

HIDDEN WASTE:

THE ROADMAP TO TRACKING AND REDUCING FOOD SURPLUS AND WASTE ON UK FARMS



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ACKNOWLEDGEMENTS

WWF-UK (2022) Hidden Waste: The Roadmap to tracking and reducing food surplus and waste on UK farms

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WWF-UK and Tesco partnership

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The views expressed within this report are those of WWF-UK and we recognise that providing feedback on this report does not mean these organisations adopt the same views. This Roadmap is provided as guidance and support for food system actors wishing to support farmers and work towards these goals and engagement does not imply a binding commitment to deliver all the actions outlined.

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EXECUTIVE SUMMARY

In the recently released Hidden Waste,ⁱ a report by WWF-UK and Tesco, it was revealed that an estimated 3.3 million tonnes of food may be lost and wasted on farms in the UK each year. This suggests food waste at farm stage represents over 25% of food loss and waste (FLW) in the UK. This has a huge environmental impact, with food waste on farms based in the UK contributing 6 million tonnes of CO₂e, equivalent to approximately 10% of UK agricultural GHG emissions.ⁱⁱ This waste also has significant financial implications for farmers already facing rising input costs, with UK on-farm food waste estimated to be worth £1.8 billion.ⁱⁱⁱ Despite this, work on food waste in this stage of the supply chain is limited.

In order to drive a reduction in food surplus and waste on farm, a pivotal first step is to increase the number of farmers measuring and reporting food surplus and waste. When utilising measurement methods waste is often higher than anticipated by farmers, and drivers and hotspots can be accurately identified, supporting actions to reduce them and so driving an increase in farm profitability by an average of 20%. However, despite the potential environmental and financial benefits, there is currently low uptake of food surplus and waste measurement on UK farms, with little having been done to engage or support farmers in an area that is integral to the sustainable agriculture agenda. As such, this Roadmap focuses largely on increasing the uptake of measurement of food surplus and waste on UK farms, enabling farmers to act on their own farms and with the long-term objective of utilising the data collected in this to drive meaningful changes to the post farm-gate drivers of food surplus and waste, and food system practices and policy that perpetuate waste. Collecting such data is imperative to provide sufficient evidence to drive changes at this scale. Farmers are at the very heart of our food system and - as custodians of the land - are also a linchpin in the protection of UK nature. However, farmers alone cannot be held responsible for the sustainability of our food production -they are part of a food system with many actors, and driving the transformation we need, including tackling on farm food waste, must be a collaborative effort across the sector including retailers, and supported by government.

In 2021, WWF-UK completed a series of farmer dialogues and analyses to better understand the barriers farmers face to measuring and reporting food surplus and waste. Four key themes were identified, with barriers relating to: perceptions around food waste; labour; finances and processes (both in internal and external to the farm). This project combines the understanding of these barriers, with engagement from actors across the UK food system to co-create scalable support and solutions to the barriers. These solutions form a roadmap for increasing measurement and reporting of food surplus and waste on UK farms, to be delivered by the types of food system actors who were engaged in its development. This Roadmap complements Courtauld 2030, the IGD-WRAP Food Waste Reduction Roadmap, and the Champions 12.3 10x20x30 initiative by providing guidance for food system actors to engage with this area of food waste and support farmers in taking positive actions towards reducing this waste. This takes place over five stages:

- 1 **Incentivise** – In order to incentivise engagement, we call for the provision of evidence to farmers highlighting the impacts of food waste and the benefits of measurement (environmentally and financially) and to promote a better understanding of the measurement processes to reduce any concerns over time and financial burdens.
- 2 **Facilitate** – The second stage focuses on providing farmers with the tools and systems necessary to facilitate them to measure and report food surplus and waste easily, efficiently and in a consistent manner to enable consolidation of the data at a sectoral and national level.
- 3 **Support** – Stage 3 calls for actors to provide support for the on-farm processes required for measuring and reporting, such as initial training on measurement sampling methods and integrating measurement into existing farm processes.
- 4 **Enable change** – Building on stage 1, stage 4 provides additional incentive in the form of actions that provide farmers with a way to maintain long term, beneficial change and waste reduction from the act of measuring and reporting surplus and waste. This includes reviewing the data to identify policy and practice shifts to reduce surplus and waste at farm stage and increasing access to secondary markets.
- 5 **Drive change** – The final stage of the Roadmap takes the assumption that the previous stages have all been adequately met and farmers have been provided with the level of support and incentive needed to bolster voluntary measurement. Subsequently the actions in stage 5 focus on driving action beyond this and integrating measurement into policy.



1. GLOSSARY

‘Food waste’: The term ‘food loss’ is used by some to represent any food that ends up being removed from the food supply chain, up to but not including the retail stage. It is often differentiated from ‘food waste’ on the basis of the stage in the supply chain where the food is lost (e.g. on farm) or the reasons why the food is lost (e.g. owing to ‘unintentional’ events such as disease or weather). Determining the difference between what may be defined as food loss versus food waste consistently can be difficult. The term ‘food waste’ as defined in this document is intended to cover all stages of the supply chain, including farm stage.

As established in WRAP & IGD’s Food Waste Reduction Roadmap for the purposes of UK guidance, the term ‘food waste’ describes any food and inedible parts sent to any of the destinations listed below.

- Codigestion/anaerobic digestion
- Composting/aerobic processes
- Controlled combustion
- Land application
- Landfill
- Not harvested/ploughed in
- Refused/Discarded
- Sewer/wastewater treatment



Food waste on farm: The focus of this work is on-farm stage food loss and waste. We are defining ‘farm stage food waste’ to apply to any outputs from primary food production that are, or were at some point, intended for human consumption, but which end up either not being harvested or sent to one of the other seven food waste destinations listed above (See Figure 3). This starts by defining the point at which the food chain begins, when the outputs from primary production can be regarded as ‘food’. For crops and produce this is defined in terms of crop maturity and being ‘mature and ready for harvest’. For livestock, the same definitional principle is applied, i.e. based on maturity, slaughter weight or when wild caught animals/fish are harvested. Fisheries and aquaculture are beyond the scope of this work. This waste can occur at or around harvest, or in post-harvest undertakings on farms (e.g. in storage or packhouses):

Harvest waste: This is waste that occurs once crops or animals have reached a mature or harvestable state (NB: harvestable could mean a variety of states, as food is often harvested pre-ripening to allow a greater lifespan in the supply chain). Typical examples of food surplus and waste in-field is food that goes unharvested due to a surplus with no secondary market, lack of affordable labour to harvest, it’s not meeting specifications due to aesthetics, size criteria or weather, pest or disease damage or last-minute order cancellation.

Post-harvest food waste: This is food that is lost post-harvest but, for the focus of this work, pre-farm gate, for example due to damage or becoming over-ripe on-farm packaging houses or in storage. In the case of livestock this can be animals which are rejected from the slaughterhouse or dead on arrival.

Food surplus: In line with WRAP and IGD’s Food Waste Reduction Roadmap, this report aims for the measurement and reporting of both food waste and food defined by WRAP as ‘surplus’. WRAP defines the term ‘food surplus’ as any food and inedible parts that are redistributed to people (e.g. through a charity or commercial redistributor) or sent to animal feed or bio-based materials/biochemical processing (e.g. feedstock for other industrial products).

Principles: this refers to the overarching aims of WWF-UK’s roadmap programme (i.e. definitions, goals, and targets), which will provide the consistent framework against which all measurement approaches will be delivered. This will include establishing clear definitions and scope for on-farm food waste and surplus, as well as defining WWF-UK and the agricultural sector’s aspirations to reduce it. These principles should be developed in the early stages of the Roadmap to set out what is required of the methods for food surplus and waste measurement.

Methods: while the food surplus and waste measurement principles will remain consistent, sector-specific considerations will require the quantification methods for measurement to be adapted. Therefore, the methods will outline the individual sector level approaches that are required to measure food surplus and waste in order to support delivery of the overarching principles.

FOOD SURPLUS AND WASTE IN PRIMARY PRODUCTION

NOT INCLUDED

- Inefficiencies in production (e.g. plants which never germinated or seeded)
- Livestock that are lost before reaching a mature weight
- Crops that are lost before they are ready to harvest
- Produce not intended for human consumption (e.g. intended for use as feed or in bio-material processing)

CAUSES OF IN-FIELD WASTE EXAMPLES

- Animals of a mature weight which die due to disease or injury
- Milk which is spilt during milking
- Eggs which don't meet specifications or are damaged

CAUSES OF POST-HARVEST WASTE EXAMPLES

- Animals which are rejected from the slaughterhouse or dead on arrival
- Milk which is rejected due to antibiotic contamination
- Eggs which are broken in storage

CAUSES OF IN-FIELD WASTE EXAMPLES

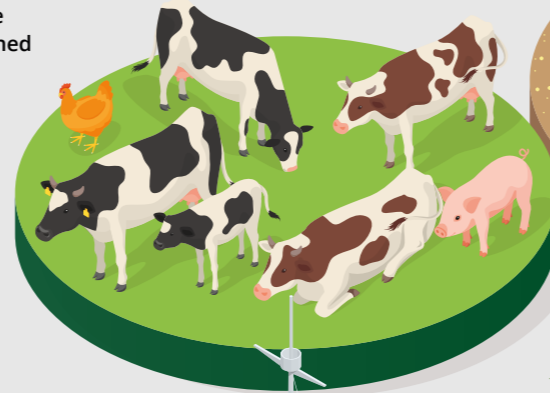
- Non-target species/non-quota species caught
- Fish caught incorrect size
- Damage during removal from nets
- Disease (aquaculture)

CAUSES OF POST-HARVEST WASTE EXAMPLES

- Delays in sales/price negotiations causing product spoilage
- Fish falling from containers during handling/transport

Meat and Animal Products

Livestock only counted as food waste once animals have reached a mature weight



Fisheries and Aquaculture

Counted as food waste once caught or have reached intended weight/harvest weight (aquaculture)



Roots, Tubers and Oil Crops



Cereals and Pulses



Fruit and Vegetables



Only counted as food waste once crops have reached a harvestable state
(NB: harvestable could mean a variety of states, as food is often harvested pre-ripening to allow a greater lifespan in the supply chain).

CAUSES OF IN-FIELD WASTE EXAMPLES

- Goes unharvested due to lack of market
- Left in field due to lack of affordable labour for hand harvesting
- Out-graded for not meeting specifications due to aesthetics, size criteria or weather
- Outgraded for not meeting (non-safety related) specifications due to aesthetics, size or weather
- Harvester settings, malfunctions and errors causes damage or waste

CAUSES OF POST-HARVEST WASTE EXAMPLES

- Damaged during transport
- Becoming over-ripe or spoiling on-farm packaging houses or in storage
- Last-minute order cancellation or changes to order
- Out-graded in packhouse

This food is then determined as either Surplus or Waste depending on its destination

FOOD SURPLUS

Food is counted as surplus when it is sent to one of the following destinations:

- Re-distributed for human consumption
- Animal feed
- Biobased materials and biochemicals processing

FOOD WASTE

Food is counted as waste when it is sent to one of the following destinations/treatments:

- Composting
- Ploughed-in/ not harvested
- Anaerobic digestion
- Landfill
- Incineration
- Discarded (fish) + unmanaged disposal
- Sewer
- Land application post-harvest



2. INTRODUCTION

2.1 FOOD WASTE ON FARMS

In the recently released Hidden Waste,¹ a report by WWF-UK and Tesco, it was revealed that an estimated 3.3 million tonnes of food may be wasted on farms in the UK each year. This suggests food waste at farm stage represents over 25% of food loss and waste in the UK. This has a huge environmental impact, with food waste on farms based in the UK contributing 6 million tonnes of CO₂e, equivalent to approximately 11% of UK agricultural GHG emissions.^v This waste also has significant financial implications for farmers already facing rising input costs, with UK on-farm food waste estimated to be worth £1.8 billion.^{vi} Despite this, work on food waste in this stage of the supply chain is limited. This is, in part, due to the lack of tracking of food surplus and waste rates and volumes on farms, which prevents the identification of hotspots, setting of specific targets or tracking of progress on reduction. Field studies across a range of key UK crops have demonstrated that data and measurement improvements are central to reducing food waste on-farm, with recorded waste levels often higher than anticipated by farmers^{vii}. Therefore, supporting farmers to measure and report farm stage food waste will play a significant role in enabling the identification of its drivers and starting to take action to reduce them, a pivotal step in improving the sustainability of our food and agriculture systems.

Measurement of food surplus and waste is an important first step in reduction, through supporting the identification of hotspots and tracking progress in reductions. This 'Roadmap to measurement' (Figure 2) sets out the specific stakeholder actions needed across the food system to address the barriers raised and support a significant increase in the number of UK farmers measuring and reporting food surplus and waste by the end of 2025, with ongoing actions to enable food system changes to drive a reduction in food surplus and waste levels. The aim of this is threefold; first, to increase awareness of hotspots of food waste on-farm, empowering farmers to reduce them and increase profitability whilst simultaneously reducing the environmental impacts of food waste on-farm. Second, to increase uptake of measurement and reporting nationally to a level where we can more accurately estimate food waste levels, their environmental impacts and to set a baseline and track progress towards UN Sustainable Development Goal 12.3^{viii} of a 50% reduction by 2030. Finally, we aim to enable reporting of data which is granular enough to inform policy and practice shifts within the food system, which support farmers to reduce food surplus and waste levels.

This Roadmap targets the increased measurement, reporting and subsequent reduction of food surplus and waste in alignment with the Food Waste Hierarchy (See Figure 1). To wit, the priority is on reducing food waste and generation of surplus at source and then increasing the redistribution of edible food to humans. Any references throughout this report to 'reducing food surplus and waste', target the reduction of waste in total, and of edible food surplus redirected to animal feed or bio-based materials. The target to reduce surplus is not aimed at reducing redistribution efforts but at reducing over-production.

There is currently low uptake of food surplus and waste measurement on UK farms, with more work needed to engage or support farmers in a topic that is relatively new to the sustainable agriculture agenda, no existing legislative drivers and minimal action from the supply chain in this field. In 2021, WWF-UK completed a series of farmer dialogues and analyses to better understand the barriers farmers face to measuring and reporting food surplus and waste. Four key themes were identified (see Table 1), with barriers relating to: perceptions around food waste on farms; labour; finances and processes (both internal and external to the farm). This project combines the understanding of these barriers, with engagement from actors across the UK food system, to establish a roadmap for increasing measurement and reporting of food surplus and waste on UK farms, where the milestones are scalable support and solutions to the barriers delivered by actors in the wider UK food system.

In order to achieve this, collaborative effort from across the food system is required. Driven to Waste^{ix} illustrates that many of the drivers of farm-stage food waste stem from decisions made beyond the farm gate by market actors and policymakers. Where wider supply chain actors play a role in driving food waste on farms, we must all take action to help reduce this waste.

