RETAIL FOOD WASTE PREVENTION

Part 1: Toolkit Report for Supermarket, Convenience and Specialty Food Store Operators

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The BC Ministry of Environment and Climate Change Strategy

The BC Ministry of Environment and Climate Change Strategy (the "Ministry") is responsible for the effective protection, management and conservation of B.C.'s water, land, air and living resources.

The Environmental Standards Branch of the Ministry is responsible for municipal solid waste management policy, setting environmental standards, and overseeing the solid waste management planning framework contained in the Environmental Management Act (EMA).

This objective of this project is to provide information and tools to BC business owners and operators that help reduce food waste.

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This document was prepared for the BC Ministry of Environment and Climate Change Strategy.

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*fs*STRATEGY Inc. ("*fs*STRATEGY") is an alliance of senior consultants providing business strategy design and support to the Food and Hospitality Industries.

Limitations of Report

*fs*STRATEGY will not be responsible for future management and marketing decisions upon which actual results will depend.

Where information included in this report was supplied by a third party, there will be appropriate attribution to such third party supplier and the user will not remove or otherwise interfere with any confidentiality, proprietary or other notice included with such third party data.

Every business is different, some recommendations in this toolkit may work for some operations and not for others. Furthermore, the estimates and related potential savings are general in nature and may or may not apply to every individual operation. See "Notes and Disclaimers Regarding Waste Estimates" at the end of this document.

When You Reduce Food Waste Everybody Wins

Retail food stores and foodservice in BC lose an estimated $1.3 billion worth of food per year, 57% more than the estimated profit in those Sectors.

That's value that is not realized by anyone, but which taxes our communities socially, economically and environmentally.

Simple operational controls like those presented in this Toolkit help operators reduce waste and be more profitable.

Wasted Resources

Operational Profit

Increased Food Costs

Edible Food

Lost Land

$1.3 BILLION

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One Objective,
Three Valuable Documents

PDF

PDF

Excel

Part 1
Food Waste
Reduction Toolkit
Report

Part 2
Food Waste
Reduction Toolkit
Instruction Manual

Part 3
Food Waste
Reduction Excel
Toolkit

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Toolkit Report Contents

Food Waste in Retail

- Methodology
- Focus of the Toolkit
- Food waste defined
- Cost of food waste
- Value of commercial food waste in B.C.
- A case for waste reduction

Common Causes of Food Waste

- Common Flow of Goods
- Descriptions and examples of common causes of food waste
  - Contamination
  - Customer Returns
  - Production Error
  - Spillage
  - Spoilage
  - Poor Product Quality
- Where these risks occur in the flow of goods and how to avoid them

Tools & Resources to Reduce Food Waste

- Descriptions and details of specific tools, procedures and resources for reducing waste within the context of a control cycle:
  - Planning
  - Training
  - Monitoring
  - Correcting

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FOOD WASTE PREVENTION

FOOD WASTE IN RETAIL

Methodology

Forging The Tools

Interviews with Operators revealed that the tools used to reduce waste are typically the same, standard tools used to control costs in any business.

The Toolkit adapts tools and procedures that should already be used or familiar to Operators. Information is presented in a general format to be useable by anyone whether they have sophisticated systems already in place, or are just starting out. For those just getting started, the kit includes several basic tools that are ready to use and adapt to your business.

TEN COMMON CAUSES OF FOOD WASTE

Where to find them and how to avoid them

MORE THAN 20 PAGES OF PRACTICAL TIPS AND DETAILED BEST PRACTICES

A SUITE OF 11 FUNCTIONING FORMS, TOOLS AND CALCULATORS

Set standards; plan and forecast effectively; track, identify, evaluate and correct waste

Focus of Toolkit

REDUCE
reduce by as much as possible the amount or toxicity of material that enters the solid waste stream and also the impact on the environment of producing it in the first place

REUSE
ensure that materials or products are reused as many times as possible before entering the solid waste stream

RECYCLE
recycle as much material as possible

RECOVERY
recover as much material and/or energy from the solid waste stream as possible through the application of technology

RESIDUALS MANAGEMENT
provide safe and effective residual management, once the solid waste stream has been reduced through the application of technology

WASTE REDUCTION:

This Toolkit focuses on the reduction of food waste within operations.

The Ministry identifies waste reduction as a primary component of its pollution prevention hierarchy (reduce, reuse, recycle, recovery and residuals management).

Repurposing and redirecting (i.e., donations to food banks, composting, recycling, etc.) are encouraged for food waste that cannot be avoided; however, the objective of this Toolkit is to reduce the amount of waste that requires redirection.
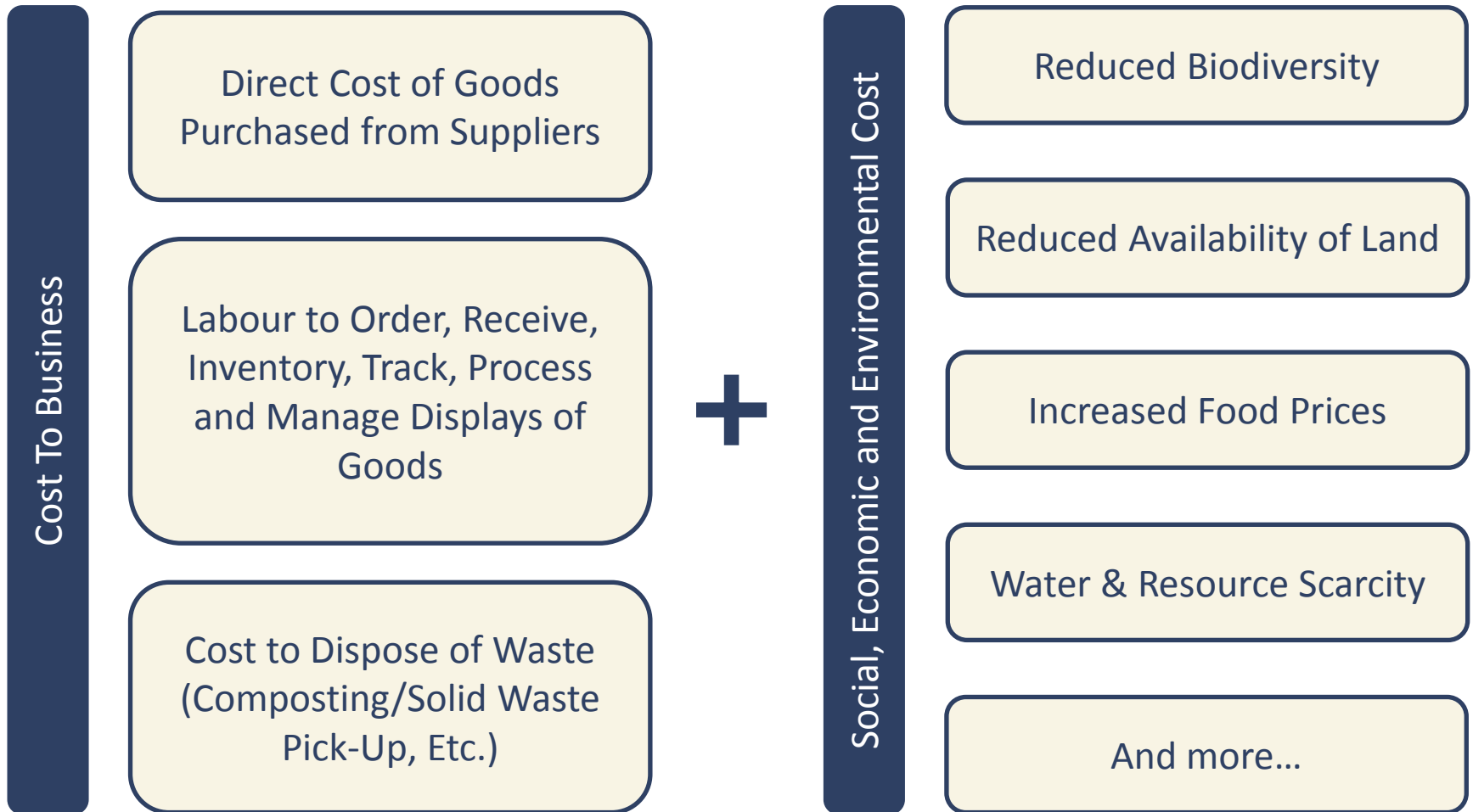
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Definition of Food Waste

