

DESIGNING AND COSTING A SUSTAINABLE FARMING INCENTIVE (SFI) STANDARD FOR SURPLUS FOOD

Compiled For



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Executive Summary

- FareShare commissioned The Andersons Centre (Andersons) to produce a brief study on how a Surplus Food Standard under the Sustainable Farming Incentive (SFI) could work and what the indicative budget for it might be.
- In this study, 'Surplus' food is defined as any food grown in England that does not reach its intended market for human consumption. There are thought to be two main sources of Surplus food:
 - Supply and Demand Imbalance – either where excess crop is grown as an insurance to meet contract requirements, but is not harvested if contract volumes are met, or short-term surpluses of crop in excess of consumer demand meaning the crop is unsellable
 - Out-of-Specification – the portion of the crop which is harvested but does not meet buyer specifications.
- It is proposed that a Surplus Food Standard is limited to the fresh-produce sector initially (fruit and vegetables – including potatoes). The concept could be tested on a limited number of crops. The scheme would only be available for produce grown in England.
- Growers would receive a (small) annual signing-on payment for joining the Surplus Food Standard. There would be no commitment from growers to supply any produce in any particular year. But every grower signed-up to the Standard would be required to deliver *some* food over the course of the 3-year agreement.
- When a grower finds they have surplus food, they would contact a 'Registered Redistributor'. 'Registered Redistributors' would have to be approved by Defra. They would agree delivery etc. and the volume of the food delivered would be recorded by the Redistributor. The Registered Redistributor would be responsible for ensuring the food is fit for purpose. Only food that is fit for human consumption would receive a payment. The information on the volume of food delivered and by whom would be passed-on to Defra / Rural Payments Agency (RPA).
- Payment would be made to the grower on the same quarterly basis as other SFI payments. For each type of produce (apples, carrots, broccoli etc.) there would be one simple payment rate per tonne delivered.
- The payment rate would be calculated from the point crops are deemed to be surplus. Therefore, growing costs will *not* be included but harvesting costs (including labour), any packing & packaging and transport costs will be included. For simplicity, there would only be one payment rate per crop – with no differentiation by variety, grade etc.
- There is likely to be issues around variability of volumes going through the scheme. From the Redistributors' point-of-view they are already used to dealing with uncertain quantities of donated food. There would be no compulsion on any Redistributor to take food. From a budgeting perspective, the Standard would have variable funding requirements from year-to-year. It is believed that this issue is surmountable.
- Setting a correct payment level under the scheme will be key. This needs to be enough to incentivise growers to take part but not high enough that crops are produced simply to enter the scheme. There will also be an interaction between and SFI Standard and existing uses for 'waste' crops such as animal feed, anaerobic digestion or processing. However, incentivising the use of these crops for direct human consumption provides a net gain for society in line with the waste hierarchy.

- An indicative budget for the Standard has been drawn up using 10 of the most important fresh-produce crops (potatoes, carrots, onions, leeks, broccoli/cauliflower, cabbages, lettuce, tomatoes, apples and strawberries).
- The volumes likely to be offered to a Surplus Food Standard have been derived from a series of assumptions on crop percentages. These are based on work undertaken by WRAP and Andersons' industry knowledge.
- These volumes have been multiplied by suggested costs for harvesting, packing & packaging and transport (i.e. potential payment rates under the SFI). These figures have been based on the payments made under the existing 'Surplus With a Purpose' scheme operated by FareShare.
- The total estimated cost of a Surplus Food SFI Standard covering the 10 categories outlined comes to circa £47m. There is a wide degree of potential variance around this figure, but it demonstrates that such a scheme is affordable for Government.

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1. Introduction

1.1. Purpose and Background

FareShare wish to increase the volume of surplus food available for redistribution from British farms. It aims to build on the existing 'Surplus with a Purpose' scheme already operated by FareShare. To do this, it is proposed that a new Standard to be introduced under the Sustainable Farming Incentive (SFI) to incentivise producers to donate their surpluses – effectively this would see the redistribution of food as a public good to be paid for by Government. In support of this proposal, this project looks at how such a Standard could be structured and then an indicative budget for the Standard is calculated.

The focus of the study is on the fresh produce sector – vegetables and fruit. Products in this sector require less processing so have greater availability for redistribution. It is also the sector with the greatest current food waste¹ due to grade-outs and over-planting to meet contracts. Therefore, the opportunities for a Surplus Food Standard are believed to be better in this sector than other areas such as meat, dairy or broadacre crops. This does not preclude the scheme being expanded to these areas in the future should it be seen to be a success in fresh produce.