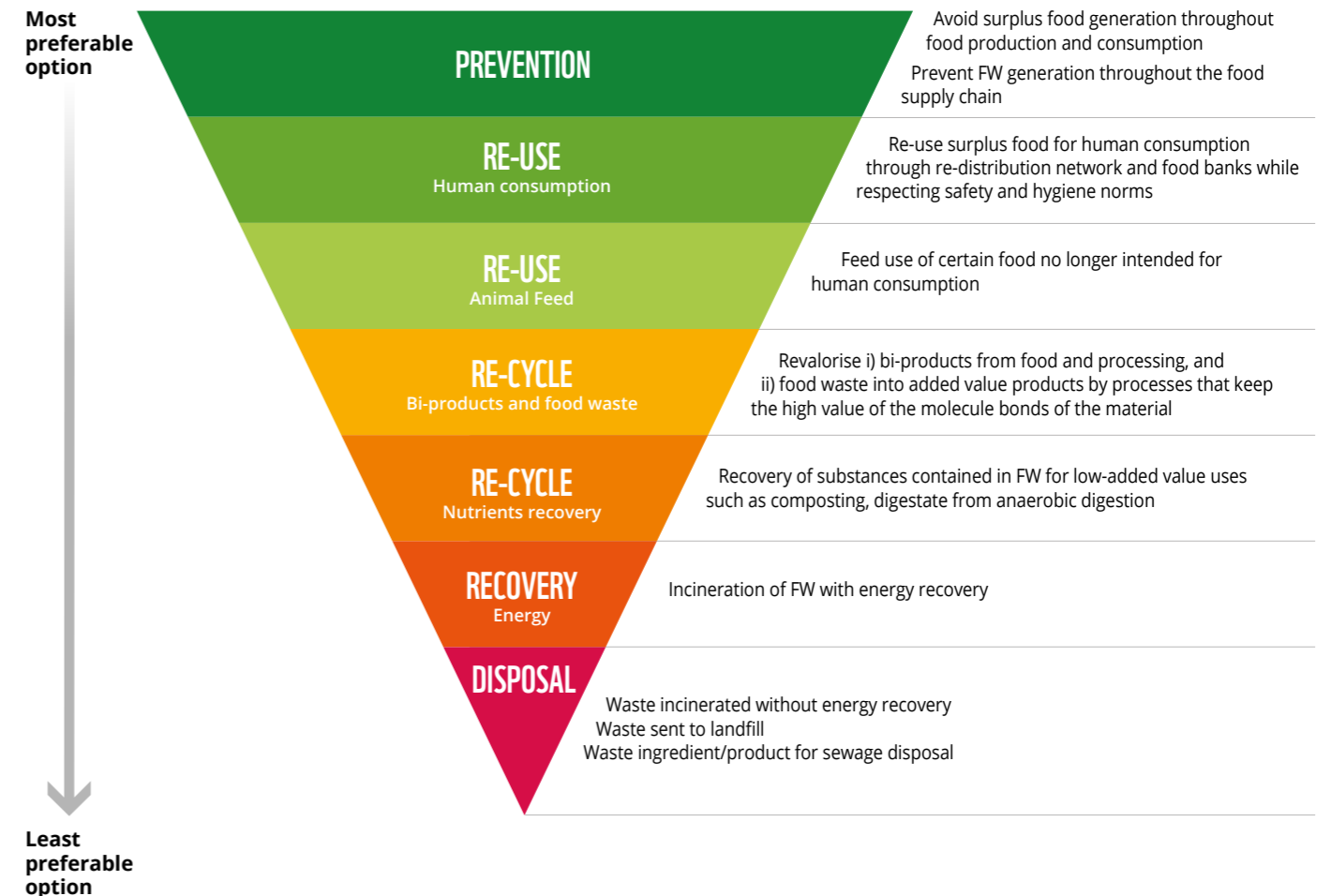


Figure 1 – Food waste hierarchy

As such, to develop the Roadmap, the UK Government and actors within the UK food system have been engaged in co-creating scalable support and solutions to the barriers farmers face in measuring and reporting food surplus and waste.

This report aims to balance the need for large system changes with immediate action. Whilst increasing even informal measurement of food waste on farms in the short term will support our understanding and farmers' abilities to reduce such waste, and should therefore be supported, we aim to enable the collection of consistent and wide-scale data, which will support systemic changes in the food system by providing a clearer and more accurate picture of the scale and impact of food waste on farms in the UK and its drivers than can be achieved through estimations or questionnaires alone. With these aims in mind, the Roadmap targets the availability of data on farms which can be shared with suppliers and retailers in order to enable them to support the development of secondary markets, the reduction of food waste and redistribution of food surplus, and the capture of food surplus and waste data in [WRAP& IGD's Food Waste Reduction Roadmap](#) data capture sheet. This data should be used to support farmers and supply chain actors in finding hotspots and key drivers of waste to target reduction and never to penalise farmers for surplus and waste. The early stages of the Roadmap call for commitments to and assurance of such. This Roadmap complements Courtauld 2030, the IGD-WRAP Food Waste Reduction Roadmap, and the Champions 12.3 10x20x30 initiative by providing guidance for food system actors to engage with this area of food waste and support farmers in taking positive actions towards reducing this waste.

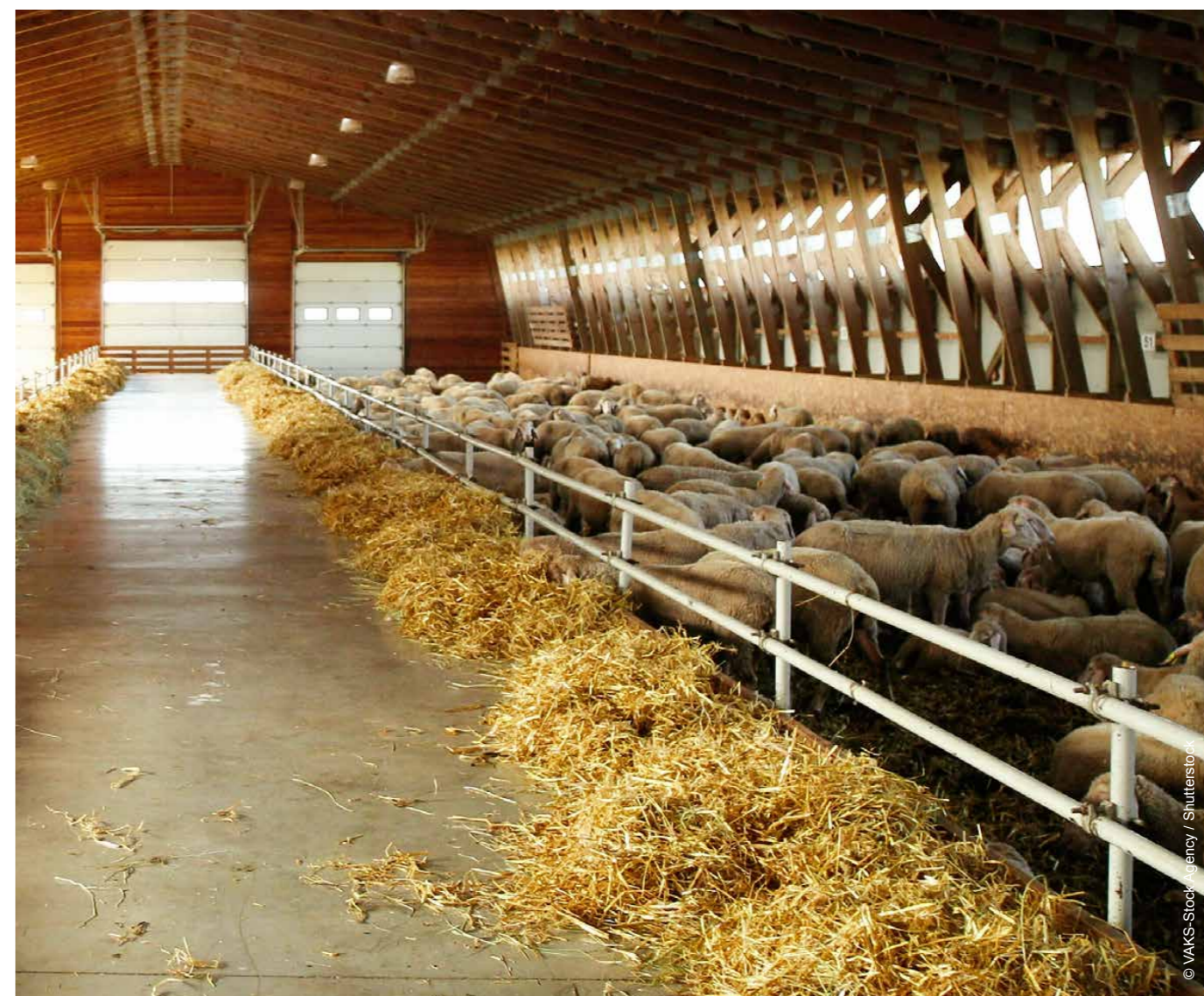
2.2 METHODOLOGY

Over October and November 2021, WWF-UK hosted a series of farmer dialogues to unpack the barriers UK farmers face to measurement and reporting. In order to develop an understanding of the complexity and context of difficulties farmers face in this area, discussions were held with farmers who worked on or owned small or SME farms. This included consulting with farmers who produced a variety of commodities, some of which were measuring food surplus and waste already whilst others were not. The discussions took the form of semi-structured interviews and were recorded, transcribed and underwent thematic analysis in order to explore and categorise the barriers farmers face in food surplus and waste measurement and reporting within the UK.

In March 2022, WWF-UK and ADAS co-facilitated four online co-creation workshops. Approximately 30 stakeholders attended the four sessions (themed around crops, or livestock and dairy), offering perspectives from a range of organisations, including farmers, suppliers, retailers, farm advisors, assurance schemes, policymakers and non-government organisations (NGOs). Representatives of various UK food system actors, including farmers, WRAP, some of the UKs largest retailers and suppliers, farm associations and certification schemes attended to work together on the issues of farm stage food waste. Additionally, officials from the Department of Environment, Food and Rural Affairs (Defra) attended the discussions in an observer capacity. The sessions were structured around the four barrier themes identified in the farmer dialogues previously held by WWF-UK. Participants took part in several collaborative ideation sessions during the workshops to offer insight and discussion, with the opportunity to provide anonymous feedback, both during and following the event. Polling and ranking activities were utilised to establish areas of priority and agreement in relation to the identified solutions. While farmers' voices were central to the discussions, the sessions aimed to distribute responsibility and actions across the supply chain. Opportunities were given to participants to assign stakeholder responsibility for identified actions, interdependencies, as well as high-level indications of their timescales.

In line with the co-creation aims of the workshops, an inductive thematic analysis approach was undertaken to examine the workshop responses and subsequent follow-up survey. This approach enabled themes to be derived from trends in the qualitative data without prior preconceptions, which ensured that the workshop participants and survey respondents steered the primary objectives of the Roadmap. Once identified, the stakeholder-driven objectives and actions were organised into five progressive stages which form the basis of the Roadmap. Stakeholders within the food system, including those who participated in the workshops, were offered several opportunities to contribute, consult and shape the end product of the Roadmap.

REPRESENTATIVES OF VARIOUS UK FOOD SYSTEM ACTORS, INCLUDING FARMERS, WRAP, SOME OF THE UKS LARGEST RETAILERS AND SUPPLIERS, FARM ASSOCIATIONS AND CERTIFICATION SCHEMES ATTENDED TO WORK TOGETHER ON THE ISSUES OF FARM STAGE FOOD WASTE



3. BARRIERS TO REPORTING FOOD SURPLUS AND WASTE ON FARM

Through the process of farmer dialogues and analysis, this work investigated the barriers farmers face to measuring and reporting surplus and waste (Table 1). These barriers were central to the workshops, where actors across the food system worked together to co-create solutions across the supply chain.

Following a detailed description of the barriers, the remainder of this report addresses the potential solutions and provides recommendations for how food system actors can support farmers in establishing on-farm measurement. The barriers identified are not insurmountable if farmers are provided with the necessary support, as evidenced by the success that 30+ farm businesses have achieved in implementing food waste and surplus measurement when supported by Tesco's Target, Measure, Act programme. Additionally, despite the barriers, there is evidence that growers are able to realise value from measuring farm-level waste. For example, there is the 'No Food Left Behind Project', led by WWF-US, in which growers confirmed that in-field measurement helped them better document, track, and communicate about their operations. Farmers learned how much, and why product was left in the field and gained insights into what was possibly marketable. They shared that this approach did not increase labour or strain resources, and provided more accurate and valuable information than existing estimates and/or standard operating procedures.^x



Barrier categories	Themes	Examples
Perception barriers	- Lack of perceived value to measuring food surplus and waste	- Belief that all waste occurring is unavoidable - Lack of commercial benefit to measuring
	- Perceived risk to measuring food surplus and waste	- Risk of being financially penalised for waste - Risk of reputational damage from reporting waste rates
	- Disassociation between UK farm waste and global waste	- Belief that farm-stage food waste is only a problem in low-income countries - Belief that little to no waste occurs on their farm
	- Lack of awareness of issues associated with farm surplus and waste	- Unaware of environmental impacts of surplus and waste Circular economy (e.g., ploughing into the soil unharvested product) seen to mitigate any environmental impact of waste
Financial barriers	- Lack of access to funding	- Loss of EU subsidies (e.g. CAP) - Food waste not included in government agricultural support
	- Inability to invest in sustainability due to finances	- Limited profit margins - Sustainability initiatives halted due to lack of profits for investment
	- Financial impact of sustainability initiatives	- Cost of equipment - Cost of labour (in particular for harvesting food that cannot be sold)
	- Inability to remain cost competitive against imports	- Sustainability requirements being placed on UK farmers are not also placed on imported goods - Profit margins reduced by sustainability initiatives
Labour barrier	- Administrative strain	- Additional time burden carried by farmers (with no perceived benefit) - Volume and variety of sustainability reporting
	- Cost of labour for measuring	- Time required to design process costly - Frequent measurement increases labour - Labour costs negated any financial benefit
	- Staff reactions to measurement	- Resistance from staff to measurement - Fear loss of staff
Process barriers	- On-farm process	- Challenging to develop new processes - Existing processes for measurement are ad hoc
	- External processes cause confusion	- Unclear definitions of food surplus and waste in agricultural sector - Lack of centralised reporting

Table 1 - Barriers to farm stage measurement of food surplus and waste

3.1 THEME 1 - PERCEPTION BARRIERS

The beliefs and perceptions surrounding food waste on farms may cause disengagement and a lack of incentive to act in this area.

Lack of perceived value to measuring food surplus and waste

The lack of perceived value to measuring and reporting food surplus and waste was contributed to by a belief that any waste occurring was unavoidable and measuring wouldn't support reduction, therefore provided no value. A key example of this was on dairy farms where farmers reported the only waste occurring was due to the use of antibiotics on the cows, and the milk therefore being unusable. Subsequently, from the farmers' perception the measurement of milk waste served no purpose. However, this was, in part, driven by the perception that the only value to measuring food waste was in its potential financial benefit, through its ability to help identify the causes and reduce them, thus improving efficiency and increasing profits. This was particularly evident on farms where they were measuring waste within certain high value commodities and not others, and again with low value crops. This was because any financial benefits achieved in these cases were not expected to outweigh the cost of labour and actions taken to understand and reduce surplus and waste rates. In many cases, where financial benefit is not evident farmers voiced resistance to the idea of measuring based on a lack of clear merit. There was no discussion of the value of measuring from a sustainability perspective or from the perspective of delivering greater nutritional value to the human food supply chain.

Perceived risk to measuring food surplus and waste

Within dialogues it was evident that there was concern around the outcome of reporting food waste. Farmers were concerned that measuring would be the initial stage that would eventually lead to them being financially penalised for the waste in the form of taxes, akin to the landfill tax, or the loss of contracts if they don't deliver improvements on waste rates. The risk of an eventual policy that replicates initiatives such as landfill tax but for food waste and waste was particularly concerning given the limited control they had over numerous causes of waste, such as extreme weather and actions of the later supply chain. Another risk identified was the potential for surplus and waste to be pushed back on them by stakeholders in the later stages of the supply chain through either normalised contemporary practices, such as last minute cancellations, or potential future practices, such as rejecting orders to keep waste in later stages of the supply chain minimised in reporting. Farmers also flagged this risk as an opportunity however, as they were interested in the potential for reporting to be used to identify the effects of supply chain actions on farm-stage waste rates. Finally, there was a fear of reputational damage from waste rates if they were to be shared widely, potentially damaging the farm in the eyes of the public and market.

Underestimation of scale and impact of farm-stage food waste

Several myths and misconceptions are still perceived to be accurate and limit interest from farmers in measuring food surplus and waste. The belief that food waste is only a problem in low-income countries and not in high income countries, such as the UK, was voiced repeatedly. As highlighted in the WWF-UK's 2021 report Driven to Waste, "per capita farm-stage waste levels are generally higher in more affluent regions". However, this perception lingers, limiting action and interest in reducing farm-stage food waste. Farmer's belief that very little is lost on their farm, particularly in comparison with food waste in the home, also feeds into the perception that action is not imperative. As has been shown in previous studies, farmers tend to underestimate rates of waste and subsequently don't see the value to measuring and reporting. Additionally, there is a dissociation between the waste occurring on the individual farm and the global scale and impact of this waste, with food waste on farms being seen only to impact the respective farmer.