"Food diverted from its primary purpose within the operation -- sale to, or consumption by, the consumer."
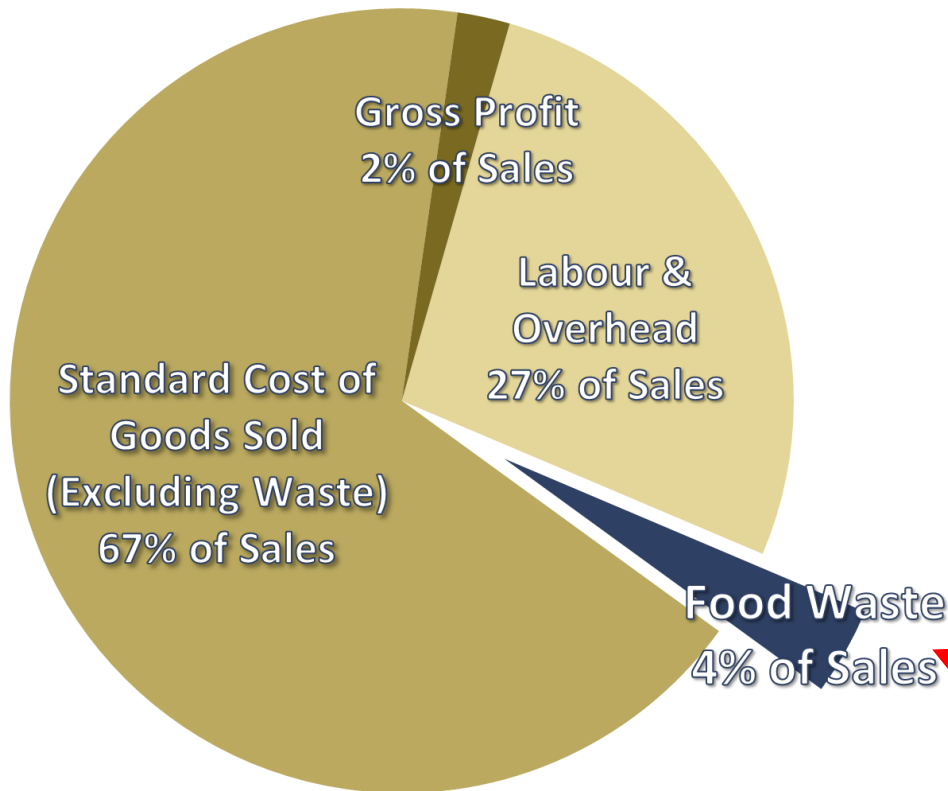
Retail Examples:

- Spoilage caused by over ordering, over production, improper storage
- Physical, chemical or biological contamination of food
- Food that is spilled or knocked over
- Incorrectly ordered or prepared food
- Unusable trim and peel from production
- Food returned by the customer because the product was not to their satisfaction
- Food that is moved from a proper display (i.e., refrigerated display) and left elsewhere in the store
- And more…

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Costs of Food Waste

Cost To Business

Direct Cost of Goods Purchased from Suppliers

Labour to Order, Receive, Inventory, Track, Process and Manage Displays of Goods

Cost to Dispose of Waste (Composting/Solid Waste Pick-Up, Etc.)

+

Social, Economic and Environmental Cost

Reduced Biodiversity

Reduced Availability of Land

Increased Food Prices

Water & Resource Scarcity

And more...

Waste = Lost Money

Gross Profit
2% of Sales

Labour &
Overhead
27% of Sales

Standard Cost of
Goods Sold
(Excluding Waste)
67% of Sales

Food Waste
4% of Sales

ESTIMATED FOOD WASTE
BC RETAIL FOOD SECTOR

$459.4 MILLION
SUPERMARKETS

$41.3 MILLION
SPECIALTY FOOD STORES

$15.8 MILLION
CONVENIENCE STORES

$516.5 MILLION
RETAIL FOOD STORES

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Waste Reduction = Good Business
A Business Case for Waste Reduction

Estimated value of food waste in the British Columbia retail sector is approximately 4% of sales, twice the value of estimated gross profit.

While the tools and procedures to reduce waste in foodservice operations may, at first, appear time consuming or complex, most represent tasks and procedures that are considered best business practices. Sound business principles seek to reduce waste and inefficiencies that affect an operation's profitability. In fact, most of the tools presented in this Toolkit come from standard operational control and food safety systems that should already be used.

Retail operations are diverse and vary greatly based on a number of variables including product offering, size and traffic volume. Opportunities may vary. Still, interviews with operators in British Columbia suggest that potential savings for an average retail food store may range from **2% to 3%* of sales**.

ESTIMATED AVERAGE
2.0% to 3.0%
POTENTIAL SAVINGS*

"...reducing waste has been made part of [our] culture over the past 15 years, (through leadership, hiring, controls, etc.) [we] hate waste and take action to reduce waste as part of that culture."
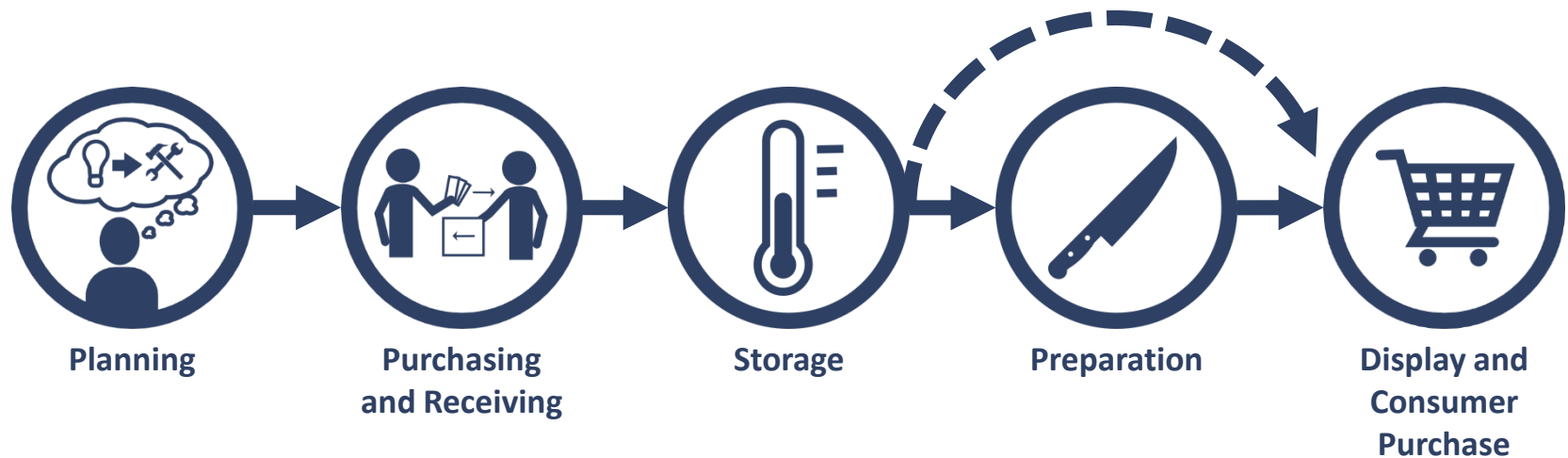
– National Supermarket Chain

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* Reported waste ranged from 0.8% to 5.0%. An average opportunity for savings was estimated as the difference between the median value and reported minimum value for waste as a percentage of sales. The range is representative of the opportunities across the three sub sectors. This number is provided as a guide only and is derived from opinion-based discussions with operators, without audit of actual results.

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FOOD WASTE PREVENTION

COMMON CAUSES OF WASTE

Food Waste Risks Exist and May Be Controlled Throughout the Flow of Goods

Planning

Purchasing and Receiving

Storage

Preparation

Display and Consumer Purchase

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CONTAMINATION

Description & Examples

Contamination loss occurs when food comes in contact with biological (i.e., pathogens like viruses, bacteria, etc.), physical (i.e., bone shard, metal filings from a can, glass shards, etc.) or chemical substances (i.e., cleaning agents, etc.) that render the food unfit for consumption.

Cross-contamination may occur indirectly when food is exposed to a contaminated surface. For example, produce prepared on a cutting board that was used to prepare raw poultry without washing and sanitizing the board between tasks will indirectly be exposed to potential pathogens such as salmonella from the raw chicken. A customer who handles food on a display may contaminate that food. Contamination is of particular concern when the preparation of the contaminated product does not include a control point that will eliminate the risk (such as cooking to a specific internal temperature).

Tools & Solutions

Planning

- Provide sufficient space to store products correctly.
- Provide suitable containers.

Purchasing & Receiving

- Purchase from reliable sources.
- Check all deliveries for signs of damaged packaging or contamination.

Storage

- Store goods in proper vertical order, following best practices for storage and storage containers.
- ⊗ Conduct frequent spot checks.

Preparation

- Ensure equipment and small wares are cleaned and sanitized between tasks.

Preparation

- Prepare products separately (i.e., poultry separate from produce etc.).
- Keep food covered, do not leave food unprotected in high traffic areas.
- Provide sanitation buckets with sanitizing solutions for employees to clean their stations.
- ⊗ Conduct frequent spot checks to ensure safe food production standards are being followed.

Display

- Use sneeze guards to protect food bars and exposed goods.
- Provide appropriate serving utensils.
- Monitor displays for signs of damage and contamination.

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PLATE WASTE

Description & Examples

Retail operations that offer food bars or made-to-order foods for immediate consumption (in-store restaurants or cafés, etc.) may also wish to consider plate waste. Plate waste occurs when a customer does not finish his or her meal and left-over food is discarded.

Plate waste is often caused by over-sized portions relative to customer need or customer satisfaction with the meal (i.e., the customer did not enjoy the food). Determining the cause of plate waste is important, not only to reduce waste, but to ensure customer satisfaction.

Tools & Solutions

Planning:

- Prepare menus that reflect the tastes and needs of the target market.

- Provide a consistent quality product by implementing standard recipes and portion controls.

- Use accurate descriptions of menu items to ensure customers know what to expect.

- Offer half sizes of menu items that consistently generate plate waste due to portion size.

Service and Consumption:

- If possible, follow up with customers who do not finish their meal to determine whether plate waste is an issue of satisfaction or volume.

- Track plate waste or conduct waste audits when notable/repeated waste is observed for specific dishes.

CUSTOMER RETURNS

Description & Examples

Customers may return food if it does not satisfy them. Reasons for dissatisfaction may include:

- the product has expired or was damaged prior to purchase;
- the wrong product is served (i.e., from food bars, in-store restaurants, service counters, etc.)
- the product is not desirable or does not meet the customer's expectations
- the product is prepared incorrectly (i.e., rare steak is over-cooked, etc.)

