COUNTING WHAT MATTERS

THE REPORT OF THE
INDUSTRY FOOD WASTE AUDIT PROPOSAL

THIS IS RUBBISH

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Industry Food Waste Audit Proposal

ABOUT THIS IS RUBBISH

This is Rubbish (TiR) is a food waste campaign that communicates the preventable scale of food wasted in the UK through policy research and community- and arts-led public events. Formed in 2009 by volunteers and launched at the first Feeding the 5000 in 2009, TiR has an extensive portfolio of successful events throughout England and Wales. Since being established, TiR has been awarded project grants by the People's Millions (2010) for the delivery of the 2011 Feast tour and the Esmee Fairbairn Foundation (2012) for The Industry Food Waste Audit Proposal (IFWAP).

Between 2009 and 2011, TiR focused on public-facing campaigning, raising awareness about the social and environmental costs of food waste and calling for the introduction of an industry-wide mandatory food waste audit (MFWA). This was done through the delivery of an eight-date food waste tour entitled Feast. While on tour delivering the Feast project (2011–2012) questions were raised by food policy experts and the public about the feasibility and political likelihood of the introduction of MFWAs. Subsequently, TiR developed IFWAP, working directly with industry, policy experts and lobbyists to gain insight into the likelihood of the introduction of a MFWA.

TiR is a Community Interest Company, a type of limited company that aims to trade with a social purpose ('social enterprise'), or to carry on other activities for the benefit of the community. The company is governed by six directors and numerous members.

For more information about TiR visit www.thisisrubbish.org.uk

THE INDUSTRY FOOD WASTE AUDIT PROPOSAL (IFWAP)

IFWAP is a six-month pilot research project examining the feasibility of the introduction of an industry-wide MFWA. By conducting a pilot research project, we hope to demonstrate the need for a more in-depth research project, examining industry, policy, academic and public perceptions towards the introduction of a MFWA on a national scale. A more detailed project will build on the findings of this report to gather primary data from a larger sample and will include the catering industry, alongside those from other sectors involved with waste disposal. Further funding will enable an expanded literature review on the history of industry audits and further research into the policy background surrounding the issue of regulatory intervention of the UK food industry.

TO AUDIT OR NOT TO AUDIT... THAT IS THE QUESTION

Industry Food Waste Audit Proposal

CONTENTS

Glossary

There are many different interpretations of terms used to describe food waste and the tools used to tackle it. Below we detail definitions of the terms we use throughout this report.

Food waste Any food intended for human consumption that is not consumed by humans. This therefore includes food fit for human consumption sent to landfill, incineration or anaerobic digestion, used as animal feed, composted or ploughed back into the ground. This is in line with the UN Food and Agriculture Organisation's (FAO's) definition of food loss *and* waste (2011); however, Stuart (2009) extends his definition to food never intended for human consumption but fit for human consumption, such as much animal feed, and excessive calorific consumption by sectors of the population above their dietary needs.

Maceration Liquidising food before disposal into the waste water system.

Mandatory food waste audit (MFWA) Businesses in the food industry being legally responsible for measuring their food waste at regular intervals and reporting this to an external body.

Whole supply chain approach Businesses working throughout their whole supply chain when conducting MFWA.

Ecological modernism The idea that economic growth could 'decouple' from environmental degradation as business has its own incentive to become 'greener': improving efficiency and therefore engendering profits in the longer term (Mol and Sonnenfeld, 2000; Gibbs, 2006; Jänicke, 2008).

Step-change A significant policy shift resulting in marked improvements in performance. With regards to food waste prevention, we feel that action to date has only had incremental effects.

Beyond Business as Usual The idea that new business models need to be mainstreamed, valuing environmental resources and human wellbeing as well as their profits. Beyond Business as Usual can be described as a business that is 'commercially successful while providing social value within the limits of the planet' (FEC, 2013).

Image: Carrot and bean pate, made from food waste, served at This is Rubbish feast event Dining Down to Earth

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Executive Summary

Industry Food Waste Audit Proposal (IFWAP) sets out to measure perceived opportunities and barriers to the introduction of an industry-wide Mandatory Food Waste Audit (MFWA). A MFWA has been proposed by This is Rubbish (TiR), following informal policy debates with industry and policy stakeholders, as a potential policy strategy to address the huge food waste problem we face.

The last ten years have seen a growing awareness of the vast amounts of food wasted, globally and in the UK, and the associated social and environmental impacts of this waste. It's estimated that globally we waste between 30–50% of food (Foresight, 2011a) and it seems clear that we must take drastic action on food waste if we are to tackle the associated problems of climate change, water, land and fossil fuel use, hunger, and food price shocks.

In Europe and the UK it's been estimated that over half of food waste stems from food supply chains, from production to retail (FAO, 2011; Defra, 2010a), yet there is much less data on industry food waste than on household and there are significant problems with the lack of transparency in industry food waste (Stuart, 2009). Three recent reports by the Waste & Resources Action Programme (WRAP), aiming to plug these data gaps across commodity supply chains, encountered problems in accessing existing data, highlighting gaps in data as a limiting factor in quantification (WRAP, 2011a, 2011b, 2011c).

In the UK we have seen the issue of food waste gaining prominence with an increasing desire across industry, multiple levels of government and civil society to act and to be seen acting. However, there are a number of key policy trends which have seen progress to date held back from the step change we need to see. These include:

- A stronger emphasis on consumer food waste than pre-consumer food waste
- A focus on reducing food waste to landfill rather than preventing its creation in the first place
- A preference for voluntary responsibility deals over mandatory regulation reflecting neo-liberal politics and a narrative that drives for business efficiency, without government interference, will result in the levels of change we need to see

At the European level there has historically been more of a tendency towards regulation with regards to waste, and in the last few years mandatory reporting of food waste has been on the agenda, suggesting that this could become a driver for increased action in the UK and other member states.

Given these trends and the scale of the food waste problem, TiR's past campaign work led to a suggestion that a legal requirement on businesses to audit their food waste could be the first step in stronger policy intervention on food waste. It was felt that audits could improve management of and action to prevent food waste, improve industry-wide data, serve as a driver for more ambitious industry-wide action, enable other policies such as food waste reduction targets or public disclosure of food waste data, and be part of a necessary shift to action on industry food waste. This rationale, informed by informal policy discussions with industry and policy makers, led TiR to instigate this research in order to consider MFWA as a possible strategy to address the scale of the food waste problem.

Mandatory audits could take many forms. In our interviews, we left the precise definition of a MFWA open, specifying only that it would involve the food industry being legally responsible for measuring their food waste at regular intervals and reporting this to an external body. This research set out to gather opinions from across the supply chain on the feasibility of a MFWA, in particular examining perceived barriers to such a policy shift. Background reviews of other examples of audit shaped our research, leading us to focus on barriers involving resources, attitudes and culture, internal communication and practicalities, in addition to external factors relating to supply chains, such as markets, supply chain dynamics, existing regulation and government support.

Research consisted of semi-structured interviews with 20 interviewees. Interviewees represented small and large businesses from across food supply chains (primary production to retail) in the South East of England and policy experts from outside the food industry. Interview transcripts were coded and analysed to draw a picture of the different debates and narratives relating to MFWA.

A SUMMARY OF FINDINGS

The value of audit in increasing efficiency was commonly accepted and much more widely cited as a benefit than expressions about the intrinsic value of sustainable actions or audit's ability to attract customers. However, many businesses were not currently auditing and the majority perceived barriers to audits to be related to costs and businesses' capacity to subsume these. The perceived costs depended greatly on how simple or onerous an audit would be. These observations raise two questions:

- Firstly, how successful may current cost motivations be in bringing about the incentive to reduce food waste and thus to audit?
- Secondly, should and how can businesses with fewer resources or less incentive to audit be encouraged to audit?

Asking interviewees about perceptions of voluntary vs. mandatory food waste audit systems revealed a great diversity in views. A common narrative was that voluntary approaches were more appropriate, gaining business buy-in, which would yield better results from the businesses that opt in. There was, however, a counter-narrative that highlighted the weaknesses of voluntary schemes. The most damning of these, coming from only a few of our interviewees, was simply that a voluntary approach is not enough; it is not driving the necessary level of change. Interviewees also highlighted the ability of a mandatory approach to cut through deterrents for early movers by creating a level playing field and the benefits of standardisation in creating comparable data. Many of the reasons behind TiR's IFWAP were listed as beneficial outcomes of MFWA, demonstrating support for parts of our wider rationale.

Interrogating the perceived barriers to MFWA suggested that many of our interviewees were not completely opposed to the idea of MFWA, but have concerns, including those about the practicalities and the business impact of increased regulation in an industry that is already heavily legislated. It was also clear that in order to support an effective audit, a range of barriers needed to be further understood and overcome. Some barriers were specific to particular supply chain stages, such as the difficulty of measuring food waste at farm level due to complex input and output systems. Certain retailers also felt that an audit of any kind would detract resources from the development of their zero waste policy.

More generic barriers related to the ease of implementation and cost of an audit, and, significantly, uncertainty over who should shoulder such costs and the responsibility for waste. A set of cultural barriers, informed by a general resistance to further regulation and the negative connotations surrounding anything mandatory, illustrated an industry stance that market efficiencies were the best tool for engendering food waste reductions and, as a part of that, food waste audits. Barriers involving government leadership were based on a view that the current government expressed little interest in tackling industry food waste. Another barrier was that government action was seen by some as dependent on industry buy in and endorsement of MFWA. Independent public reporting was recognised to be a motivational tool to encourage food waste reduction by some among our sample, but there were commonplace concerns surrounding the release of food waste figures arising in businesses due to perceived reputational risk.

When respondents were prompted it became clear that many barriers were perceived as surmountable, provided the audit came in the right format with access given to appropriate tools and resources. In our eyes, barriers outlined in our findings fall into three groups:

- More logistical barriers that respondents identified as surmountable
- Those relating to ideology and perceptions of audit that would be more difficult to tackle
- Those, including lack of government leadership, responsibility for MFWA across the supply chain and concerns surrounding which sections of the supply chain should pay, that are in need of further research

There was a strong feeling from interviewees that the success of a MFWA was dependent upon the form it took. We focus on the characteristics that make a successful MFWA effective, whilst avoiding, as far as possible, features that respondents objected to and overcoming the barriers they identified. These characteristics can be divided into: the definition of food waste, the implementation of audit, the utility of audit and what action a MFWA would require from different businesses. Examining the 'what', 'how', 'why' and 'who' aspects of MFWA, it is clear that there is currently significant uncertainty about certain aspects of a future MFWA. Questions surrounding each of these four points are central issues for future debate, and have only begun to be interrogated in our research.

CONCLUSIONS

Food waste is not an isolated problem, but symptomatic of a food system under strain. Significant structural change is needed in order to tackle the causes of food waste. The key question that needs to be considered is where this change will stem from. Many of our interviewees said that cost was the biggest barrier to conducting a MFWA, while others considered there to be a strong financial case for tackling waste. However, business efficiency incentives must be seen as just one of the many possible instigators of change.

The impetus for change must also come from the government. The government needs to move beyond providing an enabling environment within which businesses and civil society can make progress on sustainability (FEC, 2013) to acknowledging its role in creating policy frameworks that encourage businesses to tackle food waste. Where businesses are not acting urgently or on a large enough scale, more assertive government intervention is needed to address major unsustainable practices in the food industry. At present it seems likely that any regulatory change introduced will be driven from European level rather than nationally: EC and EP reporting requirements and targets currently drive food waste reduction, and their current agenda on industry food waste measuring and reporting is more progressive (EC, 2010).

Bearing in mind the more tentative approach the UK government has hitherto had to the issue, we feel that political citizenship can assist in bringing around the long-term outlook necessary to drive the fundamental changes today's global food system needs. Yet there are fundamental questions around food waste transparency. If citizens (and shareholders) are to act as monitors, they need access to accurate data. Enabling citizens to get involved with wider debate through civic engagement, as opposed to consumer choice, is a powerful way to effect change on an issue generating increasing public concern.

These issues relate to the key question of who takes responsibility for engendering the change needed to prevent food waste. There is a need for a shift in thought on what, and who, the drivers of change will be – including the roles and responsibilities of government and citizens as well as industry. Our data demonstrated a particular central conflict. This was between the preference of government and some sectors of industry for voluntary mechanisms, for some understandable reasons, yet the failure of those mechanisms thus far to deliver meaningful change. Understanding and resolving this, alongside the other key barriers we identified, is key to enabling the prevention of industry wide food waste.

The recommendations below are based on the findings of the IFWAP research project and are deemed to be both realistic and high impact. It is important to reiterate that IFWAP recommendations are separate from TiR's main campaign asks; calling for the introduction of mandatory food waste audits and ambitious food waste reduction targets. We uphold these wider campaign asks, to keep the pressure on government to take action in regulating the food industry. TiR feels that regulatory intervention is an effective approach to bringing around far reaching and fast reductions in industry food waste, and that businesses need to be held to account to act transparently on the issue of reporting and reducing food waste. It is also important to regulate business where change is not happening fast or far enough, as is currently the case with food waste.

RECOMMENDATIONS

Recommendation One: Strengthening existing voluntary agreements
We believe that there are some significant flaws which deem existing voluntary agreements short-term, unambitious, and limited in industry involvement. Yet, with the Courtauld Commitment phase 3 on the horizon we call for the following additions to be made.

- Separate targets for food waste
- Longer-term, stretching targets in line with the European Parliament's target to half food waste by 2025 (EP, 2012)
- A clear pathway for whole supply chain engagement

Given the concerns relating to self-reporting, we feel that systems need to be provided for self-reported data to be independently spot-checked to ensure accuracy and standardisation.

Recommendation Two: Paving the way for regulation if voluntary agreements fail
Having set up more stringent voluntary agreements, the government needs a transparent back-up plan in case industry fails to produce results. This would entail ambitious, long-term food-specific waste prevention targets and mechanisms to encourage industry buy-in to such agreements. If industry cannot drive the level of change required, we feel there is a role for stronger government in the shape of regulation and enforcement.

