

## **Realising the social and economic potential of food waste in the Western Cape Province**

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### **1. Food loss and food waste in the Western Cape**

The Western Cape Government's Draft Strategic Framework for Household Food and Nutrition Security focuses on 6 pillars, of which one is "food resource management for the future". Within this, the strategy identifies improvements in food waste reduction and management as an important lever for provincial action. This concept note focuses on food loss and waste in the Western Cape, with the aim of minimising the amount of edible food destined for human consumption which, for one reason or another, is reclassified as waste or consumed by animals.

The pressure for Western Cape growers, manufacturers and retailers to redistribute or find alternative routes for food 'waste' is a very real one. The province not only has limited landfill space, it has also set targets to ban organic waste to landfill, setting a target of 50% reduction within 5 years and a total ban within 10 years (Hanekom, 2016). In addition, the Western Cape needs to divert 1.5 million tonnes of waste per annum in order to meet the South African Government's target of 20% waste diversion by 2019. The cost of compliance is estimated in excess of R1 billion for Western Cape municipalities (GreenCape, 2017). Restrictions and guidelines are also being drafted for abattoir waste (Hanekom, 2016). This provides an opportunity to identify added-value opportunities for surplus food, as well as feeding the needy.

#### **1.1. Defining food loss and waste**

There are differences in the various definitions applied to food waste, partly due to a lack of consensus amongst experts (Lebersorger & Schneider, 2011). For the purposes of this document we suggest the following.

- **Food loss** – can be defined as a change in the availability, edibility or quality of food that makes it unfit for human consumption (FAO, 1981). It is often generated through spills, spoils, product damage e.g. bruising (Lipinski et al, 2013). Amongst other factors, losses in the agricultural phase can be attributed to weather or insect damage, poor farming practices or poor infrastructure and cold chain management (Lipinski et al, 2013).
- **Food waste** – refers to food that is of good quality and still fit for human consumption that is not consumed but is destroyed, rejected or discarded. It typically occurs during the processing, retail and consumer stages of the food value chain, and is often the result of negligence or a conscious decision to discard the food (Lipinski et al., 2013; Stuart, 2009). Food waste can be classified into three categories (Beretta, Stoessel, Baier, & Hellweg, 2013; Quested & Johnson, 2009):
  - **Avoidable losses** - food and drink thrown away due to it not being used i.e. prior to disposal it was edible in the majority of situations.
  - **Possibly avoidable losses** - food that is discarded e.g. apple peels or bread crusts that could have been eaten if prepared in a way that makes them edible (e.g. potato skins), or are edible but discarded as they do not meet aesthetic criteria (e.g. crooked carrots).

- **Unavoidable losses** - includes waste from preparations which cannot be eaten under normal circumstances (e.g. apple cores, banana or orange peels, egg shells). Losses related to harvesting, storage, transport and treatment which cannot be avoided by using the best technologies available and within reasonable additional costs are also classified as unavoidable.

This proposition focuses on ‘**avoidable**’ and ‘**possibly avoidable**’ food losses and waste, i.e. the food could have ultimately been used for human consumption. Food loss and waste can occur at each stage of the supply chain, from harvesting through to consumer, and is commonly categorised by its type: fruit and vegetables; roots and tubers; cereals and/or bakery; oilseeds, pulses and nuts; meat; milk and eggs, fish and seafood; and beverages (COMCEC, 2017; Lipinski et al, 2013; Qusted & Johnson, 2009).

## 1.2. Identifying interventions to reduce food loss and waste in the Western Cape

The World Resources Institute (WRI) estimates lost or wasted food in Sub-Saharan Africa at around 23% of total available food, which lies between the extremes of Latin America (15%) and North America and Oceania (42%) (Lipinski et al., 2013). Of this, around three quarters of waste occurs in the ‘production’ and ‘handling and storage’ phases, exceeding all other world regions. Ongoing research indicates that South African consumers waste more than the average Sub-Saharan African consumer, and that post-harvest losses are likely to constitute a lower percentage of total lost or wasted food than is the case for Sub-Saharan Africa (Oelofse, 2017). In 2013, the Council for Scientific and Industrial Research (CSIR) (Oelofse, 2013) estimated that a third of the 29 million tonnes of food produced annually in South Africa goes to waste, equivalent to 9 million tonnes per annum, or 31% of average annual production.

