections have led to internal disputes in businesses as a result of production teams being penalised for poor produce when it is falsely rejected.

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The reason we are not giving you any names is [because of] a climate of fear that, absolutely, permeates the industry. In fact, the clients that we asked to take part in your research are so worried about repercussions that they have not only refused, but pushed back against us taking part in the research.

Unfair trading by supermarkets affects us too, of course. As an insurance company, we are expected by clients to defend their interests. However, we do not issue claims and challenges when we believe food is rejected unfairly, because our clients fear being delisted or losing business and instruct us not to claim. This in turn damages our relationship with clients, who simultaneously are reluctant to challenge behaviour and, conversely, are asking us as insurers 'what do I pay you for if you can't pay out for losses on cargo?'. We are stuck in the middle, managing relationships within a completely broken market.

”

European fresh produce insurer

The way in which cosmetic specifications are used to buffer the amount of food a purchaser is obliged to buy can, and should, be viewed as a form of unfair trading practice (UTPs). The EU Parliament defines UTPs as “practices that grossly deviate from good commercial conduct, are contrary to good faith and fair dealing and are unilaterally imposed by one trading partner on another” (European Parliament, 2016).

There are myriad forms of UTPs which can cause overproduction and food waste. However, there are three key practices which routinely encourage overproduction leading to food waste, which are: last minute order cancellations or changes to order specifications; retrospective unilateral changes to supply agreements; uncompensated changes to forecasts. The use of cosmetic specifications as a façade for unfair trade, requires a reframing of these issues, as there is a risk that purchasers are able to use this practice to evade penalisation in countries where anti-UTP legislation exists (for example the UK), as well as to get around more general contract law.

The uncertainty and risk generated by UTPs often leads to overproduction as a means of suppliers insuring themselves against variable contractual terms (European Parliament, 2016).. This overproduction ultimately leads to good food being wasted where secondary markets are not fully established, accessible, or contractually permitted. Food waste is therefore symptomatic of UTPs and of the deeper imbalance in power of the global food economy.

It is important to note that not all rejections are the result of supermarket malpractice. There are of course numerous legitimate reasons why food might be rejected and not paid for. These are generally the result of problems caused by technological or human error such as break downs in the cold chain, or phytosanitary issues caused by an overapplication of pesticides. These issues, which related to food losses, rather than waste (see definitions in introduction), can be minimised but never 100% eliminated from food supply chains. Many experts, particularly the surveyors and inspectors that Feedback spoke to, were at pains to stress that some rejections are legitimate and gave convincing examples of where they are both sensible and justified.

THE SEASONALITY OF REJECTIONS

There is a further interesting nature to these rejections, which relates to the observable seasonality to rejections throughout the year. When produce does not meet standards but global supply is low, or demand is high, supermarkets are reported to become more flexible with their outgrading and rejections. The inconsistent application of cosmetic specifications was a phenomenon expressed through many of the independent interviews and field trips conducted through the course of this research.

Generally, supermarkets have blamed consumers for the existence of cosmetic specifications (Asthana, 2013; Fernandez 2015). Yet supermarkets sell produce of a wide and varying diversity when they have to, due to a global scarcity of particular food. This leniency must, in terms of food waste, be seen as a positive thing in the short term for the global food system, and Feedback encourages supermarkets and other final purchasers to continue to be sympathetic when harvests are affected by adverse weather conditions. However, cosmetic specifications must be seen for their true nature, not only as a means by which supermarkets maintain high standards, but also as a tool that is part of a ferociously competitive battle for market share and profit margins.

“

It's evident that supermarkets reject food when they have undersold a product - this is well-known behaviour within the sector. and at times of year, when they need the stock, they will be less scrupulous and reject less. This is totally inconsistent and, as we know from inspections, not related to the quality of the product itself. We know it is to do with supply and demand.

”

European fresh produce insurer

“

If prices are high then the market will take anything. If they are low due to oversupply, then cosmetics are enforced.

”

Peruvian onion producer

Whilst consumer behaviours must change with regards to food waste, Feedback's research in consumer waste initiatives indicates that the industry can drive education and change through the relaxation of cosmetic specifications rather than using consumers as a scapegoat for waste. Some companies are leading the way with this re-education of consumers. A vegetable box delivery business was interviewed for this research that buys lemons that are rejected by supermarkets and puts them in their veg boxes with a note explaining how hail damage and light/moisture conditions can affect the skin, but won't affect taste.