Lack of awareness of issues associated with farm surplus and waste

Farmers were often unaware of the environmental impacts of food waste and this contributed to seeing little value in measurement or reporting. Waste is seen to be a purely financial loss to the farmer, and is perceived to be a small one at that. Additionally, any form of recycling or circular economy achieved with the food surplus or waste

was seen to mitigate any environmental impacts. Farmers referred to ploughing surplus back into the field as a method of improving soil health. However, they didn't reference any environmental impacts from the growing of surplus food or its role in overproduction. Whilst some benefits to the soil may be achieved through this method, there is currently no research exploring the extent to which this occurs and how it offsets the negative impacts of overproduction and waste.

“FARMERS WERE OFTEN UNAWARE OF THE ENVIRONMENTAL IMPACTS OF FOOD WASTE AND THIS CONTRIBUTED TO SEEING LITTLE VALUE IN MEASUREMENT OR REPORTING. WASTE IS SEEN TO BE A PURELY FINANCIAL LOSS TO THE FARMER, AND IS PERCEIVED TO BE A SMALL ONE AT THAT.”

3.2 THEME 2 - FINANCIAL BARRIERS

Farmers are struggling to maintain profit margins, and the various sustainability initiatives and costs associated with them – including labour, equipment and training – impeded this further.

Profit limitations and inability to invest in sustainability

Farmers felt the need to halt all additional sustainability efforts due to financial difficulties. With profitability low, farmers explained they were not in a position to invest in sustainability initiatives and that "projects have generally been consistently delayed for the good years". Recent years in particular have caused concern, and with the loss of EU agricultural subsidies, farmers have been preparing for the worst rather than increasing sustainability efforts. Food waste was not seen to be an area currently covered by UK government sustainable agriculture grants or subsidies that could provide funding for the training, labour and any equipment needed.

There are significant labour costs associated with training staff in measurement methods, conducting measurement and reporting. In particular, the cost of labour associated with harvesting food which cannot be sold was a significant barrier. Much food which is classified as surplus or waste at farm level is left unharvested as it does not meet aesthetic standards or because there are no easily accessible secondary markets for it. As such, the financial losses from labour to harvest and measure it will not be recouped.

The cost of equipment is perceived to be a significant barrier to food waste measurement. However, in reality the impact of this barrier varies depending on the size of the grower, food commodity they farm and the field sampling method required. For example, a small fruit farm detailed the little technology they needed to begin measuring, such as scales and trays, to which they already had access. Comparatively, several wheat farmers indicated that they couldn't afford weighing bridges to measure their produce at all, and so were reliant on suppliers measuring their contributions and feeding back the volume and wage for the crop.

The fact that many of the sustainability requirements being placed on UK farmers are not also placed on imported goods makes it harder for UK farmers to remain competitive on price. A comparative example given was of wage standards, where the UK implements minimum wage laws for labour but does not have trade standards matching these for countries or businesses it imports from. As a result, UK farms struggle to compete with pricing whilst paying fair wages, which reduces their profit margins. These are the same difficulties faced when attempting to implement sustainability initiatives, which require investment and labour costs, impacting farm profit margins and restricting the ability to invest in updated infrastructure, equipment and processes that could support such endeavours.

3.3 THEME 3 – LABOUR BARRIER

Farmers are bombarded with sustainability requests and the current fragmented approach risks contributing to commitment fatigue and inaction.

Additional time burden carried by farmers

The increasing volume and variety of reporting is causing a strain on farmers and resistance to engagement. In particular, the administrative strain on small farms was seen to be unconscionable. There was concern that the length of time required to measure surplus and waste rates would mean farm labourers didn't have time to complete other tasks and would fall behind on work imperative to the day-to-day running of the farm. The time requirements from staff were felt across the commodity types but particularly in crops where there are multiple harvest points, such as orchard fruits where the fruits are harvested at various stages of the harvest period and can be lost at any time throughout this period.

As such, these required more frequent measurement and a great number of staff were involved. Where a key incentive for farmers to measure was the potential to recoup the value of the time by reducing waste, the inexperience and difficulty often resulted in measuring and reporting taking so long that farmers reported feeling the process negated the monetary benefit.

Staff reactions to measurement

Farmers also described a level of resistance from staff to measurement, owing to the additional labour and responsibilities, as well as seeing no purpose to the task. One farmer described how they couldn't demand their workers undertake an activity that they themselves see no value in. There were fears of losing staff members if seemingly unreasonable requests were made of them, a fear that has been exacerbated by labour shortages caused by Brexit and COVID.

However, many of the farmers indicated that after a prolonged period of adjustment as they learnt the measurement processes, the activities were eventually integrated into farm processes, enabling the process in a smooth and timely manner. The difficulty establishing a process and the labour intensity of measurement was amplified by the lack of a food waste champion on farms. The farmers who had begun measuring described processes where all staff members took part, but no one was specifically responsible for the process of measuring food surplus and waste, the training of staff members or tracking waste rates.

“FOOD WASTE WAS NOT SEEN TO BE AN AREA CURRENTLY COVERED BY UK GOVERNMENT SUSTAINABLE AGRICULTURE GRANTS OR SUBSIDIES THAT COULD PROVIDE FUNDING FOR THE TRAINING, LABOUR AND ANY EQUIPMENT NEEDED.”

“THERE WAS CONCERN THAT THE LENGTH OF TIME REQUIRED TO MEASURE SURPLUS AND WASTE RATES WOULD MEAN FARM LABOURERS DIDN'T HAVE TIME TO COMPLETE OTHER TASKS AND WOULD FALL BEHIND ON WORK IMPERATIVE TO THE DAY-TO-DAY RUNNING OF THE FARM.”

3.4 THEME 4 – PROCESS BARRIERS

Inconsistency in on-farm and wider external processes are a source of confusion for farmers, which may lead to disengagement.

On farm processes

Where food surplus and waste measurement is a new concept to many farmers and their staff members, they often struggled with establishing a process for measurement and reporting. There are a variety of existing measurement guides, most notably WRAP's Grower Guidance; however, due to either a lack of awareness or confusion over which methods to engage with, many farmers described creating their own processes. As a result, farms generally had either no set process or an ad-hoc process for managing the measurement of food surplus and waste. This led to measurement systems where various people were participating but no one specific was responsible for developing a plan, conducting training, explaining the value of food waste measurement or monitoring the process or the data. As highlighted above, this results in the measurement process taking far longer, in stressed and disengaged staff members, increased labour costs, and potentially negating any perceived benefits to the farmer.

Another contributing factor to the use of ad-hoc processes was resistance to moving away from traditional processes. There was far more willingness to engage with measurement if it could be integrated into the existing processes and traditions, rather than requiring new handling systems, partly because they had always been used and partly because new systems often required investment to develop, investment to which the farmers didn't have access. Additionally, as highlighted in Theme 1, where many farmers see no perceived value to food surplus and waste measurement the development of a specific process to enable this is resisted. However, once a process had been developed and integrated into normal farm activities many farmers undertaking measurement indicated food waste measurement no longer felt like a burden.

External processes

The wider issues felt by many in the food loss and waste community also contributed to confusion on farms. There was confusion around the exact definitions of food surplus and waste, with many farmers concerned that committing to measuring food waste would mean tracking waste they felt ill-equipped to track – for example, grain scattered by storms. Some of the main areas of confusion were whether waste rates should include bi-products and if they would be reporting predicted yield against actual, which would inflate waste rates due to a failure to seed for environmental reasons. Additionally, there was confusion between waste rates and optimisation, with farmers referring to excess protein in livestock feed being included in waste measurement.

As highlighted above, there is a lack of awareness of measurement guidance and sampling techniques, resulting in many farmers believing whole fields of surplus will need to be harvested to enable measurement. This increased resistance on account of the labour and financial commitments to such an endeavour with no guaranteed return. Additionally, there is a lack of centralised reporting for farm surplus and waste, which meant those who were measuring were frequently unsure of who they were supposed to report to or how, once again devaluing the work in their eyes.

4. THE ROADMAP

Measurement of food surplus and waste is an important first step in reduction. This Roadmap (Figure 4), in alignment with the WRAP & IGD Food Waste Reduction Roadmap, sets out the specific stakeholder actions needed across the food system to address the barriers raised in Section 2. The delivery of these actions aims to support a significant increase in the number of UK farmers measuring and reporting food surplus and waste by the end of 2025, with ongoing actions to enable food system changes to drive a reduction in food surplus and waste levels. The aim of this is threefold; first, to increase awareness of hotspots of on-farm food waste, empowering farmers to reduce them and increase profitability whilst simultaneously reducing the environmental impacts of on-farm food waste. Second, to increase uptake of measurement and reporting nationally to a level where we can more accurately estimate food waste levels, their environmental impacts and to set a baseline and track progress towards the targeted 50% reduction by 2030. Finally, we aim to enable reporting of data which is granular enough to inform policy and practice shifts within the food system, shifts which support farmers to reduce food surplus and waste levels.

The roadmap provides recommendations which are structured within five separate stages: (1) incentivise, (2) facilitate, (3) support, (4) enable change, and (5) drive change. Each stage is split into separate objectives that meet the overall aims of the defined roadmap stage. Specific asks from stakeholder consultation are featured under each relevant objective from which recommendations and actions were developed. The five roadmap stages are broadly linear in chronology, with the objectives, recommendations and actions building on the outputs of the former stages; however, where actions for later stages build on existing work or do not require significant data to support impactful action they may occur earlier. For example, the upscaling of funding available for redistribution efforts or the supporting of farmers to find secondary markets.

Suggested timescales are given for each action in financial year quarters and the actions for each key stakeholder group are summarised. Where no end date is given, this represents a goal which requires ongoing support and should be integrated into the businesses practices. It will be important in the delivery of all the objectives, recommendations, and actions that the activities are aligned to the defined principles and utilise the appropriate methods.

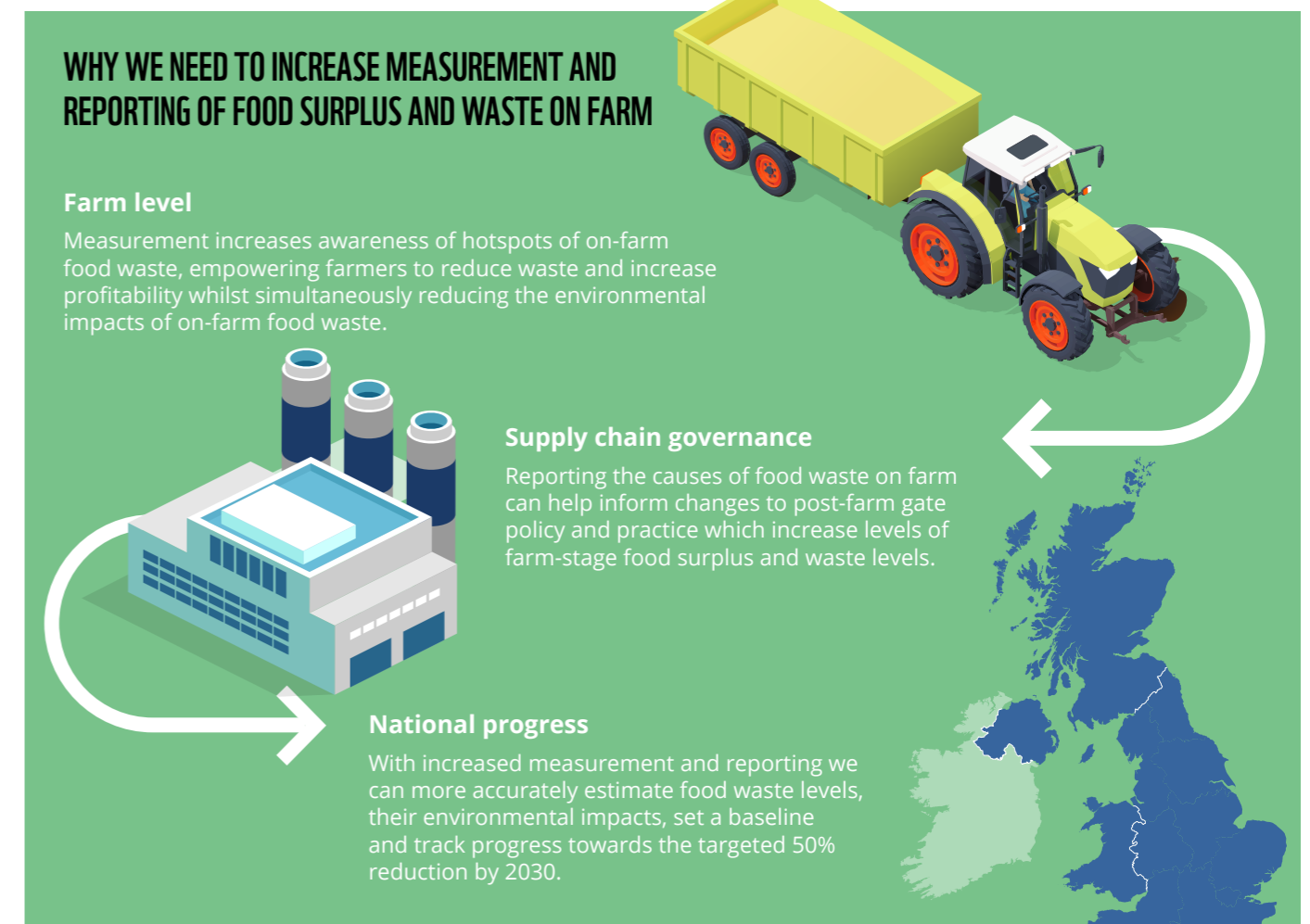
It is important to note that this Roadmap aims to increase the measurement and reporting of food surplus and waste both in-field and post-harvest (but pre-farm gate). WWF-UK's report, Hidden Waste, suggests that 48% of food waste occurring on UK farms is food left in field for a variety of reasons, such as having no market due to gluts, labour shortages or being out graded. This level of waste has high environmental and social impacts; however, as highlighted in the barriers section of this report, it is often perceived by farmers to be beneficial to the land if ploughed back. It is important that we understand the exact scale at which this occurs and what drives this food to be left in field in order to support tracking and reducing this waste. Research has shown that farmers tend to underestimate field waste rates, for example WRAP's research showed lettuce waste at 33% using field samples, where they were previously estimated to be 17% when farmers self-reported.^{xi} Accordingly, farmers may perceive what's left unharvested in the field to be insignificant in tonnage and value, and therefore lack motivation to conduct in-field measurement.ⁱ

In developing this roadmap, we recognise the differences of the various farming sectors in availability of methods and guidance on measuring and of reporting templates, the level of difficulty of measuring and the progress achieved in establishing this process on farms thus far. WWF is actively in the process of developing a tool for measurement and reporting with support from WRAP and Anthesis, which will play a key role in enabling growers to more easily collect data (see Recommendation 2.1 for more detail).

This tool will incorporate guidance for measuring and sampling, which builds on WRAP's Grower Guidance and The Stewardship Index for Specialty Crops (SISC) food loss metric tool. Through this development we aim to minimise the time requirements placed on farmers whilst providing a tool that delivers outputs that are helpful to their operations and business opportunities, and that would allow for the collection of data in a consistent and anonymised way for use at a national level to track progress in reduction and identify environmental impacts.

As outlined in later sections, this tool is targeted for release in 2024; however, until then we recommend the continued use of WRAP's Grower Guidance for measuring and reporting data.

Within the wider actions, such as providing field visits to support farmers through initial measurements, this report aims to provide top line guidance for the various food system actors to begin engaging with the topic and supporting farmers in this area. Managing the nuances of the various sectors will require further consideration and planning by the actors as they begin to engage, whilst WWF and WRAP will provide guidance on the methods to be used and training plans.





2023 - Case studies exploring on-farm measurement of food surplus and waste are developed and shared.

Retailers, Suppliers, NGOs and Farm Representative Bodies, develop and share farmer case studies on food surplus and waste measurement journey and outcomes, both financial and environmental. Communications should link these too existing areas of interest such as productivity and efficiency.