The main categories of food waste in South Africa are fruit & vegetables (4.4 million tonnes or 47% of total food waste), and cereals (2.5 million tonnes or 27%) (Oelofse, 2013). Across the supply chain, most food loss and waste occurs at:

- Agricultural production: Roots & tubers (14% of this food category’s total loss across its supply chain), oil seeds & pulses (12%) and meat (15%).
- Post-harvest, handling and storage: Cereals (8%), roots & tubers (18%) and milk (11%).
- Processing and packaging: Roots & tubers (15%), fruits & vegetables (25%) and fish & seafood (9%).
- Distribution: Fruits & vegetables (25%), fish & seafood (15%) and milk (10%).
- Consumption: Fruits & vegetables (5%).

Due to the Western Cape’s demographics, climate, produce grown and size, patterns of food production and consumption in the province will differ from those in the rest of the country and the region, but there is currently little research to aid the identification of priority interventions for the province from a nutrition and food security perspective. What is known is that, of the 7.7 million tonnes of waste the province produces each year, around 28% is agricultural residues, and 6% is organic waste (GreenCape, 2017; Hanekom, 2016). Both of these waste streams would contain an edible food component. A study undertaken in 2012, suggests the percentage (by mass) of food waste in the overall *household* waste stream in Cape Town is 8% for low income households, 9% for middle income households and 5% for high income households (Nahman, de Lange & Oelofse, 2012), but further research is required to understand the current status of food loss and waste generated, understand the food waste generated in other sectors and in other parts of the food value chain, and the impacts on the province as a whole in terms of lost nutrition and economic value.

Examples of the types of research required include a 2012 study into vegetable losses in South Africa, which found that 21% of cabbages, 18% of carrots and 15% of tomatoes were lost before retailer purchase, equating to an annual loss to the national economy of R33.7 million (Munhuweyi, 2012). It also found that mechanical damage accounted for between 50% and 70% of the losses while the remainder was due to insect damage and decay. There is a great need for further research into where food loss and waste is occurring in the food value chain, in what magnitude, and for what reason. In particular, informal sector farmers and trade need to be included in these studies, as evidence suggests that vegetable losses are even higher at outdoor markets than at supermarkets (Munhuweyi, 2012).

In order to understand the implications for food security and nutrition, food loss and waste can also be represented by calorific content. A calorie-based approach provides a better measure of the potential impact of food loss and waste on individuals' health, even if predominantly a measure of calorific energy loss (EIU, 2014). Estimating the calorific content of the province's wasted food (instead of its weight or economic value) would help to identify those strategic interventions that help to address food and nutrition security directly, but this has not yet been calculated.

### **1.3. Impacts of food waste**

Food loss and waste represents a tragic waste of high value resources that could have been used to improve social and economic conditions in the country, and the province, and which equates to environmental damage through squandering of precious resources like water and energy. Some of the impacts are as follows:

#### **1.3.1. Environmental impacts**

In 2013, the FAO published the 'Food wastage footprint' (FAO, 2013) which suggests that, if it were a country, global food waste would rank as the third highest emitter of CO<sub>2</sub> eq after the USA and China. The highest carbon footprint of food waste occurs at the consumption phase (37% of the total). This is due to the energy used for cooking, but also includes the embedded energy used for growing, storing, processing, distributing and disposing food (Dobbs et al. 2011). WRAP estimates that 78% of this food waste could be avoided (WRAP, 2011).

Although there is a lack of data on the greenhouse gas (GHG) impact of the Western Cape's food waste, figures derived from total organic waste generated suggest that the GHGs emitted by the province's organic waste are in the region of 4.2 million tonnes CO<sub>2</sub> eq (Watch My Waste, 2016; Western Cape Government, 2013). A 2012 study found that for South Africa's cabbages, carrots and tomatoes alone, postharvest losses contribute to between 1.37 and 13.77 million tonnes CO<sub>2</sub> eq (Munhuweyi, 2012).