Case Studies: The ugly truth of cosmetic standards

BUTTERNUT SQUASH - SOUTH AFRICA

Feedback obtained documented evidence of over 1,600 South African butternut squashes being rejected by a British fresh produce importer who supplies the UK's major retailers. The document shines a light on several key problems with cosmetic specifications.

The expected quantity of butternut squash to be delivered was 1,500, yet the document also states that the importer expected a yield of 70%, i.e. making an assumption that not all of the product will be suitable for selling prior to delivery. Despite this assumption, the importer rejected the entire shipment of butternut squash, on the grounds that 30% of the shipment had minor mechanical damage to the skin (scarring), and 7% of the produce was overweight (the heaviest recorded squash was 2% over the expected weight). The photographic evidence supplied with the rejection is limited and shows a number of small samples of product. In total 36% of the shipment was deemed unsuitable for sale due to cosmetic specifications despite the eating quality of the shipment being described by the importer as 'true to form'.

Arguably, the 'unsellable' fruit could have been sold had the cosmetic specifications of the final buyer been relaxed. Yet even if these cosmetic specifications had remained unchanged, the remaining 64% (over 1,000 squashes) could have been sold and eaten by people. Instead the entire shipment was wasted and the exporter was not paid for the produce. The exporter believes rejections like these are spurious, and that there is little to no way for suppliers to challenge the evidence provided.

An accompanying document to this rejection explains the agreement held between the importer and exporter. In this document a target yield of 97% was expected by the importer, meaning that any deliveries under this yield would receive an immediate rejection of the entire shipment. Another document showed a case where 2.5% of the shipment had been deemed unsellable and so it had been accepted.

In these types of situations, the importer does not return the food to the exporter. It is possible that the importer could illegally sell the product to secondary markets without reimbursing the exporter – indeed, some exporters have suspicions that this happens – but it is beyond the scope of this report to estimate the extent to which this occurs.

PRODUCER, EUROPEAN PORT

A European producer told Feedback how they were considering stopping all business with the UK market due to stringent cosmetic specifications and unfair dealings on the part of British supermarkets (see quote on the right).



The supermarkets put up a lot of reasons for rejecting produce in their specifications – more than they ever intend to hold you to account for under normal conditions - meaning essentially that it's always their decision whether to let food through and to accept some flaws...Imagine a supermarket will say it wants 10,000 packets of strawberries. On Monday and Tuesday the food is accepted. On Wednesday the food is rejected. When produce is not selling well – perhaps it's been raining and nobody is buying strawberries – the supermarket rejects the consignment, but there is no difference in the actual strawberries. Believe me, I have seen it happen time and time again...

It is totally illogical that two identical products can be rejected and accepted on different days; but it's naïve to assume there's any logic or fairness to the system at all; it's all to do with the buyer behaviour and supply and demand. It has nothing to do with the actual product. Once we realised this we made business decisions accordingly.

After 2014 the UK market has been minimised because there is no money to be made anymore and the company is sick of rejections. We are now thinking about stopping business with UK supermarkets completely. They are ... by far the worst customers. Luckily we do not rely too heavily on their business and have worked to reduce this reliance, and now we can survive without them. I fear for businesses that don't have this option.



European producer

The producer explained how the inconsistent application of cosmetic specifications led to internal problems within the business between the commercial and production teams. Similar concerns have been expressed by exporters, who suggest that when they receive order cancellations, the farmers who supply them are suspicious that they are withholding payment.

Price Volatility

For a producer to harvest, package and transport the food they have grown, the price offered to them must provide an adequate margin to justify the costs of inputs to their operation. This is particularly pertinent to producers of fresh produce due to the highly perishable nature of unprocessed fruit and vegetables. Unlike storable commodities, such as cereals or coffee, fruit and vegetables have limited periods of time in which their optimum value can be realized. Where the price offered for food is below the cost of production, producers are often forced to leave their produce in the field or at best use it for livestock feed.

Producers generally plan to grow crops that they believe will offer a good return for them either in a given year (for annual crops) or over a sustained period of time (for perennials). However, in order to plan for a given production period, the producer requires information in order to calculate the relative costs, risks and predicted revenue from different types of crops present. This information can be obtained from three primary sources: contracts; forecasts from buyers; or industry forecasts from the open market. Each of these sources have varying levels of risk, with contracts that offer guaranteed prices and volumes providing greater security to producers than non-binding forecasts, or speculations on the open market.