2024 - Farmers are provided with in field support for initial measurement and reporting process

Suppliers to undertake field visits and Policymakers to upscale Farm Advisor programme to support initial measurement efforts and integration into farm processes.



2025 - Policy and practices which drive waste on farm are reviewed

Retailers and policymakers to review data on causes of food surplus and waste reported and update relevant policies to reduce drivers of surplus and waste within the UK food system.

INCENTIVISE

- Increase awareness and understanding of methods for measuring food surplus and waste
- Increase awareness of impacts, highlight benefits of measuring and build trust in the supply chain

SUPPORT

- Provide training on measurement methods
- Support integration of measurement into farm processes

DRIVE CHANGE

- Implement requirements around measuring and reporting
- Develop consistent progress tracking towards reduction goals



FACILITATE

- Make food surplus and waste reporting simple and meaningful
- Develop new funding and green finance initiatives

ENABLE CHANGE

- Utilise data to drive and identify positive changes in the supply chain
- Facilitate shared learning and peer-to-peer support amongst farmers



2025 - National and sectoral progress reports begin being published annually

Policymakers and NGOs to share reports tracking progress as a nation and by sector towards the targeted 50% reduction in food waste by 2030

2024 - WWF's Global Food Loss Metric Tool is released

WWF are working in collaboration with WRAP-UK and Anthesis, with the aim of creating a simple, user-friendly tool which can be accessed by farmers, ranchers, and growers of all sizes and food commodity types to support measurement and reporting of food surplus and waste.



2024 - Training in measurement and reporting is provided to farmers

Retailers and Suppliers to host practical, sector-focused training sessions on food surplus and waste measurement for farmers.



2024 - Secondary markets are made more easily accessible to farmers

Retailers and suppliers to support farmers in identification of accessible secondary markets for surplus food

Figure 4. - Stages, objectives and core actions of the roadmap

5. PRIORITY ACTIONS BY STAKEHOLDER GROUP

POLICYMAKERS

(Department for Environment, Food & Rural Affairs (Defra), Welsh Government, Scottish Government, and the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland)

2023

- Incorporate into policy development the inclusion of medium and large farm businesses in mandatory food waste measurement and reporting to begin in 2024
- Integrate FLW metrics into the remit of the Food Data Transparency Partnership
- Upscale funding available for harvesting and redistributing surplus food

2024

- Expand existing funding sources and create new financial opportunities to support food surplus and waste measurement through subsidies and grants
- Upscale funding for the Waste & Resources Action Programme's (WRAP's) farm advisor programme or equivalent

2026

- Review data on causes of food surplus and waste reported and update relevant policies to reduce drivers of surplus and waste within the UK food system
- Integrate findings of annual report (see Section 8.2) into high-level reporting on related subjects, e.g. Agricultural and Food Security reporting.

SUPPLIERS

(Food businesses with an integrated supply chain and/or strong links to the primary production stage, e.g. within produce, meat, fish, poultry & eggs)

2023

- Integrate food surplus and waste into communications and quantify impacts
 - Include food surplus and waste in call-to-action statements
 - Share case studies on the benefits of measuring and reducing food surplus and waste with farmer network
- Undertake engagement activities to raise awareness of food surplus and waste

2024

- Host practical, sector-focused training sessions on food surplus and waste measurement for farmers
- Encourage farmers to appoint Food Waste Champions on farms and introduce regular briefings
- Undertake field visits to support initial measurement efforts and integration into farm processes
- Support farmers to identify secondary markets for surplus food
- Engage with consultants and advisors to develop food surplus and waste measurement services
- Integrate food surplus and waste measurement into sustainability scorecards
- Record food surplus and waste on farms on the Food Waste Reduction Roadmap data capture sheet

2025

- Identify risk areas to set food surplus and waste reduction goals and provide guidance on reducing hotspots
- Utilise existing peer-to-peer farmer networks to enable farmers to support each other through measurement

RETAILERS

(Businesses selling food products directly to the general public – particularly the major supermarkets)

2023

- Develop and share farmer case studies on food surplus and waste measurement journey and outcomes
- Integrate food surplus and waste into communications and quantify impacts
- Undertake engagement activities to raise awareness of food surplus and waste
- Include food surplus and waste in call-to-action statements
- Host webinars that introduce the importance of food surplus and waste measurement and methods
- Share case studies on the benefits of reducing food surplus and waste with farmer and supplier networks

2024

- Share sector-specific methods for food surplus and waste measurement developed by NGOs
- Adopt the WWF tool for measurement and reporting of food surplus and waste on-farm (see Recommendation 2.1) within supply chains to increase uniformity of data collection and reporting
- Record food surplus and waste on farms on the Food Waste Reduction Roadmap data capture sheet

2025

- Identify risk areas to set food surplus and waste reduction goals and provide guidance to growers on reducing hotspots based on reported data

2026

- Review reported causes of food surplus and waste within own supply chain to inform internal policy and practice changes
- Redefine best practice guidance and communicate commitments to consumers

NGOs

(Environmental NGOs including WWF-UK and WRAP)

2023

- Define a clear set of principles and goals to guide at farm-level for food surplus and waste measurement
- Develop a template for food surplus and waste measurement case studies
- Develop case studies that illustrate the financial and environmental value of food surplus and waste measurement and actions
- Advocate for inclusion of food surplus and waste in training syllabus in agriculture degrees, farm business courses, specialist produce courses (agricultural colleges, universities, and training providers such as LANTRA and BASIS) and farm labour agencies.

2024

- Develop sector-specific methods and guidance for food surplus and waste measurement
- WWF to launch a tool for the measurement and reporting of on-farm food surplus and waste
- Work with banks to develop green finance options linked to food surplus and waste measurement
- Develop training plans and videos on food surplus and waste measurement

2025

- WRAP to review sector-level data and identify key drivers of food surplus and waste

2026

- Publish annual progress reports, detailing national and sector specific, on-farm stage food surplus and waste reduction against a 50% reduction target

FARMERS

(Growers, horticulturalists, livestock farmers)

2023

- Contribute to case studies on food surplus and waste measurement and its impacts
- Provide feedback on the beta version of WWF's tool for measurement and reporting of food surplus and waste on-farm

2024

- Appoint Food Waste Champions on farms and implement regular briefings
- Report anonymised food surplus and waste data in to WRAPs ATLAS using WWF's tool (when is becomes available).

FARM ADVISORS AND REPRESENTATIVE BODIES

(Large organisations offering specialist farming advice, information and support, such as the National Farmers Union (NFU), and the Agriculture and Horticulture Development Board (AHDB))

2023

- Develop and share farmer case studies on food surplus and waste measurement journey
- Develop case studies that illustrate the financial and environmental value of food surplus and waste measurement and actions

2024

- Share sector specific methods for food surplus and waste measurement developed by NGOs
- Share training videos on food surplus and waste measurement and promote use of WWF's tool for measurement and reporting
- Advocate for inclusion of food surplus and waste in training syllabuses

2025

- Support farmers in identifying secondary markets for surplus food
- Identify hotspots to set food surplus and waste reduction goals
- Utilise existing peer-to-peer farmer networks to discuss food surplus and waste and seek innovative methods for reduction

ASSURANCE SCHEMES

(UK relevant assurance and certification schemes, including Red Tractor and LEAF)

2022

- Create an optional bolt-on to encourage farmers to measure and report food surplus and waste

2025

- Adapt core standards and certification requirements to include food surplus and waste measurement



6. STAGES OF THE ROADMAP



STAGE 1 – INCENTIVISE

The following sections outline the five core stages of the roadmap to maximise food surplus and waste measurement and reporting on-farm. Stage one is to incentivise food surplus and waste reporting on-farm. The aim is to address the lack of perceived value farmers articulated in relation to food surplus and waste measurement and reporting and to incentivise engagement through the provision of evidence to farmers of the financial and environmental impacts of food surplus and waste and the benefits to measuring. For example, sharing WRAP's recent research which suggests that measuring food waste and utilising the data to target drivers is a key step in reducing food waste and has the potential to increase farm profits by an average of 20%^{xii}. Additionally, this stage of the work aims to overcome the farmers' concerns highlighted in Section 2 regarding financial and time commitments by sharing guidance and case studies which can provide farmers with a better understanding of the processes required.

OBJECTIVES & RECOMMENDATIONS:

Objective 1:

Increase awareness and understanding of methods for measuring food surplus and waste

Recommendation 1.1

Create comprehensive but condensed guidance on measurement and reporting definitions, principles and methods

Recommendation 1.2

Develop and share case studies on farmers' measurement journey

Objective 2:

Increase awareness of impacts, highlight benefits of measuring and build trust in the supply chain

Recommendation 2.1

Integrate food surplus and waste into communications and quantify impacts

Recommendation 2.2

Include food surplus and waste in call-to-action statements

Recommendation 2.3

Develop case studies to showcase the benefits of reducing food surplus and waste.



The workshops highlighted the need for clear and widespread definitions for food surplus and waste on-farm, as well as the development of communications around measurement methods and requirements (i.e. highlighting the focus on sampling methods rather than whole field measurement) to ensure that they are understood by farmers. In the farmer dialogues, a lack of understanding of these aspects was shown to disincentivise measuring and reporting due to misconceptions that were formed about time and labour requirements of measurement, e.g. concerns that entire fields of unsaleable produce would need to be harvested in order to weigh and report field surplus and waste or that the new processes would prevent the completion of existing tasks, reducing productivity.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- “...provide clear definitions to share with farmers and along the supply chain for food waste”
- “...provide sector guidance with examples of sampling size”
- “...clarify how frequently sampling/measuring is needed”
- “...clarify what equipment is needed”
- “...share learnings from the farms which have started measuring”
- “...share case studies/examples of success in other businesses”

To ensure that farm workers have sufficient awareness and understanding of methods for measuring food surplus and waste, it is recommended that clear, consistent, compact and approachable guidance and case study examples are developed and widely communicated.



RECOMMENDATION 1.1:
 Create comprehensive but condensed guidance on measurement and reporting definitions, principles and methods

Rationale: To support an increase in the uptake of on-farm food surplus and waste measurement it is important that a clear set of principles (i.e. definitions, goals, and targets) are established that set out what the UK agriculture sector and food production industry is trying to achieve in terms of consistent food surplus and waste measurement and reporting. This will include creating clear definitions and scope for on-farm food surplus and waste, as well as outlining WWF-UK and the agricultural sector’s aspirations to reduce it. The principles are overarching and relevant across all sectors. These principles need to be supported with sector-specific methodologies that show how the surplus and waste can be measured on farms across the various food commodities and farm types. These methods would set out sampling options or techniques that are relevant to the specific sector. In some cases this may involve adaptation of existing reporting systems, e.g. livestock mortality stats. Such systems would not require a sampling approach, whereas field samples for row crops would be required.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs (WWF-UK)	Define a clear set of principles: WWF-UK and WRAP to work with industry to clearly define what the agriculture sector is aiming to achieve around measurement and reporting requirements of food surplus and waste by defining a clear set of principles (i.e. definitions, goals, and targets). These will set out what food surplus and waste is defined as, what WWF-UK and the wider food production industry are aiming to achieve and the mechanism by which this will be done (e.g. centralised reporting). The principles will be generic across all agriculture sectors.	2022 Q2 – 2023 Q1
NGOs (WRAP supported by WWF-UK)	Develop ‘bitesize’ sector specific guidance on methods for measurement: WRAP to lead the development of short sector-specific methods for measuring food surplus and waste which will be integrated into the WWF measurement tool (Recommendation 2.1). The guides should aim to clarify details such as expected time needed, equipment requirements and specific sampling procedures, i.e. sample size, as well as explaining how the use of sampling procedures removes the requirement to measure entire fields. The guides should ensure that food surplus and waste measurement is as simple as possible to reduce farmer burden. The methods should be aligned with the principles. This guidance will seek to build on and align with existing guidance (e.g., WRAP’s Grower Guidance and that developed by WWF-US as part of the SISC Food Loss Calculator Tool).	2023 Q2 – 2024 Q2
Retailers & Farm Advisors	Share sector specific guidance on measurement methods: Retailers and farm advisors to confirm support for the above guidance and to share and signpost it on website pages, newsletters and farmer networks.	2024 Q2

RECOMMENDATION 1.2: Develop and share case studies on farmers' measurement journey.

Rationale: To improve understanding of principles and methods for measuring food surplus and waste among farmers, it is important to illustrate how these methods can be applied and adapted to individual businesses using real life examples. Farmer case studies can offer guidance in a relatable format and can effectively demonstrate how on-farm measurement methods can be implemented in practice. The case studies should aim to clearly communicate the steps that were employed to address challenges and barriers identified in order to provide farmers not yet measuring with a better understanding of the process and how to overcome any issues.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs (WWF-UK)	Develop a template for case studies to follow: To ensure all pertinent information is included in case studies, WWF-UK will develop a template for retailers and farm advisors to use as guidance when developing their case studies.	2022 Q4
Retailers, Suppliers & Farm Advisors	Develop farmer case studies: Using the template developed by WWF-UK, retailers and farm advisors to develop and share case studies on farmers detailing their journey in implementing measurement, outlining sampling methods and how it has been made relevant to the scale of their business. To maintain an element of consistency, the case studies should demonstrate the set of principles outlined in the sector guidance (see Recommendation 1.1a). The case studies should feature a range of different sectors (i.e. crops, dairy, meat) and business size to demonstrate how the approaches are tailored.	2023 Q1 – Q4
Farmers	Participate in case study development: Farmers who are already measuring food surplus and waste can volunteer to share their data with retailers, suppliers and farm advisors to enable them to build case studies. Farmers who aren't currently measuring can volunteer to work with these teams to document the journey of beginning measurement and reporting, alongside the data they collect. This data can be fully anonymised.	2023 Q1 – Q4



The farmer dialogues highlighted a lack of perceived value to food surplus and waste measurement, with perceptions being raised of food waste unavoidable and its impacts being limited to the farm. To incentivise farmers to measure and report food surplus and waste on-farm, workshop participants highlighted the need to develop a clear business case for farmers to illustrate value in the process if they are to invest in this area alongside competing priorities (e.g. labour shortage, rising prices for inputs). However, participants also identified the need to build greater trust within the supply chain to prevent these messages from being undermined by perceived risks. Concerns were raised that food surplus and waste data submitted by farmers could be used to penalise underperforming businesses, therefore further assurances would be needed alongside communication of the benefits.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- "...provide education on the importance, cost, and value of reducing food waste"
- "...demonstrate financial benefits"
- "...provide evidence of opportunities for livestock and dairy farmers"
- "...increase closeness within the supply chain"
- "...provide transparency on why data is needed"
- "...ensure joint ownership of data"

To ensure that farmers identify value in measuring food surplus and waste on-farm, it is recommended that the benefits of reducing such waste are put into context using farmer case studies and through alignment with other relevant indicators (e.g. carbon savings, productivity) within communications.

RECOMMENDATION 2.1: Integrate food surplus and waste into communications and quantify impacts.

Rationale: Support raising farmer recognition of the value of measuring and reporting food surplus and waste, through linking this area to other key indicators that they are more familiar with, such as productivity and GHG emission reductions. Retailers and supply chains should aim to make these links in early communications and also provide reassurance that data will not be used to penalise farmers. This will help raise awareness of the interdependent issues, both globally and to the farm, and highlight the importance of this work within the whole food system.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Retailers & Suppliers	<p>Integrate food surplus and waste in communications: Retailers to lead collaboration with suppliers to link with other familiar topics such as productivity and emissions reduction.</p> <p>Quantify carbon saving impacts: Retailers to drive the narrative linking food waste reductions to GHG emissions reduction. Demonstrate how food waste measurements can be quantified in terms of GHG emission savings. Develop and share through your supplier network case study examples of how reductions in food waste have reduced emissions.</p>	2022 Q2 – 2023 Q1
Retailers & Suppliers	<p>Engagement to raise awareness: Retailers and suppliers to host webinars and communications to raise awareness of food surplus and waste, as well as communicate principles and methods for measurement, data use/transparency and assurances. Furthermore, industry working groups to be engaged with by retailers to support collective action across the supply chain and sharing of best practice, and the impact of decisions elsewhere on food surplus and waste on-farm.</p>	2023 Q1 – Q4



RECOMMENDATION 2.2: Include food surplus and waste in call-to-action statements.

