Co-funded by
the European Union

ECOCUISINE RECIPE BOOKLET

Eco-cuisine

Cooking for a sustainable future

ViModo Research & Education Hub

Rub & Stub

BALKAN BRIDGE

BLUE

Project code: 2024-2-CY01-KA210-ADU-000288571

TABLE OF CONTENTS

INTRODUCTION

The EcoCuisine project booklet will serve as a guide and will be a valuable resource not only for those adults participating in the project, but also for any other interested even though they haven't attended any of the workshops. The Booklet will offer comprehensive information and guidance on sustainable cooking practices learned during the EcoCuisine workshops. The guide has been developed using materials gathered during the workshops, including photographs, videos, and participant feedback.

The primary purpose of this guide is to equip participants with the knowledge and instructions needed to adopt sustainable cooking methods and raise awareness about food waste. It will be readily accessible through the project's and partners' website, facilitating easy dissemination among project partners, educational institutions, associations, and foundations engaged in promoting sustainable cooking practices.

CH 1. INTRODUCTION TO ZERO WASTE COOKING

Learning Objectives

By the end of this module, learners will be able to:

1. Define food waste and identify its environmental, economic, and social impacts.
2. Recognise the role of households in the global food waste issue.
3. Describe the personal and community benefits of reducing household food waste.

The loss of food is one of today's most critical issues, with severe environmental, economic, and social implications. From farm to plate, nearly a third of the world's produced food is lost or wasted, wasting not only food but also resources used in its production. This booklet is designed to help families make a difference in their households. By combining knowledge, practical tools, innovative cooking methods, and tested preservation techniques, it provides a step-by-step solution to reducing food waste in everyday life. From being aware of the problem to learning how to plan meals, store foods appropriately, reuse leftovers, and experiment with preservation processes, readers will find out that small changes in the kitchen can make a big difference.

SECTION 1: WHAT IS FOOD WASTE AND WHY IS IT PROBLEMATIC?

Food waste refers to food intended for human consumption that is wasted or lost. This includes not only food that consumers don't finish at restaurants or throw out at home but also raw materials and produce lost during farming, harvesting, transportation, and storage. Essentially, food waste can occur anywhere throughout the entire supply chain, from farm to fork.

While food loss and food waste are often discussed interchangeably, these terms encompass distinct issues within the food system.

Food loss happens when edible food is discarded or removed from the supply chain before it reaches stores. This includes losses during harvesting, processing, or transportation, and the food is not repurposed (e.g., for animal feed or planting). (Food and Agriculture Organization [FAO], n.d.)

- Example: A truck carrying tomatoes to a factory overturns, and the damaged produce is thrown away instead of being used for animal feed. (Food and Agriculture Organization [FAO], n.d.)

Food waste occurs when food is thrown out by shops, restaurants, or consumers. It typically involves food that was safe and ready to eat but was discarded due to overproduction, spoilage, or simply being unwanted.

- Example: A person cooks too much pasta at home, stores the leftovers in the fridge, forgets about them, and eventually throws them out when they spoil.

SECTION 2: WHAT CAUSES FOOD LOSS & WASTE?

Food loss and waste are caused by a wide range of issues, from technological challenges to consumer behaviors. (World Resources Institute, n.d.) The most common issues are summarized below:

SECTION 3: FOOD WASTE STATISTICS

Global Estimates 

Approximately one-third of all food produced globally by weight is lost or wasted between farm and fork. This amounts to more than 1 billion tonnes (United Nations Environment Programme [UNEP], 2021) or is equivalent to 19% of the food available to consumers at the retail, food service, and household levels. Additionally, 13% of food is lost in the supply chain, from post-harvest up to retail. (United Nations Environment Programme [UNEP], 2024)

Food waste alone generates up to 10% of global greenhouse gas emissions—almost five times the total emissions compared to the aviation sector. (UNEP, 2024)

Latest estimates from 2022 suggest that around 1.05 billion tonnes of food waste were generated globally, with the breakdown as follows:

- 60% came from households (631 million tonnes)
- 28% from food service (290 million tonnes)
- 12% from retail (131 million tonnes). (UNEP, 2024)

On average, each person wasted 79 kg of food per year. This is equal to 1.3 meals every day for everyone in the world impacted by hunger. (UNEP, 2024) Levels of food waste are similar in high, upper-middle, and lower-middle income countries, with observed average levels of household food waste differing by just 7 kg per capita per year. (UNEP, 2024)

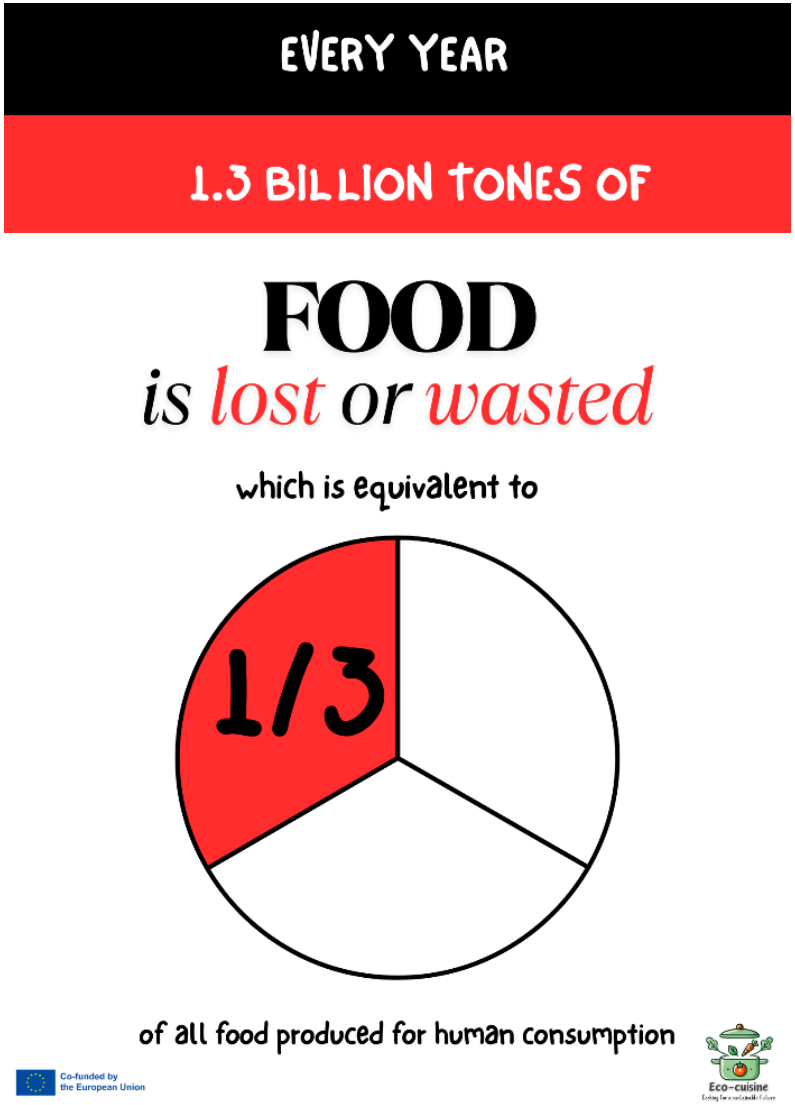
SECTION 3: FOOD WASTE STATISTICS

EU Estimates

In 2021, more than 58 million tonnes of food waste were generated in the EU. This is equal to:

- 131 kg per person
- 132 billion euros
- 252,000,000 tonnes of CO2. (European Commission, 2023)

Around 10% of food made available to EU consumers (at retail, food services, and households) may be wasted. At the same time, more than 42 million people cannot afford a quality meal (including meat, fish, chicken, or vegetarian equivalent) every second day. (European Commission, 2023)



SECTION 4: THE ROLE OF HOUSEHOLDS IN THE FOOD WASTE ISSUE

Households waste the most food across all economic sectors, accounting for more than 31 million tonnes. This is almost twice the amount compared to the sectors of primary production and manufacture of food products and beverages. (Eurostat, 2023)

According to Eurostat (2024), households are the biggest contributors to food waste in the EU, accounting for over half (54%) of the total—equivalent to around 72 kg of food wasted per person. The remaining 46% comes from earlier stages in the food supply chain:

- 19% is generated during the manufacturing of food and drinks (about 25 kg per person).
- 11% from restaurants and food services (15 kg per person).
- 8% from retail and food distribution (11 kg per person).
- 8% from primary production (10 kg per person).

At the household level, over-purchasing and improper storage are primary causes. Consumers often buy more food than they need, influenced by promotions and bulk discounts, which leads to spoilage and disposal of unused food. Furthermore, inadequate knowledge about proper storage techniques exacerbates the problem, causing perishable items to go bad prematurely.