CONTRACTS

Contracts offer producers varying degrees of security depending on the terms agreed relating to expected price and volume of orders. In the best case scenario, a minimum price and volume is guaranteed by the purchaser, thereby minimising the need for producers to second-guess the amount of food they need to grow and therefore preventing unnecessary overproduction. Producers operating with this degree of certainty report not only reduced levels of food waste as a result of greater efficiency in their business, but also better, more equitable, trading relations in general.

Suppliers who were able to negotiate minimum guaranteed prices or fixed prices on a seasonal basis were able to avoid the risks presented by price volatility. Minimum guaranteed prices were seen as favourable to fixed prices as they allowed suppliers to obtain higher prices or greater volumes at opportune moments in the growing season whilst still being protected from prices falling below the cost of production.

Although both of these contractual mechanisms increase certainty of price per unit, they do not guarantee total end prices or total ordered volumes. Some suppliers complained that although these mechanisms meant that they could budget their expected income with more certainty, they may face variable order volumes throughout the year leading to lower overall income. Minimum guaranteed or fixed prices should therefore be accompanied with accurate and guaranteed purchase forecasting to ensure suppliers can budget and manage production effectively. Where contracts do not contain such terms of certainty producers are at risk to overproduce as a means of insurance against potential risk.

BUYER FORECASTS

Forecasts provided by buyers often exist separately to contracts and act simply as guidance for suppliers. They do not offer any guarantee of final purchase price or volume but are based upon estimates that might be dependent on a number of variables such as season, weather, major cultural events etc. Due to the nature of these variables, forecasts are subject to change. Therefore, without minimum guaranteed prices and volumes suppliers are left vulnerable without any guaranteed sales agreement.

CASE STUDY: THROW-AWAY PRICES (YELLOW ONIONS, PERU)

Two suppliers of yellow onions interviewed by Feedback both claimed to have been forced to bury entire harvests of onions in the ground as a result of falling prices.

One supplier, who both produced and exported onions, reported that price volatility led to cases where it wasn't economically feasible to harvest their onions. In some cases, prices would change during the growing season, despite prices being negotiated at the beginning of the season between the buyer and the supplier, as reported by the supplier: "Prices can change at the last moment and there is nothing you can do. Some years the price is so low it is not worth harvesting."

The other supplier, who only exported onions, experienced similar issues and in 2014 was forced to tell the producers who supplied him to plough their onions back into the field because the price was too low. They argued that at the time "it was cheaper to make compost out of the onions than to harvest them for export", demonstrating how the price offered was below the cost of production and processing.

Price volatility does allow suppliers to receive higher prices for their produce when global supply is low. However, this supplier reported that after a season that has experienced high prices for onions, many new entrant producers are attracted to the market and grow onions the following year to try and obtain the same price. This led to overproduction, low prices, and high wastage rates across the industry.

INDUSTRY FORECASTS

Without sufficient shared industry knowledge between growers, there is a risk of price deflation and increased wastage as a result of overproduction. Such instability and uncertainty presents increased risks for producers, which are not shared by other stakeholders in the supply chain such as importers and retailers.

Price volatility is not intrinsically bad; prices are valuable signals of scarcity and glut. However, price volatility risk could be spread across the supply chain. Ensuring guaranteed minimum prices and volumes through contracts is one tool to achieve this.

Buyer culture and incentives

An issue within the food sector that has not been properly explored to date is buyer culture and incentives. Bonuses and incentive structures played an important role in the collapse of housing sector in 2007/2008. Bonus arrangements led bankers to offer and sell mortgages to customers with very risky credit profiles.

Risk within the housing mortgage market increased until the risk concentration led to a financial crisis, sending ripples out into the wider global economy and causing years of global economic recession.

Within the buying departments of supermarkets, the same sort of behaviours can be seen, and this research begins to unravel the effect of perverse and damaging bonus cultures. For example, according to a former supermarket warehouse employee, it is common practice for buying departments to deliberately overstock warehouses, as purchasers are incentivised by the frequency of transactions they conduct rather than the quality of the final sale. The warehouses in turn shift this product onto stores to alleviate the pressure internally, meaning that supermarket stores have more food than they will be able to sell. Examples were given of supermarket stores not properly managing stock due to lack of space, meaning that food was wasted. In these cases, the cost of the wasted produce was reported to be pushed back on the suppliers, as a 'higher level of product returns/refunds from dissatisfied customers'.