Recommendation Three: Engaging in debate on the impetus for change
There is a wider debate to be had about the drivers for change in food systems. We feel that there is need for more citizen engagement on these issues, and discussing regulation is a useful way into this debate. With such tools, citizens are equipped to hold all other actors to account for their efforts to improve the food system.

1. Introduction And Background

Inspired by informal discussion with industry and policy stakeholders, This Is Rubbish (TiR) has instigated the Industry Food Waste Audit Proposal (IFWAP) to consider Mandatory Food Waste Audit (MFWA) as a possible strategy to address the food waste problem. As TiR has engaged in informal policy debate since 2009 it has become clear that regulatory systems are low on the priority scale for industry and government. TiR therefore felt a need to explore perceptions of a MFWA within industry and policy worlds.

IFWAP sets out to measure perceived opportunities and barriers to the introduction of an industry-wide MFWA. By examining the barriers to the introduction of a MFWA we gain insight into current food waste prevention practices and gauge industry preference about food waste prevention tools and government regulation. The purpose of the research is to examine the feasibility of a MFWA and facilitate wider debate on industry food waste regulation, as well as illustrate the need for further research on government-led food waste regulation initiatives.

Here in section 1 we introduce the rationale for mandatory food waste audits in industry and the aims of this research. In section 2 we outline our methods. In section 3 we lay out our findings, before making conclusions in section 4. Finally, in section 5, we make recommendations for pushing forward action on industry food waste.

1.1. THE PROBLEM WITH FOOD WASTE

It has been estimated that 30–50% of food is wasted globally (Foresight, 2011a). In the UK alone, approximately 18–20 million tonnes of food is wasted annually (Defra, 2010a). Preventing such waste could result in a national saving of over £22 billion a year (WRAP, 2011d). A recent report from the Institute for Mechanical Engineers called such wastage a 'tragedy' (IME, 2013, p2), while others prefer the word 'scandal' (Stuart, 2009). Earlier this year, Christine Lagarde (Managing Director of the International Monetary Fund) reportedly spoke out, saying the number one priority in solving the world's food problem is to eliminate food waste (Stuart, 2013).

The wider impacts of food waste are significant. When food is wasted, so are the resources used in its production. This can be described as the embodied impact of food waste. Food waste discards embedded resources such as water and land, while contributing to climate change through the generation of preventable greenhouse gas (GHG) emissions. By reducing food waste the carbon footprint of the entire food supply chain is reduced. Stuart (2009, p92) estimates that in the UK and US, assuming that consumers waste approximately 25% of their food, '10 per cent of all greenhouse gas emissions [come from] producing, transporting, storing and preparing food that is never eaten'. The resource-saving potential of food waste prevention is highlighted by the executive director of Stockholm International Water Institute (SIWI), who states 'preventing food waste is the smartest and most direct route to relieving pressure on water and land resources' (SIWI, 2012, p1).

As well as placing great strain on environmental resources, food waste contributes to poverty and hunger. In a world where 925 million people are undernourished (FAO, 2010) and 5.8 million people are living in poverty in the UK (FareShare, 2011), it is vital that food waste be addressed alongside more structural causes of poverty, such as the occurrence of increasingly regular price spikes. In July 2012 it was estimated that global food prices had risen by 10% (World Bank, 2012a), while the 2012 Global Monitoring Report ascribed an increase in global poverty to the 2010/11 food price spikes, preventing 48.6 million from escaping poverty in the immediate future (World Bank, 2012b). These price shocks occur for a variety of reasons, and result from a range of complex variables including land and food commodity speculation and the impact of climate change on agricultural production. Food waste also plays its part. In the long term food prices have been driven up by food waste, which both creates an artificial scarcity by taking food off the market and places strain on the scarce resources that act as agricultural inputs (Bloom, 2010, p26).

Whilst reducing food waste can contribute to easing the suffering of those in poverty, for example through food redistribution schemes, the redistribution of food waste to the hungry is not a long-term solution to hunger in itself, nor a socially equitable model. Even in times of famine there is enough food. The key issue is about who has access to that food and access to land to grow food (Sen, 1981). Distributing emergency food relief through provisions of food waste donations is a short-term fix. The fact that people worldwide and in the UK continue to go hungry for a variety of reasons is symptomatic of a dysfunctional food system in need of structural redress. Tackling the problem of food waste is just one essential element of that.

The environmental and social costs of food waste are relatively overt, but food waste also has more latent impacts. Firstly, by accepting the systemic causes of current levels of food waste we in turn accept an economic system that does not adequately internalise the external social and environmental costs of food. Internalising the cost of land, water and cheap labour allows the market price to more accurately reflect the true value of food, with the costs of waste therefore being much higher. Secondly, by not taking action on tackling industry food waste, a cultural norm of unaccountability and non-transparency is further embedded. Many businesses currently refuse to publish food waste data on the grounds that it is 'commercially sensitive' (as found in reports such as WRAP, 2011a, 2011b). Such practice continues to engender a business culture that is unaccountable to its main stakeholder: the paying public. By exploring the feasibility of a MFWA we can start to cast light on these larger problems, in turn facilitating debate about how far systematic change is necessary to drive down food waste in the long run.

1.2. WHERE AND WHY IS IT HAPPENING?

The FAO estimate that of the 280kg per year per capita food waste in Europe, only 95kg per year per capita is wasted by consumers with the rest resulting from production to retail (FAO, 2011). In industrialised countries they highlight causes of pre-consumer food waste including overproduction (at the farm level) to ensure contractual duties with supermarkets, appearance standards from supermarkets for fresh produce, failures to meet food safety standards, food lost in manufacturing due to spoilage, an attitude that it is cheaper to dispose of than use offcuts, overstocked supermarket shelves and consumer attitudes and wealth (FAO, 2011).

In the UK over half of food waste occurs in the food industry (Defra, 20110a). Defra presents data attributed to the Waste and Resources Action Plan (WRAP) estimating that 8.3 million tonnes of food waste comes from consumers, 1.6 million tonnes from retailers, 4.1 million tonnes from food manufacturers, 3 million tonnes from food service and restaurants, and 3 million tonnes from other groups, including agriculture, horticulture and public sector food waste (Defra 2010a, p54).

Both the FAO and Defra reports, however, point to huge data gaps. The 2010 WRAP report 'Waste arisings in the supply of food and drink to households in the UK' highlights significant gaps in food supply chain data, specifically from agricultural and processing waste, and food and drink waste disposed of down the drain[1]. This report highlights measuring waste and more specifically measuring waste at a sub-category level to identify causes and 'hotspots' to target as two key opportunities in waste prevention (WRAP, 2010, p.78). More recent work has attempted to 'resource map', quantifying waste from farm gate to retail, for a number of key food types (WRAP, 2011a, 2011b, 2011c). This has highlighted high levels of on-farm waste for certain food types, estimating that in the UK 5–25% of apples, 9–20% of onions and 3–13% of potatoes are lost due to grading alone (WRAP, 2011a). Importantly, this data also highlights the great variability in estimates of food waste.

Whilst WRAP have taken the lead on collating and generating waste data, much of the focus has been at the household level and most of the data gaps are further up the supply chain. Just as there is great variability in the waste data estimates that are available, existing data on food industry waste

[1] Food and drink disposed of into the household sewerage system accounts nearly a quarter of household food waste (WRAP, 2010) and disposal of food in this way is being made illegal in most businesses in Scotland (The Scottish Parliament, 2012)

is unreliable (Stuart, 2009) – self-reported and extrapolated from small, unrepresentative samples[2]. All three of WRAP's recent resource mapping projects highlight gaps in data as a limiting factor in their ability to quantify waste over supply chains (WRAP, 2011a, 2011b, 2011c). It seems, therefore, that whilst the data that is being collected indicates the vital importance of tackling pre-consumer food waste, there is a need for more reliable and comprehensive quantification.

1.3. WHAT IS BEING DONE TO PREVENT FOOD WASTE?

As an issue, food waste has been increasingly under the spotlight over the past 10 years. In the UK, there have been a range of government-led and independent reports published, a great number of research projects carried out, an active and growing body of campaigns and food waste redistribution charities and an increasingly concerned public (Sourry, 2012). Here we give a brief overview of the food waste policy background to date, before pulling out key trends.

UK Government
The government has expressed commitment to tackling food waste in numerous reports, dedicating a chapter of the 2011 Government Review on Waste to the topic (Defra, 2011), and is currently addressing food waste through a number of policies. WRAP have been attempting to nudge consumer behaviour towards food waste reduction for several years through the Love Food Hate Waste campaign. Similarly, increasing numbers of local authorities are offering separate household food waste collections.

More recently, the focus of food waste policy has shifted to enabling Anaerobic Digestion (AD), which is seen as being environmentally preferable to composting and incineration with energy recovery, with The Anaerobic Digestion Strategy and Action Plan being released by DECC (Department of Energy and Climate Change) and Defra in 2011. Much of the impetus for AD comes from the carbon savings linked to it. The call in the 2011 The Carbon Plan, as in The 2011 Government Review on Waste, was for a transition to a 'zero waste economy' where all resources are fully valued, financially and environmentally (HM Government, 2011). The Carbon Plan identified food waste as a carbon and resource intensive waste stream, and for this reason labelled it a target area for carbon reduction. Yet the emphasis in both these documents on AD suggests a vision of a zero waste economy which is more akin to a zero waste to landfill economy. Additionally, there is a risk that such an emphasis on AD could lead to a situation where a continuous stream of waste is needed to maintain the system.

Whilst the policy rhetoric pays lip service to the waste hierarchy[3] and waste prevention, it is proving difficult to put into practice, with much emphasis placed on landfill diversion, the direct result of the EU Directive on the landfill of waste (Directive 1999/31/EC) (EC, 1999). Indeed, the 2011 Government Review on Waste states that 'It is clear that for too long we have worried about how to dispose of waste' (Defra, 2011, p.20).

Currently, the main lever for encouraging industry action to reduce food waste is the Courtauld Commitment (CC). Facilitated by the government funded WRAP, it is a voluntary responsibility deal aimed at improving resource efficiency and reducing the carbon and wider environmental impact of the grocery retail sector. Signatories agree to provide waste data and commit to meeting agreed targets. Phases 1 and 2 have been rolled out, with phase 3 currently being discussed (WRAP, 2013a). CC phase 2 included a target on household food waste, an act which acknowledges the part that industry plays in creating this, and a supply chain waste prevention target aiming to reduce

[2] *An extreme example of this is the case of waste data in food distribution in WRAP (2010) where the data is scaled up from information from just one supermarket.*

[3] *The waste hierarchy orders waste practices according to environmental cost and allows policy makers to prioritise accordingly. In Article 4 of the European Parliament and Council Directive 2008/98/EC it states that "the following waste hierarchy shall apply as a priority order in waste prevention and management legislation' and policy: (a) prevention; (b) preparing for re-use; (c) recycling; (d) other recovery, e.g. energy recovery; and (e) disposal." (EP and EC, 2008).*

traditional grocery product and packaging waste in the grocery supply chain by 5% (by 2012 from a 2009 baseline) – a target which included food waste (WRAP, 2013b).

The 2011 Government Review of Waste Policy in England emphasised that voluntary responsibility deals are the preferred mechanism for encouraging industry action on waste: 'The Government will only intervene where necessary, where there are clear market failures and barriers' (Defra, 2011, p.12). A more recent Hospitality and Food Service Agreement holds the same 5% waste prevention target as CC Phase 2 (by 2015 from a 2012 baseline) (WRAP, 2013b). Yet there is criticism of 'over emphasis on self-regulation' (Waste Watch, 2010, p.3), with regulatory backup plans called for by the Sustainable Development Commission (SDC) to 'ensure that voluntary agreements such as Courtauld could be enforced if they do not deliver' (SDC, 2008a, p.14).

The current government's commitment to tackling food waste has also been called into question as it cuts funds to departments that work to reduce food waste. Defra is 'losing a third of its budget and repositioning itself as an "economic department" rather than a regulator' (MacMillan, 2011, p3) and WRAP has had its budget cut year on year from £48.1 million in 2009/10 to £25.74 million in 2013/14 (Reece, 2013).

Devolved Nations
Waste is a devolved issue in the UK, with some of the other devolved nations seemingly taking more action on food waste than England. Scotland has brought about legally binding targets, imposing a ban on all biodegradable municipal waste going to landfill by 1 January 2021, a ban on waste streams (including food) collected separately for recycling from going to incineration or landfill from 1 January 2014, mandatory source separation of food waste for large and small businesses (with different enforcement dates) and a ban on food waste maceration (The Scottish Government, 2011; The Scottish Parliament, 2012).

European Policy
Urgent action on food waste across European Union (EU) member states is being advocated by both the European Parliament (EP) and European Commission (EC). In 2011 the EC's Roadmap to a Resource Efficient Europe stated a milestone of halving *edible* food waste to *disposal* by 2020 (EC, 2011). Following that the EP passed a resolution 'to take practical measures towards halving food waste by 2025' (European Parliament, 2011). Whilst on the surface this may seem less ambitious, the EC's milestone seems to be reductions to landfill and could be met solely through shifts to AD and without any actual reductions in food waste. MEPs have called for a coordinated strategy, combining national and EU-wide measures to improve the efficiency of food supply and consumption chains sector by sector (European Parliament/News, 2013) and 2014 is going to be the European Year Against Food Waste. Historically, the EC and EP have been much more inclined towards regulation than the UK government, introducing policy frameworks such as the EU Directive on the landfill of waste (Directive 1999/31/EC) which have then been translated into policy by member states. The EC has reviewed numerous initiatives for the reduction of food waste, concluding that voluntary agreements (as preferred in the UK) should not be a priority (EC, 2010). 'Food waste data reporting requirements' was one of the EC's top three recommendations for reducing EU food waste (EC, 2010, p18), highlighting that data disclosure 'forms the basis for any major action on food waste prevention in the EU' and 'accurate baseline data would enable the EU to set targets for food waste prevention' (EC, 2010, pp158–159). Whilst the report points out that it is unlikely that any additional changes related to food waste reporting would be possible for approximately another five years (EC, 2010) it suggests the possibility that more progressive policy drivers on data reporting may be on the horizon at the European level. Interestingly, one of the key aims of the recently started EU-FUSIONS (Food Use for Social Innovation by Optimising Waste Prevention Strategies) project is for the harmonisation of food waste monitoring across member states (EU-FUSIONS, 2013).