In many situations, the returned product may be voided and a new product produced, resulting in loss of a full portion (and all associated labour for producing the first product).

Tools & Solutions

Planning:

- In-store restaurants and made-to-order stations should use a P.O.S. system that efficiently and accurately records and transmits orders to the kitchen.
- Train employees on how to enter orders and read order chits (tickets).

Preparation:

- Follow up with the customer if instructions are unclear prior to preparing food.
- Spot check production to ensure production standards are followed.

Service and Consumption:

- Record all voids in a void log and waste log, including the reason for return so that the information may be used to improve control systems if necessary.

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PRODUCTION ERROR

Description & Examples

Production errors include instances when the incorrect product is produced or when a product is produced incorrectly. For example, an employees fails to follow a standard recipe resulting in an incorrect yield or poor quality/inconsistent product than cannot be used (over seasoned, over cooked, missing ingredients, etc.).

Tools & Solutions

Planning:

- ⊗ Develop standard recipes.
- ⊗ Use forecasting and production planning tools to clearly define production requirements.
- Provide the necessary tools and equipment to execute standard recipes.
- Train employees to follow standard recipes.

Preparation:

- Conduct frequent spot checks to ensure recipes are being used and standards are being followed.

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SPILLAGE

Description & Examples

Spillage occurs when product overflows the edges of its container or is dropped. Spillage may be caused by congested and high-traffic work areas where employees or product may be bumped or knocked over; overfilling of containers; failing to properly wrap containers; using unstable containers such as bowls; dropping a tray that is too hot to hold, etc.

Tools & Solutions

Planning:

- Provide sufficient space to store products correctly.

- Provide suitable containers.

- Design aisles with sufficient width for the intended traffic or work stations.

- Train employees on the proper wrapping and storage of goods.

Storage:

- Follow best practices for storage.

- ⊗ Conduct frequent spot checks to ensure storage standards are met.

Preparation:

- Train employees to follow basic safety methods such as knocking before opening doors, calling out when coming around blind corners or passing behind other employees, etc.

Display:

- Design displays to prevent spillage and damage.

SPOILAGE: Over-Production, Over-Order

Description & Examples

Spoilage often occurs when too much food is available relative to customer demand. In these instances, food expires before it can be purchased by the customer. This issue may be caused by ordering too much product from suppliers or preparing batches of food in excess of what is required.

Tools & Solutions

Planning and Ordering:

- Set and maintain suitable ingredient, product and production par levels.
- Calculate supplier order volumes based on production plan, standard recipes and product yield.
- Assign a designated manager or clerk to perform ordering duties.
- Plan menus to make use of ingredients in multiple recipes, thereby increasing the volume of product used.
- Limit the number of menu items and ingredients used.
- ⊗ Develop standard recipes for production items and standard yields for ingredients.
- ⊗ Forecast daily demand and create reliable production plans.

Preparation:

- ⊗ Conduct frequent spot checks to ensure recipes are being used and production standards are being followed.

Display :

- Promote products that require greater or more immediate sales volumes through discounting, combos and special offers.

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SPOILAGE: Equipment

Description & Examples

Using malfunctioning or improper equipment to store or hold hot or cold food may lead to product spoilage. Many perishable ingredients and products require specific temperatures to prolong their shelf-life. If the available equipment is not designed to hold that temperature or if the equipment is damaged or uncalibrated, the product may expire prematurely or fail to meet safe food handling standards.

Access to appropriate and functioning production equipment such as peelers, slicers, sharp knives, blenders and food processors may also affect the ability to meet standard production yields.

Tools & Solutions

Planning:

- Implement a preventative maintenance plan for equipment/preventative maintenance schedule.

- Select equipment that meets operating requirements (i.e., coordinate storage/cooling needs with refrigeration manufacturer prior to installation, etc.).

Ordering and Receiving:

- Ensure products are received at acceptable temperatures.

Storage, Preparation and Display:

- ⊗ Conduct frequent storage and equipment spot checks.

- Use correct equipment (i.e., do not use display refrigerators to chill ambient temperature products, use a peeler not a knife, etc.).

- Do not overload refrigeration or hot-holding equipment.

- Ensure product is within the controlled temperature zone (i.e., hot food is not heaped so high that the warming well does not transfer heat to the top, cold products stacked above refrigerated zones in grab and go cases, etc.).

SPOILAGE: Improper Handling/Cooling

Description & Examples

Food may spoil if it is not handled correctly during production. Time-temperature abuse (storing or holding food within the temperature danger zone for extended periods of time) may lead to spoilage or food that is unsafe to consume. In either situation, the food must be discarded. The risk and impact is greatest when preparing large batches of product such as soups.

Tools & Solutions

Planning:

- Provide sufficient facilities and equipment to properly cool and store production batches.
- Provide sufficient facilities and equipment to properly reheat and hold hot-held food.

Storage:

- Store and hold foods outside the Temperature Danger Zone. (See Tools & Resources Section)

Preparation:

- Reduce the temperature of prepared food not for immediate use from initial cooking temperature to below 21°C within two hours and from 21°C to below 4°C within four hours (under six hours total).

Preparation Continued:

- Use equipment designed for rapid cooling (i.e., ice wands, ice bath, blast chillers, etc.). Do not rely on standard refrigerators to cool the product. Most refrigerators are not designed to cool hot food; to do so risks raising the temperature of other perishable foods in the cooler or overworking the refrigeration unit.
- To reheat food for hot holding, bring food to an internal temperature above 74°C for 15 seconds within two hours and hold the food at a temperature greater than 60 °C.
- Conduct frequent storage and equipment spot checks.

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SPOILAGE: Improper Stock Rotation

Description & Examples

When stock (products and ingredients in storage) is not rotated properly, new stock is used before old stock, and a greater risk of spoilage exists.

Tools & Solutions

Planning:

- Provide sufficient shelving and space to allow for proper storage and arrangement of stock.
- Train all employees in the principal of FIFO (First In, First Out) stock rotation.

Purchasing and Receiving:

- Train specific employees to be responsible for receiving and processing orders into storage.

Storage and Display:

- Properly label all stock.
- ⊗ Conduct frequent storage and display spot checks to ensure product is stored correctly.

POOR QUALITY PRODUCT

Description & Examples

Receiving poor quality product from suppliers can affect production yield and quality. Under/overripe produce may be unusable. Products near their end-of-usable life may not be used before they spoil. Damaged goods such as dented cans, punctured packaging or signs that frozen goods have thawed and refrozen are all indicators that the product may potentially not be fit for use.

Tools & Solutions

Planning:

- Develop and use purchase specifications for obtaining bids from suppliers.

- Use only reputable/reliable suppliers.

- Where appropriate, explore opportunities to use a prepared product from a quality manufacturer to increase product consistency.

Purchasing and Receiving:

- Assign a specific employee for all receiving. The employee should be trained to know the purchase standards.

- Inspect, identify and address all product quality issues while the delivery driver is present. Return products that do not meet the purchase standards and obtain a receipt for those returns.

FOOD WASTE PREVENTION

TOOLS & RESOURCES

About This Section

- This section describes methodologies, best practices and tools that may be used to reduce food waste.

- In some cases, basic versions of the tools are provided in the companion toolkit consisting of a Microsoft Excel workbook and a PDF instruction manual.

- Where a companion tool exists, the name of the tool and corresponding Excel worksheet name will be noted.

As retail operators evolve their prepared food offerings, control tools used by restaurants for forecasting and production planning become increasingly relevant. This document includes tools and best practices for menu development, which may not be relevant to all retail operators; however, the underlying principals of the Toolkit apply to any operation that serves or sells food.

Controls are Cyclical Processes

Control tools and methodologies are most effective when used as part of a cyclical process that not only implements the tool but continually evaluates the effectiveness of the tool.

In the control cycle, operators plan by designing, forecasting and setting standards.

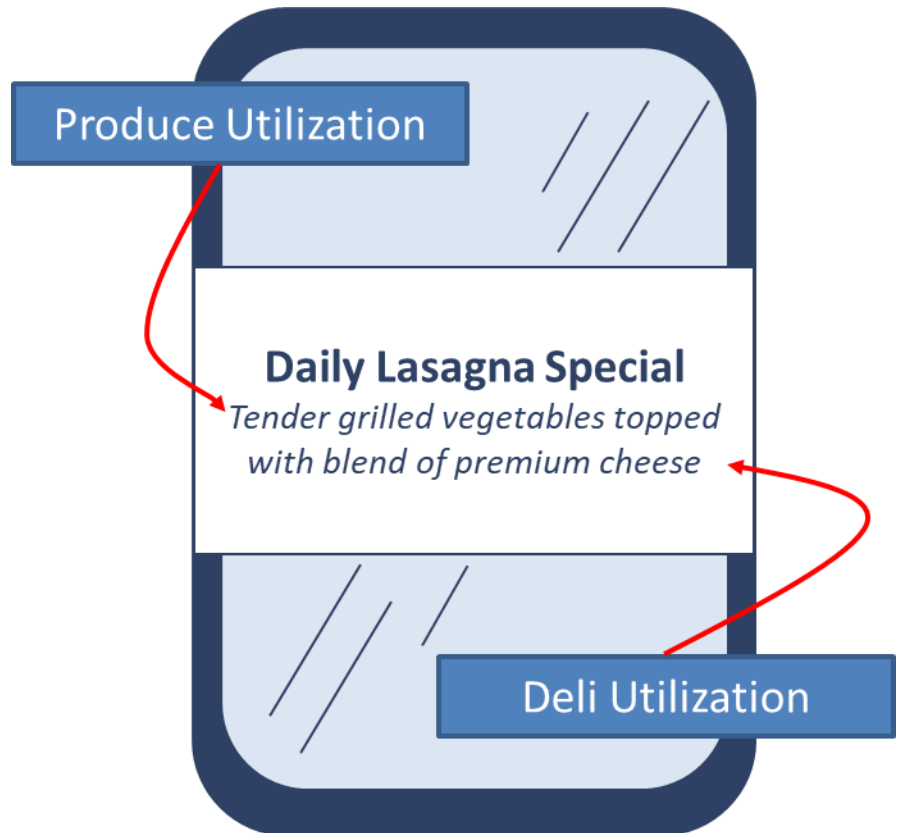Those standards are implemented through training.