Another example of malpractice was given, this time with attention to distribution centre managers. These staff members are reported to abuse their 'gate keeper' power at supermarket distribution centre, with those delivering the food often feeling the brunt of their actions. Managers can choose whether or not food is accepted at the point of delivery and often entire shipments of food can be rejected for being a few minutes late or for other similarly unreasonable issues. The case study that follows about a shipment of raspberries that were rejected for this reason shows how this practice can lead to food waste when exercised on perishable products. The waste of this produce would be paid for by the supplier with no compensation.

A former distribution centre manager confirmed the normality of these problems and listed other ways that his distribution centres reject stock in order to balance budget and space constraints:

“

If your budget is short then you fill all of your loading spaces with your own stock. You then claim a temperature control issue and the supplier loses out. We would deliberately block loading space to get money back into our budget. You could perhaps save an extra £20,000 by rejecting a load, and this could make all the difference on a tight week.

”

Former distribution centre manager

A former supermarket stock manager echoed the ways in which supermarkets transfer the cost of waste back onto their suppliers:

“

You'd think, once the supermarket realised the level of complaints and losses due to returns, they'd do something about the issues. But no, because the complaints credits go back to the suppliers and they bear the brunt of the cost or the loss. So, we the supermarket, do everything wrong, and then we push the costs back and we underreport the waste. It's sickening really

”

Former supermarket stock manager

This interviewee also described the way in which the culture in supermarket stores was not conducive to efforts to reduce food waste. He explained how the store he managed would routinely throw out over thirty skips of food per week, at a value of around £3,000-£4,000. He argued, however, that this value was inaccurate, as it reflected the final price, which was often heavily discounted instore. Had the actual value of the food been recorded, he suggested that it would be over £30,000 per week. On particularly bad weeks, they would store discarded food to keep the records in line with their internal key performance indicators, instead binning on a week when they were doing better. The working culture of supermarkets, and the way in which buying departments are incentivised to over-purchase food, is a relatively new area of research and requires further study. Nonetheless, this research shows how there are several fundamental practices and norms built into the operations of supermarkets that breed inefficiencies in the supply chain, leading to food waste, pushing excessive risk onto suppliers, and causing economic loss.



CASE STUDY: DRACONIAN DELIVERY SCHEDULES (RASPBERRIES, UK)

An employee from a logistics company involved in the transportation of fresh produce to supermarket depots discussed their experience of food waste and rejections. The individual mentioned many examples of food being rejected due to missing delivery windows by a matter of minutes. The employee expressed suspicion that inconsistent acceptance and rejection of produce due to late arrival was due to stock and warehouse management logistics.

“You wouldn’t believe the things that happen. You can be there bang on time and they keep you there for three to four hours. But, if you’re two minutes after your slot, they’ll send you away. Morrisons, Sainsbury’s, Tesco’s, Asda they are all terrible.

Either the haulage firm has to pay another local delivery firm to redeliver at a rebooked slot, or it has to be returned to the supplier. And the food miles that stem from all this silliness, well, I dread to think.

We’ve had Scottish raspberries going down to Kent that had missed their slot by less than an hour. And so they sent it all away. And by the time the producer had found another buyer the produce did not have enough shelf life left and had to be thrown away.

With some of these missed slots, it’s just a tiny inconvenience, but because there’s so much power there they can do what they want. I understand it’s annoying for depot managers, but there must be a way to resolve this...

I can think, off the top of my head, of a soft fruit producer with four claims on this at least in the last six months, where they’ve just missed the slot.

”