If you want to reduce your household food waste, you will find many strategies, tips, and tasty recipes in the following chapters of this book!

SECTION 5: FOOD WASTE IMPACT

The sheer scale of food loss and waste harms not only human health and nutrition but also economies and the environment. Wasted food takes a major financial toll, costing the global economy more than $1 trillion every year. It also fuels climate change, accounting for approximately 8%–10% of global greenhouse gas emissions.

Therefore, food waste is a major global challenge with wide-reaching environmental, economic, and ethical implications. In the European Union, as mentioned before, the issue is especially critical at the household level, with households generating over half of the total food waste. Among EU Member States, Cyprus, Belgium, and Denmark have the highest levels of food waste per capital, while Slovenia, Croatia, and Sweden report the lowest. (Eurostat, 2023)

Methodology disclaimer: Because data collection methods, reporting standards, and measurement scopes differ across European countries, direct comparisons of food waste statistics can be misleading. These figures are better understood as indicative trends rather than exact, directly comparable numbers. In some cases, countries with more extensive data collection appear to generate more waste, when in fact they may simply have greater insights

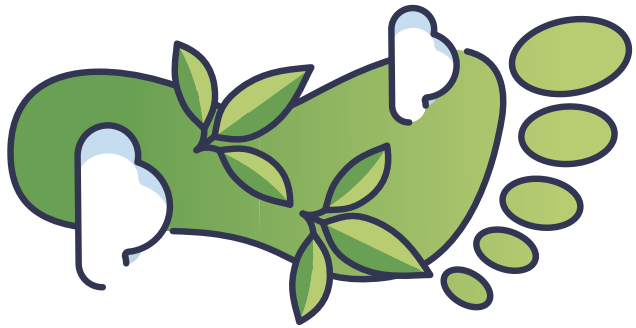
SECTION 6: ENVIRONMENTAL IMPACT

Food waste is a key driver of environmental degradation. Decomposing food in landfills produces methane, a potent greenhouse gas that significantly contributes to climate change. It is estimated that globally, food waste contributes to approximately 10% of global greenhouse gas (GHG) emissions—almost five times more than the emissions from the aviation sector. This makes food waste not only a byproduct of unsustainable practices but also a significant contributor to climate change. (UNEP, 2024)

In the EU food system, food waste is responsible for:

- 16% of total CO_2 emissions, intensifying global warming and climate instability.
- 12% of water use, straining freshwater supplies that are already under pressure in many regions.
- 16% of land use, leading to habitat destruction, soil degradation, and loss of biodiversity.
- 15% of marine eutrophication, which occurs when excess nutrients from wasted food disrupt aquatic ecosystems, causing harmful algal blooms and dead zones in water bodies.

These statistics highlight that wasting food is not simply about throwing away leftovers—it represents the misuse of critical natural resources used throughout the entire food production and supply chain.



SECTION 7:MOST WASTED PRODUCTS

The most wasted product groups (in terms of mass) in the EU were fruit (27%), vegetables (20%), and cereals (13%). (Sanyé-Mengual & Sala, 2023)

Different foods have different environmental impacts. For example, the volume of meat and dairy that is wasted and lost is not very high compared to foods such as cereals and vegetables. However, meat and dairy require much more resources to produce, so wasting them still has a significant impact on climate change. It is estimated that meat and dairy contribute to less than 20% of food waste generated in mass, but for more than 50% of the environmental impacts of food waste in the EU. (Sanyé-Mengual & Sala, 2023)

Economic and Ethical Costs

Beyond environmental harm, food waste also carries significant economic costs. Wasted food means wasted money—for consumers, producers, and retailers alike. It also means lost labor, energy, transportation, packaging materials, and the resources used to grow and process that food, including water and land. In this sense, food waste undermines economic efficiency at every stage of the food system.

Ethically, the issue is deeply troubling: millions of tonnes of edible food are discarded every year while millions of people across the globe still suffer from hunger and food insecurity. Reducing food waste is therefore not only a sustainability goal but also a matter of social justice.

SECTION 8: BENEFITS OF REDUCING FOOD WASTE

The UN's Sustainable Development Goals (United Nations, n.d.) include a call to halve food waste and reduce food losses by 2030 for good reason. Minimizing food waste is one of the most effective and immediate actions we can take to address multiple global challenges—from environmental degradation to food insecurity. In the EU, food waste is responsible for approximately 16% of the environmental impact of the entire food system. Tackling this issue is not only a moral imperative but also a key strategy for climate change mitigation. (Sanyé-Mengual & Sala, 2023)

By cutting down on food loss and waste, we contribute directly to the achievement of the Sustainable Development Goals (SDGs), especially SDG 2 (Zero Hunger) and SDG 13 (Climate Action).

1. Combat Climate Change

Food waste contributes significantly to greenhouse gas emissions, accounting for around 16% of total emissions from the EU's food system. Reducing waste helps lower methane emissions from landfills, decreases energy use in food production, and lessens deforestation and water pollution—all of which are essential in fighting climate change.

2. Strengthen Food Security and Fight Hunger

Preventing surplus food from going to waste allows for the recovery and redistribution of nutritious food to people in need. This not only helps reduce hunger and malnutrition but also supports social equity and community resilience—particularly during crises such as inflation, conflict, or natural disasters.

3. Save Money Across the Entire Food Chain

Reducing waste brings economic savings for all stakeholders:

- Farmers benefit from improved planning and reduced crop loss.
- Food businesses reduce disposal costs and increase operational efficiency.
- Households save money by buying and wasting less—on average, EU households waste food worth hundreds of euros annually.

Reducing food waste is not just about what's left on the plate—it's about rethinking how we value food, ensuring it serves its purpose of nourishing people without harming the planet. It is a win-win solution for our environment, economy, and society. (European Commission, n.d.)

CHAPTER 2: TOOLS, TIPS, AND TRICKS TO REDUCE HOUSEHOLD FOOD WASTE

INTRODUCTION: TAKING ACTION AGAINST HOUSEHOLD FOOD WASTE – A PRACTICAL TOOLKIT

Now knowing that food waste is a serious, global problem, this chapter moves beyond the "why" and focuses on the "how." Titled "Tools, Tips, and Tricks to Reduce Household Food Waste," this chapter provides practical, actionable strategies you can use in your daily life to cut down on the food you throw away in your household. After engaging with this chapter, you will be able to identify exactly what food you're wasting and why, thanks to a simple tracking method. You'll then learn to create effective meal plans that reduce waste, save you money, and make cooking easier. You will also discover how to properly store food to keep it fresh for longer, and finally, you'll master the art of preparing just the right amount of food to avoid unwanted leftovers.

This chapter presents a comprehensive toolkit designed to help you tackle every part of the food waste problem at home. It begins with Food Waste Identification to help you pinpoint what and why food is being discarded. Next, you'll use the Weekly Planner to master proactive meal planning, ensuring every ingredient has a purpose. The Storage Cheat Sheet will then show you how to optimize freshness and extend the life of your food. Finally, you'll learn about Food Portioning, which offers guidelines to cook and serve just the right amount, minimizing uneaten leftovers.

By using these four essential tools, you can transform your kitchen habits, become more aware of your consumption, and make a real difference in the fight against food waste. This is your practical path toward a more sustainable and efficient home.

TOOL 1: FOOD WASTE IDENTIFICATION – UNDERSTANDING HOUSEHOLD HABITS

To effectively reduce food waste, the initial critical step is to understand what is being wasted and, more importantly, why. Without this insight, efforts to minimize waste can be misdirected or ineffective. This Food Waste Identification tool is designed to pinpoint the specific types of food waste occurring and identify the underlying reasons. By systematically tracking waste, valuable data is gained, empowering informed changes.
How to Use This Tool:
This tool comprises two key sections:

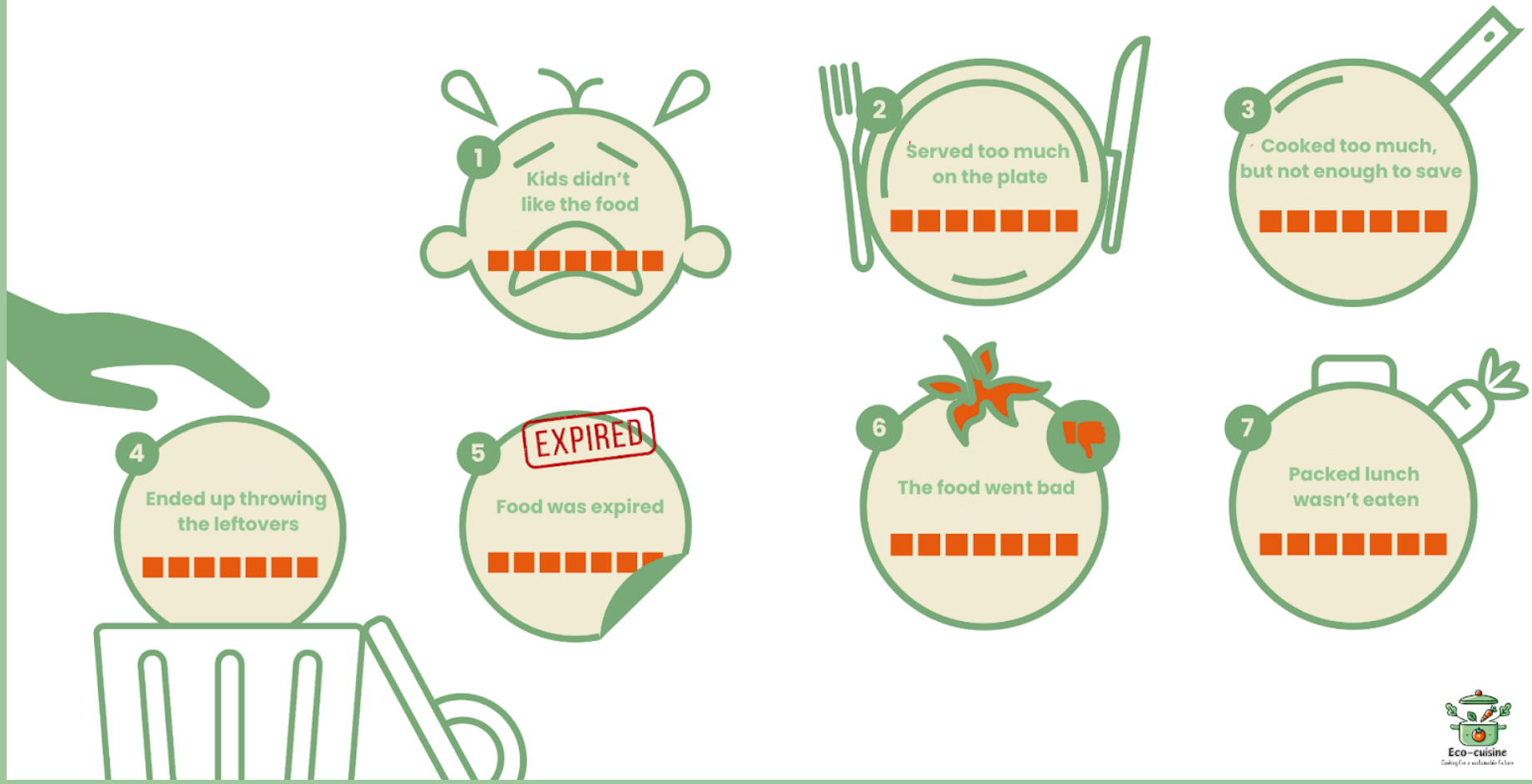
- **Why Did the Food Go to Waste?** This section features common reasons for food waste, such as "Kids didn't like the food," "Served too much on the plate," "Cooked too much, but not enough to save," "Food was expired," "The food went bad," and "Packed lunch wasn't eaten." For one week, a dedicated sheet should be used to tally the occurrences for each reason. By marking each instance, patterns will emerge, revealing the primary culprits behind household food waste.
- **What Was Wasted?** This section provides a table to track specific food types over the course of the week. Categories include "Fruit & Veg," "Bread," "Pasta, rice, grains," "Meat, fish, eggs," "Dairy," and "Cooked meals." By noting what was wasted each day, a clear picture will develop regarding which food categories are most problematic.

By consistently utilizing this Food Waste Identification tool for a week, invaluable insights into a household's unique food consumption and waste patterns will be gained. This data will then serve as the foundation for implementing targeted strategies from the other tools in this module, leading to more effective and sustainable reductions in food waste.

FOOD WASTE IDENTIFICATION

WHY DID THE FOOD GO TO WASTE?

1 sheet per week



Eco-cuisine

WHAT WAS WASTED?

Keep track of what is wasted

Eco-cuisine
Cooking for a sustainable future

Food type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Fruit & Veg							
Bread							
Pasta, rice, grains							
Meat, fish, eggs							
Dairy							
Cooked meals							

TOOL 2: WEEKLY PLANNER – THE POWER OF PROACTIVE MEAL PLANNING

Once the sources of food waste are identified, the next crucial step in minimizing it is proactive meal planning. Meal planning extends beyond simply deciding what to eat; it is a strategic approach that directly addresses many common causes of food waste, such as impulse purchases, forgotten ingredients, and excessive leftovers. By planning meals, you gain assurance that every item purchased has a purpose, reducing the likelihood of food spoilage before consumption. This Weekly Planner serves as a framework for developing effective meal planning habits.

How to Approach Meal Planning with This Tool:

To maximize the benefits of this Weekly Planner, consider these key steps and reminders:

- "Shop" the Fridge & Pantry First: Before compiling a shopping list or deciding on new meals, always begin by reviewing existing inventory. This practice helps utilize current ingredients and prevents duplicates or forgotten items from expiring.
- Consider the Week's Schedule: Tailor meal choices to your weekly commitments. Plan quick and easy meals for busy evenings, and reserve more elaborate recipes for days with more available time, such as weekends. This thoughtful approach prevents food from being wasted due to insufficient preparation time.
- Prioritize Perishables: When planning, give priority to ingredients with a shorter shelf life. Build meals around these items to ensure their consumption while fresh.
- Cook for the Future: When preparing a freezer-friendly meal, consider scaling up the recipe. Cooking larger batches and freezing portions for future meals is an excellent method to save time and prevent food waste.
- Include a "Throw It All In" Day: Designate a day, often towards the end of the week, for a "throw it all in" cooking session. This could manifest as a stir-fry, frittata, soup, or casserole – anything that allows for the utilization of various leftovers and small quantities of ingredients from the refrigerator before they spoil.

WEEKLY *planner*

MONDAY	TUESDAY	WEDNESDAY	THURSDAY

FRIDAY	SATURDAY	SUNDAY	REMINDER
			"Shop" Your Fridge & Pantry First, then make a shopping list Prioritize Perishables If you cook freezer friendly food, scale up and cook for the future as well Include a day of 'throw it all in cooking.' It will help you clean out the fridge from any leftovers

TOOL 3: THE STORAGE CHEAT SHEET – MASTERING FOOD FRESHNESS

With a clearer understanding of food waste patterns and a strategic meal plan in place, the next vital tool assists in preserving ingredients. This Storage Cheat Sheet is an essential guide to extending the life of fresh ingredients, ensuring they remain delicious and nutritious for as long as possible. Frequently, food spoilage occurs not because an item is inherently old, but because it has not been stored in its ideal environment. This tool provides 10 clear rules for longer shelf life, demystifying common storage dilemmas and offering practical solutions.

By following these guidelines, you can learn optimal conditions for various produce items, manage factors like ethylene gas and moisture, and gain clarity on when to refrigerate or keep items at room temperature. To further enhance proper food storage, this cheat sheet includes a QR code that directs to an external online tool. This valuable resource allows you to look up virtually any ingredient and receive specific instructions on how to store it properly for maximum freshness. Ultimately, this cheat sheet, coupled with the online tool, empowers a significant reduction in unnecessary waste by keeping food fresher, for longer, and maximizing the value of every purchase.

TOOL 4: FOOD PORTIONING – A GUIDE TO COOKING THE RIGHT AMOUNT

After you've identified what you're wasting, planned your meals, and learned to store food properly, the final key to preventing food waste is mastering portion sizing. One of the most common reasons food is thrown away at home is simply cooking or serving too much. This Food Portioning guide offers practical advice for making just the right amount of food for your household, which will help you minimize uneaten leftovers. By learning to accurately estimate portions, you can be confident that the food you prepare will be eaten, not discarded.

How to Use This Tool:

This tool offers a clear guide to appropriate portion sizes per person for various food categories.

- Detailed Portion Guidelines: Specific quantities for different food types are provided, including appetizers, meats, fish and shellfish, sides, starches, and desserts.
- Online Tool for Precision: For even greater precision and flexibility, the tool includes a QR code linking to an online food portion calculator. This digital resource can assist in adjusting quantities based on the number of servings and specific recipe needs.
- A Guide, Not a Rule: It is important to remember that these are average guidelines. As the guide states, "One knows their guests best, so estimate more food if guests are more hungry than usual - or the opposite." A general "rule of thumb" is that a meal should consist of 600-800 g of food per person.

By using this Food Portioning guide and its online tool, you can significantly cut down on the edible food that gets thrown away because of over-serving or over-cooking.

STORAGE CHEAT SHEET

10 RULES FOR LONGER SHELF LIFE

1. KNOW YOUR ZONES

- Fridge Crispers: Most produce (use humidity controls).
- Counter: Ripening fruit (bananas, avocados), tomatoes.
- Cool, Dark, Dry: Potatoes, onions, garlic, winter squash.