The outcomes are monitored and if the standards are not met, corrective actions are taken.

Often the corrective action may be a revision of the plan or tweaking of the tools to increase their effectiveness and so the cycle continues.

Correct Plan

CONTROL
CYCLE

Monitor Train
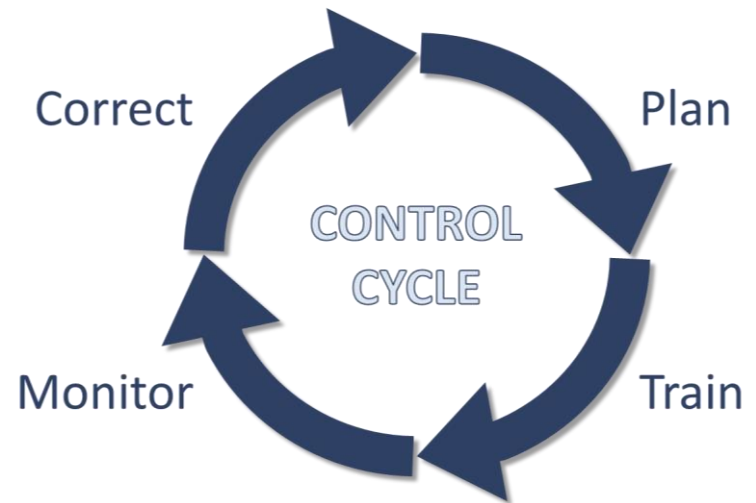
Planning: Prepared Food Menu Design

- Design menus and offerings that:
  - are relevant to the consumer, promote sufficient sales volume and reduce risk of returned food;
    - analyse sales regularly and remove or fix items that under perform;
  - offer sufficient variety while limiting the total number of offerings to reduce prep and waste;
  - use common ingredients (i.e., each ingredient is used by multiple recipes where appropriate) to increase stock turnover;
  - use ingredients with sufficient shelf life and purchase quantity to allow the product to be used before spoiling;
  - utilize trim or waste from other recipes and departments;
  - **use products from suppliers that take efforts to reduce waste;**
  - may be prepared consistently within the context of available equipment and employee skill set; and
  - provide value without over-portioning.

Produce Utilization

Daily Lasagna Special
Tender grilled vegetables topped with blend of premium cheese

Deli Utilization

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Planning: Intra-Department Cooperation

With careful planning, operations with multiple departments (dairy, butcher, seafood, prepared foods, etc.) may have distinct advantages in their ability to reduce waste, especially if these departments work collectively.

Useable trim (butcher scraps, etc.) and food that is reaching the end of its saleable life, may still be suitable for consumption with minimal processing. Soups, stews, pies, salads, sauces and other flexible prepared goods may utilize ingredients that may otherwise go to waste.

Old mushrooms from the produce aisle that look undesirable may still be highly flavourful and suitable for cooking. Pureed in a cream of mushroom soup, the appearance no longer matters. Meat scraps from the butcher may be soup garnish, savoury pie filling or flavour enhancer in a sauce. Tired vegetables may have second lives as pizza toppings or grilled as a sandwich filling.

Intra-department cooperation is not limited to utilizing trim in recipes. Cross-department combos and kits may also help promote food near the end of salable life.

Consider a scenario where a high cost product such as ribs is approaching its best-by date. Independently, the meat department is somewhat limited to reducing prices, or showcasing to promote the sale of ribs. However, working in conjunction other departments such as produce, grocery or prepared foods, the Meat Department may have an opportunity to create value for the customer through combos and meal kits utilizing products from the other departments like sauces or deli salads. Properly planned combo offerings may increase sales volume for all of the associated products, spread discount across several products and add value for the customer.

Reduced For Sale!

❌ Something's wrong?

Limited Time Combo Offer!

✅ Something's special

Planning: Standard Recipes

- Standard recipes are a primary step in food production controls:
  - May be used as a training device
  - Help ensure standard product quality consistently
  - Provide standard production yields that promote accurate production planning
  - Allows affective ordering/forecasting
  - Helps determine appropriate pricing
  - Used to determine theoretical cost of goods sold

STANDARD RECIPE COST FORM

Recipe Name:

Description	Quantity	Unit	AP Cost per Unit	Unit	Yield Ratio (%)	EP Cost per Unit	Ingredient Units in AP Unit	Total Cost
	Ingredient		As Purchased ("AP")		Edible Portion ("EP")			
Column	A	B	C	D	E	F	G	H
Formula	Entered	Entered	Entered	Entered	Entered	C ÷ E	Entered	F ÷ G x A

Total Recipe Cost *[Sum total Cost for all ingredients above]*	
Recipe Yield (Total Number of Portions) *[Entered]*	
Total Cost per Portion *[Total Recipe Cost ÷ Recipe Yield]*	

Methodology:

Sample Standard Recipe Cost Form – This Tool is available on Sheet: 'P1 – Standard Recipe Cost' in the Toolkit.

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Planning: Understanding Yield

Yield is the amount of Edible Portion ("EP") or usable prepared ingredient once trim and other waste is removed, relative to As Purchased ("AP") product. Yield is used to determine the amount of product required when ordering ingredients and adjust recipe costs to account for waste.

Setting Standard Yield:

Yield may be calculated by dividing the EP weight of a prepared product by the AP weight taken prior to processing. For example, if after preparing a kilogram of potatoes 800 grams of usable (EP) product remained, the yield would be 80% (800 divided by 1,000).

Where yield calculations cannot be conducted, operators may rely on generic yield data from books like "The Book of Yields" or numerous online sources. Generic standards are convenient but should eventually be replaced by actual yield calculations.

If the yield standard is not being met, the process is no longer reliable.

Ensure Standard Yields are Met:

Spot check production (check garbage, watch preparation, etc.) and ensure that employees have the tools they need to meet the standard. For example, if the standard yield for potatoes is determined using a peeler, cooks who only have access to a knife may lose significantly more product than expected.

Impact:

Yield losses of 5% to 20% (and greater in some instances) are typical for many common produce ingredients, representing a significant cost savings opportunity if the trim may be used by other recipes or reduced through more efficient processing of food.

Example: Consider a comparison in potato yield using a peeler (2 mm peel) (82%) versus using a paring knife (4 mm peel) (70%). If the operation pays $1.75 per kilogram and sells 50, 125-gram portions of prepared potato a day, the potential savings gained from buying a proper peeler ($10) could, in theory, reduce waste by over 545 kilograms or $950 dollars annually.

AP
100%

Trim
20%

EP
80%

Yield comparison example is a theoretical figure based on mathematic volume for a 12 cm x 6 cm x 6cm "perfect" potato used as an illustration of potential savings only.

Planning: SKUs and Par Levels

Stock Keeping Units ("SKUs") are products (or more accurately the identifier for a product but in this context representative of the individual products) in stock. Reducing the number of SKUs in storage may help reduce the risk of food waste.

Using many products may help operators offer diverse, differentiated goods to their customers. However, having too many products in stock may cost the operator.

Par Levels refer to the amount of each SKU or prepared product to that should be on hand at any time. Maintaining par ensures that enough product is available to serve the customers' needs while at the same time ensuring that only what is needed (and no more) is purchased or prepared.

Impact:

When too many SKUs or too much product (greater than par or incorrect par level is set) exists, the operator risks exposure to loss and greater costs due to:

- labour costs to order, receive and monitor inventory;

- space to store the products (occupancy cost or poor use of space that could otherwise be used for selling);

- greater risk of spoilage if stock turnover is not sufficient use products before expiry dates or if insufficient space exist to store the goods properly;

- greater risk of production waste if employees perceive that more than enough product is available, the urgency of care to meet yield standards may diminish; and

- greater risk of theft if absence of a product is less noticeable.

Control:

SKUs are controlled in the planning stage.

- Review sales history to determine which products are popular or necessary.

- Develop menu items that use common ingredients (i.e., one ingredient used by many recipes).

Par levels for products should be determined based on shelf-life, anticipated traffic, frequency of deliveries and available storage space (among other variables).

REDUCE WASTE

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Planning: Make or Buy

Making products from scratch may provide the ultimate flexibility and ability to utilize trim from other recipes.

For example, in scratch production, a whole chicken may become chicken breasts for a salad, drumstick and thigh for a fried chicken entrée and bones for a stock used in soup and sauces, thereby using the entire product.

Where scratch production is part of the brand value, it becomes point of differentiation that may be leveraged to increase sales and build customer loyalty.

However, in some cases, scratch production may be challenged by availability of skilled labour, labour cost, space constraints or variable traffic that make providing a consistent, low waste product difficult. Or, the menu may not have need for by-products of an ingredient (i.e., only chicken breast is needed; not bones or legs).