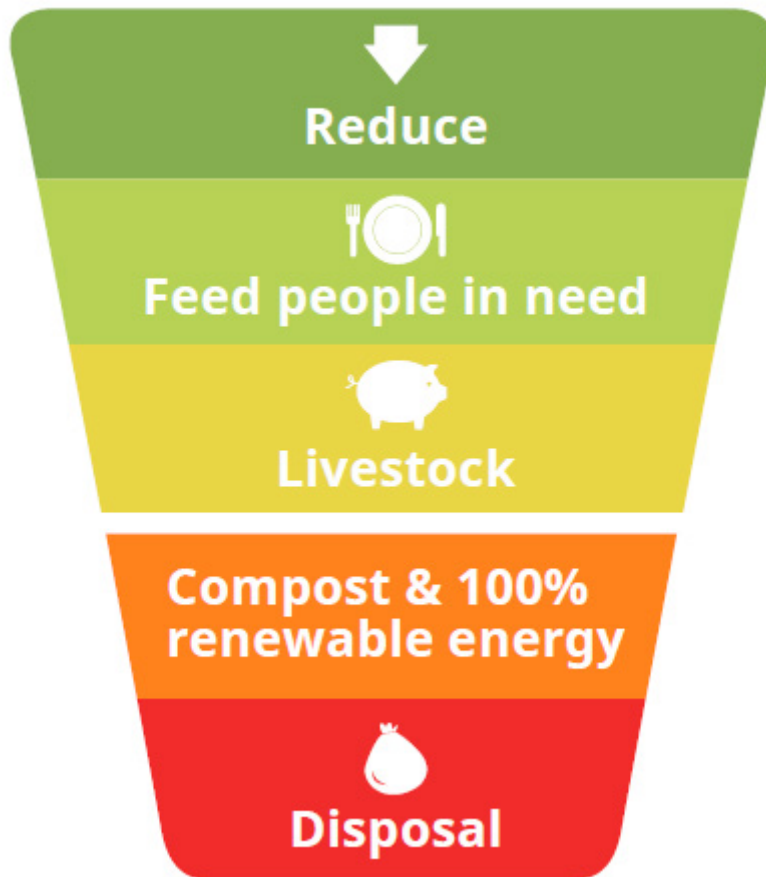
Employee from a logistics company involved in the transportation of fresh produce to supermarket depots



Surplus strawberries harvested by Feedback's Gleaning Network in the UK

FOOD WASTE DESTINATIONS

Whilst Feedback believes food waste (as opposed to food loss) is never justified and must be eliminated or minimised, the redistribution of surplus food is an essential fall back mechanism for the current global food system. Feedback's food waste pyramid outlines a model for redistribution of perfectly edible food.



This research found that food rejected by supermarkets sometimes goes to secondary markets, such as wholesale fruit and vegetable markets or catering. Although produce is sold for a fraction of the previous value, costs can often be recovered or losses minimised. Furthermore, from a food waste perspective, food that would otherwise be thrown away is not lost from the system. However, Feedback's research found barriers that prevent food from being effectively remarketed in this way.

One reason was that supermarkets exerted their power to block the salvage of surplus produce. They did this for two reasons, according to the suppliers interviewed. Firstly, branded packaging was deemed unsuitable for salvage due to concerns over brand reputation on behalf of the supermarket. Secondly, pre-existing exclusivity clauses within contracts prevented the resale of any food that a supermarket no longer wanted, despite no compensation being provided for the lost sales.

In other cases, there was no possibility of food finding secondary markets due to the short shelf life of the product, so the food went to animal feed, anaerobic digestion, compost or landfill (see case study on raspberries above).

Feedback's research found that much of the rejected food supermarkets do not want ends up being sent to anaerobic digestion (AD) plants. The AD industry certainly has a place within the food waste hierarchy, but it is currently supported by perverse incentives which mean it can be cheaper to waste food via AD than it is to send surplus food to charities or secondary markets.

WHOLESALE MARKETS

Often, rejected food, which is perfectly edible and has the same nutritional value as food that makes it onto supermarket shelves, is sold to a secondary market. This could be a wholesale market or a large catering company. The price on these markets is significantly lower than the expected price from the retailer and this economic loss is usually passed back up the supply chain to producers. A significant amount of the wholesale and day market produce is from rejections. One European importer argued that the supermarkets reject so much food that secondary markets become saturated with cheap produce.

ANAEROBIC DIGESTION

Anaerobic digestion (AD) has emerged as a key mode of waste management, but its impact is complicated. It has been upheld as a waste solution due to its dual benefits of diverting food waste away from landfill and producing renewable energy. Governments have promoted this technology across Europe in a rush to create greener economies and jobs.

However, rather than reducing food waste, AD has exacerbated the inefficiency of our food chain by absorbing food that could be redistributed to secondary markets, charities or animal feed. The effect of this is that perfectly edible food is sent to giant dustbins where it is crushed and turned into energy. The environmental credentials of this industry are highly dubious, as food grown and then transported across the world to provide fuel has a huge carbon footprint before AD processes and its own carbon footprint are even factored in.