1.2. Approach and Structure of the Report

This report comprises a summary of the findings of the project. The study has been undertaken as a desk-based research exercise, using publicly-available information supplemented by FareShare data from the current Surplus With a Purpose (SWP) scheme. There has been consultation with FareShare throughout the process.

The following Chapter (2) provides a high-level summary of how a Surplus Food SFI Standard could work Chapter 3 sets out details of the methodology employed in the costing of the Standard, including the assumptions made. This includes links to evidence on which those assumptions are based. Chapter 4 provides an estimate of the budget that might be required to operate the Standard, plus a more detailed look at two example crops. Lastly, the final Chapter (5) provides some conclusions and final thoughts on the project.

1.3. Definitions

For the purposes of this study 'Surplus' food is defined as any food grown in England that does not reach its intended market for human consumption. This would include the following;

- Ploughed back in or otherwise destroyed *in-situ* in the field (*for the purposes of this report the 'field' is also taken to include glasshouses and polytunnels for crops such as lettuce, tomatoes and strawberries*).
- Disposed on-farm or sent for composting etc.
- Used for anaerobic digestion
- Used for livestock feed
- Used to produce bio-based materials
- Diverted to a secondary human consumption market (for example, juicing for fruit). This *does not* include where produce is sold as 'seconds' – i.e. as 'wonky veg' in multiple retailers or to discount shops or market stalls.

This definition is slightly different from that set out by WRAP². This makes a distinction between waste food and surplus food. In summary, food intended for human consumption is counted as waste if it ends up disposed, composted, ploughed back or sent to anaerobic digestion, but counts as surplus rather than waste if it is redistributed, fed to livestock or if it is used to produce bio-based materials. It does not count as either waste or surplus if it reaches secondary markets, such as juicing.

A wider definition of 'Surplus' is used in this report to fully capture the range of food that could be redistributed under an SFI Standard.

For this report, it has been assessed that there are two main sources of surplus food.

The first is referred to as 'supply and demand imbalance' (hereafter 'S & D imbalance' for brevity). This encompasses two different issues;

- Where additional crops are grown to ensure contract requirements are met. Buyers will often specify the delivery of a certain tonnage. If an area is planted that produces this volume under average conditions, there is likely to be a shortfall in a difficult season. Therefore, many growers plant extra area as an insurance against poor yields. If yields are average or good, this excess is not required under contracts and may be left unharvested if there is no alternative market. In some cases, growers may grow areas speculatively and then not harvest the crops if markets do not present themselves. Given the cost of growing these crops however, such practices are not widespread.
- Where there are short-term issues matching supply and demand. This is linked to the weather and covers both crop development and consumer behaviour. It is more of an issue with crops that cannot be stored for any length of time (lettuce, tomatoes, strawberries etc.). In good weather consumers demand higher volumes of salads and fruits. In poorer weather consumer demand drops and growers can be left with produce that is not required. Conversely, weather can accelerate (or inhibit) the growth of crops, meaning more is available than planned (and required) at a given point in the season.

Some of this surplus food will be left in the field. Some will have already been harvested before it becomes apparent there is no market for it. This creates some issues in costing the volumes available – see section 3 for details.

The second major category of surplus food is referred to as 'Out-of-specification'. These are crops that have been harvested, but some of the produce is not sold into its intended market due to it failing to meet quality specifications. This might relate to size, appearance, shape etc. A proportion of this produce would be perfectly acceptable and safe for human consumption. Some might be damaged or diseased and would not be suitable for redistribution.

These two categories do not cover additional waste production at the farm level. This would cover crops abandoned due to them not being harvestable as a result of poor weather. There would also be a measure of field waste during the harvesting operation. As none of this food is easily 'recoverable' it has not been included in this analysis.

1.4. About The Andersons Centre

The Andersons Centre, is an agribusiness consultancy that is one of four separate businesses trading under the Andersons registered brand. More details can be found at www.theandersonscentre.co.uk.

Andersons has been advising UK farmers for over 50 years across all sectors of agriculture. Over the years, The Andersons Centre has expanded beyond its original farm business consultancy role to supply economic and policy analysis through its Research Team. This is arguably the leading provider of business information, interpretation and advice for the UK agricultural and food industry. It has delivered numerous studies on farming, food, the environment and rural economy for a wide variety of organisations over the past decade. It also owns The Agricultural Budgeting and Costing Book and the John Nix Farm Management Pocketbook. The Andersons Centre is headquartered in Melton Mowbray, Leicestershire and also has offices in Wales (Brecon) and Yorkshire (Harrogate).