In these cases, value-added or prepared products may provide several benefits over scratch production including:

- consistent product (even across many locations);
- reduced risk of cross-contamination (reduced work steps and less handling of raw ingredients);
- ensured proper handling and cooling of large batches; and
- reduced labour (preparation and tracking/monitoring/ordering one product versus several ingredients for a recipe).

Value-Added products may also help to reduce waste via:

- consistent, optimal yield;
- longer shelf-life; and
- ability to use or hold products in smaller batches, knowing that replacement product is ready to use when needed (versus preparing another recipe batch).

Beyond the end use, some manufacturers may achieve greater product yields than are possible in a standard kitchen. For example, a report on production yield analysis for French fries listed simulated pre-cooking yields as high as 89% (peeling, cutting, sliver removal and defect sorting).[1] Comparing this to a generic standard yield of 78% for peeled and sliced potatoes[2] suggests the manufacturing technology may reduce waste by 11% of AP product.

Leading manufacturers are evolving their products with operator demand, and many offer quality, clean label (free of artificial flavours or colours) products.

The decision to make or buy can be a sensitive one and should be made by reviewing and balancing the pros and cons of each approach carefully against the standards and differentiators of the operation.

1. Somsen, Derk (2004). Production yield analysis in food processing. Applications in the French-fries and the poultry-processing industries (Ph.D Thesis). http://edepot.wur.nl/121537 accessed 20/11/2017
2. Lynch, F.T. (2005). The Book of Yields: Accuracy in food costing and purchasing. 6th Ed. John Wiley & Sons Inc., Hoboken, NJ

Planning: Equipment

Having the right equipment and facilities to properly store food is an important variable in preventing spoilage, spillage and other types of waste.

When designing a new operation, care should be taken to identify and include the correct equipment and provide sufficient space to effectively store and prepare food. Design considerations may include:

- sufficient dry and cold storage space to allow all goods to be stored on shelves without over stacking, away from walls with good air circulation;

- equipment that may be easily cleaned (NSF certified, etc.);

- properly sized exhaust hoods to ensure proper ambient temperatures and humidity levels in the kitchen and storage areas;

- equipment that extends the life of products such as vacuum sealers and oil filtration systems;

- properly sized refrigeration systems for the intended tasks (most standard refrigeration is designed to keep cold food cold, not make warm food cold); and

- sufficient work and traffic space that areas are not at risk of spillage due to clutter or collision.

For existing operations, care should be taken to plan menus and production around the capabilities of the existing facilities:

- reduce the volume and variety of ingredients used;

- provide appropriate small wares: peelers, sharp knives, storage containers with flat bottoms (not bowls) of appropriate size and other items required to safely store and meet production standards; and

- use equipment for its intended purpose – some air-screen display refrigerators and prep-top refrigerators may not be designed for chilling or long-term storage of perishable goods.

Image Source: Frymaster a Welbilt Company (Model PF50)

Fryer filtration systems like the one shown above may extend the life of cooking oil buy as much as 100% and may make cleaning the fryer easier because carbon buildup is reduced.

Planning: Preventative Maintenance

Preventative maintenance plans include regular cleaning, maintenance and calibration of equipment to ensure proper functionality and extend the life of the equipment.

Preventative maintenance plans consist of daily in-house maintenance such as cleaning, and use of third-party factory authorized maintenance firms. Costs for third party plans will vary greatly by size of operation and types of equipment.

Preventative maintenances aims to "prevent" equipment failures that may lead to costly product waste or premature end-of-life for the equipment.

Ice build up on evaporator coils can prevent freezers from functioning correctly and can result in drippage that damages food stored below the coils.

Dust build up on compressor coils can prevent proper heat exchange with the air causing compressors to work harder (increasing wear on the compressor) or preventing the system from obtaining the correct temperature for product storage.

Build up or other damage to heating coils may prevent hot-holding devices from holding food above the danger zone.

Improperly calibrated thermometers may prevent employees and/or otherwise functioning equipment from achieving and holding correct temperatures.

Incorrectly calibrated cooking equipment may result in burnt or undercooked food that must be discarded; thereby wasting both food and labour.

Image Source: fsSTRATEGY Inc.

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Planning: Forecasting

A forecast is an estimate of the number of customers that will visit the operation and what they will order. Without an accurate forecast, operators risk ordering and preparing too little or too much food. Over preparation or over ordering food in particular may lead to greater waste. In fact, some operators reported when interviewed, that forecasting was one of the greatest challenges when trying to reduce waste.

Forecasting tools range from gut intuition based on experience to sophisticated algorithms that consider a wide array of variables. All forecasting methods rely on accurate historical data.

Forecasting is not an exact science, nor does it guarantee a certain level of business; however, when done thoughtfully, forecasting is a highly useful guide based on what has happened in the past. As such the quality and quantity of historical data is important.

Many modern P.O.S. systems have forecasting capability or the ability to add a forecasting module. The advantage of using P.O.S. systems is that they already capture much of the information required to conduct a forecast. Other tools and services may also exist to help forecast.

Forecasting may be used for building budgets, production planning, even scheduling on an hourly basis.

The Toolkit provides a basic forecasting model on Sheet:'P2-Basic Customer Forecast'.

Planning: Display Structure
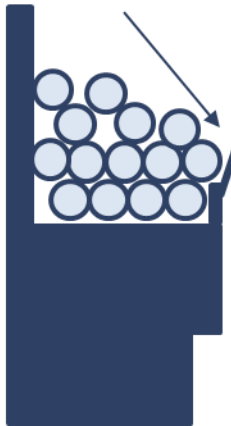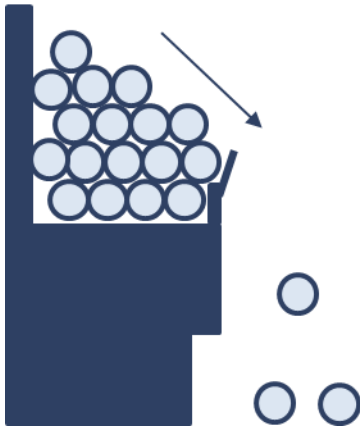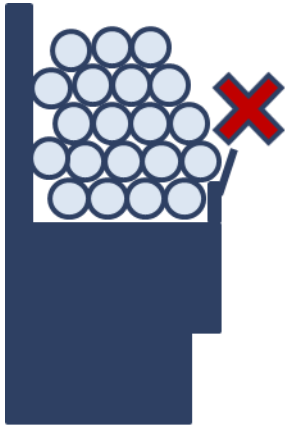
Design displays to reduce risk of damage or spillage. Stacked displays should consider where food will fall if the stack collapses. Piling food to the front of the display increases the risk of product falling. The greater the distance the product falls, the greater the chance of damage. If exposed products, such as produce, fall to the floor, they may be unsalable.

Floor displays on blind corners also risk being knocked over by carts as customers turn in or out of aisles.

Consider the following questions when designing a display:

- Are customers likely to bump or collide with the display?

- Is the design of the display resistant to collision or bumping? (i.e., will the display collapse/fall over or will it withstand the collision?)

- Can customers access the product safely without knocking other products off the display or shelf?

- Where will customer take product from the display (i.e., if the bottom apple in a pile is taken, will the pile collapse?)

- Where will the product go if it does fall?

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Planning: Hot/Cold and Perishable Display Size

Heaping piles of food may look attractive and abundant, but may result in food waste due to:

- reduced product quality over time (exposure to air, high temperatures, etc.);
- greater risk of spoilage if the pile is greater than demand and the food is not sold before it expires;
- time-temperature abuse if food sits above the temperature zone of the equipment (i.e., the refrigerated or heated pan) for prolonged periods of time making it unsafe to eat;
- greater risk of spillage;
- greater risk of contamination;
- damage from customers looking through or repeatedly scooping from the pile;
- damage from piles of food crushing food at the bottom of the pile;
- etc.

Buffets, hot/cold food bars, perishable retail displays, even heat-and-hold preparation for busy service periods (i.e. large batches of French fries, steamed vegetable, soup, etc.) may reduce waste and increase customer satisfaction by reducing the size of batches and replenishing displays more frequently.

Food will be fresher and look more appealing, and the frequent attention allows employees greater control over other issues like contamination and temperature.

Studies have shown that larger serving vessels and packages result in greater consumption. One study saw people self-served from a large bowl take 53% more food (by weight) than those self-serving from small bowls.[1]

This is great news for operators of all-you can–eat programs; smaller batches and displays may not only increase quality and reduce waste but reduce the amount of food being served and consumed.

But do these findings also mean that retailers and operators seeking to sell more food are at risk of reduced sales? Not necessarily.

As noted, small batches and small displays may yield a greater quality, more attractive product. With careful consideration to the design of displays, the perception of scarcity may be overcome and greater perceived value may be imparted to the consumer through imagery. Some ideas include:

- Deinstitutionalize food bars – swap large rectangular hotel pans for decorative pans, pots dishes or bowls that fill space and potentially imply wholesome, fresh, home- or fine-restaurant-style imagery.
- Use baskets or decorative containers with false bottoms for produce and other perishable goods displayed at room temperature to instill the imagery of fresh from the farm food and abundance while requiring less product.

1. Wansink, Brian, Matthew Cheny (2005). *Super Bowl: Serving Bowl Size and Food Consumption.* https://foodpsychology.cornell.edu/sites/default/files/unmanaged_files/SuperBowls-JAMA_2005.pdf accessed 08/03/2018

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Training, Leadership & Culture

Interviews with operators who had the lowest reported waste shared some common traits. Most believed that visibility, training and culture led to reduced waste.