Industry
Within industry, many of the large food industry brands now have corporate social responsibility policies which often feature waste. However, few of these focus on food waste in particular. As of March 2012, 53 businesses had signed up to the CC Phase 2, although that does not contain a business food waste reduction target. Some mainstream retailers such as Waitrose are

implementing zero waste policies across their stores, diverting food waste away from landfill to AD and redistribution charities (Waitrose Media Centre, 2013). Yet, as WRAP point out, 'Much of the activity undertaken by retailers regarding their food waste so far seems to have focused on landfill diversion rather than waste prevention' (2010, p.5). A number of industry facing food waste prevention activities are also taking place. For example, the focus of The Institute of Grocery Distribution (IGD) product and packaging waste working group for 2013[4] is the 'IGD Five to Drive' food waste prevention strategy, which lists 'measurement' as the first key food waste prevention tool (IGD, 2013).

Civil Society Activity
Being 'green' matters to consumers, and food waste is a key concern influencing food choices (Quinn, 2012). Such concern is reflected in the emergence of organisations calling for an end to food waste, taking a variety of approaches to address the problem. Some campaigns focus on redistribution as a means of reduction, while a handful of campaigns call for reduction of industry food waste and policy change to prevent food waste. The most visible include Feeding the 5000 (www.feeding5k.org.uk), which calls for both individuals and businesses to reduce food waste. The Discards campaign calls for EU level policy change to reform the Common Fisheries Policy (Fish Fight, 2013). This is to prevent dead fish being thrown back into the sea once caught due to the imposed species-specific fishing quota system. Other food waste redistribution campaigns such as Fareshare (www.fareshare.org.uk) and Foodcycle (www.foodcycle.org.uk) contribute to raising the profile of the issue and support the call to end to food waste, but do not call for regulation of the food industry to drive down food waste.

The UK government, EC and EP, industry and civil society recognise the need to tackle food waste, and steps are being taken to address the problem. Below we identify activity trends within the food waste policy arena.

1.4. FOOD WASTE POLICY TRENDS

Encouragingly, the issue of **food waste is gaining prominence** in the UK and globally. There seems to be an increasing desire in government and industry to act and to be seen acting, reflected in the number of voluntary targets and responsibility deals seen across government and industry.

The main theme within UK policy, however, has been a **strong emphasis on household food waste**. The much heralded Love Food Hate Waste campaign and local authority food waste collections have moved household practice well ahead of that of industry. Much of the rhetoric from industry, the British Retail Consortium (BRC) in particular, attempts to shift focus from the responsibility of supermarkets to the amounts of waste created in the home (see, for example, the weighting of household food waste vs. industry in the BRC website's policy discussion on food waste (BRC, 2013)).

Policy drivers tend to stem from the European level, with a greater desire for regulation in the EC and EP. In the past much of the UK's waste policy has been shaped by such regulation. Mandatory food waste data reporting requirements are gaining traction at this level.

Many of these efforts have also been **focused on reducing waste to landfill rather than preventing it** being produced, especially with the focus on anaerobic digestion. Efforts to reduce overall levels of food waste have been less effective. CC Phase 2 brought in a supply chain waste prevention target, an incremental movement in a more sustainable direction. In wider discussions there are still doubts over the extent to which waste production can be absolutely decoupled from economic growth (e.g. Etkins, 2008; Jackson, 2009), the pursuit of which is central to our dominant economic paradigm.

A trend in the UK, particularly with regards to industry waste, is a **preference for voluntary**

[4] *Members of this group include most large retailers and producers, including Unilever, Mars and Nestle.*

responsibility deals over mandatory regulation. The coalition government's stance on regulation in general is typical of the nudge politics of neo-liberal times. Structural issues remain unaddressed and emphasis is placed upon the ability of subtle messages to encourage behavioural change in industry rather than that of regulation to force it. However, there have been calls for more government leadership on food waste. The SDC argued that the 'government should adopt a more aspirational approach to reducing waste in food retail by setting longer-term targets and introducing enablers to support a culture of zero waste' (2008b).

The idea that heavy regulation and centralised state involvement will not engender efficient environmental change reflects the ideas of ecological modernisation prevalent in policy since the 1970s. Ecological modernisation describes how economic growth may not necessarily involve environmental degradation as businesses are incentivised to become 'greener', improving efficiency and maximising profits in the longer term (Mol and Sonnenfeld, 2000; Gibbs, 2006; Jänicke, 2008). With much natural and social capital not accounted for in resource costs, this approach is largely blind to the inability of existing market incentives to drive waste prevention:

'We only price wasted resources at one point, the point of disposal. Such measures can be effective in driving materials away from the most environmentally damaging forms of disposal, but do not work strongly enough to influence the design of products and hence their overall use of primary resources'(Green Alliance, 2010)

Food waste campaigners such as Tristram Stuart have been vocal about the need for government intervention to re-balance market incentives in line with the waste hierarchy (Stuart, 2009), yet others query whether it is possible to internalise market externalities (Buttell, 2003). The need to balance financial incentives with the food waste hierarchy is important because money motivates behaviour change. For example, incentivising recycling (as we see now with subsidies for AD) reduces the financial imperative to reduce waste at source. Defra are currently working on a research programme to explore how to develop methods of valuing ecosystem services and natural resources (Defra, 2013a). Such research could be relevant to the food supply chain, constructing a metric to value the embedded resources of food waste and attach appropriate financial disincentives to food waste. This approach would be likely to contribute to driving down industry food waste at source. Nevertheless, social and ethical as well as economic rationales for food waste reduction must be considered.

1.5. MANDATORY FOOD WASTE AUDIT: A RATIONALE FOR EXPLORATION

Given some of the trends highlighted above and the scale of the food waste problem, This is Rubbish's past campaign work led to a suggestion that a requirement on businesses to audit their food waste could be the first step in stronger policy intervention on food waste. This conclusion was reached for the following reasons:

Management Follows Measurement
Measurement is essential for a precise cost–benefit analysis of proposed food waste solutions. It generates a baseline against which to measure performance (FAO, 1985) and allows targeted waste prevention actions to be prioritised (EC, 2010): 'what gets measured gets managed' (Gunders, 2012, p15). Audits could play a vital role in quantifying food waste and revealing its causes. Organisations such as WRAP (2011a, 2011b, 2011c) and IGD (2013) are increasingly recognising the importance of quantifying food waste to help individual businesses manage their processes. Just as measurement may allow more targeted management in businesses, so too could it allow a more targeted governmental approach to support of food waste prevention in UK food supply chains. This is very different from what currently occurs[5].

Improving Industry-Wide Data
It is widely agreed that current food waste estimates are based on limited data (Smil, 2004; Foresight,

[5] *For example, recent evidence from WRAP (2011b) suggests high volumes of food waste at the farm level for certain crops, yet few resources are currently put into targeting this waste.*

2011a, 2011b; Stenmarck et al., 2011). Mandatory reporting across the supply chain could allow data to be reported in a standardised and reliable way, enabling industry-wide benchmarking and the monitoring of food waste reductions and associated savings over time. Studies to date have often been based on 'self-reported and anonymous data which cannot be verified' (Stuart, 2009, p213). In the UK, supermarkets have been resistant to releasing their food waste data in case it helps their competitors. Even WRAP, who have comparatively better access to industry data and guarantee confidentiality, have been unable to obtain the quantitative data necessary to complete all their research objectives for this reason (WRAP, 2011a, 2011b, 2011c). Patchy data, a lack of standardisation and unclear working definitions are key barriers to gaining reliable figures on national food waste at both the European (EC, 2010) and UK level (Gunders, 2012).

A Driver For More Ambitious Industry-Wide Action
As highlighted above, we feel the CC targets are not ambitious enough (5% product and packaging supply chain waste reduction by 2012 from a 2009 baseline in phase 2) and will not bring around far reaching rapid reductions in food waste, such as the EC's milestone of 50% reductions in edible food waste disposal by 2020 (EC, 2011), or the EP's target of 50% reduction in food waste by 2025 (EP, 2011). Similarly, current voluntary approaches are limited in the scope of their industry engagement, working only with larger businesses at certain stages of supply chains. A regulatory requirement to audit food waste could engage businesses which do not currently act on food waste and support efforts to audit at all stages of food supply chains.

Enabling Food Waste Reduction Targets Or Public Disclosure
MFWA could provide a vital first step towards other action on food waste. As mentioned above, the EC position is that mandatory reporting requirements for member states are a prerequisite to any major food waste prevention policy (EC, 2010). Similarly, league performance tables and certificates (which would enable consumer and shareholder pressure for action on industry food waste) would have limited scope without a solid grounding in data. With industry not currently held to account for the food waste it creates, Tristram Stuart states 'The first problem is the lack of transparency. We need the food industry to declare how much food it wastes' (Stuart, 2009, p112). MFWA could be the first step in increasing transparency and accountability.

Food Waste Prevention In Industry
As outlined earlier, food waste reduction efforts have hitherto predominantly focused on reducing waste to landfill, dealing with waste once it is produced rather than preventing it from being produced in the first place. Using a definition of 'food intended for human consumption that is not consumed by humans', a MFWA where AD, food as animal feed, incineration and composting as well as landfill disposal are defined as food waste would be a tool to prevent the creation of this waste or move its disposal up the waste hierarchy. Additionally, there are many organisations placing focus on citizen behaviour change to prevent food waste, such as the Love Food Hate Waste campaign. An industry-wide MFWA introduces a much needed focus away from consumer responsibility on to corporate responsibility.

This rationale, informed by informal policy discussions with industry and policy makers, led TiR to instigate IFWAP in order to consider MFWA as a possible strategy to address the scale of the food waste problem.

1.6. THE MANY SHAPES OF AUDIT

In the previous sections we have argued that MFWA is one possible policy intervention to address widespread food waste. Mandatory audits, however, can take many forms. In our interviews, we left the precise definition of MFWA open, specifying only that mandatory food waste audits would involve the food industry being legally responsible for measuring their food waste at regular intervals and reporting this to an external body. Interviewees could therefore give general opinions on MFWA and discuss the pros and cons of these different forms. By looking to existing policies and programmes we can consider the different ways in which a MFWA could be implemented:

Level Of Detail
A food waste audit already implies a degree of detail, as food must be measured separately from other waste. However, LeanPath, an American organisation providing food waste audit tools for businesses, describes how audit could involve recording amounts (in weight, volume, unit or cost), composition, causes and destinations of waste (LeanPath, 2013). Businesses could also select the method of measurement and the level of detail collected. Indeed, in the GHG reporting which is becoming mandatory for some UK businesses, businesses are allowed to choose their reporting method, as long as they publish their chosen methodology (Carbon Trust, 2013). This allows businesses to tailor the methodology to their business practices, but does prevent standardisation of data and provides scope for diverse definitions and methodology to hide or reduce reported food waste.

Who Would Be Required To Audit?
The audit could apply to all businesses or just those over a certain size or at a certain stage of the supply chain. The Courtauld Commitment and other regulations have focused on large businesses in manufacturing and retail, but there is a need to bring small businesses on board. For example, the Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (HM Government, 2007) are only for companies which handle more than 50 tonnes of packaging in a year and have a turnover of more than £2 million, and the mandatory GHG emissions reporting coming into place requires only businesses listed on the London Stock Exchange to report their emissions from the start of the 2013/14 financial year (Defra, 2013b).

The Scope Of Audit
Another question is whether audits would be performed by individual businesses or refer to entire supply chains, including customers. A recent report for WRAP by IGD (Tupper and Whitehead, 2011) highlights the advantages of a supply chain approach to food industry waste, yet auditing the long global supply chains dominant in our food systems is likely to be a highly complex procedure.

Auditor And Regulator
It is necessary to consider whether the auditor would be internal or external to the business and to whom data would be reported – an arm of the government or an independent private adjudicator? It is possible that MFWA reporting could be married with existing business reporting requirements, such as those for packaging, GHG or the Integrated Pollution Prevention and Control (IPPC).

Destination Of The Data
A final set of questions relates to disclosure of the data produced by a MFWA. Once the data is reported to the external body, it could either be made public or kept between the industry body and the regulating external body. Where disclosed to the public it could be amalgamated to report an industry figure or released at the individual business level. Data on individual business performance could either be used as the basis of legal food waste reduction targets enforced by the government or as the basis for competition between businesses to reduce their waste and acquire the best 'green' reputation with the consumer. It seems likely that there would be industry resistance to either public reporting or legally binding targets (as highlighted in reports such as WRAP, 2011a, 2011b, 2011c).

1.7. EXAMINING THE FEASIBILITY OF A MANDATORY FOOD WASTE AUDIT

There are two important questions to ask about the feasibility of a MFWA. The first is about the motivations behind and barriers to the implementation of food waste audits in businesses. The second is more specifically about the perceived barriers to a mandatory food waste audit. As a prelude to answering both of these questions, lessons can be learnt from other case studies examining changes to organisational practice.

Another example of attempts to bring operational improvements to the food industry illustrates the potential barriers to audit. Businesses are now required to have a food safety management system based upon HACCP (Hazard Analysis and Critical Control Point) principles, an example of an organisational drive to improve food quality rather than resource efficiency (as is the

case in MFWA). Fotopoulos et al. (2011) have produced a review of the literature on barriers and motivations to HACCP implementation. They ordered them according to their 'criticality', classifying critical barriers as those involving employees (skills, commitment and resistance to change), costs and time to develop and implement HACCP, organisational infrastructure, practicalities relating to production, and capacity issues relating to business size and lack of government support. The main critical motivation was satisfying and gaining customers, with meeting legal requirements, enhancing brand reputation, improving competence, and reducing costs all appearing to a lesser extent.