Rationale: Various stakeholders in the food supply chain have calls to action with regards to reducing climate impact, increasing biodiversity and managing other environmental impacts. It is suggested that food surplus and waste is integrated into those action statements to highlight the importance of reducing food waste on wider environmental impacts in order to overcome the perception that food waste on farms affects only the farm on which it occurs.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Retailers & Suppliers	<p>Call-to-action statement: Retailers and suppliers to feature and encourage food surplus and waste reporting within their annual call-to-action statements, referencing statistics on the impact of food waste on-farm on GHGs and other relevant climate and environmental issues</p>	2022 Q3 – 2023 Q4

RECOMMENDATION 2.3: Develop case studies to showcase the benefits of reducing food surplus and waste.

Rationale: Representative case studies are required which demonstrate the financial and environmental benefits of reporting, balanced against the time, labour and financial investment required. These should aim to showcase opportunities to make financial savings as a result of identifying food surplus and waste hotspots and implementing appropriate interventions. Case studies will provide a clearer business case to invest in food surplus and waste work, which can be shared with farmers, suppliers, retailers and policymakers. These can be consolidated with the case studies from Recommendation 1.2 to provide a holistic view of measurement processes and benefits.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs (WRAP & WWF-UK) & Farm Advisors	<p>Development of case studies: NGOs and farm advisors to develop and publish short case studies that illustrate (and, where possible, quantify) the financial and environmental value of food surplus and waste measurement and accompanying actions. These are to be compiled in a central accessible location (e.g. the organisation’s website) to build a track record of how food surplus and waste data reported by farms can result in appreciation/benefits.</p>	2023 Q1 – Q3
Retailers & Suppliers	<p>Share case studies: Retailers and suppliers to share the completed case studies with their farmer networks.</p>	2023 Q4



STAGE 2 – FACILITATE

The second stage of the roadmap focuses on providing farmers with the necessary tools and systems to enable them to measure and report food surplus and waste easily, efficiently and effectively. This stage aims to overcome barriers related to process issues identified by farmers e.g. the lack of centralised reporting and lack of clarity on measurement and reporting standards. By creating easy to use systems we aim to reduce the level of disengagement driven by confusion and uncertainty surrounding correct processes and concerns about time consumption. Additionally, within this stage we aim to provide solutions to the financial barriers to measuring and reporting food waste on farms. Where food waste at this stage of the supply chain is driven by numerous factors beyond the farm gate, any financial burden from measuring and reporting should not be carried by farmers alone, nor should the cost of making the UK's food system more sustainable.

OBJECTIVES & RECOMMENDATIONS:

Objective 3:

Make food surplus and waste data reporting simple and meaningful

Recommendation 3.1

Harmonise and standardise reporting metrics.

Recommendation 3.2

Update existing tools for reporting food surplus and waste on farms.

Objective 4:

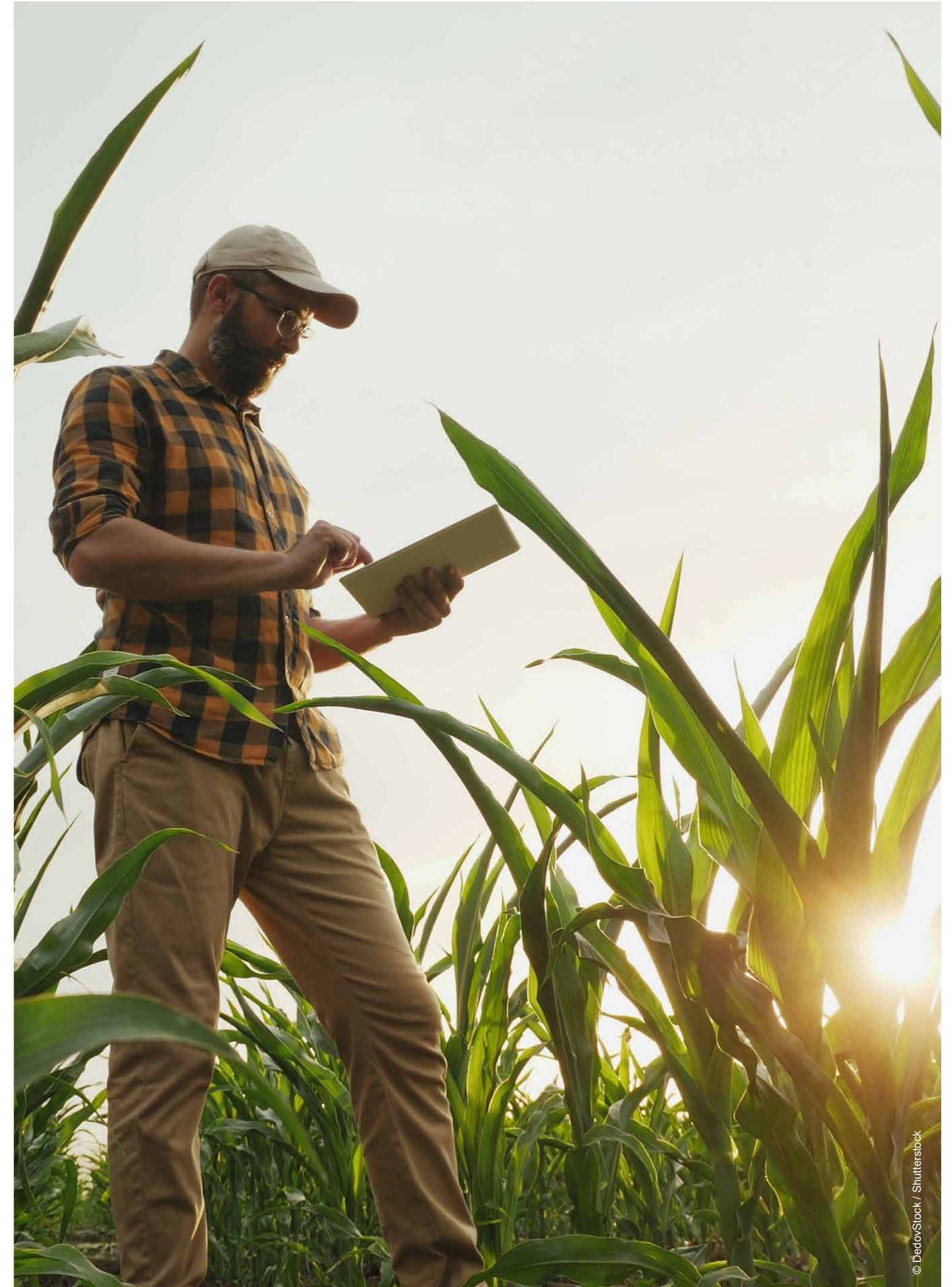
Develop new funding and green finance initiatives

Recommendation 4.1

Increase scope of funding and grants to include food surplus and waste measurement.

Recommendation 4.2

Work with banks to develop green finance options.





OBJECTIVE 3: Make food surplus and waste data reporting simple and meaningful

In order to reduce the burden on farmers who are faced with numerous requests relating to sustainability and reporting, the farmer dialogues and workshop participants highlighted the necessity of providing reporting processes that are simple and as cost- and time-effective as possible. The data required must be practical to gather, without significant investment requirements and, where possible, linked with metrics and reporting already in practice in order to minimise workload. Standardised and centrally managed reporting was deemed a critical approach to streamline processes and limit duplication of effort alongside the reporting of other sustainability indicators. Several participants suggested the possibility of integrating processes with existing indicator data (e.g. welfare data, certification schemes), however it was recognised that data availability would vary greatly by sector. Participants also requested that food surplus and waste reporting systems are developed to enable the provision of feedback on the data that they are reporting.

To ensure that food surplus and waste reporting is as simple and as meaningful as possible for farmers, it is recommended that reporting systems are standardised and centralised to streamline sustainability requests, with sufficient feedback given to farmers to provide value from their inputs.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- “...simplify reporting processes”
- “...provide one centralised reporting body, with a standard reporting template”
- “...provide regular feedback on waste measurement records”
- “... give interpretation of the measurement outputs”
- “...make it clear that there are other farmers experiencing the same drivers and waste”

RECOMMENDATION 3.1: Harmonise and standardise reporting metrics.

Rationale: There is currently no global consensus on measurement/sampling methods for food surplus and waste in the different food commodities, with several approaches available but with largely segregated focuses or sector gaps. A variety of tools exist to support farmer measurement (e.g. the SISC tool and Cool Farm Tool) but each with their own regional, crop, or sustainability focus. Farmers are bombarded with sustainability requests and the current fragmented approach risks contributing to commitment fatigue and inaction. A consistent and more widely adopted tool can ease the process for farmers, increasing adoption and therefore data availability, whilst collecting consistent and comparable data in order to help policymakers and organisations working on food surplus and waste reduction to more effectively develop benchmarks and datasets that can be used to identify hotspots globally, waste drivers, and scalable solutions. Additionally, the tool should aim to enable farmers to report not just how much food surplus and waste occurs on farms but why, supporting efforts to identify drivers and achieve reductions.

ACTIONS REQUIRED:

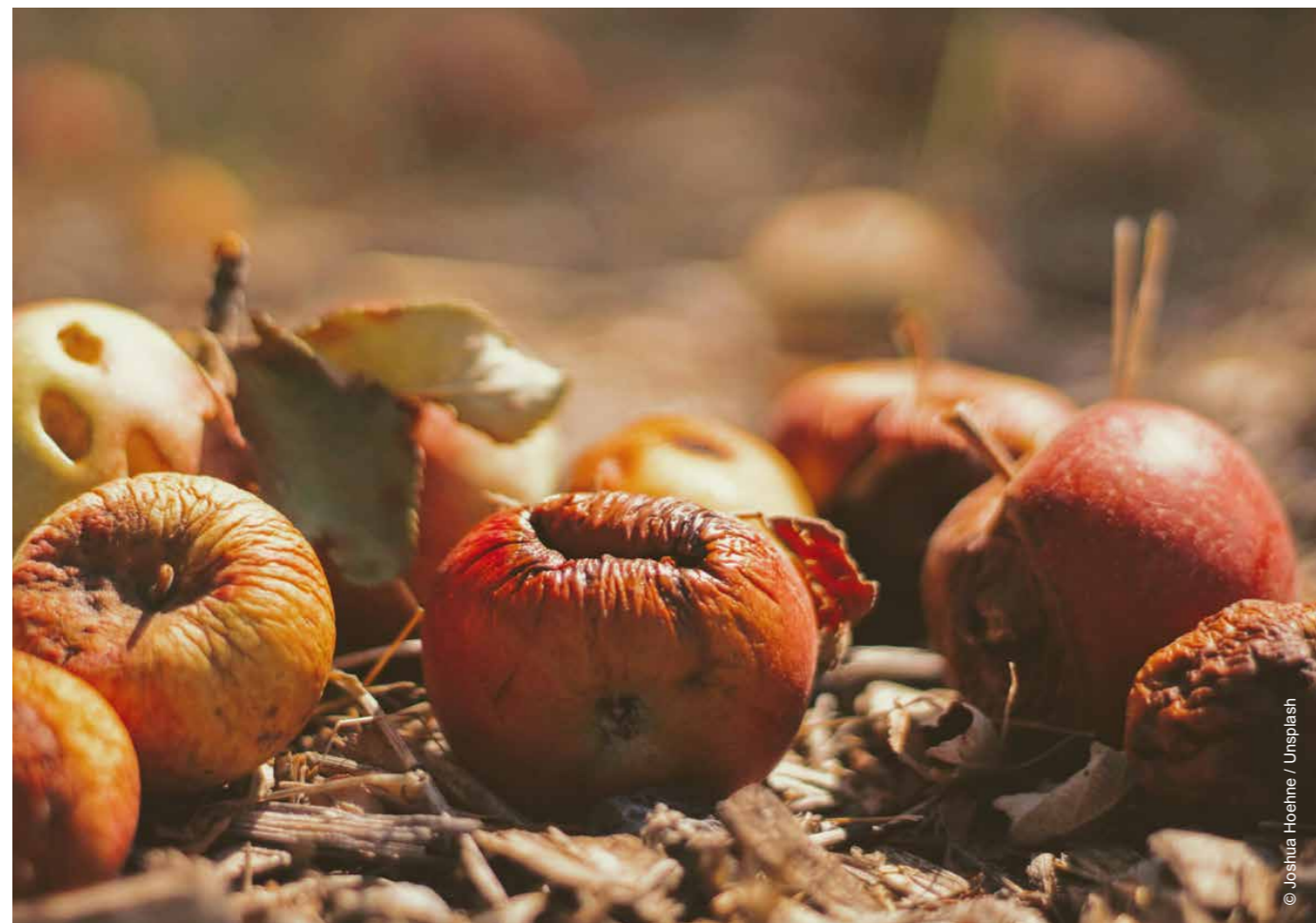
Stakeholder	Action	Timescale
NGOs (WWF-UK)	<p>Development of a tool for the measurement and reporting of food surplus and waste on farms: WWF-UK to develop a global tool, building on WRAP’s Grower Guidance and other existing metrics (e.g. animal welfare and mortality metrics), for the measurement and reporting of food surplus and waste on farms with the aim of harmonisation, consolidation, and a centralised reporting platform. This online platform will incorporate sampling guidance, allow for various reporting options including the reporting of anonymised data from farmers into ATLAS. It will be aligned with the principles and methods set out in Recommendation 1.1a. Assurances should be made to contributors to demonstrate that data is securely handled to maintain anonymity, as well as clarifying how the data may be used. The tool would enable users to also identify causes of food surplus and waste so as to enable the identification of key drivers and hotspots of waste, and the determination of supply chain actions to reduce them (see Recommendation 4.2).</p> <p>Collaborate with sustainability metrics and standards: WWF-UK to collaborate with other sustainability metrics, tools and standards to streamline sustainability reporting and facilitate compatibility. This includes: collaboration with the Sustainable Food Trust to enable the food surplus and waste on farm measurement tool to act as a component of the Global Farm Metric; and with ISO development in order to align approaches with ISO/TC 34/SC 20, a new ISO standard for FLW measurement currently under development. This action aims to provide farmers with more holistic tools, reducing the time requirements for sustainability analysis and reporting to increase willingness to engage.</p>	2022 Q2 – 2024 Q1
Farmers	<p>Work with NGOs to trial and give feedback on WWF’s food surplus and waste measurement tool: In order to ensure the tool is functional, easy to use and provides farmers with information useful to them it must be trialled in real-world settings. Farmers can support this by trialling the tool and providing feedback on how it can be further improved.</p>	2023 Q2 – 2024 Q1
Policymakers	<p>Work with NGOs to integrate FLW metrics into Food Data Transparency plans: Food Data Transparency Partnership to collaborate with NGOs in metric development to incorporate availability of data on the impacts of food surplus and waste. WWF’s food surplus and waste measurement tool will provide data relevant to the environmental impact of food production and build on existing work, such as animal welfare metrics, relevant to their aims.</p>	2023 Q1

RECOMMENDATION 3.2: Update existing tools for reporting food surplus and waste on farms.