2. The Proposed Standard

2.1. Introduction and Development of the Standard

This section sets out a high-level summary of how a SFI Standard for Surplus Food could work. It should be noted that this is not a detailed set of rules or processes – simply an illustration of what may be possible. It aims to balance the need for administrative simplicity with the required checks to ensure the proper use of public money.

It has been developed by The Andersons Centre through discussions with consultants who are involved in the fresh produce sector at the farm level. It has also been shared with FareShare staff who have wide experience of food redistribution programmes. However, it is not the ‘finished article’. A number of potential issues would need to be addressed before any scheme could be launched. These are set out at the end of the section. As with other elements of the SFI programme, it is suggested that a Pilot be run in the first instance to test approaches and highlight any problems. This might be limited to one or a limited number of products only.

2.2. Operation

The proposed Surplus Food Standard under the SFI would work as follows;

- The scheme is limited to the fresh-produce sector initially (fruit and vegetables – including potatoes). Whilst it could be expanded into other sectors that have food waste (e.g. eggs) it is believed that the scope should be limited initially to test the concept and processes.
- The scheme would only be available for produce grown in England. As SFI is designed to provide support for farmers and land managers in England, there would be ‘leakage’ of funds if the scheme covered imported produce that was subsequently found to be surplus, or food grown in the other parts of the UK.
- Growers would receive a (small) annual signing-on payment for joining the Surplus Food Standard. This would cover the administration of providing their business details plus the types of food they could *potentially* supply. This payment might be circa £500 per year.
- There would be *no commitment* from growers to supply any produce in any particular year. It is envisaged that most growers would be likely to have some grade-outs during a season (but possibly not all). The amount production from additional (insurance) over-planting will vary greatly between seasons. By not having a minimum delivery requirement, growers will not feel locked-in. Every grower entered onto the Surplus Food Standard would be required to deliver some food over the course of the 3-year agreement.
- When a grower finds they have surplus food, they would contact a ‘Registered Redistributor’. They would agree delivery etc. and the volume of the food delivered would be recorded by the Registered Redistributor. The Redistributor would be responsible for ensuring the food is fit for purpose. Only food fit for human consumption would receive a payment. The information on the volume of food delivered and by whom would be passed-on to Defra / Rural Payments Agency (RPA).
- Payment would be made to the grower on the same quarterly basis as other SFI payments. For each type of produce (apples, carrots, broccoli etc.) there would be one simple payment rate per tonne delivered.

- The payment rate would be calculated in line with existing 'Surplus With a Purpose' policies. This means costs will be calculated from the point crops are deemed to be surplus. Therefore, growing costs will *not* be included but harvesting costs (including labour), any packing & packaging and transport costs will be included. In terms of transport, a standard figure would be used. For simplicity, there would only be one payment rate per category – with no differentiation by variety, grade etc.
- 'Registered Redistributors' would have to be approved by Defra. It is assumed that there would have to be a requirement that these were registered charities (to prevent the food being diverted for commercial purposes). However, the scheme would be open to all eligible organisations – from large national collectors such as FareShare to small local food banks.

2.3. Issues to Address

It is believed that the structure outlined above would produce a workable scheme. However, it is acknowledged that it will not necessarily be straightforward to implement. It is worth highlighting some potential problems at the outset.

- Such a Standard departs from the basic 'model' of the SFI, in that it does not require certain land-management. However, the Animal Health and Welfare Standard under the SFI already shows that Standards can be constructed in a different way.
- The key problem is likely to be around variability of supply of surplus food. Due to the vagaries of growing seasons, some years may produce a lot of food under the Standard, whilst in others, there may be little or none. Two main problems arise;
 - From the Registered Redistributors perspective, it will be difficult to plan ahead with uncertain supplies. However, as organisations, they are generally used to dealing with varying supplies. *Conversations with FareShare have indicated that variability in the volumes of surplus food would not be problem.* Redistributors would be under no obligation to accept Surplus Food if they had no use for it. *Rather than a grower having to contact multiple Registered Redistributors to see who wanted the surplus, it is envisaged that some type of online 'matching service' could be set up – matching suppliers and Redistributors.*
 - From a budgetary perspective, the Standard would have different funding requirements year-on-year depending on the volume of produce available in any season. This may complicate project management for Defra. However, it is believed this problem is surmountable. Firstly, there will be an averaging effect across crops – some crops will have a 'good year' whilst others do not produce much of a surplus, and the situation might reverse the following year. The overall budget could be set on averages. Also, Defra is able to move funding from one year to the next to smooth out fluctuations.
- There will be a need to pitch payment levels at the correct amount. This needs to be enough to incentivise growers to deliver the surplus food (rather than dispose of it by other means), but not enough to set up perverse incentives whereby extra crops are being grown simply to go into the Surplus Food Standard. Specific issues may arise from;
 - Different growing systems, or produce/varieties for certain markets will have different cost structures. For example, in the potato market, there is a large difference between a crop being grown for processing and one grown for packing. In addition, there may be different costs for growers based on geography – certainly transport, but possibly labour rates as well. By having

a single payment rate per tonne, none of this nuance will be captured. However, it is believed that the simplicity of a single rate outweighs any potential drawbacks. A rate would be set for a number of years (possibly three), based on averages, and would not change yearly. However, it would need to be adjusted periodically to reflect changes in costs – especially increases in labour rates.