Other examples can illustrate the barriers to mandatory audit. Clinical audit was established in the UK in 1993. Literature on barriers to overcome when implementing clinical audit again emphasised the internal characteristics of clinical settings that prevented successful audit. These were similar factors such as time (Roberts et al., 2004; Hogan et al., 2007), expertise (McCarthy and Byrne, 1997) and personal motivation (Johnston et al., 2000) alongside doubt about whether audits actually need to be performed or their effectiveness in improving practice (Davies et al., 2007). Occasionally, more organisational and possibly political factors like organisational structure of the health service (Robinson, 1996) were mentioned. Such literature also emphasised the opportunities that audit could provide for clinicians, such as an opportunity to gain accreditation alongside efficiency improvements. This was echoed by literature on environmental audit, although ISO 1400 and its successor, the Eco-Management and Audit Scheme, are voluntary (Alvarez-Larrauri and Fogel, 2008).

These cases suggest more internal rather than external or political barriers for organisations enacting change. Yet this could be more a result of the institutional and behavioural focus of these pieces of work. For example, much of the HACCP literature is published in food control or management journals. Little is from publications with a more macro-scale perspective. Emphasising internal barriers implies that nudges could result in the behavioural change needed, yet research that recognises external barriers implies the importance of supply chains and the government shaping the playing field within which businesses act.

These background reviews shaped our research, leading us to focus on barriers involving resources, attitudes and culture, internal communication and practicalities, in addition to external factors relating to supply chains, such as markets, supply chain dynamics, existing regulation and government support.

Image: Apples that cannot be sold as they do not meet supermarket aesthetic criteria. Ross on Wye 2011

2. Methodology

The aim of this research was to elicit opinions from across the supply chain on the feasibility of a mandatory food waste audit. A qualitative approach using semi-structured interviews enabled us to obtain the detailed data appropriate to the exploratory nature of the study. As qualitative research, this report identifies and describes key discourses and opinions rather than giving quantitative data that would not be justified given our small and semi-purposive sample.

The sampling strategy involved two stages. First, we identified six strata we wanted to collect information from. Four were from within industry: producers, manufacturers, distributors and retailers. Several respondents were involved in two or more stages of the supply chain. The other two strata comprised key policy experts from outside the food industry: policy-makers (MPs and civil servants) and policy influencers (academics, industry bodies and campaigners). The two groups of policy experts were selected by snowball sampling for a pool of possible respondents and purposively selecting from that pool.

The geographical areas from which our within-industry sample was drawn were all located within the South East region of the UK. Within the areas that were logistically possible for our interviewers to access, for reasons relating to travel time, the South East region had a spread of producers, manufacturers, distributors and retailers that was representative of the UK as a whole. In London, for example, agriculture is under-represented and retail disproportionately common; and the South West has an unusually high proportion of agricultural businesses (Defra, 2010b; Wetherill, 2010). Food businesses in the UK are required to register with the local authority for registration with the food standards authority. Ten districts in the South East were randomly selected using an online random number generator (Random, 2013). Businesses from the food business lists of those local authorities were added to the sampling frame until there was a list of at least 100 retailers, 100 manufacturers,100 producers and 100 distributors. All categories were added to until there were at least 100 businesses in each category. This was in order to ensure that there were businesses from the same districts within each stratum. Individual businesses were selected from each category list using a random number generator and contacted via telephone.

The aim was to interview five respondents within each of the six strata. A high attrition rate, mainly due to high business activity around Christmas, left a sample of 20 interviewees. The majority of attrition was from industry, leaving a sample of eight policy experts and 11 industry players and indicating the time pressures industry players operate under and their level of engagement with this issue. Sample characteristics and the codes that will be used to refer to the respondents throughout the report are detailed in Table 1. Seven of our 11 industry interviewees were from small or medium enterprises (SMEs) (less than 250 employees), with the remaining four representing large retail chains.

Our interview tool used 13 open questions to elicit qualitative responses. Interview schedules were clearly structured. This was firstly in order to ensure consistency between the nine trained interviewers and secondly because of the pragmatic aim of the research. Interview schedules were designed to guide respondents towards addressing the specific research questions of whether MFWA was feasible and what the barriers to such a system might be. After the collection of unprompted data in response to questions such as 'can you tell us about the barriers to performing food waste audits?' respondents were prompted to comment on the importance of the five potential barriers (resources, attitudes and culture, internal communication, practicalities and external factors) elicited from our surveys of the literature on clinical and food safety audits outlined in section 1.7.

With 20 interviewees, theoretical saturation (Glaser and Strauss, 1967) was achieved, with similar repetitive themes emerging from the data of multiple respondents from different strata. A number of key actors, however, declined to participate and so there are key viewpoints missing, notably that of a Defra representative.

Following the interviews, interview transcriptions were coded into themes using qualitative data analysis software (NVivo10). The data in these themes were then analysed to draw a picture of the different debates and narratives in our interviews.

Interviewee Code	Sector/ Stratum
1-PP.R	Retail and production: Small fruit and vegetable producer and farm shop owner, 4 employees
2-PP	Production: Pullet rearing and egg laying business, 30 employees
3-PP	Production: Small livestock farmer, 2 employees
4-PP.R	Retail and production: Arable fruit and vegetable farm and farm shop owner, 8 employees
5-R	Retail: Butcher, fishmonger and delicatessen, 4 employees
6-M	Manufacture: Cake maker, 2 employees
7-M.D.R	Manufacture, distribution and retail: Food smoker, 2 employees
8-R.D	Retail (management) and distribution: Sustainability role, national supermarket chain
9-R.D	Retail (management) and distribution: Sustainability role, international supermarket chain
10-R.D	Retail (management) and distribution: Sustainability role, international supermarket chain
11-R.D	Retail (management) and distribution: Fresh food manager in branch of international supermarket chain
12-PM	Public body: Manager publicly-funded body dealing with waste
13-PM	Public sector: MP with waste policy expertise
14-PI	Third sector: Director, Sustainable food research project
15-PI	Retail (restaurant): Head of sustainability, international take-away chain
16-PI	Non-profit consultant: Sustainable waste management consultant
17-PI	Academic: Academic with expertise in food reduction and loss
18-PI	Public funded consultant: Chair of waste management body
19-PI	Academic: Academic with expertise in sustainable food systems
20-PI	Third sector: Sustainability advisor, environmental not for profit organisation

Table 1. Respondent codes and characteristics.

PP-Primary production; M-Manufacture; D-Distribution; R-Retail; PM-Policy maker; PI-Policy influencer

3. Findings

Our interviews revealed a range of contrasting views about the feasibility of a MFWA. In this part of the report we present the key themes that surfaced, examining in section 3.1 the value of audit; in section 3.2, the advantages and disadvantages of a voluntary approach; in section 3.3, perceived barriers to MFWA; and in section 3.4, how steps that may be taken to overcome these barriers may influence the design of a MFWA. Where respondents are quoted, the codes in Table 1 above are indicated in brackets.

3.1. THE VALUE OF AUDIT

In order to establish perceptions of the value of audit we asked interviewees about the ways in which they thought a food waste audit would hinder and/or help a food business. There were a number of perceived **benefits of audit**:

Cost Savings
Almost all of our interviewees felt that there was a business case for auditing waste: 'the more waste there is, the more cost there is' (7-M.D.R). Audit was seen to provide an opportunity to identify and manage the points at which waste occurs, reducing the costs of both inputs and disposal. Respondents identified that different businesses could make different cost savings depending on size and location in the supply chain. Some owners of smaller businesses felt that audit would be more beneficial to the more wasteful supermarkets – where 'hundreds of thousands of pounds is chucked out in a skip' (5-R) – than companies such as theirs that produced less waste. 17-PI, however, felt that audits would not produce cost savings for supermarkets as waste measurement is already standard practice in large retail outlets.

Customer Demand
Some interviewees felt that audit would comply with the preferences of increasingly aware consumers. Audit was presented as synonymous with waste reduction, and businesses wanted to be seen to be acting on food waste: 'reputation-ally it's a very, very positive thing' (15-PI). Here, customer satisfaction is seen as key to making profit. These ideas partially contrast with those to be presented in section 3.3 about the reputational risk some associated with forced disclosure of food waste levels and those in section 3.2 which cast doubt over the extent to which consumers care about food waste measurement.

Values
Although not specifically asked about values relating to food waste, some interviewees expressed the sentiment that there was a moral imperative to tackle food waste, with audit being a vital tool towards that end. Most of these attitudes centred on social justice values, with interviewees considering that edible food waste should be redistributed to those in need of food.

Organisational endorsement
It was also suggested that audits could help promote awareness of waste reduction amongst employees across large businesses: 'the more people that can see the scale of the opportunity the more likely it is that you can get buy-in across the organisation at different levels of the hierarchy' (12-PM).

Despite almost all of our interviewees seeing the value of audit in increasing efficiency, many (particularly small businesses and producers) were not measuring their food waste, and some of those that were had gaps in data. For example, one large retailer (8-R.D) explained the difficulties they were experiencing trying to implement a system to measure food waste going to redistribution charities, and a farm shop owner measured stock in and out but did not have information for unbarcoded stock such as vegetables. A number of non-industry interviewees explained that they did not know what businesses were measuring because that information was not disclosed. A number of barriers were perceived to stand in the way of individual businesses carrying out their own audit. We discuss these here as we feel that they highlight the need for a discussion about the two options for industry-wide food waste auditing schemes, voluntary and mandatory systems, something we explore in section 3.2. However, we mention them only briefly at this stage, as a number are expanded upon in section 3.3, focusing on the barriers to MFWA.

The **perceived barriers to individual businesses auditing** their food waste were :

Cost
Just as efficiency savings were cited by almost every interviewee, so too were potential costs of a food waste audit, in terms of either money or time. Respondents were explicitly concerned that the time employees spent filling in an audit would detract from productive activity. As we expand upon later, there were contested views on how capacities to subsume these costs may differ for different sized businesses and at different stages of the supply chain, with some considering that the costs would not justify the future savings and others feeling they would. There was also recognition that a decision on audit requires a trade-off between short-term and long-term accounting, with the former focusing on the cost of audit and the latter on the savings it brings: 'a lot of the companies aren't going to see a lot of payout from it to start off with, it's … probably way down the line' (16-PI).

Perceptions that audit is less relevant to some businesses
Some smaller businesses felt that whilst food waste audits make business sense for other, mainly larger businesses, they themselves produced little waste, so audit was less relevant for them. Whilst it could indeed be true that these businesses produced little waste, 18-PI identified that householders' similarly optimistic perceptions of their own efficiency were often inaccurate, and could be corrected by audit.

Ease of measurement
Respondents identified that food waste would be most easily measured by recording the stock entering and leaving a process, possibly through an electronic system. This would therefore be more difficult in businesses that did not use barcodes or computers, such as the small farm shops described by 1-PP.R and 4-PP.R. Additionally, as 14-PI pointed out, waste 'is very different at a retail level to at a farm level'. Quantification of on-farm inputs (seed, soil nutrients, feed, rain and fertiliser) and outputs (which may be ploughed back into fields, composted or burnt) would be especially problematic. These difficulties in measuring would be likely to increase the costs of audit for these businesses.

Business-wide employee endorsement
A number of interviewees mentioned that audit was unlikely to succeed in a business without an internal champion taking responsibility for the process. In larger organisations, 16-PI stated that 'somebody with the authority to drive it, somebody probably quite senior within the organisation, is really key'. As audit could engender such endorsement, this could be perceived as a mutually reinforcing positive feedback.

The value of audit in increasing efficiency is commonly accepted and much more widely cited as a benefit than expressions about the intrinsic value of sustainable actions or audit's ability to attract customers. However, many businesses were not currently auditing and the majority perceived barriers to audits to be related to costs and businesses' capacity to subsume these. The perceived costs depended greatly on how simple or onerous an audit would be. These observations raise two questions:

- Firstly, how successful may current cost motivations be in bringing about the incentive to reduce food waste and thus to audit?
- Secondly, should and how can businesses with fewer resources or less incentive be encouraged to audit?

The shape of any industry-wide audit certainly needs to allow for differential resource endowment

3.2. ADVANTAGES AND DISADVANTAGES OF A VOLUNTARY APPROACH

Whilst interviewees saw some barriers to carrying out food waste audits, very few interviewees expressed outright feelings that to encourage audit industry-wide, or adopt a more comprehensive effort to tackle food waste, was a bad idea. Respondents' opinions were highly dependent upon what shape an audit might take, whether it would be a regulatory requirement and how that would be enforced. It is to those issues that we now turn, examining the advantages and disadvantages of voluntary food waste audit approaches.

Advantages Of A Voluntary Approach

Voluntary Agreements Are Likely To Engage Businesses
Reflecting the dominant policy rhetoric, a number of businesses as well as policy expert interviewees expressed the view that voluntary schemes were preferable to mandatory audits. Some perceived that industry buy-in was more likely with voluntary schemes, as business would resent mandatory requirements for audit (17-PI, 18-PI, 9-R.D).The MP we interviewed similarly expressed a preference for nudge policies and incentives over regulation (13-PM). Interestingly, both small and large business representatives also conveyed the opposite view – that mandatory audits were necessary to engage business participants. Most respondents expressed views midway between these two positions, feeling that although audit was useful and should form 'an important part of the overall picture' (20-PI), extremely rigid compulsory guidelines would prove unpopular.

Less Data Distortion From Committed Actors
Some interviewees considered that the popularity of voluntary audit would lead to more accurate data, avoiding the 'fudging' that could arise from a mandatory requirement to disclose (18-PI). The idea that mandatory audit could lead to mandatory reduction targets led to speculation that businesses would want to be perceived as tackling waste and could alter their figures accordingly. It was suggested that certain end points of audit, such as league tables and comparisons between companies, could therefore influence businesses' propensity to report accurately (19-PI). Although it was not mentioned by our interviewees, it is important to note that distorted figures could arise from both mandatory and voluntary disclosure of figures to the public, and one of our interviewees actually felt that mandatory reporting would yield more accurate data (19-PI).

Businesses Are Already Motivated To Reduce Food Waste
8-R.D stated the opinion that, as the imperative to improve efficiency is integral to the free market governance, regulation may distort incentives to reduce food waste. This could make audits seem burdensome and potentially lower performance.

Disadvantages Of A Voluntary Approach

Although many interviewees endorsed a voluntary approach to audit, challenges to that dominant policy position emerged.