A great deal of water is required to produce most foods, which makes food waste avoidance an important sustainability issue in a water-scarce region like South Africa, and particularly in a drought stricken province like the Western Cape. It is estimated that food waste accounts for more than a quarter of total freshwater consumption globally (BSR, 2011), of which 86% is associated with avoidable food waste (WRAP, 2011). According to Oelofse (2013), total water loss as a result of food waste in South Africa is equivalent to nearly 22% of the country's total water footprint, of which 12.8 million m<sup>3</sup> is lost through food loss on-farm. Water loss per food type and associated food loss is: cereals (4,168 million m<sup>3</sup> or 32% of total contribution to water loss), meat (3,334 million m<sup>3</sup> or 26%) and fruits & vegetables (3,076 million m<sup>3</sup> or 24%).

### **1.3.2. Social impacts**

In an inequitable society like South Africa, with high levels of food insecurity<sup>1</sup>, wasting food that could otherwise have met the needs of the poor is a missed opportunity to address social ills in a cost-effective and environmentally sound manner. In an annual assessment of global hunger, the FAO reported “the world produces enough food to feed everyone”, yet at the same time an estimated one in eight people suffer from chronic undernourishment (FAO, 2015). The causes of hunger and malnutrition are complex and cannot be attributed to food waste entirely. Nevertheless, food waste does result in a decrease in food availability and access, and compromises food security at a community and household level (HLPE, 2014). According to The Economist’s Intelligence Unit, food waste has a moderately strong relationship with overall food security (EIU, 2014). Given that approximately 48% of the Western Cape population is food insecure (26% at risk of hunger and 16% experiencing hunger) (Shisana et al., 2013), the reduction of food waste by redistributing that which is still edible to those that need it would play an important role in addressing the province’s social challenges.

### **1.3.3. Economic impacts**

Food waste can impact on food prices (Rutten et al, 2013) and contribute to more strained commodity markets, and therefore an increase in food prices, which raises concerns about the impact on the poor. For the grower (small-scale through to large-scale commercial farmers), on-farm losses can threaten their financial survival. This is prevalent amongst South African farmers, as in terms of weight and volume, more food waste occurs on farm and during processing than at the consumption end of the food supply chain (Oelofse, 2013). A recent study undertaken for a South African retailer suggests on-farm loss rates for spinach can be anything from 20-90%, depending on factors like the season, farming practices and retailer specifications. The cost of food waste incorporates the cost of agricultural production and land, supply chain and retail costs, and treatment and disposal.

Oelofse (2013) estimates the indicative value of food waste at R61.1bn in South Africa. The cost to society associated with this waste is equivalent to 2% of the country’s GDP (Oliveira, 2013). Food categories that contribute most to this cost are fruit & vegetables (36%), meat (28%) and fish & seafood (13%) (Oelofse, 2013). In terms of the supply chain, distribution (32%), processing & packaging (25%) and agricultural production (20%) contribute the most to costs (Oelofse, 2013). Nahman et al. (2012) estimate the market value of consumer food waste in South Africa at R32 billion per annum. Whilst not the most significant cost component of food waste generated in the country, by reducing this cost, households could reduce expenditure on food purchased.

## **2. Food waste interventions and partnerships**

Two key interventions and strategies are proposed to support the province in achieving its ‘Nourish to Flourish’ ambitions: 1) A formal retailer food optimisation pyramid, and 2) Improved data collection. Additional interventions for consideration are discussed in the Appendix, such as improved cold chain management, packaging to avoid spoilage, a food waste reduction roadmap, and household and food service sector campaigns.

### **2.1. Retailer Food Optimisation Pyramid**

In the absence of comprehensive data that would help to identify where the most nutritious foods are being lost or wasted in the province, we propose that this strategy focuses on the minimisation of food lost or wasted by formal retailers<sup>2</sup> and markets in South Africa. The

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<sup>1</sup> Food insecurity refers to lack of reliable access to a sufficient quantity of affordable, nutritious food.