Employees must:

- be aware of the amount and impact of waste they generate;
- understand the value of reducing waste;
- be shown how to reduce waste;
- be given the tools to achieve waste reduction standards; and
- be supported by management and peers.

Set achievable targets and celebrate the successes. Build a sense of pride for waste reduction within the operation's culture.

Recognize that the employees are the front line and that waste cannot be reduced without their efforts. When tracking waste, ensure that employees feel safe to contribute to the tracking process. If employees are chastised or punished when they report waste, over time, employees will be hesitant to report waste and the system will cease to be effective.

Visibility Of Waste

Hiring Practices (Employees Who Care)

Employee Buy-In on Waste Reduction

Awareness of Reduction Methods

Support and Leadership From Management

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Training: Storage – General Conditions
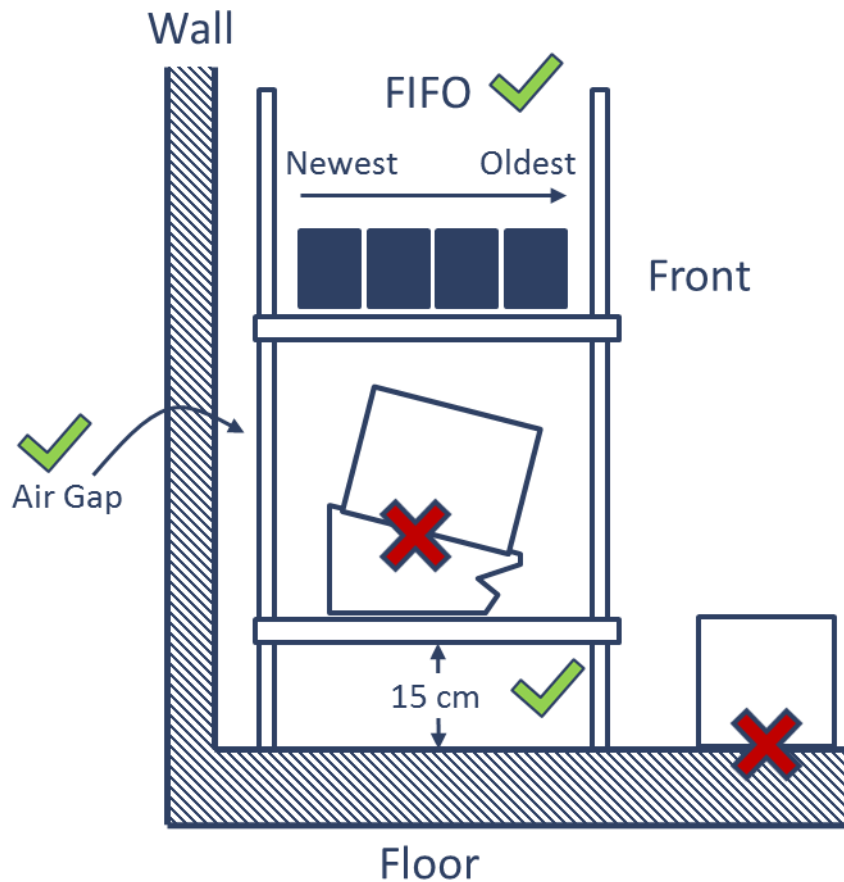
FIFO – First In First Out:

Proper rotation of goods in storage ensures that the oldest product is used first, thereby reducing the risk of spoilage.

Off the Floor:

Never store food on the floor. Store all products at least 15 centimetres (6 inches) above the floor. Storing food on the floor, even temporarily, leaves it susceptible to contamination, infestation or damage.

Don't Over Stack:

Over stacking and over crowding storage areas may lead to damaged products, hidden product that fails to be used before it spoils and may prevent proper airflow.

Air Gaps:

Leaving air gaps between shelving and the wall promotes proper air/temperature circulation and helps prevent pests from access the food.

Everything In Its Place:

Store all goods in the same place (one place) all the time (i.e., apples are stored on the first shelf on the left in the refrigerator, and nowhere else, etc.). This ensures that products may be easily found and reduces the risk of reordering goods that already exist or using more recently purchased product first.

Training: Storage – Vertical Order

Vertical Storage Order

**(TOP)
Reay to Eat Products**

Seafood

**Whole Cuts of Meat
(Pork, Beef, Lamb etc.)**

**Ground Meat and
Ground Fish**

**Raw Poultry
(BOTTOM)**

*Proper Vertical Storage Order Helps Reduce the Risk of Cross-Contamination from Spillage and Dripping*

Ideally, dissimilar foods will be stored separate from each other: meat separate from dairy, separate from produce, etc.; however, this is not always feasible, especially for smaller operations.

In those situations where dissimilar foods are stored together, operators must take care to use the correct vertical storage order.

Vertical storage order products against cross-contamination of goods that have no further processing steps that will reduce that risk. The order is essentially determined by whether another step between the current product format and consumption exists that will kill unwanted pathogens.

If, for example, raw chicken drips on ready-to-eat lettuce, no further cooking step exists to render the lettuce safe to eat and the product must be thrown away. If, however, raw beef dripped on to raw poultry, the poultry is still potentially useable because it is cooked to a greater internal temperature than beef so any potential pathogens are likely to be destroyed.
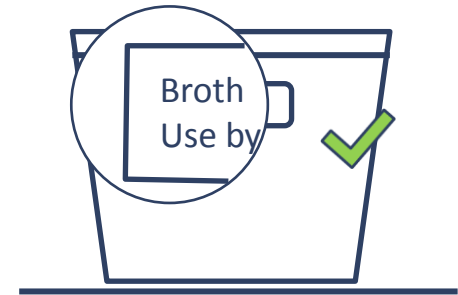
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Training: Storage – Containers
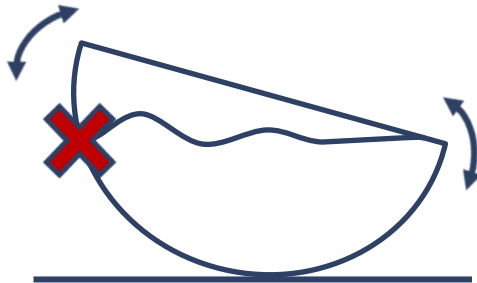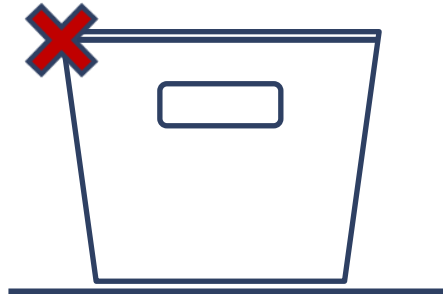

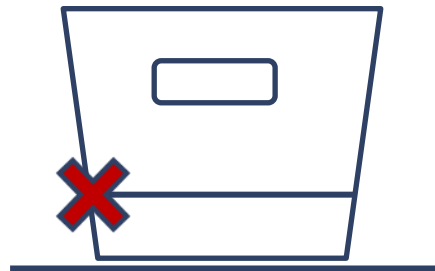**Unstable, Prone to Tipping**

No Label

Broth
Use by
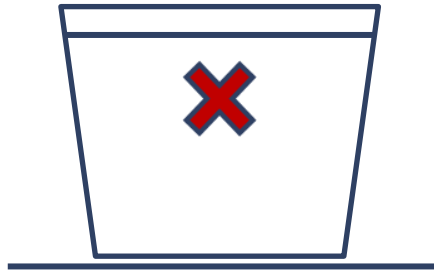
Appropriate Storage

- Stable, durable, leak-proof, suitably-sized container.
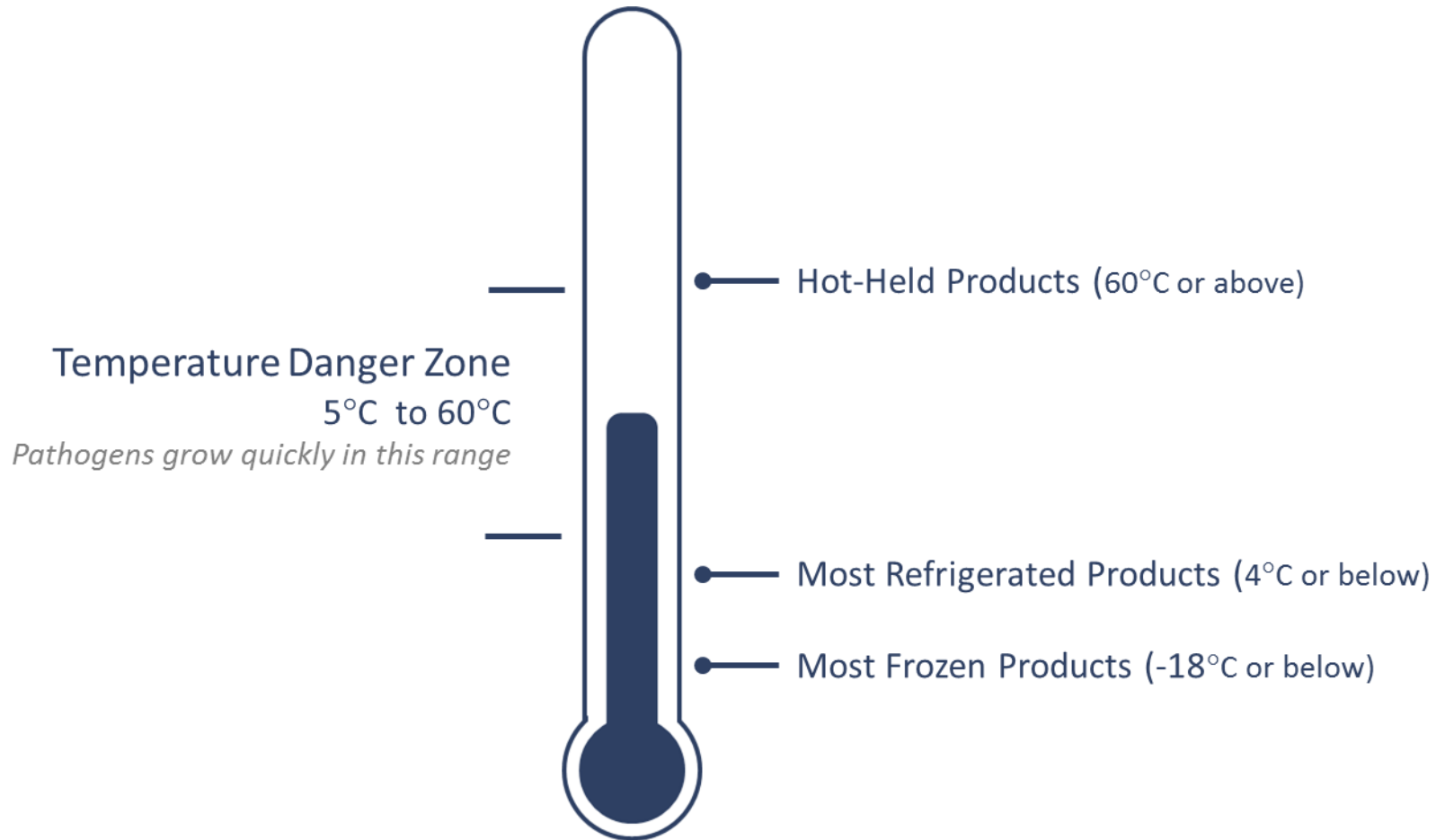- Sealed / wrapped tightly, labelled with description and use-by date.