Voluntary Approaches Do Not Bring About The Level Of Change Needed
One view was that voluntary agreements were not as effective as mandatory audits, making less of a big impact on a national scale (19-PI). 16-PI felt that the private sector is 'dragging behind' the public sector, and that voluntary agreements like the Courtauld Commitment have been slow to manifest results. One interviewee working in a food business felt that 'things will have to be legislated' because 'we are getting to the point of no return', qualifying that with realistic assessments of the industry resistance: 'there would be a lot of resistance to it but it would make a massive difference' (15-PI).

There Are Disadvantages To Early Adoption
In an unregulated system of voluntary disclosure there are deterrents to being an early adopter of food waste auditing, especially in a less favourable economic climate and in such a competitive sector. 20-PI articulated that many businesses such as supermarkets often 'know there are some things they have to do, but they can't take the risk of doing it first, because they can't lose any customers'. It was suggested that as regulation goes some way towards 'levelling the playing field' it could provide a solution to this problem.

Standardisation
1-PP.R and 4-PP.R reflected that voluntary arrangements, as they generally comprise less standardised surveys, compromised the ability to compare results between businesses, who may be auditing selectively in line with what they perceive their own industry issues are. 19-PI also felt that standardisation allows for a more rigorous benchmarking tool.

Doubt Over Perceived Consumer Interest In Food Waste
Although some respondents suggested that consumer pressure could incentivise voluntary participation in an audit mechanism, the idea that businesses may compete to impress their customers on the basis of performance in a food waste audit was questioned. One interviewee doubted whether food waste is really a central issue for consumers. Although the interviewees who thought that the public were very eager to see businesses prevent food waste have been mentioned in section 3.1, others felt that customers cared little about the issue. 'You don't go into a shop and think, "I'm going to buy this particular brand because I know they do waste audits on their food"' (18-PI). This questions whether consumer pressure would be sufficient to incentivise business participation in a voluntary scheme.

It is clear that there is great diversity in views on voluntary and mandatory food waste audit systems. A common narrative was that voluntary approaches were more appropriate, gaining business buy-in, which would yield better results from the businesses that opt in. There was, however, a counter-narrative that highlighted the weaknesses of voluntary schemes. The most damning of these, coming from only a few of our interviewees, was simply that a voluntary approach is not enough; it is not driving the necessary level of change. Interviewees also highlighted the ability of a mandatory approach to cut through deterrents for early movers by creating a level playing field and the benefits of standardisation in creating comparable data.

With some respondents feeling that the time is right for government regulation, we now turn to an examination of the feasibility of a regulatory requirement to audit food waste, looking at the perceived barriers to MFWA.

3.3. INTERROGATING THE BARRIERS

This section of the report examines in closer detail the barriers that interviewees described to a successful MFWA. We have grouped the array of barriers described into the five key areas of cost, industry perception and culture, the government's policy-making approach, practicalities and concerns surrounding the transparency of waste data.

Cost

Although the financial benefits accruing from a MFWA appeared straightforward, section 3.1 mentioned how cost was described as a major concern. Interrogating this issue more closely, three particular elements of this barrier related to: whether available resources should be targeted towards measurement or directly towards food waste reduction, who should bear the cost and whether this was a justifiable use of financial resources in an era of austerity.

1. Managing Or Measuring?

Section 3.1 discussed the primary rationale for food waste auditing that measurement is a prerequisite for management, an idea that most of our interviewees supported. However, some also questioned whether, with a finite waste prevention/reduction budget, more or better measurement would always lead to more or better management. Some respondents perceived a risk that being forced to dedicate resources to measurement could be at the expense of management: 'if you had to plough all your resources into measurement then it will detract from any reduction work you could do' (10-R.D). This opinion was stated by two large retailer representatives who, elsewhere in their interviews, stated that management followed measurement.

2. Who Should Pay?

Interviewees expressed a range of opinions about which sectors of the food industry should be held to account for measuring their food waste and, stemming from that, who should foot the bill. 12-PM felt 'who's paying for it and how much it's cost' must be asked. We later discuss the different views on which businesses should be involved in a MFWA, and here discuss views on who should pay for a business to audit.

Interviewees often assumed that a business would be responsible for covering the costs associated with auditing their waste. This is something that led some smaller businesses to express a desire to see MFWA introduced to larger businesses (rather than small), perceiving them as better resourced. Conversely, some interviewees suggested that external financial support for businesses with less capacity (generally small businesses) would be necessary. There were two sources of support suggested. One suggestion was that large businesses, particularly retailers, perceived as having more spare cash, could support small businesses to audit – 'they [large businesses] could quite easily sponsor that system put around the smaller independent people… I think there's a lot more money made in these massive retailing outlets, or massive farms' (5-R). An alternative opinion, generally expressed by smaller businesses, was that the government could provide subsidies. However, as we explore next, this was a contentious idea.

3. Affording An Audit In Times Of Austerity

The proposal of government subsidy was met with concern in places, particularly in the context of the current recession. Respondents, especially those involved in politics, identified the conflicts between government spending on tackling food waste and more urgent social needs such as basic health care. The public relations impact of this was evident – 'the government's money is my money' (5-R) – and respondents in favour of a mandatory audit identified that this meant government action may not be forthcoming. On the other hand, 15-PI considered that the recession made subsidies more appropriate: 'we are in a double–triple dip recession. If a business has to find more money to do this sort of thing then that could be, would be, a barrier. If it was a government sponsored programme in some way then that could possibly be better'. These differences merely serve to reinforce the fact that cost, both to businesses and to the government, was an overriding concern for the majority of respondents.

Industry Perceptions And Culture

It was widely accepted that the success of an audit scheme hinged upon industry buy-in, and respondents were at pains to emphasise that many businesses were really trying to integrate sustainability into their business culture, for example by working with bodies like WRAP and Defra. However, a number of key barriers were identified that related to industry perceptions and culture. These involved generally negative perceptions of bureaucracy and regulation as well as the aforementioned ideas that the efficiency of a free market economy should make the need for legislation redundant.

1. Negative Perceptions Of Bureaucracy And Regulation

A range of big and small business, industry and non-industry, producer and retailer interviewees felt that businesses were already overburdened by regulation. 9-R.D, an employee from an international retailer, warned that 'you need to be careful with mandatory things, it's not the one mandatory

scheme, it's the 25 other mandatory schemes that the one man band has got to deal with'. The feeling that this could be the 'straw that broke the camel's back' (4-PP.R) informed the suggestion that a MFWA could work for larger businesses, with a voluntary scheme for small businesses so they could easily opt out. It is worth mentioning that this concern with 'red tape' was usually presented as a perception held by others, rather than the interviewee's own opinion.

2. Perceptions That Market Efficiencies Should Negate The Need For Legislation

Throughout our research, respondents repeatedly emphasised that the most effective and important motivations for business were usually dictated by economic gain. 18-PI spoke about their experience encouraging businesses to perform audits, highlighting that if the economic benefits of increased efficiency were the major drivers of action, reductions in food waste were not guaranteed when the financial benefits were more marginal: 'if you can sell it as an economic benefit then it gets sold' 'where it's more difficult is where the economic benefit is marginal'. As we highlighted in section 1, many of the social and environmental costs of food waste are not currently reflected in the market price of food. Bearing this in mind, it is questionable whether the drive for efficiency is a sufficient motivation to reduce waste.

The Government's Policy-Making Approach

The power of the industry lobby was identified as a factor contributing to the government's drive against red tape and their reticence to regulate on food waste.

1. Lack Of Government Leadership

A number of interviewees recognised that the government had little appetite for regulation. Those we spoke with in elected and unelected government bodies did not support a MFWA. Defra's rationale behind their decline of an interview illustrates their softer, lean management systems approach to environmental regulation: our contact felt that as mandatory approach was not on their policy agenda they would prefer not to be interviewed. 19-PI felt, however, that a mandatory system could offer a real opportunity for more effective policy-making. 'If it becomes mandatory it certainly could form part of a much more sort of structured and effective waste reduction strategy at a national level'. This was an optimistic hope for a government that, in the main, has been hesitant to show strong leadership on industry food waste. The nudge politics and behavioural approaches integral to current environmental policy are not achieving the step change required on food waste, as expressed by 16-PI – 'I think it's such a shame that there's not a strong drive from central government for this. And that would make a huge difference'. This lack of government leadership is one of the key messages that emerged from the Food Ethics Council's 2012 'Beyond Business as Usual' report: government is failing to respond to the need to accelerate change on sustainability.

2. Power Of Industry Lobby

A couple of interviewees alluded to the strength of large companies in the food industry in shaping government policies, suggesting that the power of industry lobbying would be a barrier to the introduction of MFWA: 'many of these companies have a lot of connections, and I doubt whether it would go through if the industry doesn't buy into it, and my belief is that if the industry doesn't want it then it won't happen' (17-PI). Whilst the importance of industry buy-in for a successful MFWA was iterated above, this relates not to the success of a MFWA once implemented, but to the power of an anti-regulation industry lobby, which makes it unlikely that such a suggestion could even be brought to the table.

Practicalities

Practical barriers were identified by individuals from across industry. They included issues such as differing capacity for reporting across businesses of different sizes, and questions surrounding supply chain responsibility.

1. Business Size And Supply Chain Stages

A recurrent question was whether every business would be obliged to conduct food waste audits or whether it would be applicable only to those at particular stages of the supply chain or of certain sizes. 18-PI commented that 'It tends not to be the bigger companies that suffer from compulsory, it tends to be the smaller companies that haven't got the same resources to do it... and also, every business is different, so you would need different types of audits'. In contrast, the need for a set definition of food waste to be used throughout different stages of the supply chain was raised by a broad section of our interviewees.

Some individuals had strong views on which stages and business sizes should take a lead in introducing mandatory audits. 1-PP.R expressed the idea that big businesses and supermarkets should lead the way in implementing the audit: '[supermarkets] have got the resources, the money, the systems for doing it'. This view was challenged by 17-PI: 'Just because you're bigger, doesn't mean you've got more spare money'. A range of other opinions was expressed on how an audit would or would not work across business sizes and stages. For example, some interviewees thought it would be easier to implement an audit system in a smaller business as there would be less produce to manage. Some small businesses thought a mandatory audit could not only be easy but also beneficial. 6-M commented 'I think an external audit would be very helpful, because you're bound to introduce things you didn't think of doing before'. An important finding was that manufacturers, distributors and retailers had existing stock rotation measuring systems that an audit could be potentially attached to. One policy expert explained 'I am sure if you ask the supermarkets they have a pretty good idea of what stock [they have] because, after all, the stock comes in and, as I understand it it's scanned, so they know exactly what they've got in the store, they know what's gone out because it's gone past the till' (13-PM).

2. Support For Farmers

It was mentioned that, due to the complexity of agricultural inputs and outputs, it was much harder for farmers to measure waste. One pick-your-own grower explained 'we obviously try to direct people to the right places to pick, so that everything gets picked. We also pick excess that we sell for markets, or freeze, or whatever, or do special offers with it. But it's difficult for us to actually quantify what's out in the field there' (1-PP.R). Both farmers and non-farmers also recognised the intense financial pressure and risk that farmers in the UK operate under.

'Then of course there's the farming end of it, of looking at how much is being wasted at farms, which is also really important. Ultimately anything that helps farmers might be the most important thing to do because they're the ones who are most squeezed and who have got to keep producing enough food for everyone' (20-PI).

One farmer expressed concern about having to audit, as he feared it could lead to blame being apportioned and felt that the waste he had to deal with was not a result of his own mis-management. 'I've grown it for them, and they've bought from someone else, and I am left with it. Some I was able to sell, some I wasn't; it's not my fault'. These views illustrate that farmers may find an audit system particularly onerous, and therefore may be candidates for special types of support. One large retailer said it was their role to assist with food waste reduction along the supply chain by working closely with consumers and farmers, suggesting a willingness to support others in their supply chains: 'We need to make sure that we don't spend our time looking at what we've got in stores and not spend time thinking about how we can play a role in educating and assisting customers and helping farmers at the other end' (9-R.D).

3. Supply Chain Approaches And Power

How responsibility for an audit will be integrated into the supply chain, as demonstrated already, may be complex. One retailer expressed the importance of a whole supply chain approach: 'I think if you're looking… thinking about auditing and making that sort of hotspots, the real challenge is how you capture wastage in the supply chain. From agriculture through processing. I mean, I think it's important that you capture the whole value chain' (10-R.D). A spectrum of views were expressed about which sector and size of business should be a) obliged to conduct enforced audits and b) responsible for food waste occurring further along the supply chain that they shape. The same

retailer explained how working closely with their suppliers could be a step towards reducing food waste further up their supply chain. Although such retailers expressed interest in working closely with other businesses in their supply chain, there were also concerns that supermarkets and big business could pass down costs and responsibility to their suppliers, with food waste audit becoming yet another requirement (1-PP.R). And so, whilst there seem to be great advantages of supply chain approaches, we must also remember that such an approach would sit in the context of existing supply chain power relations.

Concern About The Impact Of Transparency In Waste Data

Many of our respondents equated mandatory reporting to government with public reporting of food waste data. Relating to this, a further barrier was the commercial sensitivity of this data. Preoccupation with a similar concern, the endpoint of audit, is discussed in more detail in the next section, 'Shape of Audit'.

1. Commercial Sensitivity Of Publicly Released Data

Whilst some felt that a mandatory audit would decrease competition between those who would otherwise choose to participate in a voluntary audit and those who would not, others considered that disclosure could reveal the inefficiencies of those businesses without waste management systems. This was therefore deemed to be 'commercially sensitive' information that could damage a company's reputation, deterring customers and displeasing shareholders. A number of interviewees believed that many in the food industry would fear the reputational risks of making their food waste data public, with 12-PM feeling that the media can oversimplify messages to consumers and that there is a 'massive reputational risk' to companies of generating data which risks being 'interpreted in the wrong way, used in the wrong way or just out of context'. As we highlight in the next section, this led a few interviewees to express that data should not be made publicly available.