During this research project, Feedback visited an AD plant located next to importers and warehouses at a European port, which processes fresh fruit and vegetables with a market value of hundreds of thousands of pounds every single day. All of the waste processed in this facility was supply chain waste and came from the importers and warehouses at the port. To give an impression of the scale of waste in one warehouse visited by Feedback, the following list of food was present at the AD plant on the day of the visit:

- 500kg broccoli (unknown origin)
- 500kg British celery
- 400 pineapples (unknown origin)
- 4 tonnes of cranberries (unknown origin)
- 600kg spinach leaves (unknown origin)
- 200 boxes of Peruvian asparagus (approximately 7,500 asparagus spears)
- 10,000 figs (unknown origin)
- 1 tonne of satsumas and 2 tonnes of oranges (unknown origin)
- 25 tonnes of grapes from Greece, Macedonia, India, South Africa

- 500kg yellow plums (unknown origin)
- 200 romaine lettuces (unknown origin) 60,000 Spanish cucumbers
- 6,000 boxes of Columbian physalis
- 4,000 cabbages (unknown origin)
- 1 tonne of carrots (unknown origin)
- 1 tonne of tomatoes (unknown origin)
- 800 iceberg lettuces (unknown origin)
- 300 125g punnets of rocket (unknown origin)

At full staff capacity, the AD facility would process all of this food in one morning. This gives some sense of the scale of food waste being processed by the plant over the course of a month or a year.



FOOD WASTE SOLUTIONS

The following subsections describe practical solutions that are already being used by some stakeholders in the international food system. Each of these solutions were championed by the respective research participant as ways in which suppliers are able to minimise wasted food. Nonetheless, suppliers interviewed believed that addressing the root cause of the problem of waste, i.e. cosmetic specifications, price volatility, and rejections, would be preferential and would ensure the risk and responsibility of food waste is shared across the supply chain.

THIRD-PARTY PRODUCE INSPECTORS OR SURVEYORS

Order cancellations and spurious rejection claims were generally not experienced by suppliers interviewed in Peru as many businesses employed third-party agents to inspect produce upon arrival in the destined country. The use of these agents mean that importers cannot make false claims relating to product quality as all claims are subject to validation.

Whilst the use of agents means there is a lower prevalence of order cancellations and spurious rejection claims, the cost of these actors is paid for by the exporter alone. Suppliers agreed that effective legislative measures to prevent these unfair trading practices would be preferable to the cost of employing third-party agents. Producers in Senegal, for example, argued that many were unable to afford agents so they never questioned rejections, even if they didn't trust the claim. In the UK, a levy on supermarkets covers the budget of the government-appointed groceries code adjudicator. This system and similar structures such as tax-funded regulators are possible alternative to producers and exporters paying for agents to inspect produce post-import.

MINIMUM OR FIXED PRICE AGREEMENTS

Suppliers who are able to negotiate minimum guaranteed prices or fixed prices on a seasonal basis are able to avoid the risks presented by price volatility. Minimum guaranteed prices were seen as favorable to suppliers as it allowed them to obtain higher prices at opportune moments in the growing season whilst still being protected from prices falling below the cost of production.

Although both of these contractual mechanisms increase certainty of price per unit, they do not guarantee total end prices or total ordered volumes. Some suppliers complained that although these mechanisms meant that they could budget their expected income with more certainty, they may face variable order volumes throughout the year leading to lower overall income. Minimum guaranteed or fixed prices should therefore be accompanied with accurate and guaranteed purchase forecasting to ensure suppliers can budget and manage production effectively.

DIVERSIFICATION OF MARKETS

Suppliers who did not experience food waste in their operations attributed their success to having built a wide range of clients with varying product requirements. Rather than supplying just one client, and therefore being dependent on these purchasers to operate fairly, these suppliers are able to operate with great bargaining power across a range of market. In Peru, this business model has led to a low prevalence of order cancellations and spurious rejection claims, as suppliers are able to simply stop working with problematic clients and find other outlets for their produce. In South Africa, a citrus and stone fruit grower reported to have built other markets in the Middle East to absorb what surplus the export market generated.

“

If higher specification markets don't take the volume it gets shipped to other markets at lower prices or eventually ends up on the local market. The local market can mean local retailers, street hawkers, juice, etc. *(Citrus, grape, pome, stone fruit grower and exporter)*

”

“

In general citrus is either exported (if it makes the cut), sold on the local market, sold to informal markets...or is processed (juiced or citrus oils). Waste citrus is also used as an animal feed. *(Citrus grower and exporter)*

”

“

We sell whole butternut to the UK market. If it can't be used because of size for example, we use it in the SA [South Africa] market. We have our own pack house and process it – cut, slice and dice – for the local market. This is value add on for us. *(Butternut grower, processor and exporter)*

”

Development of secondary markets

In addition to diversified primary markets, access to secondary markets was identified as a key solution to preventing surplus produce being wasted as result of not meeting the specifications of the export market.