<sup>2</sup> We recognise the potential inequalities and power held by the main formal retailers, and in the workshop wish to explore other formal food sales routes that should be included within this target audience for this proposal.

reason for this focus is that formal retailers have influence both up and down the value chain, are relatively few in number and high in influence, are typically located in close proximity to areas of highest nutritional need, and have economic incentives to minimise food loss and waste within their operations. In order to frame food waste in a positive light and inform retailers of the economically viable options for reducing food waste, we propose the development of a Retailer ‘Food Optimisation Pyramid’. This is aimed at positioning food waste as an area of opportunity for retailers, and the preliminary outline (which is intended to form a starting point for discussion) is as follows:

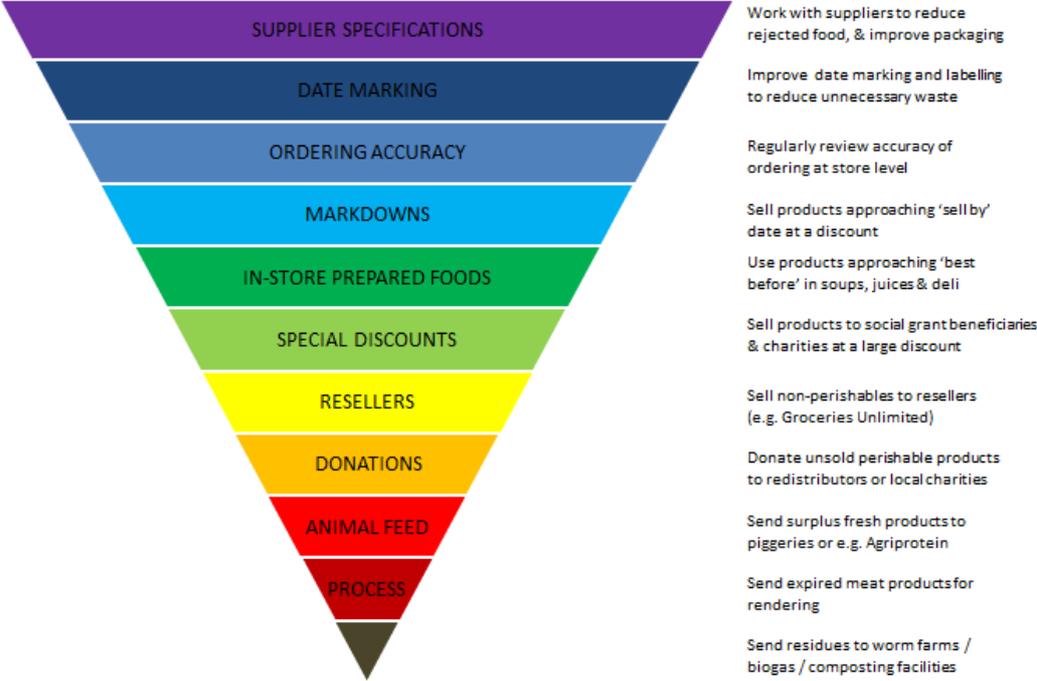


Figure 1: Food Optimisation Pyramid for Retailers (Robinson & Jenkin 2017)

The strategy would consist of the following interventions and role players to refine and implement the food optimisation pyramid amongst retailers:

STEPS	TIMING	OBJECTIVES
1. Retailer Forum 1	May 2017	<ul style="list-style-type: none"> <li>To better understand retailer perspectives on food waste</li> <li>To build consensus as to the need for better strategic approaches to diverting surplus food</li> <li>To determine the possibility of a voluntary retailer commitment to adopting and implementing the pyramid at national level, and whether retailers could contribute funds toward further research</li> <li>To determine what data and good practice retailers would be willing to share (with a view to potentially doing local ROI calculations), and the mechanisms for sharing</li> <li>To determine legislative / regulatory challenges and opportunities</li> </ul>
2. Stakeholder Interviews	June - July 2017	<ul style="list-style-type: none"> <li>To hear the perspectives of those the retailers interact with in the food chain (e.g. suppliers or food distributors, consumer bodies) as to what would be most feasible</li> </ul>
3. Retailer Interviews	June - July 2017	<ul style="list-style-type: none"> <li>To discuss and refine the “Food Optimisation Pyramid” for retailers based on retailer and</li> </ul>