Interrogating barriers – summary

Although overall there was not an overriding sentiment against MFWA, interviewees had concerns, including those about the practicalities and business impact of increased regulation in an industry that is already heavily legislated. Reasons for MFWA outlined in section 1.5 (such as improved supply chain management, industry-wide food waste reduction achieved through the setting of more ambitious food waste reduction targets and improved food waste data) were listed as beneficial outcomes of MFWA, demonstrating support for parts of our wider rationale. There were explicit statements of preference for a voluntary audit system, but also expressions of support for mandatory mechanisms. It was clear that in order to support an effective audit, a range of barriers needed to be further understood and overcome.

Some barriers were specific to particular supply chain stages, such as the difficulty of measuring food waste at farm level due to complex input and output systems. Certain retailers also felt that an audit of any kind would detract resources from the development of their zero waste policy. More generic barriers related to the ease of implementation and cost of an audit and, significantly, uncertainty over who should shoulder such costs and the responsibility for waste. In section 1.6 we examined mandatory regulations such as Producer Responsibility Obligations Regulation and the new requirements for businesses listed on the London Stock Exchange to report their levels of greenhouse gas emissions from the start of the 2013/14 financial year. Such initiatives serve to inform thinking, exploring how business size relates to requirements to report on food waste. The set of cultural barriers, informed by a general resistance to further regulation and the negative connotations surrounding anything mandatory (not always held by the interviewee but generally stated as a perception of both industry and government), illustrated an industry stance that market efficiencies were the best tool for engendering food waste reductions and, as a part of that, food waste audits. This view reinforces ideas of ecological modernism, outlined in section 1.4. Related to this, there was a perception that industry reticence to buy into MFWA influenced the government's lack of interest in regulating, hence the current emphasis on voluntary responsibility deals.

Independent public reporting was recognised to be a motivational tool to encourage food waste reduction by some among our sample. Wider research on citizen opinions surrounding food waste has identified similar findings, referred to in section 1.3. Although there was some support for the idea of transparent public reporting, there were commonplace concerns surrounding the release of business food waste figures due to perceived reputational risk. The prevalence of such barriers that were external to businesses highlights the importance of attending to these wider issues when examining the feasibility of regulatory change, something not considered in most of the other cases of audit we examined in section 1.7.

Provided the audit came in the right format, with access given to appropriate tools and resources, certain barriers could be overcome. In our eyes, barriers outlined in our findings fall into three groups: more logistical barriers that respondents identified as surmountable, those relating to ideology and perceptions of audit that would be more difficult to tackle, and those that need further research.

Surmountable Logistical Barriers
Barriers seen as possible to overcome included the cost and complexity of audit and fear of disrepute. With the right consultation processes, interviewees could foresee implementing a well-designed, simple, quick and digitised audit system that generated accurate data through standardised delivery.

Perceptual Barriers
Immutable barriers related to industry perceptions and culture stemmed from individuals' specific points of view. Rejection of what respondents perceived as external regulatory interference in their business affairs could certainly decrease the accuracy of data reported and, through pressure on government, the chance of policy uptake. The few who were adamant that a MFWA was entirely unnecessary considered that it would detract efforts from direct food waste reduction initiatives currently being rolled out in sections of the industry.

Barriers That Need Further Consideration
Our findings indicate certain issues that need further research and engagement of stakeholder groups in a more nuanced debate. Key issues include lack of government leadership, responsibility for MFWA across the supply chain and concerns surrounding which sections of the supply chain should pay. This reflects the need for increased resources to be allocated to developing industry food waste prevention tools. With the budget cuts to Defra and WRAP outlined in section 1.3, this is something the government does not currently prioritise. Further enquiry into these areas will allow an understanding to arise about how best to tackle these barriers.

In the next section (3.4) we explore the characteristics of a MFWA which could overcome many of the barriers discussed above. Yet, given the scale of action necessary, we feel there is a need to go further and examine the ideological drivers of businesses' efforts to measure and manage food waste. In Box 1 we discuss whether the promise of cost efficiency alone is a sufficient force for change.

Box 1. An overarching barrier to action on food waste: the emphasis on business efficiency

A key ideological undercurrent in our interviews is an emphasis on cost savings as an incentive to reduce waste. We feel that this rationale alone is unlikely to result in the step change needed to tackle industry-wide food waste.

Where waste is tackled, it is done for financial reasons. Although a number of respondents did express environmental and social values, the main two reasons our interviewees saw to audit their food waste were firstly efficiency, where it made business sense to audit and reduce waste, and secondly that being seen to act on waste would gain customers, improve reputation, and thus increase profits. We feel it important to address a number of issues within this thinking.

Short-termism in business accounting skews the longer-term financial incentives to audit food waste. Food businesses currently operate on short-term time frames. Some of our interviewees pointed out that cash flow constraints may affect the willingness of SMEs to pay for an audit which will have long-term savings. For larger businesses, short-term reporting to shareholders often similarly drives the pursuit of short-term profits. The influential finance sector revolves around short-term profits. While this is the status quo it is difficult for businesses to invest in systems where returns will only be seen over a longer time frame.

Even if businesses could move past short-termist accounting, there are questions about the extent to which markets can drive change. The rhetoric of ecological modernisation, discussed in section 1.4, was encountered in our interviews. With the view that desires for efficiency would be enough to incentivise food waste audits, a number of interviewees expressed an opinion that the ability of markets to drive efficient change means there should be no need for government policy. Yet, as we discussed in section 1.1, the massive scale of food waste shows that under-regulated global markets do not value environmental and social goods in ways that lead to their efficient, sustainable use.

Green capitalism proposes solving such market inefficiencies by quantifying natural resources and bringing externalities into the marketplace as 'ecosystem services'. Such services are argued to be integral to human and environmental wellbeing. However "fundamental changes are needed in the way biodiversity, ecosystems and their services are viewed and valued by society. (De Groot, 2010,pg 4). The complexities of global food supply chains do not currently allow these costs to be completely internalised, even if this were theoretically possible. We do not know how to measure effectively across supply chains and appropriately transfer the environmental and social costs of materials (land, carbon, water, labour). A view that markets alone could encourage change also ignores the way in which costs may be externalised by one member of the supply chain and pushed onto another member (as in the case of cosmetic quality standards, the costs of which are generally borne by farmers whilst supermarkets profit). It seems that some costs would be impossible to internalise, such as the social injustice of a world of plentitude that cannot feed everyone. This is quite apart from the ethical issues associated with the privatisation and monetisation of natural resources.

The view that the impetus for efficiency negates the need for regulation also ignores the ways in which market incentives are currently shaped by government regulation, for example the landfill tax, and poses regulation and markets as opposite ends of a scale. We question whether such a lean business approach can drive the level of change needed without government involvement. This perception that business desires for efficiency are all that is needed for resource efficiency is a thread that weaves through many of the barriers to MFWA.

As we detail in our conclusions, we feel that civil society and government, as well as business, have roles in engendering change. In section 1.1 we outline that large food businesses tend to practice without transparency or accountability (Stuart, 2009, p112), although accountability is deemed by WRAP (2011a, p3.) to be a 'pre-requisite' for food waste management. Without transparency and accountability on waste, citizens are ill equipped to make informed decisions and contribute to the debate on reducing industry food waste.

The debate around food waste illustrates one small element of the wider challenge to create sustainable food systems. Food waste is a symptom of an economic paradigm that influences the markets and politics of today's food system. It must, therefore, be seen not as an isolated problem but as part of an integrated food system, and it must be tackled in such a way as to address the structural inequalities inherent in that system.

3.4. THE SHAPE OF AN AUDIT SYSTEM

Building on the overriding perception described in sections 3.1 and 3.2 that audit is a valuable and integral element of waste reduction, respondents identified design features that could make an audit effective and tackle the barriers to its implementation outlined in the previous section. There was a strong feeling from interviewees that the success of a MFWA was dependent upon the form it took. A properly designed MFWA could even have a feedback effect on some of the barriers examined above, such as industry perceptions of regulation. Some of the features and tools we discuss below could be satisfied by a voluntary audit scheme. The CC (not an audit scheme, but the most established policy driving industry food waste measuring and reporting) has incorporated many of these and should be commended accordingly.

The most compelling arguments for a mandatory system refer to the need to engage businesses who are not measuring their food waste and to push best performers to be more ambitious in preventing waste. Here, therefore, we focus on the characteristics that make a successful MFWA effective, whilst avoiding, as far as possible, features that respondents objected to and overcoming the barriers they identified. These characteristics can be divided into: the definition of food waste, the implementation of audit, the utility of audit and what action a MFWA would require from different businesses. These factors we have termed 'what', 'how', 'why' and 'who'. Some of the characteristics of MFWA were more widely agreed on than others. However, bearing in mind our respondents concerns, in this section we propose the shape of a successful MFWA. What is clear is that this is just the beginning of these debates, and later we outline key discussions that need to be instigated in order to bring these issues into the open.

What?

- A central concern was the **need for clear definitions** of food waste. 12-PM expressed 'I think they would really want, and what's been a strength under Courtauld, is consistency of definition'. There is a decision to be made here between more detailed audits, which may examine the causes and types of food waste as well as quantities and disposal routes, and simpler, less detailed measures. 20-PI suggested that although more detailed audits facilitated targeted action on waste, they were also likely to be more onerous and less universally applicable. This is a central challenge – collecting data that allows effective quantification and appropriate targeting of food waste, but collecting it in a simple way. One mechanism through which this could be done would be to collect essential and non-essential information. As detailed in section 1.6, the Carbon Trust employs a practice where businesses can choose a range of reporting methods, as long as they publicly report their methodology. Such an approach allows businesses to choose a reporting system that best suits them.

How?

- By far the most commonly mentioned feature of a successful audit was **simplicity**. A number of interviewees felt that this could be achieved with an electronic system that was integrated into existing stock-taking mechanisms. '…it's integrating it into the system you've already got really' (1-PP.R). This view was also expressed in section 1.7, where industries involved with prior audits called for a simple and cost effective system. A key reason for this was that it would reduce resource requirements: one interviewee thus saw **opportunities for coordinating with other reporting requirements**, for example the waste records businesses are required to hold[6]. As highlighted in section 1.6, reporting requirements could be added to GHG or IPPC reporting requirements, or the food quality audit requirements, to minimize the additional burden.

- It was emphasised that new policies should **build on existing efforts** to measure waste, for example by WRAP and IGD, as well as current voluntary measures and food waste prevention practices and the lessons learnt from all these.

- Bearing in mind persisting negative perceptions of mandatory audit in industry (although not from all our interviewees), respondents in favour of a compulsory system suggested that it be combined

[6] *Businesses are legally required to hold waste transfer notes which outline details of the waste they hand over to waste disposers.*

with **communication and education programs, as had been the case in previous audits** (see section 1.7). These would explain its economic, social and environmental value and provide the skills necessary to implement it through workshops, training, access to advice, personal support and online case studies. 7-M.D.R felt that businesses were unlikely to perform audits voluntarily, but 'with an education process, it could work'.

- Some interviewees considered that public opinion could help drive the uptake of MFWA. One way to overcome strong views that the resource burden of a mandatory audit was excessive and that it would hinder food waste initiatives would be to involve active citizenship, mobilising public opinion to call for the introduction of a mandatory audit, regulated by the government.

Why?

- A number of interviewees felt that there is a need to **make the financial rewards of audit clear,** although such an emphasis on efficiency does embody the ecological modernisation perspective that sits somewhat uneasily with an ideological commitment to food waste reduction. Related to the idea that financial benefit should be made explicit, 10-R.D felt that any audit would need to be **proven to be effective**, and any scheme would therefore need to be piloted.

- A clear goal must be to **bring non-starters on board**. Some used this as an argument for voluntary audits: 8-R.D felt that a MFWA audit 'would actually deter people who are trying to get onto this journey, who are not as far as we are, from doing any donations at all'. Some, however, used this as an argument for a compulsory system: 19-PI said that 'I think being mandatory… you may then bring on board some companies who just for whatever reason hadn't looked at their business practice in that way'.

- Respondents were keenly aware that the purpose of audit was to act as part of a waste management strategy. Being clear about this was perceived as central to the success of an audit. The conflict between management and measurement could be tackled by explicitly integrating **audit into a waste reduction system**, not just appearing to perform an audit for its own sake. As 12-PM highlighted, 'the driver is about how could this help people take action on food waste'. There was therefore a **need for the end point of the audit to be clear** from the outset, whether it was to facilitate sanctions, provide data to help businesses to become more efficient or construct a league table to enable shareholders and customers to hold businesses to account.

- One respondent emphasised that, whatever the end-point, a MFWA would need to be **enforceable**. 'The thing about regulation… is it only works if it's enforceable' (18-PI). Education efforts were seen by some to walk hand in hand with any enforcement.

- The point about the need for a clear end-point to an audit relates to concerns about **data disclosure and transparency**, key issues relating to the format of a MFWA. Some interviewees felt that the larger players in the food industry were only interested in engaging with a system where waste data were confidential. 10-R.D suggested that food waste figures be reported anonymously to an industry body such as the IGD, who would then report an industry-wide figure, as happens now with the waste data collected by WRAP for the Courtauld Commitment. However, if informed customers were seen as a powerful driving force for tackling food waste (a contested point amongst our interviewees), this issue could not be dealt with in this way. The controversial nature of this problem means that it requires further debate to ensure it is not an obstacle to a MFWA.

Who?

- There is a need for a MFWA scheme to take account of the **vast differences between businesses in the food industry,** particularly as small businesses and farms have different capacities to implement audits, and there is a perception from some that they produce little or no waste. As detailed in Section 1.6, any audit needs to have a clear definition of who it involves, and measurements and definitions of waste must reflect this. A number of suggestions were made for who would be required to audit. These were:

Universality - audit would be mandatory for all stages of supply chains and all business sizes. This would bring on board non-engagers.

Selectivity - audit would only be mandatory for those businesses whose size and place in the supply chain made audit easy – perhaps big retailers. This was suggested by a number of smaller producers and by 14-PI, who felt that requirements for audit could sit alongside requirements on companies to file accounts, which only apply to businesses with a turnover above £60 million.

A tailored approach - different methods and requirements for various types of businesses.