2. MANAGE ETHYLENE GAS

- Keep high-ethylene fruits (apples, bananas, avocados, peaches, tomatoes) separate from sensitive produce (greens, broccoli, carrots, potatoes).
- This prevents the gas from producers causing faster spoilage in sensitive items.

3. MANAGE MOISTURE

- Remove tops from root veggies
- Use damp towels for carrots/ celery (in fridge bag).
- Use dry towels for leafy greens (in fridge bag).
- Wash berries, grapes, mushrooms just before use (prevents mold).

4. HANDLE GENTLY

- Mushrooms: Use paper bags (allows breathing).
- Asparagus: Store upright in water (fridge).
- Soft Fruit (berries, peaches): Avoid deep piles (prevents bruising).

5. FREEZE SMART

- Best for long-term storage.
- Blanch most veggies first (quick boil -> ice bath).
- Freeze berries flat on a tray before bagging.
- Freeze liquids in ice cube trays

6. RIPEN FIRST, CHILL LATER

- Ripen on counter: Avocados, stone fruit, melons, pears, tomatoes.
- Refrigerate after ripe (except tomatoes) to slow aging.

7. KEEP OUT OF FRIDGE

- Potatoes (affects taste/ texture).
- Onions, Garlic (sprout/soften).
- Whole Winter Squash.
- Whole Tomatoes (damages texture/flavor).

8. HERB CARE

- Soft Herbs (parsley, cilantro): Stems in water, covered (fridge).
- Hardy Herbs (rosemary, thyme): Wrap in damp paper towel, bagged (fridge).

9. CHECK & TOSS SPOILAGE

- Inspect stored produce regularly.
- Remove moldy/rotting items immediately to prevent spread.

10. WASH JUST BEFORE USE

- Washing early removes protection & adds moisture.
- Rinse right before preparing or eating.

Eco-cuisine

Cooking for a sustainable future

ONLINE TOOL

FOOD PORTIONING

A GUIDE TO COOKING THE RIGHT AMOUNT OF FOOD

All items are listed per person

APPETIZERS

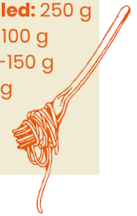
Starter: 150-250 g
Soup: 2,5-3 dl

SIDES

Vegetables: 150 g
Salad: 125 g
Sauce: 1 dl

STARCH

Potatoes, unpeeled: 250 g
Pasta, dried: 75-100 g
Pasta, fresh: 125-150 g
Noodles: 75-100 g
Rice: 70 g (1 dl)
Couscous: 75 g



FISH AND SHELLFISH

Fish Fillets: 170-200 g
Fish Steaks: 150-200 g
Shrimp: 200 g
Clams, Oysters, and Mussels (in shell): 450 g or 12-18 pieces

MEATS

Meat, bone-in: 250 g
Meat, boneless, for roasting: 150 g
Meat, boneless, for stews: 100 g
Minced meat: 100 g
Sausages: 150 g
Spareribs: 750 g

DESSERTS

Dessert: 150-250 g
Cheese: 50 g

FOOD PORTION CALCULATOR

Online tool

A GUIDE FOR THE GUIDE

This is an **average!**

You know your guests best, so **estimate** more food if your guests are more hungry than usual - or the opposite.

Rule of thumb: a meal should consist of **600-800 g** of food per person.

Eco-cuisine

Cooking for a sustainable future

CONCLUSION: CULTIVATING A SUSTAINABLE FUTURE, ONE HOUSEHOLD AT A TIME

You've now completed a journey through the practical side of reducing food waste. By using the Food Waste Identification tool, you've gained crucial insights into your household's unique patterns of waste. With the Weekly Planner, you've harnessed the power of foresight in meal preparation. The Storage Cheat Sheet gave you the knowledge to keep ingredients fresh for longer, and the Food Portioning guide showed you how to serve just the right amount, so nothing goes to waste.

Each of these tools, when consistently applied, represents a powerful step towards minimizing your environmental footprint and maximizing the value of your food. The journey to reduce food waste is ongoing, and every conscious decision, regardless of its perceived scale, contributes to a larger collective impact.

CHAPTER 3: COOK TO AVOID FOOD WASTE: RECIPES AND METHODS

INTRODUCTION: CULINARY SOLUTIONS FOR A SUSTAINABLE KITCHEN

This chapter will teach you how to use creative and delicious cooking as a powerful tool against food waste. After reading this section, you'll be able to transform common food waste culprits like stale bread and tired vegetables into exciting new meals. You will also learn to repurpose leftovers into new dishes, turning what's often an afterthought into a strategic part of your meal planning.

PRESERVING BREAD: FROM STALE TO STELLAR

Bread is a staple in many households, yet it's also among the most frequently wasted food items. A forgotten loaf or leftover rolls can quickly become stale, often leading to their disposal. However, stale bread is far from unusable; its drier texture can, in fact, be an asset in various culinary applications. This section introduces creative and delectable recipes that revitalize forgotten bread, transforming it into exciting components for meals and snacks. The aim is to demonstrate how bread can be saved from waste and elevate culinary creations simultaneously.

RECIPE 1: RUSTIC PANZANELLA SALAD WITH ROASTED VEGETABLES

Panzanella, a classic Italian bread salad, is specifically designed to utilize stale or day-old bread, which readily absorbs vinaigrette without becoming soggy. It offers considerable versatility, allowing for the incorporation of various fresh or leftover vegetables.

Yields: 4 servings Prep time: 15 minutes Cook time: 10-20 minutes

Ingredients:

- 300 grams day-old crusty bread, torn or cut into 2-3 cm cubes
- 3 tablespoons olive oil, plus extra for drizzling
- 1 large tomato (or 200 grams cherry tomatoes), chopped
- 0.5 cucumber, deseeded and chopped
- 0.5 red onion, thinly sliced
- 1.25 deciliters fresh basil leaves, torn
- Optional Additions: 1 bell pepper (any color), chopped; 1.25 deciliters pitted Kalamata olives; 0.6 deciliters capers (for enhanced flavor)
- Optional Roasted Vegetables: 2.5 deciliters pre-roasted vegetables (e.g., zucchini, eggplant, or bell peppers, roasted with a drizzle of olive oil, salt, and pepper until tender)

For the Vinaigrette:

- 3 tablespoons olive oil
- 1 tablespoon red wine vinegar
- 1 clove garlic, minced (optional)
- 0.5 teaspoon Dijon mustard (optional, for emulsification)
- Salt and freshly ground black pepper to taste

Instructions:

1. Prepare the Bread Croutons: Preheat the oven to 180°C. Toss the bread cubes with 1-2 tablespoons of olive oil, spreading them evenly on a baking sheet. Bake for 10-15 minutes, or until golden and slightly crispy. Alternatively, toast them in a large pan on the stovetop until crisp. Allow to cool completely.
2. Combine Fresh Vegetables: In a large mixing bowl, combine the chopped tomatoes, cucumber, red onion, and fresh basil. If applicable, add the optional bell pepper, olives, and capers.
3. Prepare the Vinaigrette: In a small bowl, whisk together the olive oil, red wine vinegar, minced garlic (if included), Dijon mustard (if included), salt, and pepper until well combined and emulsified.
4. Assemble the Salad: Add the cooled bread croutons and any optional roasted vegetables to the bowl with the fresh vegetables. Pour the prepared vinaigrette over the salad. Toss gently to combine all ingredients, ensuring the bread begins to absorb the dressing.
5. Rest and Serve: For optimal results, allow the salad to rest at room temperature for at least 15-30 minutes before serving. This permits the flavors to meld effectively and the bread to soften slightly while retaining some textural contrast.

RECIPE 2: GREEN DIP WITH LEFTOVER BREAD

This vibrant and flavorful dip offers an excellent method for transforming day-old bread and available fresh greens into a delicious spread or accompaniment.

Yields: 4 servings Prep time: 10 minutes

Ingredients:

- 1 large handful wild garlic (or substitute with baby spinach, kale, or a mix of tender greens)
- 1-2 slices day-old bread (sourdough is recommended for flavor and texture)
- 1 deciliter dairy product (e.g., plain yogurt, skyr, or sour cream)
- 2 tablespoons olive oil (select an oil with a preferred flavor profile)
- 1 clove garlic
- Juice from 0.5 lemon
- Salt and freshly ground black pepper to taste
- Optional: A small amount of grated Parmesan cheese

Instructions:

Soften Bread (if necessary): If the day-old bread is particularly dry and hard, briefly soften it by soaking in a small amount of water for 5-10 minutes. Gently squeeze out any excess water before proceeding.

Prepare Greens: Thoroughly wash the wild garlic or other greens (spinach, ground elder, etc.) and pat them dry.

Combine & Process: Place the wild garlic/spinach, the garlic clove, and the softened (or dry, if not excessively hard) bread into a food processor or mini chopper.