		<ul style="list-style-type: none"> <li>stakeholder interviews</li> <li>To capture what each retailer is doing at each level of the pyramid (incl. barriers and opportunities for adopting the identified actions)</li> </ul>
<b>4. Compilation of FOP Guide</b>	August - October 2017	<ul style="list-style-type: none"> <li>To explain the business case (return on investment) for food optimisation options based on secondary research</li> <li>To explain the legalities of various disposal or distribution methods e.g. donations</li> <li>To present priority actions and responsibilities clearly and concisely</li> <li>To provide contact details for option partners (e.g. Food Forward)</li> </ul>
<b>5. Distribution of Draft FOP Guide</b>	November 2017	<ul style="list-style-type: none"> <li>Launch of the guide e.g. workshop event, media, one-to-one with retailers</li> <li>To educate store managers and staff about the FOP guide, why it is relevant, how they can benefit from it and implement it</li> </ul>
<b>6. Retailer Forum 2</b>	May 2018	<ul style="list-style-type: none"> <li>To gather feedback on progress from retailers, and to refine the FOP with new observations / learnings</li> <li>To create a sense of continuity, and build accountability amongst retailers</li> </ul>
<b>7. Finalise FOP Guide</b>	June-July 2018	<ul style="list-style-type: none"> <li>To include new observations or data arising from Retailer Forum 2</li> <li>To improve the guide based on feedback</li> </ul>

<b>ROLE PLAYERS</b>	<b>ROLES</b>
Food Lab	Coordination of research partners and meetings, strategic guidance
Retail Industry Bodies (CGF, CGCSA, SRF)	Ensure cooperation from retailers and disseminate guide
DAFF	Connect to "Champions 12.3" initiatives, possibly provide some funding
Sustainability Institute	Strategic support, research, compilation of feedback and report
WWF	Strategic support, compilation of report
Retailer representatives (incl. formal markets)	Attending meetings, providing information, following up within the business, potentially contribute funding
Other stakeholders (e.g. RCL, Tiger Brands, Food Forward)	Provide input on retailer strategies that affect them

<b>BUDGET</b>	
Coordinate 2 x Retailer Forums and conduct interviews	R 100,000
Compilation of FOP Guide (SI & WWF)	R 100,000

**NOTE:** It may be possible for retailers to contribute toward these costs (e.g. compilation of the guide) as part of their role in the initiative. This would be discussed in the forum.

### **a. Improved Data Collection**

There is currently very little data on the quantities of food waste generated at each point in the Western Cape's food chain, let alone the value of nutrition being lost. It is therefore

difficult to determine what is being lost and wasted, channels of diversion, in what quantities, for what reason, by whom, and where in order to set priorities. The Food Forward Report (Western Cape Government, 2015) recommends approaching government departments, municipalities and industry bodies for their support and endorsement for a coordinated and official call for data relating to food waste. In collaboration with research and academic institutions like UCT, UWC, Stellenbosch University, CPUT, NMMU, WWF-SA and the CSIR, this data could be processed to build a better understanding of the Western Cape's food loss and waste and where interventions would be most beneficial. The data could also be used to establish a baseline, against which the effectiveness of actions could be assessed, such as the Retailer Food Optimisation Pyramid. The comparability of data could be ensured by adopting a standard, such as the global *FLW Standard* for quantifying and reporting ([www.flwprotocol.org](http://www.flwprotocol.org)).

Suggestions as to the types of data to be collected include:

- The edible food fraction of organic waste sent to landfill in the Western Cape (weight, volume, value and calorific value)
- A profile of food loss and waste in the South African retail sector<sup>3</sup>
- Financial returns associated with different options for reducing food waste by South African retailers
- A profile of post-harvest losses for the Western Cape (reasons and routes of diversion or disposal)
- An analysis of informal food flows in urban areas, and associated losses and waste

In terms of the Province's 'Nourish to Flourish' strategy, there may be potential for other key projects to contribute information on, for example, food losses generated on smallholder farms or waste generated by informal traders.