There is a need to consider **who will and should pay**. As the cost of a mandatory food waste audit scheme is a significant barrier to its implementation, some businesses felt it should be cost-free to them and some suggested subsidy. Some smaller businesses felt larger businesses should support these efforts. This contested issue is particularly pertinent in times of austerity.

There is therefore a need to consider the pros and cons of a **supply chain approach,** described in more detail in section 1.6, in scope of audit section. The large retailer employing 10-R.D was starting to do that in their own operations, despite 10-R.D's perception that 'fragmented and multi-tiered supply chains are a massive, massive challenge'. Yet another interviewee (1-PP.R) sounded words of warning, feeling that this could become another system to shift responsibilities down supermarket's supply chains. Supply chain approaches have great advantages, as 1-PP.R pointed out, but these need to be considered in the context of the power structures inherent in contemporary food systems.

Examining the 'what', 'how', 'why' and 'who' aspects of MFWA, it is clear that there is currently significant uncertainty about certain aspects of the shape of a future MFWA. Questions surrounding each of these four points are central issues for future debate, and have only begun to be interrogated in our research.

4. Conclusion

Through the IFWAP project we set out to explore the feasibility of MFWA as an effective policy mechanism to drive down industry-wide food waste. We wanted to find out if there was industry-wide opposition to MFWA, and what the key barriers were seen to be, from a range of positions within the UK food industry. We aim to inform proposals to policy-makers and businesses to address the problem of industry food waste, keeping in mind the feasibility of industry-wide implementation.

Our introduction showed that this is a timely enquiry. Food waste has become a high profile public issue due to its social and environmental impacts. In a time where climate change and resource security are identified as areas in need of 'urgent action' (as described by Professor Sir John Beddington (Linden, 2013), continuing to waste food which is responsible for up to 10% of the UK's and US's GHG emissions, (Stuart, 2009, p92) is a problem in need of immediate address. Industry is starting to address the issue but, as our results show, although food waste audits were often seen as sensible from a business perspective very few businesses currently audit food waste, and many are concerned about the reputational risk of public disclosure. Worryingly, food waste is low on the agenda of the 'greenest ever' UK government, evident in the budget cuts made to Defra and WRAP, and current low and non-food-specific industry waste reduction targets.

Our data reveal a mix of views about voluntary audits. The perceived benefits of voluntary agreements include their effectiveness in engaging businesses, encouraging ideological buy-in and thus being more likely to lead to more accurate data. An Ecological Modernisation perspective identifies the business case for tackling food waste, and this was a prevalent discourse in our data, showing how voluntary agreements are riding the wave of existing interest. However, interviewees also identified that voluntary approaches do not always bring about change quickly enough and to the scale required, and there are disadvantages to early adoption. Finally, there was much concern about standardised measurement methods and some doubt over perceived consumer interest in food waste, resulting in business apathy.

In section 3.3 we unpacked barriers to MFWA in more detail. The barriers fell into five themes: costs, industry perceptions, government policy approach, practicalities, and concerns around data transparency. In contrast to the literature on food quality and clinical audits, our data suggest the utility of attending to external barriers to MFWA. Barriers fell into three key groups:

- Surmountable logistical barriers
- Perceptual barriers
- Barriers in need of further consideration

In section 3.4, we examined what an audit system might look like, taking into consideration barriers listed by our interviewees, and attempting to think of audits that would design out limiting characteristics.

Food waste is not an isolated problem, but symptomatic of a food system under strain. Significant structural change is needed in order to tackle the causes of food waste. The key question that needs to be considered is where this change will stem from. Many of our interviewees said that cost was the biggest barrier to conducting a MFWA, while others considered there was a strong financial case for tackling waste. However, as we discuss in Box 1, business efficiency incentives must be seen as just one of the many possible instigators of change. We feel that sustainability needs to be embedded in businesses' practices rather than being tacked on to a profit-driven ways of working. 'Beyond Business as Usual', the latest report from the Food Ethics Council, calls for new business models that define sustainability as being 'commercially successful while providing social value within the limits of the planet' (FEC, 2013).

The impetus for change must also come from the government. Section 1.3 showed that food waste is not a priority for the current administration, a perspective espoused by some of our interviewees.

The government needs to move beyond providing an enabling environment within which businesses and civil society can make progress on sustainability (FEC, 2013) to acknowledging its role in creating policy frameworks that encourage businesses to tackle food waste. Where businesses are not acting urgently or on a large enough scale, more assertive government intervention is needed to address major unsustainable practices in the food industry. At present it seems likely that any regulatory change introduced will be driven from European level rather than nationally: EC and EP reporting requirements and targets currently drive food waste reduction, and their current agenda on industry food waste measuring and reporting is more progressive (EC, 2010).

Bearing in mind the more tentative approach the UK government has hitherto had to the issue, the emphasis some interviewees laid on customer preference indicates a potential role for civil engagement in furthering debate and action. We feel political citizenship can assist in bringing around the long-term outlook necessary to drive the fundamental changes today's global food system needs. Section 1.3 detailed how citizens can highlight areas in need of rapid improvement, such as supply chain and big business food waste, and keep the pressure on the government to bring around a systemic change that represents the environmental and social welfare interests of their constituents. Yet there are fundamental questions around food waste transparency. If citizens (and shareholders) are to act as monitors, they need access to accurate data. As expressed in section 3.2 some saw a disadvantage of voluntary audit to be that businesses were not motivated to meet voluntary targets, as some thought that consumers didn't care enough about food waste. Enabling citizens to get involved with wider debate through civic engagement, as opposed to consumer choice, is a powerful way to effect change on an issue generating increasing public concern.

These issues relate to the key question of who takes **responsibility** for engendering the change needed to reduce food waste. There is a need for a shift in thought on what, and who, the drivers of change will be – including the roles and responsibilities of government and citizens as well as industry. This research has primarily investigated the viability of a MFWA from the perspective of one key stakeholder, industry. Citizens, academics, researchers and campaigners are also key agents in shaping action against industry food waste. We urge the government to listen to and consider calls for change from voices beyond as well as within industry.

Our data demonstrated a particular central conflict. This was between the preference of government and some sectors of industry for voluntary mechanisms, for some understandable reasons, yet the failure of those mechanisms thus far to deliver meaningful change. Understanding and resolving this, alongside the other key barriers we identified, is key to enabling the prevention of industry-wide food waste.

The recommendations below are based on the findings of the IFWAP research project and are deemed to be both realistic and high impact. It is important to reiterate that IFWAP recommendations are separate from TiR's main campaign asks; calling for the introduction of mandatory food waste audits and ambitious food waste reduction targets. We uphold these wider campaign asks to keep pressure on the government to take action in regulating the food industry. TiR feels that regulatory intervention is an effective approach to bringing around far and fast reduction in industry food waste, and that businesses need to be held to account to act transparently on the issue of reporting and reducing food waste. It is also important to regulate businesses where change is not happening fast or far enough, as is currently the case with food waste.

5. Recommendations

Recommendation One: Strengthen Existing Voluntary Agreements

Given the importance of building on current efforts to tackle food waste, we call for the following additions to be made to the CC. We believe that there are some significant flaws, discussed in the introduction, which deem it short-term, unambitious, and limited involvement. With CC phase 3 on the horizon the timing of this proposal is particularly pertinent to that agreement, yet many of the points we make here are also relevant to other voluntary agreements in the food industry, such as the Hospitality and Food Service Agreement.

Separate Targets For Food Waste
The CC phase 2 aimed to reduce traditional grocery product and packaging waste in the grocery supply chain by 5% by 2012 from a 2009 baseline, including food, packaging and mixed waste. Food waste needs to be measured and given targets independently.

Longer-Term, Stretching Targets
Given the views that current action on food waste is simply insufficient, we feel there is a need for industry food waste prevention targets to be more ambitious. We call for targets to be set in line with the needs of a resource-finite world rather than industry's ability to meet them. CC phase 1 spanned a five year timeline, while phase 2 covered two years. This short-term target does not guarantee ongoing commitment. As mentioned in our introduction, the EP's target is to half food waste by 2025 (EP, 2011). We call for a pathway of targets that identify how we will meet longer-term targets in line with the EP's.

Whole Supply Chain Engagement
Our interviews highlighted the need to engage more businesses in preventing food waste. We call for a clear pathway for engaging SMEs and all stages of supply chains (in particular farmers) and bringing them on board. We propose a mentoring system whereby large companies guide a number of SMEs through the reporting process, providing them with resources and training. We also call for WRAP to expand their best practice case studies in their CC phase 3 learning resources, extending these resources to SMEs and farmers. We also call for targets for engaging the rest of industry, so that the success of the agreement could also be measured against these.

Given the concerns relating to self-reporting, we feel that systems need to be provided for self-reported data to be independently spot-checked to ensure accuracy and standardisation.

Recommendation Two: Pave The Way For Regulation If Voluntary Agreements Fail

Having set up more stringent voluntary agreements, the government needs a transparent back-up plan in case industry fails to produce results. This would entail ambitious, long-term food-specific waste prevention targets and mechanisms to encourage industry buy-in to such agreements. If industry cannot drive the level of change required, we feel there is a role for stronger government in the shape of regulation and enforcement. As highlighted in our introduction, this was the point made by SDC, who called for proposals 'to ensure that voluntary agreements such as Courtauld could be enforced if they do not deliver' (SDC, 2008a, p.14). This would give business an incentive to meet more stringent voluntary targets.

Given the need for a transparent back-up plan, we call for government-led research and debate on a range of regulatory policy packages, as is being considered at a European level (EC, 2010). It is crucial that debate is opened within government and industry on mandatory food waste audits and the policies, such as food waste reduction targets, that could follow audit. We recognise that any such policy changes would need cross-party support and civil society endorsement. The success of previous CC phases, and the increasing concern about food waste among the public, government and industry suggests an existing momentum in this direction.

There is potential for a MFWA to form part of an effective regulatory package, so we call for continued research and debate on overcoming the barriers to successful MFWA outlined in this report. Our findings identified three clear areas for further research and debate: how to take account of differences between businesses in the food industry, what a supply chain approach might look like, and whether data would be transparent.

Recommendation Three: Engaging In Debate On The Impetus For Change

There is a wider debate to be had about the drivers for change in food systems. This conversation has begun with bodies like the SDC and FEC calling for stronger government action. Civil society must also play a role in effecting change. We feel that there is a need for more citizen engagement on these issues, and discussing regulation is a useful way into this debate. To concentrate attention on these important questions, we call for wider resourcing of public debate on the drivers of tackling industry-wide food waste. We feel that the main issues fit broadly into discussions about the roles and responsibilities of government, industry and civil society.

This requires two key inputs: further research into an evidence-led approach, measuring the true scale of the problem; and establishment and financing of public debate platforms. Examples include better provision and publication of information on the food waste commitments of different businesses and groups, and the extent to which they have acted on those commitments. With such tools, citizens are equipped to hold all other actors to account for their efforts to improve the food system. Alongside this investment we encourage citizens and public interest groups to take a lead on lobbying the government to take action on industry food waste.
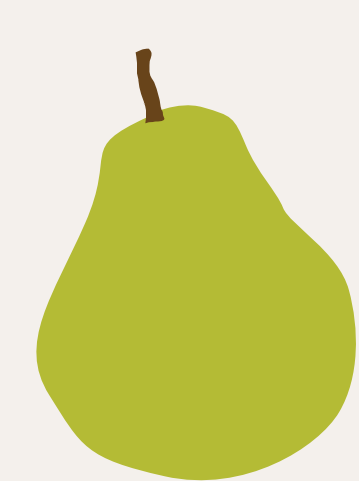
References

Alvarez-Larrauri, R. and Fogel, I. (2008) Environmental audits as a policy of state: 10 years of experience in Mexico. *Journal of Cleaner Production*. 16(1), 66–74.

Bloom, J. (2010) *American Wasteland*. Boston: Perseus Books Group.

BRC (British Retail Consortium) (2013) *Policies & Issues: Environment, Food Waste*. Available from: http://www.brc.org.uk/brc_policy_content.asp?iCat=43&iSubCat=651&spolicy=Environment&sSubPolicy=Food+Waste (date last accessed 30.3.13).

Buttell, F. H. (2003) Internalizing the societal costs of agricultural production. *Plant Physiology*. 133(4), 1656–1665. Available from: http://www.plantphysiol.org/content/133/4/1656.full (date last accessed 30.3.13).

Carbon Trust (2013) *Mandatory Carbon Reporting*. Available from: http://www.carbontrust.com/resources/guides/carbon-footprinting-and-reporting/mandatory-carbon-reporting (date last accessed 30.3.13).

Davies, H., Powell, A. and Rushmer, R. (2007) *Healthcare Professionals' Views on Clinician Engagement in Quality Improvement: A Literature Review*. Universities of Dundee and St Andrews: The Health Foundation.

DECC and Defra (2011) *Anaerobic Digestion Strategy and Action Plan: A Commitment to Increasing Energy from Waste through Anaerobic Digestion*. London: Defra. Available from: http://www.defra.gov.uk/publications/files/anaerobic-digestion-strat-action-plan.pdf (date last accessed 30.3.13).

Defra (2010a) *Food 2030*. London: Defra. Available from: http://archive.defra.gov.uk/foodfarm/food/pdf/food2030strategy.pdf (date last accessed 30.3.13).

Defra (2010b) NoofHoldingsbyfarmtypeandcounty.xls. Available from: http://archive.defra.gov.uk/evidence/statistics/foodfarm/landuselivestock/junesurvey/documents/NoofHoldingsbyfarmtypeandcounty.xls last updated December 20, 2012 (date last accessed 30.3.13).

Defra (2011) *Government Review of Waste Policy in England* 2011. London: Defra. Available from: http://www.defra.gov.uk/publications/files/pb13540-waste-policy-review110614.pdf (date last accessed 30.3.13).

Defra (2013a) Biodiversity, plants and animals. What we are doing in the UK. http://www.defra.gov.uk/environment/natural/biodiversity/uk/ (date last accessed 30.3.13).

Defra (2013b) *Measuring and Reporting Environmental Impacts*. Available from: http://www.defra.gov.uk/environment/economy/business-efficiency/reporting/ (date last accessed 30.3.13).