- There will be a difference between the costings for Out-of-spec crop (which has already been harvested and sorted) and those for S & D imbalance (which would generally, but not always, be still in the field). It would be very difficult to differentiate between sources with different payment rates – once an apple is delivered to a warehouse, it is simply an apple. Again, a single payment rate is believed best for simplicity, probably based on a weighting between S & D imbalance and Out-of-spec costs.
- There are already existing channels for Surplus food – into animal feed markets, the anaerobic digestion (AD) sector and also the processing market (juicing for fruit, ready-meals and preparations for veg etc.). Any payments under a SFI Standard would have to be sufficient to incentivise its direct use for human consumption. For example, the pricing mechanism may also have to consider differentials between both prices for retail apples and prices for apples sent for juicing. If payments are set at the right level it should incentivise the 'correct' use of the food in terms of the food waste hierarchy³. One further point is that the AD sector receives support through mechanisms such as FITs, RHI etc. Therefore, two Government policies would be in conflict. Consideration would need to be given to how this could be resolved. However, as the AD support is just on the output of the plant (electricity) it is agnostic on feedstock used. It is believed that operators could swap in other feedstocks to replace surplus food if there was a more profitable market for that food.
- Defra would be relying on third parties (Registered Redistributors) for information on which to base payments. It is not believed this would be a particular problem as long as the registration and vetting process is robust enough.
- Such a Standard could be seen as supporting food production. This may be a particular issue with WTO classification of support (Red / Amber / Green box etc.) and the restrictions this places on the UK Government. This would need to be verified before any scheme commences, but the total sums of support involved (see section 4) are almost certainly below the *de minimis* thresholds under WTO rules and are not considered to be a problem.
- *It should be noted that any Surplus Food Standard is likely to build over time – volumes may be modest at the outset but steadily increase as growers and the food redistribution sector become more familiar with the scheme. This will provide an opportunity to amend the scheme rules should issues arise. As outlined above, running a Pilot scheme would seem sensible.*

3. Costings Methodology

3.1. General

As well as a SFI Surplus Food Standard being workable, it must also be affordable. This section and the next sets out some budgetary estimates for the Standard. Below is the methodology used and the assumptions made. It should be noted that data on volumes of surplus food is not comprehensive and thus there will be a degree of uncertainty around potential volumes. In addition, the uptake of the scheme among growers is highly unlikely to be 100%, adding to the potential range of estimates.

3.2. Methodology for Costing the Standard

3.2.1. Crops

Ten of the most important fresh produce crops were chosen for the analysis (actually eleven crops as broccoli and cauliflower were combined into one category). These were chosen in collaboration with FareShare to both cover a wide range of fresh produce categories and to encompass the most important crops (in terms of volumes and value) seen under the current Surplus With a Purpose scheme. The crops looked at in the calculation were;

- Potatoes
- Carrots
- Onions (dry bulb)
- Leeks
- Broccoli and Cauliflower (combined as one category)
- Cabbages
- Lettuce
- Tomatoes
- Apples (dessert)
- Strawberries

Any SFI Standard would require a list of all the crops that were eligible and a specific payment rate for each one. There would be a trade-off in terms of the effort involved in extending the scheme to 'minor crops' versus the volumes of extra produce that might be generated for redistribution. As suggested above, it may make sense to limit the scope of the scheme initially, and expand it further over time.

3.2.2. Volumes of Potential Surplus Food

The volume of potential surplus food is calculated as follows;

- The base data on volumes of crops comes from the Defra publication 'Horticulture Statistics'⁴. It provides tonnages of fruit and vegetables. A five-year average of volumes has been used to smooth-out yearly yield fluctuations, based on the years 2018 to 2022 inclusive.