Rationale: The Food Waste Atlas is a freely accessible online tool that collates global FLW data in one place, enabling the tracking of FLW across food types, sectors, and geography. However, the Atlas only currently enables reporting of FLW in the later stages of the supply chain and does not support farm stage. It is recommended that the tool is updated in line with WWF’s food surplus and waste measurement tool to support farm stage reporting and enable the collation and downloading of data on national and sectoral waste. In addition, Retailers and Suppliers should still seek to collate anonymised data from their supply chains and record on the Food Waste Reduction Roadmap data capture sheet.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs (WRAP)	Update tools to integrate farm stage food waste: WRAP to update The Food Waste Atlas tool to support farm stage food surplus and waste reporting to enable the collation of national data reported from WWF’s tool.	2024 Q1 – 2024 Q4
	Communicate updates to farmers: WRAP to undertake engagement activities to communicate the new additions and benefits of the tool to a wider audience, including farmers.	2024 Q4 – 2025 Q2



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Echoing findings from the farmer dialogues, a lack of sufficient funding to invest in new processes, labour and equipment was further reinforced within the workshops as one of the primary barriers to farmers measuring and reporting food surplus and waste. Participants identified the need for government level financial support to facilitate farmers to invest in this area. Labour costs and training requirements to upskill staff in the adoption of new systems were raised as key areas requiring additional funding. Food surplus and waste measurement is currently perceived to be out of the scope of existing agricultural sustainability schemes by farmers, therefore disincentivising applications.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- “... provide better grants that are food loss specific”
- “... make grants available to growers which assist with time, investment and equipment costs”
- “...increase green finance initiatives”
- “...provided funded advisory support”

Whilst the extent to which equipment is required in order to measure food surplus and waste, and what this means financially, will only become evident as the tool (see Recommendation 2.1a) further develops its guidance on sampling and measuring food surplus and waste, the potential investment required by farmers should be considered as plans progress. Concerns were raised over the potential investment costs required to undertake measurement (e.g. to purchase new equipment), with some farms lacking the technology to measure their harvested yields directly on-farm, relying instead on suppliers to weigh crops and feed back the sale volume. Investment in such technology may be seen as difficult to justify and prioritise in the current financial climate without dedicated grants.

To ensure that farmers are adequately supported when introducing new food surplus and waste measurement processes, it is recommended that dedicated food surplus and waste grants are made available to farmers and that they are made aware of existing support options.

RECOMMENDATION 4.1: Increase scope of funding and grants to include food surplus and waste measurement.

Rationale: There are currently no available funding sources that explicitly support investment for food surplus and waste measurement, i.e. new equipment, training, setup costs. Without dedicated funding sources, other areas requiring financial investment are likely to be prioritised above food surplus and waste measurement, providing a persistent barrier to its widespread adoption.

ACTIONS REQUIRED:

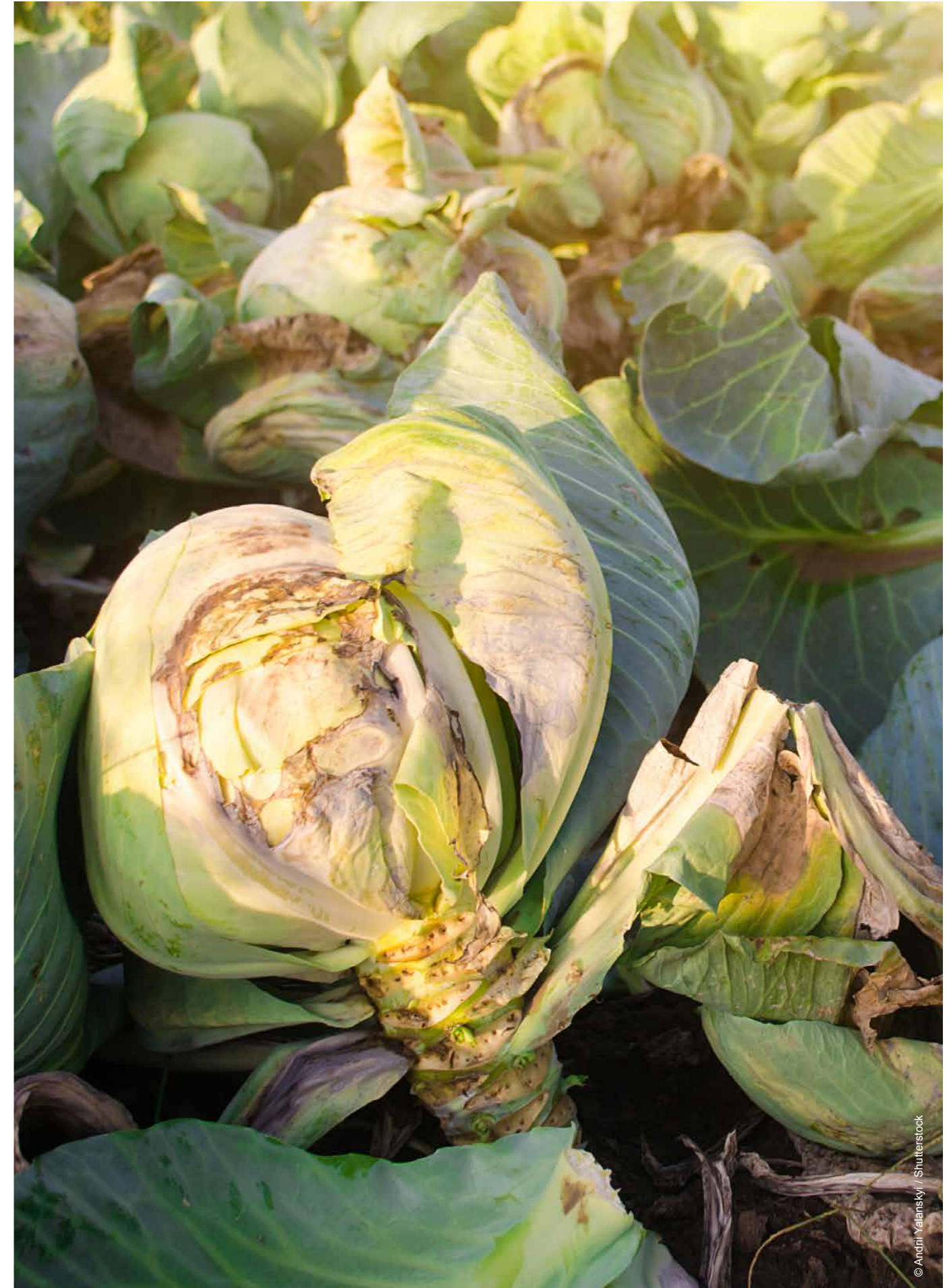
Stakeholder	Action	Timescale
Polymakers	Expand existing funding sources and create new opportunities: Policymakers to expand the scope of existing farm grants and subsidies to explicitly include food surplus and waste measurement and reporting. Alternatively, create new dedicated funding sources which are available for the equipment and training needed to undertake food surplus and waste measurement.	2023 Q1 – 2024 Q2

RECOMMENDATION 4.2: Work with banks to develop green finance options.

Rationale: An additional option for providing funding for food surplus and waste measurement is through the development of green financing initiatives. Following the approach of other sustainability issues (e.g. climate mitigation), access to certain loans or reduced interest rates could be made conditional on the submission of food surplus and waste measurement data.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs	Develop Green Finance options/Integrate food surplus and waste measurement into existing green finance: NGOs to work with corporate banks to highlight the importance of food surplus and waste measurement and incorporate this within green finance mechanisms to support farm loans. For example, recognition of its contribution to the circular economy to align with the EU taxonomy.	2024 Q2 – Q4





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STAGE 3 – SUPPORT

In stage three, WWF-UK calls for actors to provide additional on-farm support for the processes required for measuring and reporting, including training on measurement sampling methods and practical guidance to integrate measurement into existing farm processes. We aim for a system where farms can have a permanent staff member act as Food Waste Champion who can be provided with the necessary training on sampling and reporting. This person can then manage the on-farm activities such as field sampling and integrating instructions for temporary labourers into general farm management. As described in Section 3 of this report, farmers' concerns around the initial measurement and reporting and integrating the processes into existing farm structures were a barrier to the adoption of the practice. Once the initial measurement process has been undertaken and the activities integrated into normal farm routines the farmers indicated that the process no longer felt burdensome. By providing support to overcome the initial difficulties the increase in uptake of on farm measurement of food surplus and waste could be significant.

OBJECTIVES & RECOMMENDATIONS:

Objective 5:

Provide training on measurement methods

Recommendation 5.1

Develop training plans on food surplus and waste measurement.

Recommendation 5.2

Host training sessions.

Recommendation 5.3

Advocate for inclusion of food surplus and waste within training syllabus.

Objective 6:

Support integration of measurement into farm processes

Recommendation 6.1

Farmers to nominate an on-farm Food Waste Champion and implement regular briefings.

Recommendation 6.2

Suppliers to undertake field visits and engage with consultants and advisors to develop food surplus and waste measurement services.

Recommendation 6.3

Policy makers to fund farm advisor programme.



OBJECTIVE 5: Provide training on measurement methods

In the farmer dialogues, concerns were raised around potential labour barriers to food surplus and waste measurement, such as staff not understanding the purpose of new tasks, with some staff even presenting resistance to measurement. In the workshops, education and staff training featured prominently as solutions and were identified as important prerequisites to achieving wide-scale adoption of food surplus and waste measurement on-farm. However, participants recognised that this would require external support to achieve this and that farm owners should not bear primary responsibility to design and facilitate sessions. The workshop discussions identified the need for co-ordination across the supply chain to develop sector specific training plans, as well as the development of centralised guidance on training requirements from an external actor.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- “...provide training workshops”
- “...organise training courses to provide information on the key indicators to be measured on farms”
- “...get farm labour agencies, suppliers and consultants involved”

To ensure that training in food surplus and waste measurement remains consistent between training providers, it is recommended that training plans are centrally developed and disseminated (to ensure alignment with the principles, methods and indicators), with supply chain actors having primary responsibility for their delivery.

RECOMMENDATION 5.1: Develop training plans on food surplus and waste measurement.

Rationale: The establishment of consistent training approaches on food surplus and waste measurement will facilitate consistent reporting of data that is comparable within the defined sectors. In addition to methodology, formal training presents further opportunities to educate staff on the importance of food surplus and waste measurement, which may support the integration of new staff (particularly agency staff).

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs (WWF-UK and WRAP)	Develop training plans: WWF-UK and WRAP to collaborate to develop guidance and plans for training sessions, which can be adapted and shared with suppliers, agencies, and training providers. These should outline the core principles, methods and indicators to be used (following Recommendation 1.1a). The plans should consider the methods for different sectors.	2023 Q3 – Q4
NGOs & Farm Advisors	Develop training video guidance: WRAP and WWF-UK to collaborate with farm advisors to create training videos to demonstrate measurement processes for different sectors.	2024 Q1 – Q4

RECOMMENDATION 5.2: Host training sessions.

Rationale: To consistently communicate the principles and methods outlined within the food surplus and waste training plans (see Recommendation 3.1a), the most beneficial approach would be for supply chain actors to have primary responsibility for the delivery of training in their farm supply base. Practical training sessions can be delivered through supply chain networks, including industry associations. Retailers can support the process by offering high-level introductions to food surplus and waste that clearly communicate the aims and core principles of measurement and reporting, allowing farmers to raise questions or concerns about the process and to receive real-time support.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Retailers	Adopt the WWF tool for measurement and reporting of food surplus and waste on-farm as best practice: Retailers to stipulate use of WWF's tool as best practice within their supply chains to increase uniformity of data collection and reporting.	2024 Q1
Retailers & Suppliers	Host webinars and training days: Retailers to host webinars that introduce the importance of food surplus and waste measurement and methods for measurement and reporting at a high-level. Suppliers to host practical training days (possibly as webinars) that are more tailored to specific sectors. Sessions to follow guidance from NGO developed training plans (see Recommendation 3.1a).	2024 Q1 – Q4

RECOMMENDATION 5.3: Advocate for inclusion of food surplus and waste within training syllabus.

Rationale: A long-term strategy to increase awareness of food surplus and waste in the farming community is to target and equip farm workers with relevant knowledge in the early stages of their training. There are two points of entry for this, the management team (farmer/farm manager) via formal qualifications, and the farm worker (e.g. fruit picker) via on-the-job/agency provided training. Providing clear messaging of the links between food surplus and waste and resource use efficiency, productivity, climate impact and sustainable agriculture will be important to encourage its uptake in training curriculums.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs & Farm Advisors	Advocate for inclusion of food surplus and waste in training syllabus: NGOs to create a clear business case for the inclusion of food surplus and waste measurement in training courses and as standard practice across all farm types. NGOs to collaborate with farm advisors to approach agricultural training course coordinators – agriculture degrees, farm business courses, specialist produce courses (agricultural colleges, universities, and training providers such as LANTRA and BASIS) and farm labour agencies.	2023 Q1 – 2024 Q4



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A key concern to emerge from the farmer dialogues and workshops was the challenge of developing and integrating new processes into existing on-farm protocols. Some farmers expressed resistance to replacing traditional processes or had no similar measurement practices in place on which to build. The workshops highlighted the need for additional on-farm field visits as a way to support the initial adoption stages for food surplus and waste measurement, offering bespoke one-to-one support at the business level. Suggestions included the establishment of regional third-party specialists offering sector specific support, which may also involve the sharing of measurement equipment as an initial option prior to investment.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- “...provide support to farm businesses to help review and optimise processes, as well as set up new ones”
- “...integrate measurements into existing systems and processes (e.g. the harvesting process)”
- “...select livestock and dairy farms to initially work with and share learning”
- “... work with and support a dedicated food loss champion and/or waste manager on farms”

To ensure the smooth adoption of food surplus and waste measurement and reporting processes on-farm, it is recommended that proactive actions are taken, such as assigning responsibilities and third-party field visits, to support integration with existing farm processes.

RECOMMENDATION 6.1: Farmers to nominate an on-farm Food Waste Champion and implement regular briefings.

Rationale: The nomination of an existing member of staff to act as a Food Waste Champion will provide a point of contact for the suppliers and retailers working to support farmers, with whom they can connect and who can offer training and support opportunities. This role should be incorporated into an existing position and not require additional staff members. This roadmap calls on suppliers and retailers to support farmers in integrating measurement and reporting into existing farm processes and, once passed the initial learning curve, enable this to occur without requiring significant additional labour. The nominated champion will be an existing member of staff who is upskilled by training provided (see Recommendation 3.2) and can then act as a point of expertise on the farm, allowing for dissemination of the information throughout the farm, and empowering them to manage food surplus and waste work. Furthermore, this will enable them to engage with farm labourers on food surplus and waste measurement in their daily briefings and help normalise behaviours around tackling food waste and integrating related actions into everyday routines. The increased exposure to food surplus and waste issues through assigning of responsibility and having a team member responsible for attending and disseminating training on measurement will be particularly beneficial for informing and integrating temporary staff within the processes. This applies to medium and large farms, whereas for small farms with fewer permanent employees the farmers themselves will be the food waste champions.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Farmers/ Suppliers	Appoint Food Waste Champion: Suppliers to request that farmers appoint a permanent member of staff at each farm as Food Waste Champion to undergo more extensive training and to disseminate learnings among staff.	2024 Q1 – Q4
	Introduce regular briefings: Suppliers to request that food surplus and waste measurement methods are regularly featured within the daily briefing process for farm labourers.	2024 Q3 –Q4

RECOMMENDATION 6.2: Suppliers to undertake field visits and engage with consultants and advisors to develop food surplus and waste measurement services.

Rationale: The integration of measurement processes into existing farm processes (e.g. harvesting processes) will enable farmers to measure and report with minimal disruption their existing tasks and processes. However, greater levels of support will be required in the initial adoption stages to enable this, as well as to provide on the ground guidance during the initial learning curve of sampling methods. While offers of support may be best placed with suppliers after facilitating sector-focused training sessions (see Recommendation 3.2), additional third-party support may be required to meet farm requests.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Suppliers	Field visits to provide guidance: Suppliers to undertake field visits to their farm supply base during initial measurement to support and guide farmers through the first sampling process. The visits should provide practical support and guidance on integrating measurement and sampling into existing processes.	2024 Q1
	Engage with consultants and farm advisors: Suppliers to engage with external consultants and farm advisors to steer and develop support services to support food surplus and waste measurement. Request the integration of food surplus and waste measurement with other sustainability services and advice programmes (e.g. productivity, business management planning).	2025 Q4

Rationale: The work delivered in this roadmap should build on pre-existing work in this field, such as WRAP's farmer-led data collection programme.^{xiii} Such work has demonstrated the need for on-the-ground support of farmers as they learn measurement methods and integrate the activities into their existing processes. Expansion of farm advisor programmes, such as the one demonstrated by WRAP, may be required to meet the increased demand for on-farm support targeted within this roadmap. Access to this advisory support could be made conditional on the submission of food surplus and waste measurement data. Additionally, expansion on programmes such as WRAPs which focus not only on farm level support, but group measurement and discourse will support actions in Recommendation 4.2, which focuses on peer-to-peer learning and support of measurement and reduction efforts.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Policymakers	Upscale funding for farm advisor programmes: Policymakers to provide funding for the agriculture industry to upscale farm advisor programmes and expansion of their services to include food surplus and waste.	2024 Q1



STAGE 4 – ENABLE CHANGE

Building on earlier stages of the roadmap, stage four calls for further actions which provide long-term incentives to farmers to maintain the process of measuring and reporting food surplus and waste by utilising the data to make positive changes in the food system whilst reducing waste. This includes the reviewing of the newly available data to identify further supply chain policy and practice shifts and developing new legislation to reduce surplus and waste at the farm stage. Additionally, utilising the data gathered from reporting and the activities from Stages 1–3 will enable the identification of secondary markets to ensure that surplus or wasted food is made more easily marketable, both reducing waste, the impact of disposing of surplus (when sent to animal feed or biochemical processing) and waste, and providing farmers with long-term reasons to engage in food surplus and waste measurement and reporting.