De Groot, R (2010) *Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation*. Available from http://www.teebweb.org/wp-content/uploads/2013/04/D0-Chapter-1-Integrating-the-ecological-and-economic-dimensions-in-biodiversity-and-ecosystem-service-valuation.pdf (date last accessed 30.3.13).

Etkins, P. (2008) *Policies to Achieve Dematerialisation: A 'Thinkpiece' for the Project of the Sustainable Development Commission 'Economy Lite – Can Decoupling Work?'* London: SDC.

European Commission, EC (1999) Directive 1999/31/EC of 26 April 1999 on the landfill of waste. Available from http://ec.europa.eu/environment/waste/landfill_index.htm (date last accessed 30.3.13).

EC (2010) Preparatory study on food waste across EU 27, Technical report 054, EC. Available from: http://ec.europa.eu/environment/eussd/pdf/bio_foodwaste_report.pdf (date last accessed 30.3.13).

EC (2011) *Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee and The Committee of the Regions: Roadmap to a Resource Efficient Europe,* 20/09/2011. Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:DKEY=615217:EN:NOT (date last accessed 30.3.13).

EU-FUSIONS (2013) About FUSIONS [Online]. Available from: eu-fusions.org (date last accessed 30.3.13).

European Parliament, EP, and EC (2008) Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. Available from: http://europa.eu/legislation_summaries/environment/waste_management/ev0010_en.htm (date last accessed 30.3.13).

EP (2011) *European Parliament Resolution of 19 January 2012 on How to Avoid Food Wastage: Strategies for a More Efficient Food Chain in the EU*, 2011/2175(INI). Available from: http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P7-TA-2012-0014&language=EN&ring=A7-2011-0430 (date last accessed 30.3.13).

European Parliament/News (2013) Parliament calls for urgent measures to halve food wastage in the EU. Available from: http://www.europarl.europa.eu/news/en/headlines/content/20120106FCS34949/10/html/Parliament-calls-for-urgent-measures-to-halve-food-wastage-in-the-EU (date last accessed 30.3.13).

FAO (1985) *Prevention of Post-Harvest Food Losses: A Training Manual*. Rome: FAO.

FAO (2010) *Global Hunger Declining, but Still Unacceptably High*. Rome: Economic and Social Development Department (FAO). Available from: http://www.fao.org/docrep/012/al390e/al390e00.pdf (date last accessed 30.3.13).

FAO (2011) *Global Food Losses and Food Waste*. Rome: FAO.

FareShare (2011) *FareShare Media Kit*. Available from: http://www.fareshare.org.uk/wordpress/wp-content/uploads/2011/07/FareShare-Media-Kit1.pdf (date last accessed 30.3.13).

Fish Fight (2013) *Discards: Causes and Solutions*. Available from: http://www.fishfight.net/blog/Discards-Causes-and-Solutions/ (date last accessed 30.3.13).

Food Ethics Council (2013) *Beyond Business as Usual: Towards a Sustainable Food System*. Brighton: Food Ethics Council (date last accessed 30.3.13).

Foresight (2011a) *The Future of Food and Farming: Final Project Report*. London: The Government Office for Science. Available from: http://www.bis.gov.uk/assets/foresight/docs/food-and-farming/11-546-future-of-food-and-farming-report (date last accessed 30.3.13).

Foresight (2011b) *Workshop Report: W4 Expert Forum on the Reduction of Food Waste*. London: The Government Office for Science. Available from: http://www.bis.gov.uk/assets/foresight/docs/food-and-farming/workshops/11-608-w4-expert-forum-reduction-of-food-waste (date last accessed 30.3.13).

Fotopoulos, C., Kafetzopoulos, D. and Gotzamani, K. (2011) Critical factors for effective implementation of the HACCP system: A Pareto analysis. *British Food Journal*. 113(5), 578–597.

Gibbs, D. (2006) Prospects for an environmental economic geography: Linking ecological modernization and regulationist approaches. *Economic Geography*. 82 (2), 193–215.

Glaser, B. and Strauss, A. (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New Jersey: Transaction Publishers.

Green Alliance (2010) *A Pathway to Greener Products: Recommendations from Green Alliance's Designing Out Waste Consortium*. Available from: http://www.valpak.co.uk/Libraries/General_Documents/Green_Alliance_A_Pathway_to_Greener_Products.sflb.ashx (date last accessed 30.3.13).

Gunders, D. (2012) *Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*. Natural Resources Defense Council. Available from: http://www.nrdc.org/food/files/wasted-food-IP.pdf (date last accessed 30.3.13).

HM Government (2007) *The Producer Responsibility Obligations (Packaging Waste) Regulations 2007*. London: HMSO. Available from: http://www.legislation.gov.uk/uksi/2007/871/pdfs/uksi_20070871_en.pdf (date last accessed 30.3.13).

HM Government (2011) *The Carbon Plan: Delivering our Low Carbon Future*. London: Department of Energy and Climate Change. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf (date last accessed 30.3.13).

Hogan, H., Basnett, I. and McKee, M. (2007) *Consultants' attitudes to clinical governance: Barriers and incentives to engagement*. Public Health. 121(8), 614–622.

IGD (2013) *Supply Chain Waste Prevention Guide 2013 – From Factory In-Gate to Till*. Available from: http://www.igd.com/our-expertise/Supply-chain/Sustainable-supply-chains/2661/Supply-Chain-Waste-Prevention-Guide-2012-from-factory-in-gate-to-till/Five-to-Drive-to-Prevent-Waste/Supply-Chain-Waste-Prevention-Guide-Five-to-Drive-to-Prevent-Waste/ (date last accessed 30.3.13).

Institute of Mechanical Engineers (2013) *Global Food – Waste Not, Want Not*. London: Institute of Mechanical Engineers. Available from: http://www.imeche.org/Libraries/Reports/Global_Food_Report.sflb.ashx (date last accessed 30.3.13).

Jackson, T. (2009) *Prosperity Without Growth: Economics for a Finite Planet*. London: Earthscan.

Jänicke, M. (2008) Ecological modernisation: New perspectives. *Journal of Cleaner Production*. 16(5), 557–565.

Johnston, G., Crombie, I. K., Alder, E. M., Davies, H. T. O. and Millard, A. (2000) Reviewing audit: Barriers and facilitating factors for effective clinical audit. *Quality in Health Care*. 9(1), 23–36.

LeanPath (2013) LeanPath overview and customer results. Available from: http://www.leanpath.com/videos/ (date last accessed 30.3.13)

Linden, M (2013) Climate change will bring greater extremes in weather, warns government's chief scientific adviser.. *The Independent online*. Available from: http://www.independent.co.uk/environment/climate-change/climate-change-will-bring-greater-extremes-in-weather-warns-governments-chief-scientific-adviser-8547893.html (date last accessed 30.3.13).

MacMillan, T. (2011) Nudge politics: Analysis. In: Food Ethics Council (ed.) *Nudge Politics: Changing Government, Changing Lives*. Food Ethics 6(1), p.3.

McCarthy, M. and Byrne, G. (1997) Surgical audit: The junior doctor's viewpoint. *Journal of the Royal College of Surgery Edinburgh*. 42(5), 317–318.

Mol, A. P. J. and Sonnenfeld, D. A. (2000) Ecological modernisation around the world: An introduction. *Environmental Politics*. 9(1), 1–14.

Quinn, I. (2012) Retailers and suppliers motor ahead with waste targets. *The Grocer* (11 Oct 2012). Available from: http://www.thegrocer.co.uk/companies/retailers-and-suppliers-motor-ahead-with-waste-targets/233336.article (date last accessed 07.04.13).

Random (2013) True random number generator. Available from: http://www.random.org/ (date last accessed 07.04.13).

Reece, A. (2013) Wrap budget cut by 11%. *Resource Magazine*. Available from: http://www.resource.uk.com/article/Latest/WRAP_budget_cut_11_cent-2582#.UUH-TdaTKuI (date last accessed 07.04.13).

Roberts, C. M., Lowe, D., Barnes, S. and Pearson, M. G. (2004) A prospective study of the practical issues of local involvement in national audit of copd. *Journal of Evaluation in Clinical Practice*. 10(2), 281–290.

Robinson, S. (1996) Evaluating the progress of clinical audit: A research and development project. *Evaluation*. 2(4), 373–392.

The Scottish Government (2011) *Policy Statement: Zero Waste Regulations*. Available from: http://www.scotland.gov.uk/Resource/Doc/360341/0121809.pdf (date last accessed 30.3.13).

The Scottish Parliament (2012) SPICe *Briefing: The Waste (Scotland) Regulations 2012*. Available from: http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_12-18.pdf (date last accessed 30.3.13).

SDC (Sustainable Development Commission) (2008a) *Green, Healthy and Fair: A Review of the Government's Role in Supporting Sustainable Supermarket Food*. London: SDC. Available from: http://www.sd-commission.org.uk/publications.php?id=692 (date last accessed 30.3.13).

SDC (2008b) *Memorandum by the Sustainable Development Commission to the Select Committee on Science and Technology*. Available from: http://www.publications.parliament.uk/pa/ld200708/ldselect/ldsctech/163/8031103.htm (date last accessed 30.3.13).

Sen, A. (1981) *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford: Clarendon Press.

SIWI (2012) Press release: World Water Week opens with call for global action to reduce food waste, Stockholm. Available from: http://www.worldwaterweek.org/documents/Press_Releases/OPENING_PRESS_RELEASE_WWW_2012_AUGUST_27.pdf (date last accessed 07.04.13).

Smil, V. (2004) Improving efficiency and reducing waste in our food system. *Environmental Sciences*.1(1), 17–26. Available from: http://www.tandfonline.com/doi/pdf/10.1076/evms.1.1.17.23766 (date last accessed 30.3.13).

Sourry, A. (2012) Consumers want it. Now is the time to act on food waste. *The Grocer* (29 September 2012). Available from: http://www.thegrocer.co.uk/opinion/the-grocer-says/consumers-want-it-now-is-the-time-to-act-on-food-waste/233026.article (date last accessed 30.3.13).

Stenmarck, A., Hanssen, O. and Werge, M. (2011) Initiatives on prevention of food waste in the retail and wholesale trades. Swedish Environmental Research Institute. Available from: http://www.ivl.se/download/18.7df4c4e812d2da6a416800089028/B1988.pdf (date last accessed 30.3.13).

Stuart, T. (2009) *Waste – Uncovering the Global Food Scandal*. London: Penguin Books.

Stuart, T. (2013) Christine @Lagarde MD of IMF addressing #wcs conference: Number 1 priority to solve the world's food problem is eliminate #foodwaste. [Twitter] 28 Jan 2013. Available from: https://twitter.com/Feeding5k/status/295951638928191490. (date last accessed 30.3.13).

Tupper, J. and Whitehead, P. (2011) *Reducing Food Waste through Retail Supply Chain Collaboration*. WRAP: Banbury. Available from: http://www.wrap.org.uk/sites/files/wrap/WRAP_IGD_supply_chain_report.pdf (date last accessed 30.3.13).

Waitrose Media Centre (2013) Waitrose achieves zero food waste to landfill ahead of target. 24 October, 2012. Available from: http://www.waitrose.presscentre.com/Press-Releases/Waitrose-achieves-zero-food-waste-to-landfill-ahead-of-target-a98.aspx (date last accessed 30.3.13).

Waste Watch (2010) Response to the consultation on the review of waste policies. Available from: http://www.wastewatch.org.uk/data/files/resources/10/Waste-Watch-response-to-the-Waste-Policy-Review.pdf (date last accessed 30.3.13).

Wetherill, P (2010) UK business: Activity, size and location – 2010 (Newport: UK Office for National Statistics). Available from http://www.ons.gov.uk/ons/rel/bus-register/uk-business/2010/uk-business--activity--size-and-location-2010---publication.pdf. Last accessed 26/3/2013 (date last accessed 30.3.13).

World Bank (2012a) *Food Price Watch*. November 2012. Available from: http://siteresources.worldbank.org/EXTPOVERTY/Resources/336991-1311966520397/Food-Price-Watch-November-2012.htm (date last accessed 30.3.13).

World Bank (2012b) *Global Monitoring Report 2012: Food Prices, Nutrition, and the Millennium Development Goals*: Overview. Available from: http://siteresources.worldbank.org/

INTPROSPECTS/Resourc es/334934-1327948020811/8401693-1327957211156/8402494-1334239337250/Overview.pdf (date last accessed 30.3.13).

WRAP (2010) Waste arisings in the supply of food and drink to households in the UK. Available from: http://www.wrap.org.uk/sites/files/wrap/Waste%20arisings%20in%20the%20supply%20of%20food%20and%20drink%20toUK%20households,%20Nov%202011.pdf (date last accessed 30.3.13).

WRAP (2011a) Fruit and vegetable resource maps. Available from: http://www.wrap.org.uk/sites/files/wrap/Resource_Map_Fruit_and_Veg_final_6_june_2011.fc479c40.10854.pdf (date last accessed 30.3.13).

WRAP (2011b) Resource Maps for Fresh Meat across Retail and Wholesale Supply Chains. Available from: http://www.wrap.org.uk/sites/files/wrap/RSC009-002_-_Meat_Resource_Map.pdf (date last accessed 30.3.13).

WRAP (2011c) Resource Maps for Fish across Retail and Wholesale Supply Chains. Available from: http://www.wrap.org.uk/sites/files/wrap/Resource%20Maps%20for%20Fish%20across%20Retail%20and%20Wholesale%20Supply%20Chains.pdf (date last accessed 30.3.13).

WRAP (2011d) Sustainable food. Written evidence by WRAP. Available from: http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenvaud/writev/food/m31.htm (date last accessed 30.3.13).

WRAP (2013a) Courtauld Commitment 2 targets, progress and benefits. Available from: http://www.wrap.org.uk/content/courtauld-commitment-2-targets-progress-and-benefits (date last accessed 30.3.13).

WRAP (2013b) *The Hospitality and Food Service Agreement*. Available from: http://www.wrap.org.uk/content/hospitality-and-food-service-agreement-3 (date last accessed 30.3.13).

THANK YOU

THIS IS RUBBISH
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Image: Food waste, being discarded at a fruit and vegetable wholesaler in London