The basis of the volume figures shown has been questioned with Defra. The response from the Statistics team was that the figures presented are '*the average tonnage actually harvested per planted hectare taking into account any waste losses (post-harvest). Wastage relates to any post-harvest item for which no income is obtained, such as storage losses, including both weight loss and rots*'. Therefore, the volumes appear to *exclude* any over-plantings left in the field but *include* any grade-outs post-harvest. It might be argued that the figures should be grossed-up to arrive at the

total crop size *including* over-plantings left in the field – and then calculations done on the basis of this ‘true’ crop size. However, given the inherent uncertainties around surplus food percentages (see below) any difference arising is believed to be lost in the margin of error, so the Defra figures were simply used as a basis.

- As the SFI is an England-only scheme, the volumes of produce in England were required. Separate volume data for England is not available. Therefore, the UK figures were apportioned on the basis of the ratio of UK planted area to English planted area. The UK areas were from the Horticultural Statistics and UK June Survey⁵ results. The English areas came from the English June Survey of Agriculture⁶. There was not a full breakdown for all crops. Therefore, an ‘other category’ was used to cover Leeks, Broccoli/Cauliflower, Cabbages, Lettuce and Tomatoes. As above, five-year averages were used.
- Thus, an average English tonnage for each crop was arrived at.
- For each crop the total potential tonnage of surplus food available for each crop was estimated. This was done separately for the S & D imbalance and Out-of-spec categories;
 - Firstly, for each, the percentage of total crop volume that is accounted for by S & D imbalance or Out-of-spec respectively was estimated. These estimates are made by The Andersons Centre but are based, where possible, on work undertaken by WRAP – the report¹ referenced earlier plus subsequent additional studies^{7, 8}. There are differences between crops. In terms of S & D imbalances, crops with delivery programmes and limited storage opportunities (either in-field or in sheds) are more likely to see higher percentages. The main examples are lettuce and strawberries, plus, to a lesser degree tomatoes, leeks, cabbages and carrots. In terms of Out-of-spec then the percentages applied can vary on the levels of specification applied by major buyers.
 - Secondly, for the crop volume calculated in stage one, a percentage of how much of this might be **usable** in terms of human consumption was estimated. For S & D imbalance, the percentage tends to be high – the whole crop is available and much of it should be useable. For ‘Out-of-spec’, the useable percentage is lower as it is assumed that some of the grade-outs will be due to damage etc.
 - Thirdly, a final percentage was applied, based on how much crop might be put forward into an SFI scheme. This is obviously speculative, but it is thought unlikely that **all** potential crop volume will be attracted into the scheme. Some crops will already have established markets for surplus – for example potatoes and carrots for stockfeed, apples for juicing etc. Producers may wish to carry-on with established practices even if there is an alternative. This will be influenced by the economics of the alternatives which is discussed below. For this reason certain crops have a lower percentage under this category than others.

Annex 1 show the percentages used in more detail.

The calculations for potatoes have been undertaken in a slightly different way. Potatoes are not included in the horticultural statistics. Instead, data has been taken from the Agriculture in the UK⁹ publication. The potato data in this (Table 7.11) contains a line for ‘waste & stockfeed’ – therefore, this has been used as the post-harvest waste/surplus figure. The proportion of the total crop falling into this category is surprisingly high – over a quarter on average for the 2018-2022 years. This would be more than expected, but reflects the high proportion of grade-outs. Of the total waste & stockfeed volume, around 94-95% goes into the stockfeed market. Therefore, it still has a use in food production. Because there is an

existing market for this produce, it is assumed in the calculations that a SFI Surplus Food Standard diverts relatively little of it to redistribution.

3.2.3. Cost of Potential Surplus Food

The budget to 'purchase' the volume of potential surplus food calculated above has been worked out as follows;

- In line with the existing 'Surplus With a Purpose' scheme, the cost of the scheme was based on compensating growers fully for any operations that were required to get the surplus food delivered to a redistributor.
- Cost were calculated from the point crops are deemed to be surplus. Therefore, growing costs were **not** included but harvesting costs (including labour), and packing & packaging costs were included.
- For S & D imbalance, all costs, harvesting plus packing, were applied. *This is likely to overstate the actual cost to growers, as a proportion of this production will have already been harvested (and possibly packed) before it becomes clear it is not needed. As set out previously, this is likely to apply only to a few of the crops that are most perishable. Others have more flexibility due to being able to be left unharvested (for a short period of time at least), or harvested and stored. For the purposes of this report, it is felt that this element will be relatively small.*
- For Out-of-spec production, as the crops had already been harvested, only the packing and packaging costs were included.
- The existing Surplus With a Purpose scheme allows growers to request a contribution towards overhead costs to be included. This element was excluded for this project.
- A standard delivery cost of £100 per tonne was applied to all produce.
- The costs for each element were based on the average costs being paid for each product under the current Surplus With a Purpose (SWP) scheme (data supplied by FareShare). The figures were rounded to the nearest £10). *However, these costs (which are producer-supplied) were checked against figures in the Agricultural Budgeting and Costings Book¹⁰. In general, the SWP figures were somewhat higher. It is not entirely clear why there should be such a divergence.* In terms of an SFI Standard, a standard cost for each crop would need to be produced (as set out in section 2.2). The SWP costs are not an exact equivalent to this, as they are figures supplied by growers. However, for the purposes of this project they have been used as they are the figures that are high enough to incentivise growers to take part in such a scheme.
- In terms of any final scheme, the calculation of costs may also have to take account of alternative markets for surplus food if the scheme is to be successful. This issue is looked at in some more detail in section 4.2.
- The costs for S & D imbalances were added to the costs for Out-of-spec production. This arrives at a potential budget for each crop. This is then totalled to arrive at an overall budget for the scheme.