Too Full, Prone to Spillage

Container Too Large, Prone to Degraded Quality Due to Air Exposure

Training: Storage Temperatures

Hot-Held Products (60°C or above)

Temperature Danger Zone
5°C to 60°C
Pathogens grow quickly in this range

Most Refrigerated Products (4°C or below)

Most Frozen Products (-18°C or below)

These are general temperatures provided as guides. Storage temperatures for certain items may vary. Temperatures shown prevent against premature spoilage due to pathogen growth; however, taking these recommendations to extremes (i.e., holding certain hot food at temperatures significantly greater than 60°C or leafy greens close to 0°C) may degrade product quality and also result in waste. Consult your supplier for optimal storage temperatures for specific items if you are unsure.

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Monitor: Sales Tracking

Every business must track sales in some manner in order to calculate profits. Recording only sales dollars and not other details about the transaction severely limits the usefulness of the historical sales data.

Effective sales data should, at a minimum, include:

- The number and type of items purchased
- The price of the items purchased
- The number of customers served
- The date and time of the transaction

These simple variables allow the operator to forecast traffic patterns, set par levels, prepare production plans, order the correct amount of food, analyse and optimize menu and product offerings.

Sales tracking is rarely conducted manually. Point of Sale System ("P.O.S.") and inventory tracking systems, many with powerful analytic and reporting features are readily available and range in price from open-sourced software to affordable online systems to enterprise class networks worth thousands of dollars.

The appropriate choice will vary by operation, but as long as the minimum data requirements may be tracked, and the data may be exported in a useable report format, any choice is better than not tracking sales effectively.

The Toolkit provides a basic sales record as part of the forecasting model on Sheet:'P2-Basic Forecast'; however, sales tracking best performed using a P.O.S.

Date m/d/yyyy	Month	Day of Week	Weather	Customers	Special Notes
02/11/2018	November	Friday	Cold	100	
03/11/2018	November	Saturday	Cold/Rain	80	
04/11/2018	November	Sunday	Rain	75	
05/11/2018	November	Monday	Rain	70	
06/11/2018	November	Tuesday	Snow	70	
07/11/2018	November	Wednesday	Cold/Sunny	85	
08/11/2018	November	Thursday	Cold/Sunny	100	
09/11/2018	November	Friday	Cold/Sunny	120	
10/11/2018	November	Saturday	Cold/Sunny	120	
11/11/2018	November	Sunday	Cold/Sunny	80	
12/11/2018	November	Monday	Cold/Sunny	80	

Monitor: Logging Waste

Understanding what waste exists and how it occurs is a critical step in reducing waste.

The proper use of a waste log may identify the value of waste and how to reduce the same.

An effective waste log should collect enough information to identify the cause, frequency and volume of waste; yet be simple and concise enough that it is easily used with minimal effort. Complex tracking methods may, in theory, provide more detail to work with, but the system is less likely to be used if it is cumbersome or takes too much time to use.

Some inventory management and P.O.S. systems may have the ability to track waste. In larger, retail or foodservice operation, dedicated tools (software, scan guns, etc.) may make the process of tracking waste relatively simple.

Even without sophisticated tools, tracking waste manually on a paper form or a basic spreadsheet is still valuable.

The Toolkit includes an interactive Waste Log that summarizes waste values by location of waste (department, etc.) and type of waste (i.e., spoilage, spillage, etc.) and is fully customizable. This tool is the most comprehensive for the tools in the Toolkit and includes several components on:

- Sheet:'M2A-Waste Categories'
- Sheet:'M2B-Waste Log Print Out'
- Sheet:'M2C-Waste Log Data'
- Sheet:'M2D-Waste Log Summary'

The Waste Log is intended to track pre-consumer waste.

Monitor: Shrinkage

Shrinkage is the difference between what cost of goods sold **IS** and what cost of goods sold **SHOULD BE**. Therefore, to determine shrinkage one must know:

- Theoretical Cost of Goods Sold
- Actual Cost of Goods Sold

Shrinkage includes waste, spoilage, theft and other issues that prevent products from being sold to or consumed by the customer. Most causes of Shrinkage are controllable.

Shrinkage is an effective metric for tracking operational inefficiency, and, if waste may be isolated from total shrinkage, an effective metric for tracking the impact waste has on profitability.

Shrinkage may also be used to evaluate the effectiveness of the waste tracking system.

⚒ Collectively, the tools in the Toolkit may be used to calculate Shrinkage, isolate waste and identify unaccounted loss (the difference between tracked waste and Shrinkage).

		Dollars	Percentage of Sales
Actual Sales Dollars for Period		$ 31,390	100.0%
Actual Cost of Goods Sold (Inventory Method)		$ 11,968	38.1%
Theoretical Cost of Goods Sold	-	$ 11,018	35.1%
Shrinkage / Potential Savings	=	**$ 950**	**3.0%**
Shrinkage / Potential Savings		$ 950	3.0%
Waste Log Value	-	$ 679	2.2%
Unaccounted Loss	=	**$ 271**	**0.9%**

⚒ *Shrinkage Calculator – This Tool is available on Sheet: 'M5 – Shrinkage Calculator' in the Toolkit.*

Monitor: Spot Checks

Frequent spot checks of displays, storage and production areas are an easy and convenient method for ensuring standards and processes are being followed.

In their simplest form, spot checks involve the manager or dedicated employee checking areas of high potential risk for waste. Formalized spot checks may use forms or logs to track the observations and corrective actions taken during the spot check.

Targets for spot checks may include:
- proper temperatures being held by cold storage equipment;
- the temperature of hot held food;
- proper storage order and compliance with FIFO;
- proper wrapping and labelling of goods;

- customers have not left temperature sensitive goods on a grocery shelves;
- products in cold storage displays are positioned to maintain temperature (i.e., not sacked up an out of the cold zone); and
- any other condition that could lead to spoilage, spillage or contamination of food.

Spot checks should occur frequently (i.e., hourly or several times per shift). This frequency has two key benefits:

- potential issues are identified before they become irreversible; and
- less time exists for issues to occur; spot checks take less time and effort to conduct when everything is in its place.

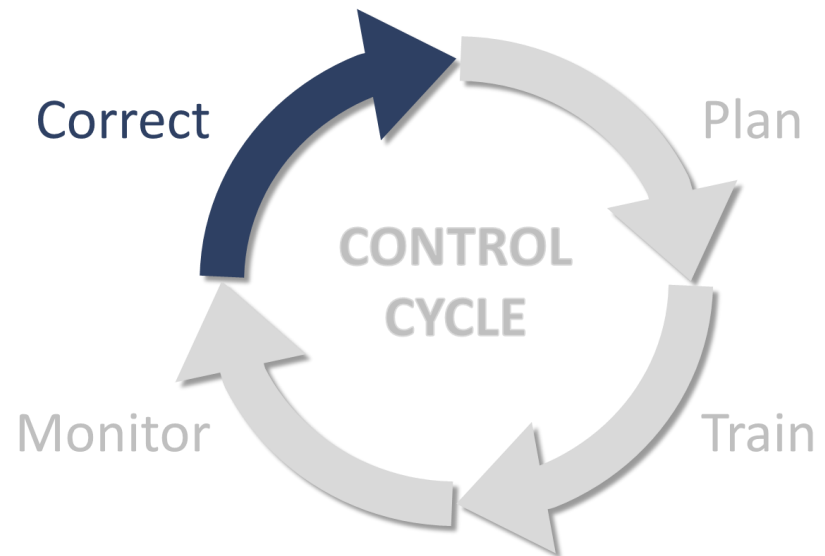| Spot Check Form	Date:	12/01/2018		
Time of Check	1:00			
Checked By (Initial)	AW			
Service Line				
Prep Refrigerator #1				
Temperature Check (Between 1°C and 4°C) (Record Temperature)	4°C			
Containers Wrapped and Labeled Correctly (Yes/No)	N			
Containers Stored in Correct Order (Yes/No)	N			
Comments or Corrective Actions Taken: *Strip steaks were unwrapped and sitting on top of herb garnishes (had cook wrap steaks and move steaks to the bottom shelf)*				

Correct: Fix Shrinkage, Reduce Waste, Save Money

Tracking and monitoring waste is not enough. The information must be used to fix the problem. The tools presented in this document are designed to not only identify waste but identify how it occurred and the impact of that waste on profitability.