Add Liquids & Blend: Add the yogurt (or other dairy product), olive oil, and lemon juice to the food processor. Blend until the mixture achieves a smooth and creamy consistency.

Season to Taste: Taste the dip and season with salt and pepper as required. Stir in the optional grated Parmesan cheese if desired.

Serve: Serve the green dip immediately with vegetable sticks, potato chips, crispbread, or as a lively accompaniment to a main dish.

RECIPE 3: CLASSIC BREAD AND BUTTER PUDDING

A cherished dessert, this recipe utilizes day-old bread to create a comforting and rich pudding, transforming simple ingredients into a delightful treat.
Yields: 4-6 servings Prep time: 15-30 minutes (includes soaking time) Cook time: 35-45 minutes
Ingredients:

- 300–400 grams day-old bread (e.g., white bread, brioche, challah, or croissants)
- 4 large eggs
- 5 deciliters milk (or use half milk/half cream for a richer texture)
- 100 grams sugar
- 1 teaspoon vanilla sugar or 1 teaspoon vanilla extract
- A pinch of salt
- 50 grams butter, melted
- Optional Additions: 1.25 deciliters raisins, chopped chocolate or nuts, a pinch of cinnamon, thinly sliced apples, or citrus zest.

Instructions:

- Prepare the Baking Dish: Preheat the oven to 180°C. Lightly grease a baking dish (approximately 20x30 cm or similar size).
- Arrange the Bread: Cut the day-old bread into 2x2 cm cubes. Place the bread cubes evenly into the prepared baking dish. If incorporating optional solid additions such as raisins, chocolate, or apples, sprinkle them among the bread cubes.
- Make the Custard: In a mixing bowl, whisk together the eggs, milk, sugar, vanilla (sugar or extract), and salt until well combined. Stir in the melted butter.
- Soak the Bread: Carefully pour the egg mixture over the bread cubes in the baking dish. Gently press down on the bread with the back of a spoon or spatula to ensure all bread pieces are submerged and absorb the liquid. If time permits, allow the bread to soak for 15–30 minutes at room temperature to absorb more custard, which will result in a creamier pudding.
- Bake: Place the baking dish in the preheated oven. Bake for approximately 35–45 minutes, or until the surface is golden brown and the center is set (a knife inserted into the center should emerge clean, or mostly clean, without liquid custard).
- Serve: Serve the Bread and Butter Pudding warm. It is enjoyable on its own, or with accompaniments such as whipped cream, vanilla ice cream, fruit compote, or jam.

CHAPTER 3: COOK TO AVOID FOOD WASTE: RECIPES AND METHODS

REVITALIZING TIRED PRODUCE: SAVE THE VEGETABLES!

A common occurrence involves once-crisp carrots softening, leafy greens appearing limp, or a collection of vegetable remnants that did not find their way into planned meals. While seemingly "tired," these vegetables frequently retain significant flavor and nutritional value. Discarding them contributes substantially to household food waste. This section provides inspiring concepts and practical recipes designed to rescue slightly past-their-prime vegetables, transforming them into vibrant, delicious dishes. The objective is to illustrate how perceived waste can be converted into wholesome and appealing meals.

RECIPE 1: WILTED VEGETABLE CHIPS

Transform tired vegetables into crispy, flavorful chips. This recipe is adaptable to a variety of root vegetables and leafy greens that may be on hand.

Yields: Varies (dependent on vegetable quantity) Prep time: 15 minutes Cook time: 30-50 minutes

Ingredients:

- 2-3 pieces of chosen wilted vegetable (e.g., beetroot, carrot, parsnip, Jerusalem artichoke, parsley root, turnip, kale, lacinato kale – any available in the vegetable drawer)
- 1-2 tablespoons olive oil
- Flake salt or sea salt
- Optional: A small amount of fresh rosemary, thyme, or smoked paprika for additional flavor

Instructions:

1. Preheat Oven: Preheat the oven to 150-160°C (fan/convection setting).
2. Prepare Vegetables: Wash the vegetables thoroughly. Slice them very thinly – a mandoline slicer is recommended for uniform thickness, which ensures even crisping.
3. Enhance Crispiness: Place the sliced vegetables in a bowl of cold water for 10 minutes. Afterward, drain them and dry thoroughly with a clean kitchen towel or paper towels. This step is critical for achieving extra crispy chips.
4. Season and Arrange: Toss the dried vegetable slices with a small amount of olive oil. Spread them in a single layer on a baking sheet lined with parchment paper. Avoid overcrowding the tray.
5. Bake: Bake for 30-50 minutes, depending on the vegetable type and its thickness. Monitor closely, as baking times can vary; thinner slices may finish sooner. Turning them halfway through cooking may be necessary to ensure even crisping.
6. Season and Cool: Immediately upon removal from the oven, sprinkle the hot chips with salt and any optional spices.

Final Crisp: Transfer the chips to a wire rack to cool completely. This facilitates additional crisping as they cool.

RECIPE 2: "THROW-IT-ALL-IN" VEGETABLE MEDLEY OR SOUP

This adaptable stew is ideal for utilizing various vegetables and starchy items available, creating a comforting and wholesome meal.
Yields: 4 servings Prep time: 15 minutes Cook time: 30-40 minutes
Ingredients:

- 1 can chickpeas (approx. 240 grams drained weight)
- 500 grams potatoes, scrubbed and halved – or other starchy vegetable such as sweet potato, parsnip, or celeriac
- 5-8 green asparagus (or other green vegetable like broccoli florets, green beans, or peas), cut into smaller pieces
- 1 leek (or 1 onion, 3-4 spring onions), thoroughly washed and thinly sliced
- 2 carrots (or courgettes/zucchini or similar from the refrigerator), washed and sliced
- 2 cloves garlic, finely chopped
- 1 teaspoon Dijon mustard
- 3.5 deciliters vegetable broth
- 1 deciliter cream (heavy cream or single cream)
- Fresh thyme or parsley, for serving
- Olive oil for sautéing
- Salt and freshly ground black pepper to taste
- Optional: A splash of apple cider vinegar for freshness

Instructions:

1. Prepare Ingredients: Drain and rinse chickpeas. Cut potatoes (or other starchy vegetables) into halves or 2-3 cm pieces. Cut green vegetables into smaller pieces. Thinly slice the leek (or chop onion/spring onions). Wash and slice carrots (or other vegetables). Finely chop garlic.
2. Sauté Aromatics: In a large pot or Dutch oven, heat a drizzle of olive oil over medium heat. Add the leek/onion and carrots. Sauté for 5-7 minutes until softened. Add the chopped garlic and sauté for another 1-2 minutes until fragrant.
3. Add Starchy Vegetables and Liquid: Add the potatoes (or other starchy vegetables) to the pot along with the Dijon mustard and vegetable broth. Bring to a simmer, then reduce heat, cover, and cook for 15-20 minutes, or until the starchy vegetables are nearly tender.
4. Incorporate Remaining Vegetables: Add the chickpeas and green vegetables (asparagus, broccoli, etc.) to the pot. Continue to simmer for 5-10 minutes, or until all vegetables are tender-crisp.
5. Finish the Stew: Stir in the cream and heat through for 2-3 minutes, without boiling. Taste and adjust seasoning with salt and freshly ground black pepper as needed. If desired, add a splash of apple cider vinegar for a brighter flavor.
6. Serve: Ladle the "Throw-It-All-In" Vegetable Medley or Soup into bowls. Garnish with fresh thyme or parsley before serving.

RECIPE 3: HEARTY VEGETABLE QUICHE

This savory quiche presents an excellent means of transforming various wilted vegetables into a delicious and substantial meal. Roasting the vegetables concentrates their flavors and softens their texture, making them an ideal filling alongside tangy feta cheese.