4. Cost of the Standard

4.1. Budget Summary

Figure 1 below summarises the costings undertaken for this project;

Figure 1: Surplus Food SFI Standard – Potential Costs

Crop ('000 tonnes unless stated)	Estimated English Production ^①	Potential Volume from S & D Imbalance	Potential Volume from Out-of-spec	Total Estimated Costs - £m
Potatoes	3,885	36.5	92.2	£21.2
Carrots	683	9.0	22.3	£7.1
Onions (dry bulb)	314	3.4	6.3	£2.4
Leeks	29	0.5	0.6	£0.6
Broccoli + Cauliflower	110	2.6	1.8	£3.0
Cabbages	108	2.6	1.3	£2.2
Lettuce	73	2.2	1.4	£2.1
Tomatoes	46	1.0	1.5	£1.5
Apples (dessert)	184	2.3	6.1	£2.4
Strawberries	70	2.8	3.5	£4.8
Total -				£47.2

Source: The Andersons Centre ① average 2018 to 2022

The largest potential volume available is from the potato crop – unsurprising considering its relative size compared to the other crops. Even with a relatively low costs compared to the other crops, it still generates the largest budget requirement. Carrots, Onions and dessert Apples also could contribute significant volumes of surplus food. Due to their high value per tonne, broccoli & cauliflower and strawberries comprise a significant part of the total budget.

The amounts in Figure 1 should be treated with appropriate caution. As set out in section 3, a series of assumptions lie behind them. These are based on the best available evidence (and knowledge of the sector) but cannot be wholly accurate. The figures should be seen as a guide to the likely level of budget that would be required.

Only ten crops were covered in the analysis. The Surplus Food Standard could be extended to cover all fresh produce (and, indeed, other foodstuffs). Without detailed calculation the cost of this wider scheme is speculative. However, it is felt that a budget of between £70-£90m would be sufficient to cover the entire sector.

As alluded to earlier, the scheme may start slowly and gradually build over time. The budget figures provided above are for a 'normalised' year once it has been in operation for some time. The budget requirement is likely to be lower at the outset.

4.2. Crop Case Studies

Due to the high-level nature of this report, the findings are inevitably broad-brush. In any actual scheme there will be an inevitable tension between simplicity of operation and reflecting the complexity of the fresh produce sector. To provide additional insight into some of the issues, this section focusses briefly on two of the crops outlined above – carrots and apples. It highlights the range of markets within each crop and some of the differences between crops in the fresh produce sector.

4.2.1. Carrots

Like most fresh produce, the prime outlet for English-grown carrots are the multiple-retailers (supermarkets). The UK has high self-sufficiency in the crop with deliveries possible throughout the year due to an extended growing season and the 'storage' of crops in the ground through the winter months – usually with a straw covering.

The crop does not suffer greatly from short-term S & D imbalances. This is because the crop matures relatively slowly and can be kept in the ground if there is specific oversupply issues (although if it is left too long, quality and size issues will arise). In terms of consumer demand, this is relatively constant (within usually seasonal cycles) and is not as influenced by the weather as salad crops or soft fruit. There is relatively little insurance planting. However, there are sub-markets such as for chantenay carrots. These more 'niche' markets are more tightly balanced in terms of supply and demand. As they command a premium price, producers are often loath to release surplus production onto the market for fear of eroding the price premium. Any surplus is therefore often ploughed-in.

Retailers have exacting quality standards in terms of carrots. These relate to shape, colour, blemishes and size. To meet these requirements, there is generally quite a high percentage of grade-outs. To reduce food waste, many supermarkets have promoted the concept of 'wonky veg' (or similar) in recent years. Carrots have been at the forefront of this initiative. However, growers are increasingly seeing this as a doubled-edged sword. Whilst a percentage of the crop might be sold to retailers that would otherwise not be, this is generally at a lower price. 'Wonky veg' sales are likely to be at the expense of 'full-spec' volumes. Therefore overall revenue may be less.