OBJECTIVES & RECOMMENDATIONS:

Objective 7

Utilise data to identify and drive positive changes in the supply chain

Recommendation 7.1

NGOs to review sector-level data on causes of food surplus and waste.

Recommendation 7.2

Identify risk areas to set food surplus and waste reduction goals.

Recommendation 7.3

Identify secondary markets and provide grants for redistributing surplus food.

Objective 8:

Facilitate shared learning and peer-to-peer support amongst farmers

Recommendation 8.1

Utilise existing peer-to-peer farmer networks to share learning and reduce stigma around waste rates.

Recommendation 8.2

Stakeholders to improve supply chain communication and networks.





As highlighted in Driven to Waste⁹, many of the drivers of on-farm food waste stem from beyond the farm gate, including labour shortages, changes to orders or specifications. The discussions within workshops highlighted the incentive that measuring and reporting would carry for farmers if they enabled the identification of high-level, off-farm issues driving waste rates, and thus provided the opportunity for food system actors to provide greater support to reduce these rates.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- “...give regular feedback on waste measurement records”
- “...identify areas most at risk and then set long-term goals against them”
- “...put policies in place to provide support”

The workshop sessions also highlighted that the introduction of on-farm goal setting and benchmarking activities could help to bolster these practices further and attract further participation. However, benchmarking would require more substantial datasets to be collated at the sector level. Once sufficient food surplus and waste data have been gathered by early adopters, these data sets can be reviewed to identify and implement positive changes in the supply chain, which in turn will help to recruit a wider farmer audience to report. The provision of regular and meaningful feedback to farmers on their reported data inputs, to enable the targeting of hotspots and gauge the potential benefits of reducing surplus and waste, was regarded by many as a crucial action to achieve the roadmap goals.

To ensure farmers are equipped with the information to implement positive food surplus and waste reduction actions, it is recommended that they receive sufficient feedback (e.g. identifying hotspots, quantifying high-level financial and environmental savings) on their measurement inputs, with support offered from a variety of stakeholders to identify risk areas and secondary markets.

RECOMMENDATION 7.1: NGOs to review sector-level data on causes of food surplus and waste.

Rationale: The lack of historic data for on-farm food surplus and waste rates has severely restricted research to identify drivers and hotspots across different sectors. Once greater levels of food surplus and waste reporting have been achieved, there will be greater scope to analyse and identify primary causes in specific sectors, while considering the potential interventions for reduction.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
NGOs (WRAP)	Review data and identify causes of food surplus and waste: WRAP to compile and review anonymised food surplus and waste data to identify the main drivers across different sectors. Present high-level trends and provide recommendations on the potential interventions to reduce food surplus and waste.	2025 Q1 – Q4

RECOMMENDATION 7.2: Identify risk areas to set food surplus and waste reduction goals.

Rationale: Anonymised food surplus and waste datasets linked to specific practices can help to recognise high-level trends within supply chains, which can be used to identify potential risk areas. Through the identification of food surplus and waste hotspots and drivers, targeted guidance can be given to farmers to develop reduction interventions for farm-stage causes of waste. Simultaneously, this data may be used to inform changes to retailer-level policies and practices to introduce food surplus and waste reduction measures at a larger scale and reduce any supply chain behaviours driving food surplus or waste on farms.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Retailers, Suppliers & Farm Advisors	Identify risk areas: Retailers to coordinate efforts to work closely with farmers and identify areas most at risk for driving food surplus and waste, with the support of suppliers and farm advisors. Once hotspots are identified, long-term reduction goals can be set and monitored.	2025 Q1 – Q4
Retailers & Suppliers	Provide guidance on reducing hotspots: Retailers and suppliers to share existing research and sector-specific guidance with farmers to provide high-level advice on reducing their identified food surplus and waste hotspots.	2025 Q1 – 2026 Q2
Retailers	Review policy around causes of surplus and waste: Retailers to review causes of food surplus and waste within own supply chain to inform changes to internal standards. Ensure best practice guidelines for managing product/quality specifications on fresh produce are followed as set out by WRAP & IGD Food Waste Reduction Roadmap. This could be built into annual feedback to suppliers on their reporting process. Specific farm level trend reports could also be produced.	2026 Q1 – Q2

RECOMMENDATION 7.3: Identify secondary markets and provide grants for redistributing surplus food.

Rationale: As set out in the food waste hierarchy, reduction of food waste and production of surplus is the priority. Beyond this, redistribution of food surplus for human consumption should be targeted ahead of repurposing surplus in animal feed or bio-based materials. In order to enable this, in instances when surplus produce is unavoidable, farmers need access to a variety of potential secondary markets or opportunities where surplus can be distributed. Once alternative routes are identified, these must be widely communicated among farmers utilising existing networks. The creation of targeted grants would support the use of such practices by funding the additional labour investments required to harvest non-marketable/surplus produce.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Policymakers	Upscale funding available for redistribution effort: Policymakers to increase grants available to farms or redistribution organisations to encourage the harvest of non-marketable/surplus food, preventing the cost of the additional labour from falling on the farmer.	2023 Q4
Suppliers & Farm Advisors	Identify secondary markets: Suppliers and farm advisors to work together to support farmers to identify new secondary markets or opportunities for non-marketable food or surplus.	2024 Q2



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To support the long-term adoption of food surplus and waste measurement and maintain momentum towards the roadmap goal, workshop participants identified the need for better communication and collaboration between farmers to help share learning and normalise reporting. It was recognised that greater levels of reporting would require building support networks as well as a sense of togetherness within farmer communities. It was also raised that such peer-to-peer support could help reduce the potential stigma around reporting high waste, as waste levels are frequently out of the control of the farm (e.g. extreme weather events or decisions made in the later stages of the supply chain).

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- “...use existing networks to support peer-to-peer learning”
- “...support improved communication and collaboration within farming communities”
- “...work to change attitudes, normalise/accept losses and remove the stigma that the farmer is doing something wrong if waste is incurred”

Suggestions included the expansion of existing farmer networks and establishment of new ones to facilitate knowledge exchange on food surplus and waste, measurement and peer-to-peer learning. Providing food surplus and waste dedicated networks would build upon earlier roadmap actions (e.g. farmer case studies) to pool together field-tested guidance and experiences across different business types.

To ensure food surplus and waste-related learning is widely communicated across farmer communities, it is recommended that peer-to-peer support groups and networks are developed and incentivised.

RECOMMENDATION 8.1: Utilise existing peer-to-peer farmer networks to share learning and reduce stigma around waste rates.

Rationale: Facilitating opportunities for food surplus and waste learning to be shared via peer-to-peer networks will help to build momentum around measurement and interventions in the farming community. By targeting existing farmer networks already engaged in environmental issues, farmers undertaking initial measurement can be supported by peers who are undertaking or have undertaken the same process. The discussions can help normalise and mainstream food surplus and waste measurement, whilst also building the link with other key agricultural issues such as the environment and productivity. To achieve maximum benefits, any newly developed peer-to-peer groups or networks need to be widely utilised with regular engagement.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Farm Advisors & Suppliers	Utilise peer-to-peer support groups, networks, or forums: Farm advisors, with the support of suppliers, to approach existing network facilitators to provide opportunities to discuss food surplus and waste and enable peer-to-peer knowledge exchange in measurement and reporting difficulties. This may include regional farmer groups, online support groups, or networks with sustainability goals (e.g. the YEN Zero (Yield Enhancement Network) for growers to track and benchmark GHG emissions). Members from existing supply chain networks are to be encouraged to participate.	2024 Q3

RECOMMENDATION 8.2: Stakeholders to improve supply chain communication and networks.

Rationale: Sufficient feedback to the farm level is required early in the adoption of food surplus and waste reporting to ensure that farmers undertaking the reporting understand its value. However, for this feedback loop to be successful, good working relationships are needed between farmers and suppliers through increased dialogue where the aims of food surplus and waste reporting are clearly communicated. An additional focus at this stage should be monitoring whole supply chain progress towards reduction targets. In February 2023, WRAP and IGD are due to publish a one-page action plan that businesses who have direct relationships with or can influence primary producers can use to support them in reducing on farm food waste. Retailers and suppliers should use this to engage primary producers and ensure progress is recorded with the *Food Waste Reduction Roadmap*.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Retailers & Suppliers	Record food surplus and waste data on WRAP & IGD Food Waste Reduction Roadmap data capture sheet: In order to track progress towards industry targets suppliers and retailers are encouraged to work collaboratively to collect data from farmers and record it in the WRAP & IGD FWRR.	2024 Q4
Retailers & Suppliers	Encourage dialogue around food surplus and waste performance: Retailers to encourage suppliers with short supply chains to have regular dialogue with their farm supply base on surplus and waste performance and drivers to utilise existing networks – and incorporate food surplus and waste into wider discussions. This action is dependent on information being shared by farmers with their suppliers, therefore assurances are needed that farms will not be penalised for high waste rates. Where supply chains are longer and more complex, retailers need to start the conversations with supply chain actors as to how they can access key farmers within the supply chain.	2025 Q1 – Q4



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STAGE 5 – DRIVING CHANGE

The final stage of the roadmap assumes that the previous stages have been adequately met, with farmers provided with sufficient levels of support and incentive to maximise voluntary measurement. Subsequently, the actions in stage five focus on driving change beyond voluntary levels by integrating surplus and waste measurement for medium and large farm businesses into policy. Additionally, this stage focuses on utilising the data collected through measurement and reporting to drive changes in the food system which contribute to food waste and subsequent environmental degradation. This prioritises updating policy and practice in both supply chains and government based on the drivers of waste identified from the data reported. The final aim of this stage of the roadmap is to ensure regular progress checks on national and sectoral on-farm food waste levels to ensure progress towards the 50% reduction target.

OBJECTIVES & RECOMMENDATIONS:

Objective 9

Implement requirements around measuring and reporting

Recommendation 9.1

Retailers to redefine internal standards and best practice guidance.

Recommendation 9.2

Polymakers to review and update relevant policies.

Recommendation 9.3

Assurance schemes to adapt certification requirements to include food surplus and waste measurement and reporting.

Objective 10

Consistent progress tracking towards reduction goals

Recommendation 10.1

Polymakers to integrate farm stage food surplus and waste into high level reports.

Recommendation 10.2

NGOs to steer the development of benchmarking analyses.



OBJECTIVE 9: Implement requirements around measuring and reporting

It was generally agreed within the workshops that to reach the goal of increasing the number of UK farmers reporting food surplus and waste on-farm to a level that sufficient data was being received would require the introduction of mandatory requirements, whether imposed within government legislation or by supply chain actors in their contractual requirements. However, the introduction of mandatory reporting by retailers or suppliers should be carefully considered with regards to timing, phasing and engagement with the supply chain, therefore it would not be a viable option. The expansion of Defra's planned consultation on mandatory FLW measurement to include medium and large farm businesses may present the most appropriate opportunity to drive reporting numbers but would require additional government support to sufficiently prepare businesses for the changes and to ensure farm businesses do not suffer for the additional sustainability reporting. Additionally, where the vast majority of UK farms are considered to be small businesses, this action should be seen as an alternative to engaging in the other stages of the roadmap, which remain imperative to upscaling the number of small farms measuring and reporting.

Workshop participants said to overcome the barriers to measurement and reporting we need to...

- "... eventually make reporting a base requirement ahead of commercial contracts being awarded"
- "...to provide clear expectations for suppliers depending on their relationship with the farm (e.g. contracted, vertically integrated)"
- "...implement mandatory reporting which would mean a solution [to the barriers] has to be found"
- "...incentivise reporting rather than penalising farmers for not reporting"

To ensure that sufficient incentives are in place to maximise levels of measurement and reporting, it is recommended that best-practices policies are revised to include food surplus and waste measurement at both a supply chain and government level.

RECOMMENDATION 9.1: Retailers to redefine internal standards and best practice guidance.

Rationale: To maintain trust and collaboration between farmers and the rest of the supply chain it is important that retailer drivers for producers to measure and report food surplus and waste are implemented via incentives and guidance rather than by penalising non-compliance. Further participation may be attained by adjusting existing mechanisms of continuous improvement, such as best practice guidance, to feature food surplus and waste reporting at the farm level. This approach presents additional incentives for farmers to report but still offers some flexibility in the way that the guidance is adopted. Coordination will be required between retailers and NGOs to ensure that best practices are consistently defined and correspond with existing sector level guidance (see Recommendation 1.1a). Changes to retailer standards could also be communicated with consumers to foster buy-in on positive changes to address food surplus and waste.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Retailers and Suppliers	Integrate food surplus and waste in Supplier Scorecards: Retailers to lead collaboration with suppliers to encourage integration of food surplus and waste measurement into supplier scorecards	2024 - Q3 2025 - Q2
Retailers	Redefine best practice guidance: Retailers to redefine their internal standards and adopt best practice guidance for their suppliers to measure and report food surplus and waste back to the farm level. Collaboration will be required with NGOs, and potentially between different retailers, to ensure consistent messages are maintained for each sector around how best practice is defined. Communicate food surplus and waste commitments to consumers: Retailers to link food surplus and waste reduction on-farm with customer facing sustainability commitments. This is intended to help reinforce consumer awareness and demand, therefore providing further motivation for farmers to measure.	2025 Q1 - Q2 2025 Q3

RECOMMENDATION 9.2: Policymakers to review and update relevant policies.