Yields: 6-8 servings Prep time: 20 minutes Cook time: 40-50 minutes

Ingredients:

- 1 pre-made pie crust (shortcrust or puff pastry), chilled
- 300-400 grams mixed wilted vegetables (e.g., bell peppers, zucchini, eggplant, onions, broccoli florets, asparagus, spinach, kale), cut into bite-sized pieces
- 1 tablespoon olive oil
- 2 cloves garlic, minced
- 0.5 teaspoon dried herbs (e.g., oregano, thyme, Herbes de Provence)
- Salt and freshly ground black pepper to taste
- 150 grams crumbled feta cheese
- 4 large eggs
- 2.5 deciliters milk or cream (or a combination)
- Optional: 50 grams grated hard cheese (e.g., Parmesan, Gruyère) for enhanced flavor

Instructions:

1. Prepare Pie Crust: Preheat the oven to 200°C. Carefully press the pre-made pie crust into a 22-24 cm pie dish. Prick the bottom lightly with a fork. For a crispier crust, blind baking for 10-15 minutes before filling is an option; if undertaken, reduce the oven temperature to 180°C after blind baking.
2. Roast Vegetables: In a large bowl, toss the cut wilted vegetables with olive oil, minced garlic, dried herbs, salt, and pepper. Spread them in a single layer on a baking sheet. Roast for 15-20 minutes in the preheated oven, or until tender and slightly caramelized. If using delicate greens such as spinach or kale, add them during the final 5 minutes of roasting, or wilt them briefly in a pan on the stovetop before adding to the quiche.
3. Prepare Custard: While the vegetables are roasting, whisk together the eggs, milk or cream, a pinch of salt, and pepper in a medium bowl until well combined. If using the optional grated hard cheese, whisk it into the custard mixture at this point.
4. Assemble Quiche: Evenly scatter the roasted vegetables over the bottom of the prepared pie crust. Sprinkle the crumbled feta cheese over the vegetables.
5. Pour and Bake: Carefully pour the egg custard mixture over the vegetables and feta in the pie crust.
6. Bake the Quiche: Transfer the quiche to the oven. Bake for 30-40 minutes, or until golden brown on top and the center is set (a knife inserted into the center should emerge clean). If the crust edges begin to brown too quickly, they can be loosely covered with aluminum foil.
7. Cool and Serve: Allow the quiche to cool on a wire rack for at least 10-15 minutes before slicing and serving. This allows the custard to fully set for easier cutting. It is palatable warm, at room temperature, or even cold.

CHAPTER 3: COOK TO AVOID FOOD WASTE: RECIPES AND METHODS

EMBRACING LEFTOVERS: SMART METHODS AND CREATIVE APPROACHES

Leftovers are often perceived as an afterthought, occasionally forgotten in the refrigerator until no longer edible. However, mastering the management and repurposing of leftovers represents one of the most significant ways to reduce food waste, conserve resources, and streamline future meal preparation. This section extends beyond mere reheating, advocating for the adoption of smart methods and creative approaches to ensure every cooked component finds a second, or even third, use.

Methods and Approaches for Utilizing Leftovers:

Proper Storage is Essential: The fundamental principle of leftover utilization is correct storage immediately after the meal. Employ airtight containers to maintain food freshness, label them with the date, and promptly refrigerate or freeze. This prevents spoilage and preserves quality for subsequent consumption.

Transform and Reimagine: Beyond simple reheating, consider how leftover components can be transformed into an entirely new dish. For instance, roasted chicken can become chicken salad or an ingredient for a soup. Cooked rice can be converted into fried rice or a base for a grain bowl. Cooked vegetables can be incorporated into omelets, frittatas, or blended into sauces.

Planned Overs: Integrate leftover utilization into initial meal planning. Prepare slightly larger portions of certain components (such as grains, roasted vegetables, or proteins) with the explicit intention of using them in a different meal later in the week. This saves cooking time and provides a predetermined purpose for the "leftovers."

The "Leftover Buffet" Night: Designate one evening weekly as a "leftover night." Encourage household members to select and combine from a variety of properly stored leftovers. This minimizes effort and ensures all food is consumed.

Freezing for Future Meals: Many cooked dishes and individual components freeze exceptionally well. If a leftover meal will not be consumed within a few days, portion and freeze it. Clearly label and date all items for easy identification and to ensure consumption within a safe timeframe. Soups, stews, casseroles, and cooked grains are excellent candidates for freezing.

Creative Combinations: Cultivate a mindset of combining various small portions of leftovers into a cohesive new meal. This might involve a "fridge clean-out" stir-fry, a loaded baked potato, or a vibrant pasta dish utilizing a mix of ingredients.

Sauces and Dressings from Scraps: Even small quantities of leftover sauces, gravies, or dressings can be repurposed. They can form the base for a new sauce, a marinade, or a flavorful addition to another dish.

CONCLUSION: EMPOWERING THE KITCHEN FOR A WASTE-FREE FUTURE

This module has explored a transformative approach to food in the kitchen, moving beyond merely understanding waste to its active prevention through culinary ingenuity. From strategies for revitalizing bread and tired vegetables to embracing strategic methods for utilizing leftovers, a range of practical recipes and approaches has been provided.

The true efficacy of this module lies in empowering individuals to perceive ingredients not solely for their initial purpose, but for their comprehensive potential. By applying these techniques, individuals not only conserve resources and enjoy more diverse and flavorful meals but also contribute tangibly to reducing the considerable volume of food destined for landfills. Every meal rescued from waste represents a triumph for financial prudence, culinary satisfaction, and environmental sustainability.

CHAPTER 4: REDUCING FOOD WASTE – NEXT STEPS

By the end of this chapter, readers will be able to:

- Explain how traditional preservation methods like fermentation and pickling help reduce food waste, including the science behind these processes and their benefits for flavor, nutrition, and sustainability.
- Differentiate between key preservation techniques—such as fermented pickling, vinegar pickling, and upcycling kitchen scraps—and apply safe practices for home use.
- Demonstrate practical ways to minimize food waste at home, including fermenting or pickling produce and repurposing common kitchen by-products into useful products like broths, natural cleaners, and compost.

1. FERMENTING AND PICKLING – TRADITIONAL METHODS OF PRESERVATION

Food waste is one of the most pressing environmental, economic, and ethical challenges of our time. According to the Food and Agriculture Organization (FAO), nearly 1.3 billion tons of food are wasted globally each year—about one-third of all food produced. Much of this loss comes from fresh produce that spoils before it can be eaten. This chapter focuses on two powerful, practical solutions: traditional preservation methods and creative upcycling techniques. We'll explore how time-tested practices like fermentation and pickling not only extend the shelf life of fruits and vegetables but also boost flavor, nutrition, and gut health. Alongside these, you'll learn how to turn everyday kitchen scraps into valuable resources—from homemade broths and natural cleaners to compost and skin-care products. By combining these strategies, you'll gain the tools to cut waste, save money, and make your kitchen more sustainable—one jar of sauerkraut and one citrus peel at a time.

Fermentation is a biochemical process in which beneficial microorganisms—such as bacteria, yeast, and molds—break down sugars and starches into simpler compounds like lactic acid, alcohol, or acetic acid under anaerobic (oxygen-free) conditions. These byproducts not only preserve food but also create complex flavors and enhance health benefits.

Types of Fermentation Relevant to Food Preservation:

- Lactic Acid Fermentation: Used for vegetables like cabbage (sauerkraut, kimchi), cucumbers, and beets. Carried out by lactic acid bacteria (Lactobacillus, Leuconostoc).
- Alcoholic Fermentation: Yeasts convert sugars into alcohol and carbon dioxide (used in beverages like beer, wine, and kombucha).
- Acetic Acid Fermentation: Converts alcohol into acetic acid (basis for vinegar production).

Fermentation offers a range of benefits that make it an excellent method for reducing food waste while enhancing nutrition and flavor. It allows foods to be preserved for months or even years without the need for refrigeration, making it both practical and energy-efficient. Beyond extending shelf life, fermentation enriches the taste of food by developing complex flavors such as umami and tang. It also improves digestibility and increases the bioavailability of essential nutrients. Additionally, fermented foods support gut health through the natural production of probiotics, which promote a healthy microbiome. Finally, fermentation encourages the sustainable use of seasonal or surplus produce, transforming potential waste into valuable, nutrient-rich products.

Pickling on the other hand is a traditional method of preserving food by creating an environment that inhibits the growth of harmful microbes, thereby extending the shelf life of perishable items. There are two primary approaches to pickling. The first is vinegar-based or quick pickling, where foods are immersed in a vinegar solution combined with salt, sugar, and spices. The high acidity of the vinegar prevents the development of harmful microorganisms, and these pickles are typically ready to eat within a few hours or days. The second method is fermented or brine pickling, which uses a saltwater brine to encourage the growth of lactic acid bacteria. Unlike quick pickles, no vinegar is added; instead, the acidity develops naturally through fermentation over one to four weeks, producing a tangy, probiotic-rich product.

Several key ingredients make pickling successful. Salt plays a critical role in drawing out moisture and preventing harmful bacterial growth, while vinegar provides immediate acidity in quick pickling. Water is used to create brine or dilute vinegar solutions, and spices—such as garlic, dill, mustard seeds, and peppercorns—not only enhance flavor but can also offer antimicrobial properties.

1. **Kimchi (Korea)**
A spicy, fermented cabbage dish with regional and seasonal variations.

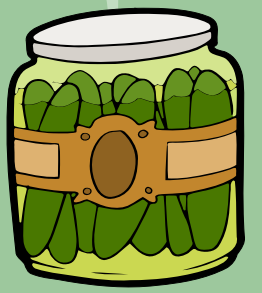
- Main ingredients: Napa cabbage, daikon radish, green onion, garlic, ginger, Korean chili flakes (gochugaru), fish sauce or soy sauce.
- Process:
  - Cabbage is salted to draw out moisture.
  - A spice paste is mixed in.
  - Fermented in jars at room temperature for 2–5 days, then refrigerated.
- Nutritional profile: High in vitamins A, B, and C, fiber, and probiotics.
- Cultural note: Traditionally made in large batches during "kimjang" season in Korea.