In South Africa, there exists a highly sophisticated and layered market that enables producers to sell surplus produce to range of secondary markets (see quotes below). In Peru, secondary markets are available for products like avocados and grapes (raisins), and in some cases asparagus as well. However, there is a need to develop such markets for other products, especially citrus fruits and onions. Similarly, in Senegal, where 65% of mangos are currently lost or wasted, there is a strong need for secondary markets to transform this fruit into value-added products.

CASE STUDY: SECONDARY MARKETS IN SOUTH AFRICA

South Africa has a sophisticated and embedded 'layering' of market options should product originally intended for the UK and US export market not meet specifications. The following quotes are from South African growers and exporters and describe the many different secondary markets available to absorb surplus produce from the market:

“

Watermelons that don't meet the specifications e.g. size or shape, are chopped up and used in fruit salads for M&S and Tesco. *(Watermelon grower)*

”



“

The avo is the farmer's best friend as they can make the most of the fruit, such as guacamole and oils. The skin might not look 100% but the avo inside is perfect. *(Avocado grower and exporter).*

”

CONCLUSIONS AND RECOMMENDATIONS

The hypothesis at the beginning of this report was that:

'An overwhelming concentration of power at the buyer end of the food system causes an inefficiently high level of food waste. Supermarkets' market power enables them to put pressure on suppliers and intermediaries to bend to frequently changing demands and requirements. A lack of sufficient oversight and regulation to tackle this market failure allows supermarkets to dictate the terms of business, thereby transferring risks and costs up the supply chain.'

This report indicates the veracity of this hypothesis. It has highlighted the way in which suppliers are unable to challenge unfair trading behaviour, such as spurious rejections, conducted by retailers. This hypothesis has been further developed to show how this behaviour at the retail stage can be transferred via intermediaries back up to the production stage of the supply chain, thus presenting a notion of concentric circles of power emanating from supermarkets. There exist multiple 'gates' which food must pass through from farm to fork, and at each of these gates there is an actor that plays the role of gate-keeper and can ultimately decide if food will be wasted. The cost of this waste is always borne by the supplier and never by the purchasers, whether a retailer or intermediary actor.

Food waste is a symptom of underlying structural issues in the supply chain that relate to an imbalance in power. Food waste exists in these supply chains because the cost of waste disposal, alongside any sales loss, does not impact substantially on profitability, and is cheaper than redistribution to secondary markets or charities. Legal frameworks are either not in place or not enforced to prevent unnecessary food waste.

Whilst the current food system may be working to the benefit of a concentrated set of actors in the supply chain, in the long run the systemic power imbalances and associated inefficiencies will pose a threat to food security and will lead to the decline of innovation and investment in small and medium food enterprises. This will ultimately impact consumers, with higher food prices and reduced choice.

Based upon the findings of this report, Feedback make the following recommendations:

Cosmetic specifications

The application of cosmetic specifications to food products encourages the overproduction of food so that suppliers can meet the strict size, shape and colour criteria for sale to supermarkets. Suppliers fear undersupplying so will routinely produce, or procure, more food than they intend to sell to make sure they are not short. This oversupply has become normalised in the food system and is a major cause of unnecessary land, water, and fossil fuel usage.

Cosmetic specifications are determined by retailers who therefore set the industry standard for the expected shape, size and colour of different produce. As such, it is supermarkets who have the power to change these specifications in order to reduce waste.

Recommendation: Supermarkets should relax their cosmetic specifications within their existing supply chains to ensure the maximum amount of food grown for them is valorised and fed to people.

There are several ways supermarkets could do this. They could relax cosmetic standards

unilaterally; some supermarkets have begun trialling 'imperfect' produce as a separate category. Supermarkets could also work within an industry group to relax cosmetic standards in concert.

In addition to this normalised level of waste, this report shows how cosmetic specifications are used to reject shipments and deliveries of food at various stages of the supply chain. When food is rejected like this, little to no evidence is provided to show why the product has been rejected or destroyed. As the South African butternut squash case study on page 8 demonstrated, exporters oversupply orders to ensure that they meet the minimum requirement of importers. Cosmetic specifications are reported to be enforced and relaxed throughout the year by importers and retailers as a buffer to artificially control the amount of food entering the market during periods of oversupply and scarcity. Some suppliers have prevented these issues from arising by using third-party inspectors. However, for many, this is not an option due to the cost of these agents. Furthermore, even businesses that employ inspectors are sometimes unable to challenge unfair claims due to the fear of losing future business, as was shown by the case of the insurance company described in the section on unfair trading practices, rejections, and inconsistently applied cosmetic specifications.