An alternative to direct retailer supply is selling to the fresh produce wholesale markets. This will supply the remaining greengrocer trade and also foodservice outlets. This would have been the main market for most carrot growers up to the 1980's when direct retailer contracts started to be introduced. Prices in the wholesale market will usually (but not always) be lower than direct contracts. As carrots going into this market are still for human consumption and Surplus Food SFI payment would have to be pitched not to out-compete prices in this market.

In the hierarchy of uses (and prices) next would come the processing market. In the case of carrots this would be for use in soups, ready meals and juice. Again, as a valid food use, a SFI Standard should not interfere with supply for these end-uses. However, it should be noted that the prices received from this market would be unlikely to return a profit to growers if it applied to the whole crop.

Significant quantities of carrots of lower quality go into the animal feed market. They are valued for ruminant livestock and equines. Much of this volume would comprise of product that is perfectly acceptable for human use. Its consumption as livestock feed is simply a result of the current structure of the market and is making the least-worst use of the product. Not of all this production would be available

under an SFI Standard. Some producers would likely not want the 'hassle' of entering into the SFI and would prefer to continue with existing disposal methods that are tried-and-tested. This may be particularly the case for a crop like carrots where the surplus can be disposed of in 'bulk' quite easily. Some growers may also have long-standing arrangements that they wish to honour.

At the bottom of the scale are poor-quality production that largely now goes into anaerobic digestion (AD) plants. Whilst this is a beneficial use for production that might be ploughed-in or otherwise disposed of, it is certainly not an optimum use of a product that might have human consumption potential. However, many major growers (or packers) have set up their own AD plants to deal with surplus production. This generates a revenue out of what could be a waste product and also, in the past, has received generous financial incentives. The capital cost of AD plants is high and is front-loaded – high set-up costs followed by relatively low operational costs. For this reason, businesses may be keen to continue to digest surplus carrots rather than make them available for redistribution.

4.2.2. Apples

As a perennial crop plantings for apples do not vary on an annual basis in the same way that many other crops do. With a 15-year orchard life, investing in apple production is a long-term undertaking. *(It should be noted, however, that all fresh-produce production involves significant investment and has become the preserve of a limited number of dedicated growers. No-one dips in and out of fruit and vegetable farming on a yearly basis in reaction to market conditions).* Supply does tend to be more stable than for some other crops. To an extent, short-term demand can be managed through the timing of picking and the storage of the crop (although there is a cost to storage). Demand too is less dependent on weather than for some other crops. This results in relatively low proportion of fruit becoming surplus as a result of S & D imbalances.

Apples are a crop with exacting retailer requirements. One of the most important is fruit size – so that the apple fits in standard packing. Skin finish and the fruit being blemish-free is another key specification. This means that a relatively high proportion of the dessert apple crop is graded-out if the producer is supplying multiple retailers (which is the main market). In a similar way to carrots there is a hierarchy of uses, and prices, in the sector;

- Multiple retailers paying the highest prices, but with the highest specifications. The market for 'seconds' in the apple sector through supermarkets (the equivalent to wonky veg) is much less developed
- Wholesale markets supplying independent retailers and the food service market. *It should be noted that some 'class A' fruit also goes through this channel however, and it is not all second-quality.* Any Surplus Food scheme should be designed not to compete with this market.
- Some apples not suitable for the markets above go into the processing sector – mainly for producing dessert ready-meals but also for use as dried fruit and in jams/sauces
- The default use for the lowest-quality apples tends to be for juicing. This can be used for apple juice itself or for cider. Although there is a small quantity of waste apples used in animal feed or AD plants, this is not a primary use. Sometimes the pulp after juice extraction is used.

There are potentially a large volume of grade-outs from the apple sector that could be used under a Surplus Food Standard. However, as with carrots, existing arrangements are well established and may be favoured by producers for their familiarity and ease of use. The removal of apples in bulk for juicing, for example, would be far easier to do than packaging the fruit and transporting it to a depot – even if this

were more remunerative. It should also be noted that the handling of apples is a labour-intensive process. Some other crops (strawberries, tomatoes, lettuce) are equally dependent on labour. Finding labour has become increasingly difficult over the past few years. If it is in short supply, farmers are likely to prioritise its use in marketing top quality produce to the highest-priced market, rather than using it to redistribute Surplus Food, which might be regarded as just a nice-to-have rather than business critical.