STEPS	TIMING	OBJECTIVES
<b>1. Western Cape Food Waste Research Symposium</b>	Mid 2017	<ul style="list-style-type: none"> <li>○ To identify areas of research synergy and interest within the province and in alignment with other national research</li> <li>○ To identify gaps and needs</li> <li>○ To refine research program and focus</li> <li>○ To identify potential funders</li> <li>○ To assign research projects to research institutions</li> </ul>
<b>2. Research Program</b>	1 – 3 years (depending on the level of academics/researchers involved)	<ul style="list-style-type: none"> <li>○ To gather data to fill gaps in understanding of where food is wasted, in what quantities and for what reasons</li> <li>○ To identify areas of highest priority for intervention based on e.g. weight (tonnes), CO<sub>2</sub>, water footprint, nutritional and financial value</li> </ul>
<b>3. State of Food Waste in the Western Cape Report</b>	TBC, but interim reports would be released as they are completed	<ul style="list-style-type: none"> <li>○ To collate the findings of the research program</li> <li>○ To present the findings in the form of a clear and effective knowledge product that can guide strategic direction and facilitate decision making</li> </ul>

ROLE PLAYERS	ROLES
Cape Higher Education Consortium (CHEC)	Co-ordination of university research
Western Cape Universities	Research
CSIR	Research

<sup>3</sup> Limiting the scope of retailer data collection to the Western Cape only would make this more manageable than asking them to provide national level data, and will hopefully encourage them to participate.

The Southern Africa Food Lab	Strategic support & coordination
Sustainability Institute	Additional research & compilation of report
Green Cape	Additional research & dissemination of findings to government
WWF	Additional research & dissemination of findings to consumers and other stakeholders
Funding Agencies (e.g. UNEP, Rockefeller Foundation, NRF)	Contribute funding for research aligned with their objectives

<b>BUDGET</b>	
Strategic support and coordination (SA Food Lab & SI)	R 50,000
Additional student research (Universities)	Approx. R 270,000 per Masters Approx. R 540,000 per PHD
Additional research (CSIR)	TBC
Compilation of Food Waste Report (SI)	R 150,000

**NOTE:** It is anticipated that much research can be done using existing research budgets and students, but some more specialised studies may require the CSIR or consultants to undertake research that does not necessarily fit within academic agendas or timetables. This would need to be discussed within the CHEC and Western Cape Government task team at the start of the project.

### 3. Conclusion

In conclusion, it is noted that numerous solutions to diverting waste from landfill focus on waste-to-energy, composting (waste to soil), anaerobic digestion or waste to feed, whereas a very small volume is proposed as a 'waste to food' solution (7,200 tonnes per annum) (GreenCape, 2017). While these interventions are much needed, they should not be seen as the main route for minimising and diverting edible food waste in light of the province's food and nutrition security challenges. The solutions proposed above should also be considered within a wider mix of options to frame food waste as an opportunity, and reinforce the logic of waste hierarchies with the ultimate aim of diverting edible food 'waste' for human consumption at its highest nutritional value.

## Appendix

### Other areas for consideration

#### 1. Improve cold chain management and logistics

Developing countries often have underdeveloped cold chains for food preservation during transport and storage, resulting in increased food waste. This is particularly an issue for small scale farmers who are less likely to have access to the refrigerated store rooms and vehicles used by their competitors. Sufficient cold storage capacity is essential to deliver fresh food to market with minimal loss to spoilage (EIU, 2014). One option would be to explore technological and behavioural innovations and activities to improve food distribution and cold chain management, particular at an informal or small to medium-scale farmer level.

According to GreenCape (2017), market opportunities in the Western Cape and South Africa for food value retention through improved cold chain management and waste reduction are estimated at R600 million.

From a logistical perspective, the Western Cape is a large province, and as such farmers are often situated far away from markets and food must travel long distances. If roads or limited access to alternative transport (e.g. rail) is not sufficient, this can result in increased food wastage (e.g. from products being damaged when driven over bumpy roads). A proposition is to promote the production of more fragile foods (e.g. leafy greens) in closer proximity to consumers (e.g. in the Philippi Horticultural Area in Cape Town), or to identify key arterial roads used by growers to deliver produce to market and ensure that the necessary budget is made available to maintain roads. Alternatively, a switch to rail (where geographically feasible), should be encouraged as an alternative route to market in line with the Western Cape Infrastructure Framework's aim to shift freight away from road toward rail.