The Toolkit will help operators visualize food waste, set targets for reduction and aid in planning.
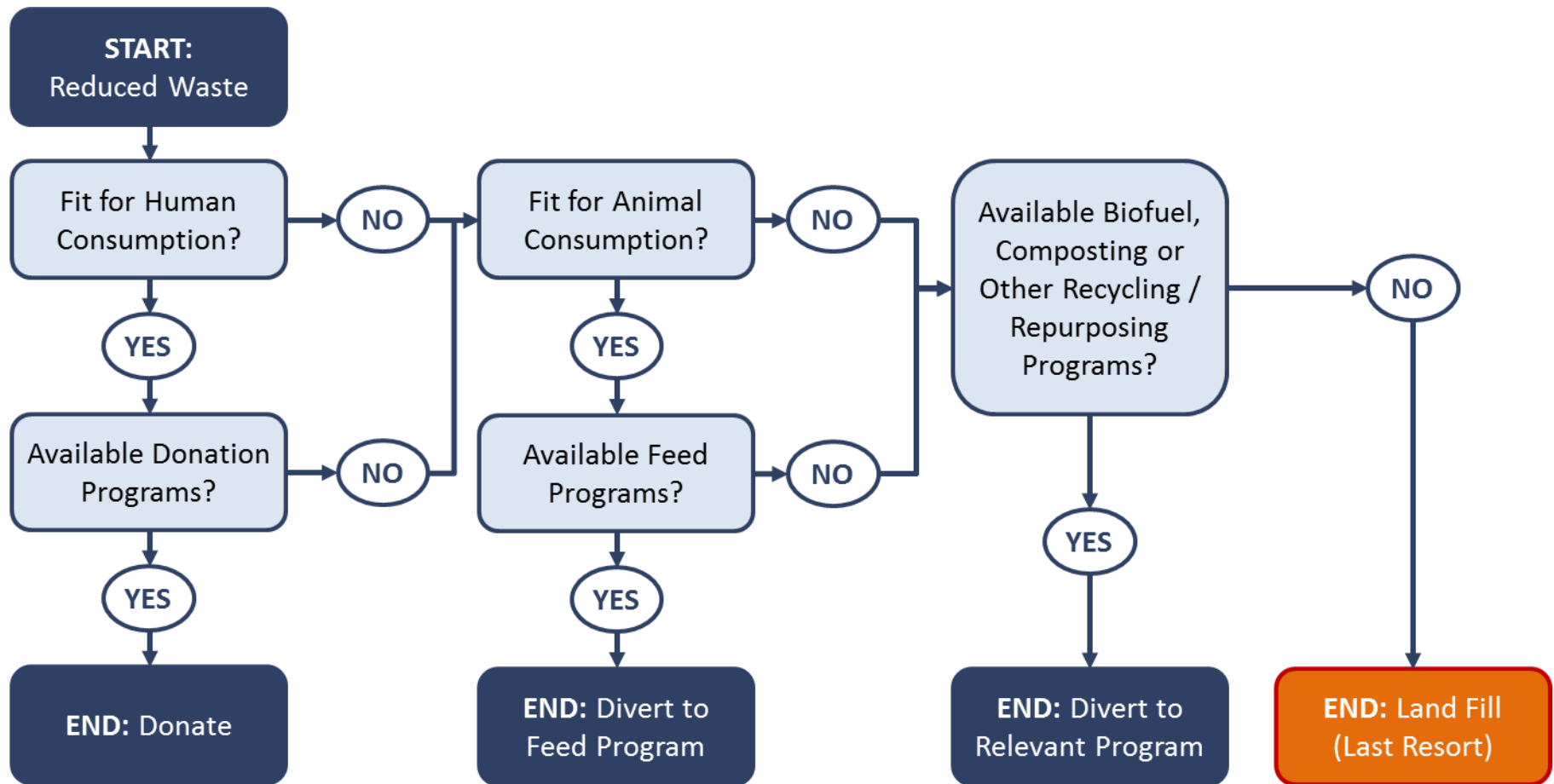
The Waste Log tool is specifically designed to not only quantify tracked waste, but to give the operator the ability to drill down and define the cause of that waste so it may be removed or corrected.

Users of the Toolkit should evaluate the process and tools as well as the outcomes and identify ways to improve their specific waste reduction process. In this way the Toolkit should evolve to become more effective for the operation over time.

Reducing waste is a noble objective if for no other reason than reducing landfill; however, this document and the associated tools aim to illustrate that beyond the ecological benefits, reducing waste is just good business. Reducing waste may provide greater flexibility in pricing to adapt to competitive markets, and may, with relatively little effort, increase gross profit.

Correct

Plan

CONTROL CYCLE

Train

Monitor

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Handling Unavoidable Waste:
Feed People First

Resources, Associations and Programs

Canadian Federation of Independent Grocers
https://cfig.ca/

National Zero Waste Council
http://www.nzwc.ca/

Where's My Shrink? (US)
http://wheresmyshrink.com/

Waste and Resources Action Programme (UK)
http://www.wrap.org.uk/content/waste-prevention-action-retail-and-manufacturing

US Environmental Protection Agency
https://www.epa.gov/sustainable-management-food/tools-preventing-and-diverting-wasted-food

ReFED (US)
http://www.refed.com/downloads/Retail_Guide_Web.pdf

More Resources and Information

BC Centre for Disease Control
Food Donation Guidelines
http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/EH/FPS/Food/Food%20Donation%20Guidelines%20Part%201.pdf

Food and Agriculture Organization of the United Nations
http://www.fao.org/nr/sustainability/food-loss-and-waste/en/

Food Loss Waste Protocol

Standards
http://flwprotocol.org/flw-standard/

Tools
http://flwprotocol.org/flw-standard/tools-resources/

No Waste Network (Netherlands)
http://www.nowastenetwork.nl/en/

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Notes and Disclaimers Regarding Waste Estimates

The waste figures presented in this document are estimates are intended to illustrate potential cost impact of food waste in foodservice and retail operations. The estimates were developed using a mix of qualitative and quantitative methods based on secondary research (i.e., existing reports, studies and estimates) and first-hand interviews with operators in British Columbia and other regions.

Foodservice interviews included a variety of national and regional restaurant chains, independent restaurants, pubs, film caterer, social off-site caterers, business dining facilities, a food cart, hospitals and long-term care.

Retail interviews included independent, national and local supermarkets chains; convenience stores; assorted specialty food stores including bakeries, butchers and delis, produce stores and seafood merchants.

The greatest challenge faced with this type of research is the availability of data. Specifically, respondents either track waste, or they do not.

Respondents who do track waste are typically conscious of waste and work to reduce waste in their operations. As such, estimated food waste from these respondents, while reliable, is likely understated compared to the true industry average which includes operations who do not monitor or actively try to reduce waste.

Respondents who do not track waste do not know how much waste they actually produce. Most foodservice respondents do not track plate waste. Where waste estimates were provided by these respondents, the figures are best-guess estimates on the operator's part.

Estimated food waste share of sales ("Waste Ratio") varied greatly by type of respondent.

The Waste Ratios reported by foodservice respondents ranged from 1.0% to 52.3%. The responses obtained for special foodservice were weighted based on institutional subsector sales from *fs*STRATEGY's Canadian Institutional Foodservice Market Report to eliminate bias caused by unbalanced response rates in this sector.

Estimated food waste share of sales for retail respondents ranged from 0.8% to 8.0%.

To estimate total sector food waste, the estimated waste ratios for each sector were multiplied by provincial sector sales data and operating ratios from Statistics Canada and Restaurants Canada.

Sales data for foodservice was adjusted to isolate food sales from beverage sales using sales ratios from a variety of sources including Kostuch Media's Bottom Line Report, Statistics Canada's Survey of Household Spending and *fs*STRATEGY's experience.

*fs*STRATEGY believes the estimate to be suitable for its intended purpose; however, caution should be taken if using the estimates for purposes requiring statistical precision.

Disclaimer

This Toolkit was prepared for the British Columbia Ministry of Environment and Climate Change Strategy. Opinions expressed in this Handbook are not necessarily those of the British Columbia Ministry of Environment and Climate Change Strategy. The Ministry of Environment and Climate Change Canada, its directors, agents, employees, or contractors will not be liable for any claims, damages, or losses of any kind whatsoever arising out of the use of, or reliance upon, this Toolkit.

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https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/environment-climate-change
1.800.663.7867

All Information provided in this Toolkit was drawn from the author's experiences, expertise and interviews conducted with BC based food service and food retail businesses. This information is intended to be as broad as possible to be applicable to food service and food retailers throughout B.C. Actual quantities of food waste, and tools and strategies to reduce food waste are highly site specific. As such, information presented in this Toolkit should be viewed as ballpark estimates only. fsSTRATEGY Inc. will not be liable for any claims, damages or losses of any kind arising out of the use of, or reliance upon, this Toolkit.

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