5. Conclusions

Although there will be some issues to resolve, there seems no fundamental barrier to designing a workable SFI Surplus Food Standard. This would incentivise the use of food which is currently either wasted or goes for low-value uses. It should help improve the nation's diet whilst also helping alleviate food poverty. It would seem an ideal example of a 'public good' that the SFI could fund. This report gives some initial thoughts but no doubt it could be refined and improved with more industry input.

In terms of the budget, this brief report gives some broad indication. Within the context of the current £2.4bn budget for farming schemes, a cost of circa £47m would not seem excessive. It would also provide some support to the fresh produce sector which, at present, receives very little from SFI or other Environmental Land Management schemes. It could be argued that the funding for this innovative element of the SFI should not come from existing budgets at all, as it addresses issues that have not previously been covered by Government support.

Annex 1 – Assumptions

Figure A: Volume Availability Assumption – Over-plantings

Crop	Over-plantings as % of Total Crop	% of Over-plantings Useable	% of Useable Over-plantings available to SFI	Est. Volume Available – '000 tonnes
Carrots	5%	80%	33%	9.0
Onions (dry bulb)	3%	90%	40%	3.4
Leeks	5%	80%	45%	0.5
Broccoli + Cauliflower	6%	80%	50%	2.6
Cabbages	6%	80%	50%	2.6
Lettuce	8%	75%	50%	2.2
Tomatoes	6%	75%	50%	1.0
Apples (desert)	3%	85%	50%	2.3
Strawberries	10%	80%	50%	2.8
Potatoes calculated in a different way -				
Potatoes	3%①	95%	33%	36.5

Source: The Andersons Centre ① of total harvested production

Figure B: Volume Availability Assumption – Grade-outs

Crop	Over-plantings as % of Total Crop	% of Over-plantings Useable	% of Useable Over-plantings available to SFI	Est. Volume Available – '000 tonnes
Carrots	15%	66%	33%	22.3
Onions (dry bulb)	10%	50%	40%	6.3
Leeks	10%	40%	50%	0.6
Broccoli + Cauliflower	8%	40%	50%	1.8
Cabbages	10%	25%	50%	1.3
Lettuce	15%	20%	66%	1.4
Tomatoes	15%	33%	66%	1.5
Apples (desert)	20%	66%	25%	6.1
Strawberries	15%	50%	66%	3.5
Potatoes	100%①	90%	10%	92.2

Source: The Andersons Centre ① of tonnage identified as 'stockfeed & waste'

Figure C: Indicative Operational Costs

£ per tonne	Harvesting (Machine & Labour)	Packing & Packaging	Transport
Potatoes	£100	£30	£100
Carrots	£195	£70	£100
Onions (dry bulb)	£170	£85	£100
Leeks	£700	£130	£100
Broccoli + Cauliflower	£750	£125	£100
Cabbages	£375	£200	£100
Lettuce	£340	£280	£100
Tomatoes	£890	£125	£100
Apples (desert)	£460	£60	£100
Strawberries	£710	£355	£100

Source: The Andersons Centre

Annex 2 – References

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- ¹ Food Waste in Primary Production in the UK (WRAP, 2019) – see <https://wrap.org.uk/resources/report/food-waste-primary-production-uk>
- ² UK Food Waste Reduction Roadmap guidelines (WRAP, 2018) – see <https://wrap.org.uk/taking-action/food-drink/initiatives/food-waste-reduction-roadmap>
- ³ Defra Food Waste Hierarchy see <https://www.gov.uk/government/publications/food-and-drink-waste-hierarchy-deal-with-surplus-and-waste/food-and-drink-waste-hierarchy-deal-with-surplus-and-waste>
- ⁴ UK Horticulture Statistics (Defra, 2022) see - <https://www.gov.uk/government/statistics/latest-horticulture-statistics/horticulture-statistics-2022>
- ⁵ UK June Survey Results (Defra, 2022) – see <https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june>
- ⁶ English June Survey Results (Defra, 2022) – see <https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june>
- ⁷ Financial implications for farms of reducing food surplus and waste (WRAP, 2022) - see
- ⁸ Upscaling Farm Food Waste Measurement (WRAP, 2023) see - <https://wrap.org.uk/resources/report/upscaling-farm-food-waste-measurement-uk>
- ⁹ Agriculture in the UK 2022 (Defra, 2023) – see <https://www.gov.uk/government/collections/agriculture-in-the-united-kingdom>
- ¹⁰ Agricultural Budgeting and Costing Book (ABC, 2033) – see <https://abcbooks.co.uk/product/abc-budgeting-costing-book-november-2022/>