Rationale: Whilst the focus of this work remains on increasing voluntary uptake of measurement and reporting, to achieve high enough levels of food surplus and waste measurement and reporting in the UK to enable systemic change, government legislation will be needed to make these processes mandatory. Defra are holding a consultation on mandatory reporting of FLW for large businesses in England (June – September 2022). However, the consultation's current scope does not consider pre-farm gate food surplus and waste reporting, therefore excluding all of the UK's primary producers. WWF-UK calls for Defra to extend this stage of policy development to include large and medium sized farm businesses in mandatory food waste reporting from 2024 onwards¹. This time frame enables farm businesses time to benefit from the action outlined in this document. With food waste a devolved matter, equivalent policies will be required from other UK governments to achieve the roadmap's wider UK goals.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Policy makers	Review policies on mandatory reporting: Rationale: Defra to extend policy development on mandatory reporting to include large farm and medium farm businesses in 2024. Necessary support will need to be offered to farms in the preceding years, sufficient evidence of the benefits to reporting on medium sized farms, as well as achieving satisfactory levels of voluntary reporting. This time frame enables farm businesses time to benefit from the action outlined in this document prior to mandatory reporting being implemented. With food waste a devolved matter, equivalent policies will be required from other UK governments to achieve the roadmap's wider UK goals.	2022 Q4 – 2026 Q4
Policy makers	Review policy around causes of surplus and waste: Policy makers to review causes of food surplus and waste reported to inform changes to policy which can prevent supply chain practices which drive on-farm waste (e.g., last minute changes to or cancellations of orders).	2026 Q1 – Q4

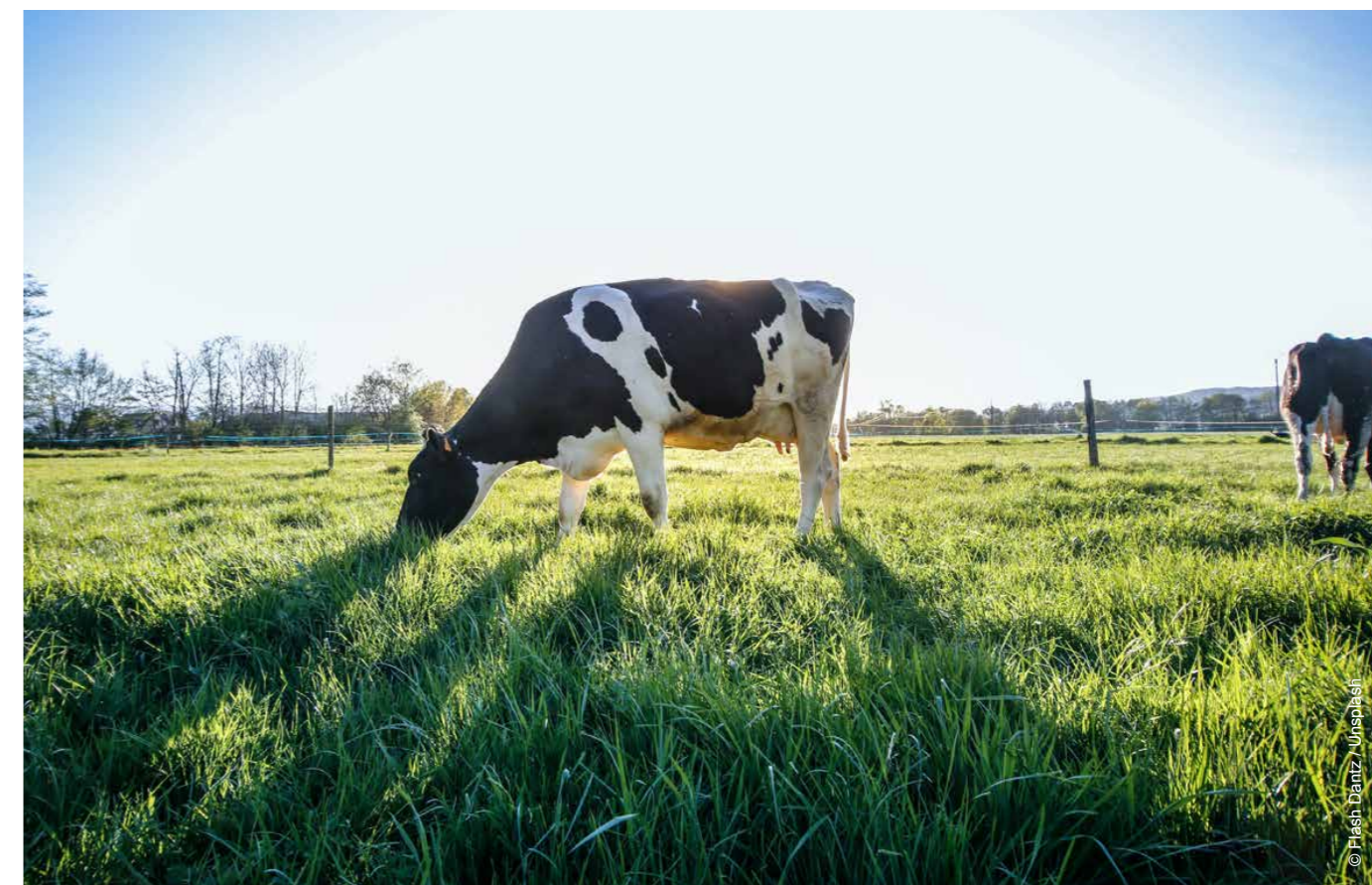
¹ As highlighted in Section 2, this can be managed by using WRAP's grower guidance for measurement until the tool which integrates and develops this guidance further is available in 2024.

RECOMMENDATION 9.3: Assurance schemes to adapt certification requirements to include food surplus and waste measurement and reporting.

Rationale: To further support integration of food surplus and waste measurement into farm processes and to represent its importance in sustainable agriculture practices, it is recommended that the requirement to undertake and report measurement is incorporated within existing assurance and certification schemes (e.g. Red Tractor). Their incorporation could initially be utilised to provide recognition for early adopting farms through optional bolt-on certifications (2022). Following greater levels of reporting, food surplus and waste reporting could be incorporated into their core standards and to be required to meet compliance (2025).

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
Assurance Schemes (Red Tractor, LEAF)	Adaptation of existing sustainability and welfare indicators: Red Tractor and other assurance/certification schemes to include food surplus and waste measurement as part of their auditing processes. The aim will be for it to be added initially as an optional bolt on for sectors where measurement guidance is already available through WRAP's Grower Guidance (2022), then later to become part of the core standard (2025), which is applicable to approximately 95% of UK farms.	2022 Q4 – 2025 Q4





The final objective of the roadmap builds on the success of the previous stages being implemented when food surplus and waste measurement and reporting becomes relatively widespread across UK farms. To drive consistent progress towards reducing food surplus and waste it was indicated that new mechanisms would be required to track progress in relation to similar sectors and business types. Some workshop participants suggested that to substantially drive change, such progress would need to be linked to reward systems; however, it was unclear how this could be made equitable when considering different sectors and factors which drive waste. These discussions raised further concerns about how reported data might be managed and used, which would need to be clearly communicated with farmers to maintain confidence in reporting.

To drive continuous improvement around reducing food surplus and waste in UK farms, it is recommended that sector-level progress is widely communicated on at least a yearly basis, with further benchmarking services developed for those who require more detailed information.

You said we need...

- “a baseline measurement to encourage change”
- “provide benchmark/analysis of data back to businesses submitting data”
- “to think about the sensitivity of data sharing”

RECOMMENDATION 10.1: Policymakers to integrate farm stage food surplus and waste into high level reports.

Rationale: Once sufficient levels of food surplus and waste data are being captured at the farm level, it is important that insights are shared with the wider agriculture industry to facilitate sector level target setting and progress tracking throughout the supply chain. It is recommended that sector progress is communicated directly from government to reach the widest possible audience. Defra produces annual reports on waste for other sectors (e.g. local authority collected waste), providing a well-known source of waste statistics and datasets. However, the development of these reports is dependent on sufficient food surplus and waste data having been gathered for different sectors following earlier stages of the roadmap. With FLW a devolved matter, equivalent progress reports would need to be developed and published by other devolved nations.

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
<p>Policymakers & NGOs (WRAP)</p>	<p>Publish annual progress reports: WRAP to provide annual sector level reports for sectors to track their progress nationally and within supply chains. The report should provide high-level statistics, annual progress tracking against a 50% reduction by 2030 targets using ‘Hidden Waste’ as a baseline and should identify reasoning for notable trends (e.g. waste in a specific region owing to extreme weather). The development of these reports is contingent on having access to sufficient good quality data that has been gathered for multiple sectors. Assurances should be made to contributors to demonstrate that data is securely handled and presented to maintain anonymity. Defra should incorporate these findings and the context provided by the reporting within related high-level reports, e.g. Agricultural and Food Security reports.</p>	<p>2025 Q1 – 2026 Q4</p>

RECOMMENDATION 10.2: NGOs to steer the development of benchmarking analyses.

Rationale: Some businesses may benefit from detailed farm-level analysis and progress tracking (e.g. benchmarking) of their surplus and waste rates, which cannot always be attained from sector progress reports or online reporting systems and may seek external assistance from consultants. To promote consistency and comparability of the analysis of food surplus and waste data, it would be beneficial for NGOs to provide written guidelines on the principles, methods and indicators to be followed. By creating a clear and consistent approach, food surplus and waste targets can be incorporated within other mandatory sustainability targets (e.g. Net Zero emissions).

ACTIONS REQUIRED:

Stakeholder	Action	Timescale
<p>NGOs (WRAP)</p>	<p>Develop guidance for surplus and waste progress tracking: WRAP to define an approach for analysing and benchmarking food surplus and waste at the farm level, aimed at external consultant services. For instance, benchmarking analyses could utilise Defra-published datasets to compare client farms with similar business types. NGOs to engage with consultants to communicate guidance and help to steer the development of consistent services for food surplus and waste progress tracking alongside other sustainability metrics.</p>	<p>2026 Q1 – 2026 Q4</p>

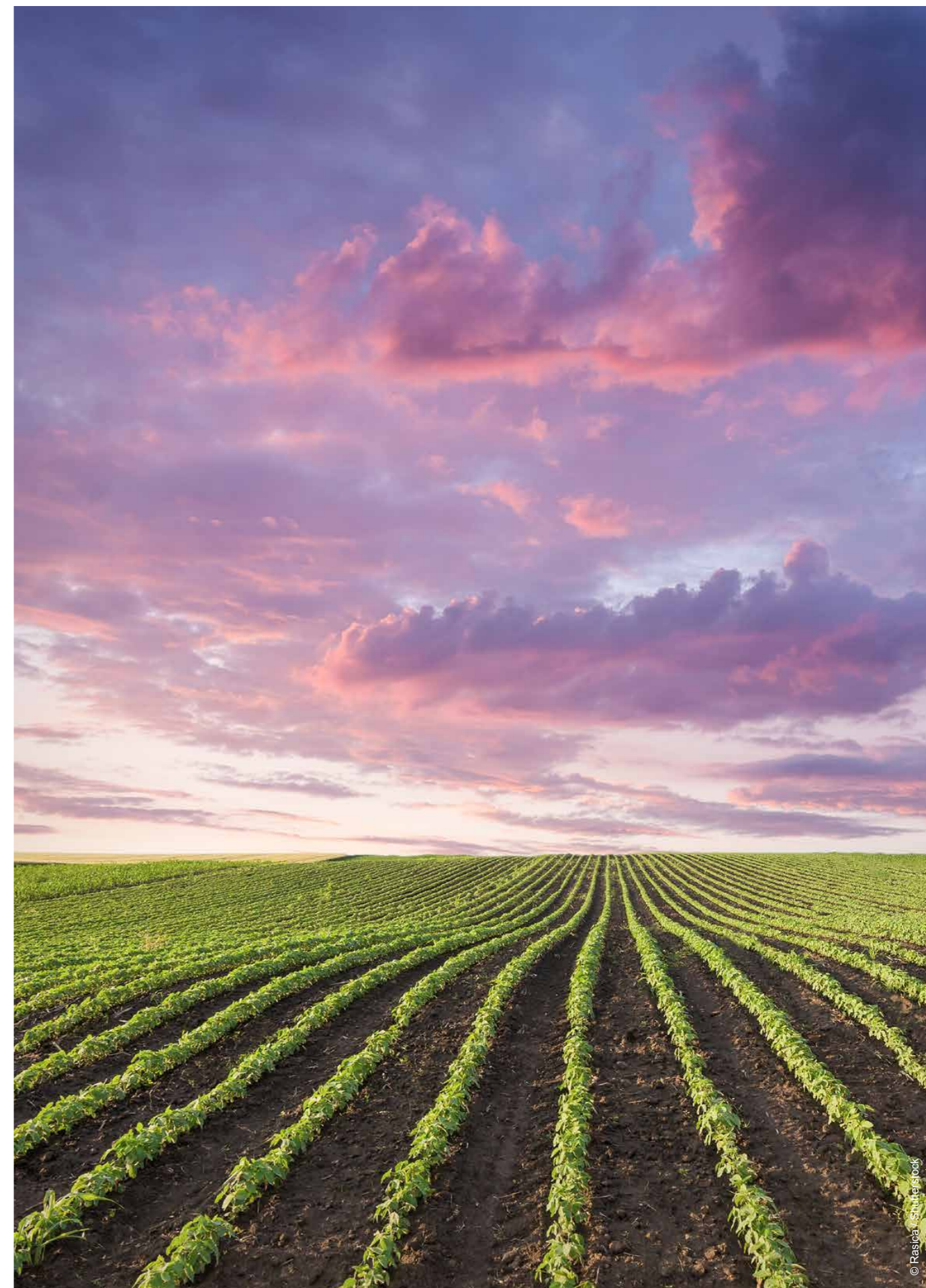
7. CONCLUSIONS

Within the UK, an estimated 3.3 million tonnes of food are wasted on farms each year. This puts total estimates for food loss and waste in the UK at 12.8 million tonnes, with the farm-stage representing over 25% of this. This food waste has a huge environmental impact, contributing 6 million tonnes of CO₂eq, which amounts to approximately 10% of UK agricultural emissions, and requires an area of land almost half the size of Wales to grow. Furthermore, it carries the potential of 6.9 million meals at a time when increasing numbers of the UK population live in food insecurity. This illustrates the significant scale and impact of food waste in UK primary production, and highlights the role reducing it could play in driving progress towards numerous environmental targets, such as carbon budgets. However, in order to achieve progress in these areas, both an increase in the number of farms measuring and reporting food surplus and waste, and collaborative effort and change across the supply chain is required.

Numerous studies reflect the importance of measuring farm-stage food waste, both post-harvest and through the use of in-field sampling to calculate in-field losses, in driving reductions in such waste. Farmers tend to underestimate both the scale and value of food waste occurring when relying on traditional estimation and self-reporting, which contributes to missing valuable opportunities to increase on-farm profitability and reduce food waste simultaneously. This report sets out the specific stakeholder actions needed across the food system to support the required increase in UK farmers measuring and reporting food surplus and waste by the end of 2025, with ongoing actions to enable food system changes to drive a reduction in food surplus and waste levels. This complements the work and ambition of Courtauld 2030, WRAP & IGD Food Waste Reduction Roadmap and the Champions 12.3 10×20×30 initiative.

As many of the drivers of on-farm food waste stem from beyond the farm gate, such as a limited access to secondary markets and lack of flexibility in specifications, changes with the greatest odds of success in reducing food waste on farm will require collaborative approaches from across the supply chain. The plans laid out in this report will enable reporting of data that is granular enough to inform policy and practice shifts within the food system, and thus support farmers to reduce food surplus and waste levels. By doing so there is further potential to collect enough data to more accurately estimate national and sectoral food waste levels, their environmental impacts and to set a baseline and track progress towards UN Sustainable Development Goal 12.3 of a 50% reduction by 2030.

- i WWF-UK (2022) Hidden Waste: The scale and impact of food loss and waste in UK primary production. WWF-UK.
- ii GOV.co.uk (2021) Agri-climate Report. <https://www.gov.uk/government/statistics/agri-climate-report-2021/agri-climate-report-2021>
- iii WRAP (2019) Food waste in primary production in the UK. Banbury: WRAP.
- iv WRAP (2021) Farmer-led data gathering pilots 2019-2021 (Year 2). Banbury: WRAP.
- v GOV.co.uk (2021) Agri-climate Report. <https://www.gov.uk/government/statistics/agri-climate-report-2021/agri-climate-report-2021>
- vi WRAP (2019) Food waste in primary production in the UK. Banbury: WRAP.
- vii WRAP (2021) Farmer-led data gathering pilots 2019-2021 (Year 2). Banbury: WRAP.
- viii Champions 12.3. <https://champions123.org/publication/guidance-interpreting-sustainable-development-goal-target-123>
- ix WWF-UK (2021) Driven to Waste: The Global Impact of Food Loss and Waste on Farms. WWF-UK.
- x WWF-US (2021) No Food Left Behind V, Growers' Perspective on Measuring Fresh Produce Left in the Field: A Summary Business Case. WWF-US.
- xi Food waste in primary production – a preliminary study on strawberries and lettuces, WRAP 2017
- xii WRAP (2021) Financial implications for farms of reducing food surplus and waste. <https://wrap.org.uk/sites/default/files/2021-09/WRAP-Financial-implications-for-farm-enterprises-of-reducing-food-surplus-and-waste.pdf>
- xiii WRAP (2020) Farmer-led data gathering pilots 2018-2020 (Year 1). Banbury: WRAP. <https://wrap.org.uk/sites/default/files/2020-11/WRAP-Farmer-led-data-gathering-pilots-2018-20.pdf>





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