Recommendation: A standard practice should be developed by the fresh produce industry to prevent the spurious use of cosmetic specifications to reject food.

This best practice should define the type and quality of evidence provided by purchasers for rejecting food to reduce the prevalence of claims based on false or inadequate evidence. The practice should lay out clear reporting requirements and should set maximum time periods in which food can be rejected, and evidence can be shared with suppliers. This practice should be developed by a multi-stakeholder platform with representatives from across the supply chain.

The use of cosmetic specifications as a front for changes in demand is not currently seen as a form of 'unfair trading practice' (UTP) where voluntary (Europe) and legislative (United Kingdom) measures are in place to prevent these practices. The UK's system relies on a government appointee to adjudicate the groceries code, which covers conduct between retailers and their suppliers. Europe's voluntary system also covers conduct between retailers and suppliers. In both systems, cosmetic specifications present a loophole through which supermarkets and other purchasers can transfer risk back up the supply chain.

Recommendation: The use of cosmetic specifications as a means to reject food due to changes in demand should be considered an unfair trading practice by voluntary and legislative prevention mechanisms such as the UK's Groceries Supply Code of Practice (GSCOP) and the EU Supply Chain Initiative (SCI).

Minimum price guarantees

Price volatility was an issue experienced by suppliers exporting produce on the open market. In contrast, suppliers operating with minimum guaranteed prices were not affected by price decreases leading to food waste.

Minimum price guarantees should be promoted and supported across the supply chain to reduce food waste and increase certainty for suppliers. Price volatility generates additional risks and costs that are borne entirely by the supplier. Minimum guaranteed are a way in which this risk is shared by the purchaser and the supplier.

Recommendation: Supermarkets should ensure minimum guaranteed prices are offered throughout their supply chain, even between indirect suppliers.

Investment in secondary markets

Where there is currently food being wasted, secondary markets must be established and developed to ensure the full potential of crops is valorised. There is need for this in both Peru and Senegal.

Peru: There are no industrial markets for surplus produce of onions and squash in Peru. Suppliers noted that if there were processors who could produce dried, powdered or pureed products from their onions and squash this would allow them to recuperate some of the costs incurred growing food that could not otherwise be sold. Similarly, the citrus fruit suppliers interviewed suggested that the development of a juicing industry could absorb consistent levels of surplus fruit production. Such an industry would benefit suppliers with consistent levels of income and would ensure food is not wasted because of poor storage. The juicing industry that does exist only uses particular varieties of citrus fruit that differ from those which are exported as whole fruit.

Senegal: Senegal provides a strong investment opportunity for the development of value-added processing facilities in the mango sector. Senegalese entrepreneurs need to develop business models for the transformation of surplus mangos into different value-added products. Investment will be required for these businesses to be realised for both large industrial facilities as well as smaller-scale or mobile processing machinery.

Recommendation: Further research should be conducted to assess the feasibility of potential business models for processing facilities in Senegal and Peru.

Implementation of the food waste hierarchy into policy and business practice

The food waste hierarchy is widely recognised as a practical means of prioritising different waste prevention and waste management processes, yet its effective uptake and implementation is currently limited. Anaerobic digestion currently receives disproportionate attention and subsidies as a means for managing waste, which has meant that the redistribution of food to humans and livestock has been deprioritised. Anaerobic digestion should only be used for unavoidable waste that is not fit for consumption by humans or livestock.

Recommendation: Food businesses should manage their surplus food and waste in line with the food waste hierarchy to maximise the amount of food kept within the food chain. All surplus food should be made available to charities before being sent to animal feed where possible.

Recommendation: Governments should ensure that the food waste hierarchy is adopted in food waste related policies to support the prevention of avoidable food waste and redistribution of surplus food to people. Policies that support food waste being sent to anaerobic digestion should be reviewed to ensure that they do not create perverse incentives that reduce the amount of food available for uses higher up on the hierarchy.

Measurement and transparency of food waste

This report has reaffirmed the importance of tackling food waste that arises between the production and retail stages of the supply chain. It has also confirmed the scarcity of food waste data in this section of the supply chain as a major barrier to effectively tackling this issue. Increasing the availability of data will not only hold food businesses to account on the environmental impact of their operations, but will also enable them to track and promote progress when implementing waste reduction initiatives.

Recommendation: All large food businesses should publicly report data on the amount of food waste that arises in their supply chains on an annual basis.

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