2. **Sauerkraut (Germany, Central/Eastern Europe)**
Fermented shredded cabbage.

- Ingredients: Cabbage and salt.
- Process:
  - Salted cabbage is packed tightly into a crock or jar.
  - Brine forms naturally from the cabbage's moisture.
  - Ferments for 1–4 weeks at room temperature.
- Nutritional benefits: Probiotic-rich, vitamin C, and digestive enzymes.

3. **Pickled Vegetables (Worldwide)**
Commonly pickled items: Cucumbers, carrots, beets, onions, peppers, radishes.

- Quick Pickles:
  - Use vinegar, sugar, and spices.
  - Can be made and eaten the same day.
  - Refrigerated, not shelf-stable unless heat-processed.
- Fermented Pickles:
  - Salt brine and ambient microbes.
  - Develop sourness over 1–3 weeks.
  - Shelf-stable when properly stored in a cool environment.



SAFETY AND STORAGE TIPS FOR HOME FERMENTATION AND PICKLING

Preparation & Equipment:

- Use sterilized glass jars, fermentation crocks, or food-grade plastic containers.
- Clean all surfaces, hands, and produce thoroughly.
- Use non-iodized salt (like kosher or sea salt) to avoid inhibiting fermentation.

Salinity & pH:

- For fermentation, maintain 2–3% salt by weight of vegetables.
- Ensure vegetables are fully submerged to prevent mold growth.
- For vinegar pickles, use vinegar with at least 5% acidity (e.g., white vinegar, apple cider vinegar).

Signs of Healthy Fermentation:

- Bubbles and fizzing (natural CO_2 production)
- Tangy or sour aroma
- Cloudy brine (a sign of microbial activity)
- No signs of mold if produce remains submerged

Red Flags (Discard Immediately):

- Mold growing on vegetables (white kahm yeast on brine is usually harmless)
- Slimy textures or foul, rotten odors
- Pink, blue, black, or green spots

Storage Guidelines:

- Fermented products: Store in the refrigerator after fermentation; most last 3–6 months.
- Quick pickles: Refrigerate and consume within 2–4 weeks.
- Canned vinegar pickles: If properly processed in a water bath, can be stored at room temperature for up to 1 year.

ENVIRONMENTAL AND HEALTH IMPACT

How Fermenting & Pickling Help the Planet:

- Reduce food waste by preserving fruits and vegetables that might otherwise spoil.
- Cut energy use compared to freezing or refrigeration.
- Promote local and seasonal eating, reducing reliance on imported goods.
- Support biodiversity by encouraging the use of heritage crops and lesser-known vegetables.

Health Benefits:

- Boost gut microbiota and digestion through probiotics.
- Reduce the need for added preservatives or artificial flavoring.
- Enable better absorption of nutrients like iron and B vitamins.

Getting Started – A Beginner's Guide

Basic Equipment:

- Mason jars or fermentation crocks
- Chopsticks or weights to press down vegetables
- Airlock lids or cloth covers (optional but helpful)
- Sharp knife and cutting board

First-Time Ferment Projects:

- Simple Sauerkraut – cabbage + salt
- Quick Pickled Red Onions – red onion + vinegar + sugar + salt
- Fermented Garlic Carrots – carrot sticks in 2% brine + garlic

Tips for Success:

- Label your jars with dates and ingredients.
- Taste every few days to learn how flavors develop.
- Keep a fermentation journal to track recipes and results.

Further Resources		
Books:	**Websites:**	**YouTube Channels:**
• *The Art of Fermentation* by Sandor Katz • *Fermented Vegetables* by Kirsten & Christopher Shockey • *Wild Fermentation* by Sandor Katz	• Cultures for Health • Fermenters Club • Nourished Kitchen	• Pro Home Cooks – practical, beginner-friendly • Farmhouse on Boone – traditional food prep • Mary's Nest – ancestral kitchen wisdom

UPCYCLING USED COOKING OIL

3.1 FROM WASTE TO VALUE: BIODIESEL AND CANDLES

The most common way of recycling used cooking oil is converting it into biodiesel—a renewable and biodegradable fuel. This process, known as transesterification, involves a chemical reaction between the oil and an alcohol (usually methanol or ethanol), in the presence of a catalyst such as sodium hydroxide (NaOH) or potassium hydroxide (KOH). Although biodiesel offers an environmentally friendly alternative to fossil fuels, especially in transportation, its production requires hazardous substances and strict quality control to meet fuel standards for motor use. For this reason, it is typically carried out on an industrial or semi-industrial scale, where safety and environmental regulations can be properly followed.

In contrast, recycling used cooking oil into candles is a simple, safe, and creative alternative that can be done at home—even by children with the help of adults. Candle-making does not involve any dangerous chemicals and requires only basic equipment, such as molds, wicks, and essential oils for fragrance.

Beyond their aesthetic and functional value, candles made from waste oil demonstrate in a tangible way how a harmful waste material can be transformed into something beautiful and useful. In fact, making candles at home is arguably the most ecological form of oil recycling, as it eliminates the need for long transportation chains associated with biodiesel production and reduces the overall environmental footprint.

This home-based approach not only raises awareness about sustainable practices but also empowers communities to take part in circular economy solutions—right from their kitchens.

Comparison: Biodiesel vs. Candles from Used Cooking Oil

BIODIESEL	CANDLES
Main purpose Fuel for vehiceles and machines	**Lighting and** ambiance
Scale of production Industrial or semi–industricial	**Domestic or** small-scale
Key ingredients Used cooking oil, methanol/ethanol, sodlum or potasslum hydroxide	**Low** - simple, safe DIY process
Use of hazardous materials Yes – methanol (toxic, flammable), strong bases (NaOH, KOH – corrosive)	No hazardous materials
Need for equlpment Specialized equipment and safety gear	Basic kitchen tools
Environmental impact Reduces fossil fuel use, but involves transport and industrial emissions	**Extremely low -** especially if candles are made and used locally
Children-friendly Not suitable	With aduit supervision kit (www.oilright.eu)

UPCYCLING USED COOKING OIL

3.2 HOW TO MAKE CANDLES FROM USED COOKING OIL

There are two common methods for making candles from used cooking oil, but both begin with the same essential step: filtering the oil.

Step 1: Preparation and Filtering

Before use, it's important to let the used oil sit in a container for at least 24 hours. This natural sedimentation process allows heavier food particles and impurities to settle at the bottom.

Once the oil has rested, gently heat it. Warming the oil helps remove any remaining moisture and reduces its viscosity, making it flow more easily. This significantly improves the speed and effectiveness of filtration.

To filter the oil, simply pour it through a single layer of paper towel (if it's a multi-ply towel, just separate one layer), cheesecloth, a fine mesh strainer, or another filtering tool. This removes small food residues and other particles that could affect the final product.

Step 2: Candle-Making – Two Simple Methods

Once the oil is clean and ready, you can proceed with one of the following methods:

A. Oil Lamp Candle (No Wax Needed)

This method is the easiest and requires no wax. These candles burn with a warm, steady flame and are ideal for quick, low-waste use.

Instructions:

1. Prepare the Wick Holder: If using a jar with a lid, you can poke a small hole in the lid to hold the wick. Alternatively, a small piece of metal (like a bottle cap with a hole) can serve as a floating wick holder.
2. Fill the Jar: Pour water into the jar first, filling it about halfway. Then, carefully pour the filtered used cooking oil on top. The oil will float on the water. This reduces the amount of oil needed and can help if the lamp accidentally tips over.
3. Insert the Wick: Thread your cotton wick through the holder, ensuring enough wick is submerged in the oil to draw it up, and about 0.5 to 1 cm (0.2 to 0.4 inches) extends above the holder.
4. Saturate the Wick: Allow the wick to fully soak in the oil for at least 10-15 minutes before lighting. This prevents the wick itself from burning too quickly.
5. Light and Adjust: Light the exposed end of the wick. Adjust the wick height as needed to control the flame size. A smaller flame will burn longer and produce less smoke.

B. Solid Candle (With Wax Blend)

This version creates more traditional, solid candles:

1. Gently heat a mix of filtered used cooking oil and natural wax (such as soy wax or beeswax). A common ratio is 60–70% wax to 30–40% oil, depending on desired consistency.
2. Stir the mixture until fully melted and blended.
3. Add a few drops of essential oil for fragrance (optional).
4. Pour the hot mixture into a mold or container with a wick in place.
5. Let it cool and harden—this usually takes a few hours.

The result is a stable, eco-friendly candle that burns cleanly and slowly.