## **2. Improve packaging to avoid food spoilage**

Packaging can play an important role in reducing food waste along the supply chain, particularly in the home. For example, using the correct-size 'lugs' for transporting fresh produce can reduce bruising, or using strips to absorb ethylene in transit can significantly extend food shelf life (e.g. Desicare, 2016). At a primary packaging-level various packaging solutions can be adopted to reduce food waste, such as resealable packs, packaging food in smaller portions, using modified atmosphere or sophisticated perforations in punnets to control air flow. Numerous good practice examples exist (see [WRAP](#)). Initiatives to support packaging innovations, such as trials to reduce food damage in transit, or extend shelf-life should be encouraged with retailers and their suppliers. Where possible, packaging should also include recycled content, be minimal yet fit for purpose and be recyclable.

## **3. Develop a food waste reduction roadmap**

Given the complexity of the challenge of channelling edible food waste to feed hungry citizens and the multiple disciplines that would need to be involved, it is proposed that businesses and organisations along the food supply chain be brought together with government and academics to develop a food waste roadmap to help the Province play its part in achieving the UN's Sustainable Development Goal (SDG) target 12.3 of reducing food loss and waste by 2030 (Champions123, 2016). This forum could be a sub-forum of a national food waste forum, which was proposed following a meeting of food waste stakeholders co-ordinated by the CSIR, DTI and WWF-SA in February 2017. By connecting different actors, innovative new solutions and collaborations can result – similar to Green Cape's WISP network that promotes industrial symbiosis in the Province. The latest data on food waste and best practice examples of interventions could be shared with these networks, so that they can more rapidly respond to the challenges at hand.

## **4. Household consumer food waste campaign**

Approximately 4% (372,700 tonnes) of food waste in south Africa is lost at the consumer stage (households and food service sector), where a lack of consumer awareness typically leads to edible foods being given to domestic staff, fed to pets, composted or sent to landfill. Once there is sufficient data on what types of foods are being wasted by consumers, as well as in what quantities and for what reasons, the Province's consumers should be educated on how to minimise food waste and save money through well planned Government-sponsored media campaigns and collaborations with celebrity chefs, food markets, retailers and other stakeholders. Some of the areas that require consumer education include:

- The difference between "sell by", "best before" and "use by" dates.
- How to store food more effectively (e.g. storing carrots in water) and preserve leftovers for future use (e.g. freezing, jams, etc.).

- Which food “wastes” are edible, and what they can be used for (e.g. beetroot leaves).
- The health benefits of eating certain unpeeled fruits and vegetables (e.g. potatoes, apples etc.), offal, and less popular cuts of meat.
- How to plan and portion meals to avoid preparing too much food.
- How to use left overs in future meals.
- How to plan food shopping trips, including better meal planning, checking what food you have before shopping and not falling for bulk deals that may result in wasted food.

For an example of similar consumer education efforts, see:

- Nedbank’s [Food Savers Guide](#)
- WRAP’s [Love Food Hate Waste](#) campaign
- UNEP’s [Think.Eat.Save](#) campaign (which is currently being proposed for South Africa)

## 5. Food service sector campaign

Both the public (e.g. hospitals, schools, prisons) and private (e.g. restaurants, hotels, food stalls) components of the food service sector have important roles to play in reducing food waste associated with preparing and serving food. Once there is sufficient data to indicate where the Province’s food service sector is most likely to be wasting edible food, both public and private role players in the sector should be provided with guidance and information on how to minimise food waste and save money. This could be achieved through the preparation of a Food Optimisation Pyramid for the sector, the inclusion of food waste in chef school syllabuses, and training for chefs and kitchen staff. The areas requiring education would be similar to those listed for household consumers, but would be more oriented toward bulk food production, such as stock and menu planning, portion sizes, encouraging customers to take home leftovers and shifting from buffet-style services to *a la carte*. It is proposed that a voluntary agreement for the food service sector is implemented to reduce food waste, such as WRAP’s [Hospitality and Food Service Agreement](#).

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