For those who prefer a ready-made solution, DIY kits for making solid candles are available on the market. These kits typically include all necessary ingredients: natural wax pre-blended with non-toxic fragrances and dyes, wicks, and wick holders.
One such product is offered under the Oilright brand.
More information is available at: www.oilright.eu/.

Safety Precautions for Making and Using Recycled Oil Candles

Whether you're making simple oil lamp candles or solid wax candles from used cooking oil, it’s important to follow basic safety guidelines to ensure a safe and enjoyable experience:

- Never leave a burning candle or oil lamp unattended. Always extinguish the flame before leaving the room.
- Place candles on a stable, non-combustible surface, away from flammable materials such as curtains, paper, or clothing.
- Keep candles and hot materials out of reach of children and pets.
- Do not move a lit candle or lamp. Wait until the container has cooled completely.
- Never refill or adjust a candle or oil lamp while it is burning.
- Ensure the area is well-ventilated while the candle or lamp is burning.
- Used cooking oil may emit a slight odor depending on what was cooked in it. Filtering the oil thoroughly before use helps reduce unwanted smells.
- When melting wax or heating oil, use a double boiler or low heat to avoid overheating, which can be a fire hazard.
- Do not overfill containers with hot wax or oil. Leave space at the top to prevent spillage.
- Have a fire extinguisher or other fire-safety materials (like sand or a damp cloth) readily available when working with open flames.

By following these simple precautions, you can safely enjoy making and using eco-friendly candles from waste cooking oil.

UPCYCLING USED COOKING OIL

3.2 FIRE STARTERS

Filtered used cooking oil can be repurposed to create simple but effective fire starters, offering a practical way to extend the utility of a common kitchen "waste" product.

Homemade Oil Lamps
For a simple DIY oil lamp, you'll need a heat-safe glass jar (like a Mason jar), a cotton wick (you can often use thick cotton string or a strip of cotton fabric), and your filtered used cooking oil.

Fire Starters
Used cooking oil makes an excellent, long-burning accelerant for fire starters. It helps kindling catch and sustain a flame for longer than paper alone.
Instructions:

1. Gather Absorbent Material: Collect dry, absorbent materials like newspaper, cardboard, dryer lint, sawdust, or cotton balls.
2. Saturate with Oil: Drizzle or spray the filtered used cooking oil liberally onto the absorbent material, ensuring it's thoroughly soaked. For dryer lint or sawdust, mix it directly with the oil in a bowl until saturated.
3. Form and Store:
    - For newspaper or cardboard, you can roll or fold it into tight "logs" or "bundles."
    - For lint or sawdust, press the oily mixture into small molds (like egg carton sections) or simply form into small balls.
    - Store these fire starters in a sealed, non-flammable container (e.g., a metal tin or glass jar) to prevent oil leakage and to keep them ready for use.

To Use: Place the oily material under your kindling and wood in a fireplace, campfire, or barbecue. Ignite the oily material with a match or lighter. The oil will help it burn slowly and consistently, giving your larger fuel a better chance to ignite.

Safety for Fire Starters with Used Cooking Oil:

- **Only use for starting fires in designated and safe areas** (e.g., fireplaces, fire pits, wood stoves).
- **Do not use excessive amounts of oil**, as this can create too large a flame or produce excessive smoke.
- **Ensure good ventilation** when using indoors.
- **Never use in a way that could cause an uncontrolled fire.**
- **Store fire starters in a cool, dry place**, away from direct heat or open flames.
- **Do not use for starting fires in highly enclosed spaces** without proper ventilation, as incomplete combustion can produce harmful byproducts.

You're doing great with building out this comprehensive guide! I'll enhance the "Infused Oils" section with more detail, practical tips, and a stronger emphasis on both culinary and non-culinary applications, while reinforcing safety.

UPCYCLING USED COOKING OIL

4. INFUSED OILS: AROMATIC AND FUNCTIONAL

Infused oils are a fantastic way to capture and extend the essence of herbs, spices, and citrus, transforming simple oils into aromatic and functional ingredients. They add depth of flavor to your cooking and can also be incorporated into homemade skincare or cleaning products, further minimizing waste from often-discarded kitchen scraps.

4.1 Using Herb Stems and Citrus Peels

Rather than tossing out woody herb stems (like rosemary, thyme, or oregano) or fragrant citrus peels, give them a second life by infusing them into oil. This method extracts their volatile compounds, creating oils rich in flavor and aroma.

Suitable Scraps for Infusion:

- Herb Stems: Rosemary, thyme, oregano, marjoram, sage, basil stalks (ensure they are very clean and dry).
- Citrus Peels: Lemon, orange, grapefruit, lime (peel only, avoid the bitter white pith).
- Other Flavorful Scraps (ensure dry): Garlic skins (cleaned), ginger peels, chili stems (for spicy oil).

Instructions for Warm Infusion (Quick Method):

1. Prepare Scraps: Thoroughly wash and completely dry your herb stems or citrus peels. Moisture is the enemy of infused oils and a significant safety concern (see 4.2). If using peels, make sure there is no white pith attached.
2. Choose Your Oil: Select a neutral-tasting oil that complements your infusion, such as olive oil, sunflower oil, grapeseed oil, or a lighter vegetable oil.
3. Warm Infusion: In a small saucepan, combine your clean, dry scraps with the chosen oil. Use a ratio that allows the scraps to be submerged, typically about 1 part scraps to 2-3 parts oil.

Alternative: Cold Infusion (Slower Method): For a more gradual and delicate infusion, combine clean, dry scraps with oil in a clean jar, seal it, and let it sit in a cool, dark place for 1-2 weeks, shaking gently every day or two. Strain and bottle as above. This method is often preferred for more delicate herbs.

Applications for Infused Oils:

- Culinary: Drizzle over salads, roasted vegetables, pasta, grilled meats, or use in marinades and dressings. Citrus-infused oil is excellent for baking or adding a bright note to fish.
- Skincare: Herb-infused oils can be soothing for skin. (Always patch-test on a small area first).
- Cleaning: Citrus-infused oils can enhance the cleaning power and scent of homemade cleaning sprays.

4.2 Storage Safety: Preventing Botulism

When making homemade infused oils, especially those involving garlic, herbs, or vegetables, botulism prevention is paramount. Clostridium botulinum spores can thrive in anaerobic (oxygen-free), low-acid, moist environments, and produce a deadly toxin. Improperly stored homemade infused oils are a known risk factor.

Crucial precautions to ensure safety:

- Always dry ingredients thoroughly! This is the most critical step. Any moisture on the herbs, garlic, or peels can create an anaerobic environment for bacteria. After washing, thoroughly pat dry, and consider air-drying for several hours or even lightly baking at a very low temperature (e.g., 50°C) until completely free of moisture.
- After infusion, strain the oil meticulously to remove every single solid particle of herb, garlic, or peel.
- Always store infused oils containing fresh herbs or garlic in the refrigerator. This significantly slows down bacterial growth.
- Even with refrigeration, these oils have a limited shelf life. Use them within 1–2 weeks.
- Clearly label your bottles with the date of preparation and a list of ingredients.
- If the oil appears cloudy, smells off, or shows any signs of mold, discard it immediately. When in doubt, throw it out.

UPCYCLING USED COOKING OIL

5. BENEFITS OF UPCYCLING KITCHEN WASTE

Beyond the immediate satisfaction of creating something new, embracing upcycling in the kitchen offers a multitude of tangible benefits that extend from your home to the planet.

- **Environmental Impact:** Upcycling kitchen waste directly contributes to a circular economy. It significantly reduces the volume of waste sent to landfills, which in turn helps to lower methane emissions—a potent greenhouse gas produced by decomposing organic matter. This practice conserves natural resources that would otherwise be used to create new products, lessening the overall environmental footprint of your household.
- **Economic Savings:** By transforming scraps into useful products, you save money that would otherwise be spent on purchasing items like commercial broths, specialized cleaners, or expensive body scrubs. This approach fosters a more self-reliant household where creativity replaces consumption, leading to tangible financial benefits over time.
- **Creative & Educational Engagement:** Upcycling encourages a mindset of innovation and resourcefulness. It transforms mundane kitchen tasks into opportunities for experimentation and learning. This process can be particularly educational for families, teaching children the value of resources, the concept of waste reduction, and the endless possibilities of repurposing materials. It promotes a deeper connection to the food you consume and the resources it represents.

With minimal effort, common kitchen scraps can be transformed into useful, eco-friendly products. Upcycling not only reduces waste but also redefines the value of what we once considered disposable. Whether you’re simmering a broth, crafting a scrub, or blending a biofuel, you're part of a sustainable shift toward circular living.

Co-funded by
the European Union

Eco-cuisine
Cooking for a sustainable future

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

ViModo
Research & Education Hub

Rub Stub

BALKAN BRIDGE

BDUE

Project code: 2024-2-CY01-KA210-ADU-000288571