



# Garde-Manger: Pantry Storage




<https://wiki.lowtechlab.org/wiki/Garde-Manger/en>

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 Difficulty **Medium**

 Duration **3 day(s)**

 Cost **150 EUR (€)**

## Description

Garde-Manger, or pantry storage, enabling optimal environmental conditions by food type

# Summary

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# Introduction

## A Quick Survey of the Food Waste Situation

Worldwide, 1/3 of total food production is thrown away.

In France, this constitutes 10 billion kilograms (22 billion pounds) of food waste each year. The carbon impact of this is equivalent to 5 times the country's domestic air traffic per year.

The analysis of food waste shows that 33% happens on the last link of the chain: the consumer.

The losses amount to a global cost of 160€ (\$189 USD)/year per person.

Quantitatively, fruits and vegetables constitute the most substantial losses (50%).

However, animal products (meat, fish, dairy), while representing just 6% of all food waste, represent the most significant financial loss.

## Causes of Food Waste

Analyzing the causes of waste is relevant if we are to design the appropriate solutions to put in place to reduce it:

- Sociological causes: Our pace of living; family structures; the ways of organizing our days and our meals shifting over time. We are more hurried and less attentive, which brings about food waste.
- Cultural causes: Our perceptions of food, our aesthetic criteria, how we supply our food leads to a dismissal of products that are nonetheless consumable.
- Poor knowledge of conserving foods: conserving is not synonymous with making cold--a refrigerator is not made to accommodate all types of food. In addition, confusions arise between terms such as "Use by," "Best-Before," and "Expired by."
- Organizational problems: We lack organization before doing our grocery shopping, to question our needs and to buy the appropriate quantities. Refrigerators and cabinets are equally sources of numerous losses due to storage space that encourages stacking new food in front of older food. It's important to note that a good number of these causes can be remedied by better practices that anyone can put into place. Technical solutions can support us, mainly by:
  - Creating the right environmental conditions for conserving food according to food type
  - Promoting better visibility of produce
  - Making products more easily accessible.

See [this report](#) for an analysis of the use of this food storage system, as well as 11 other low-tech experiments throughout the project "En Quête d'un Habitat Durable"

## Step 1 - The "Zero Waste" Approach

The first step in using a food-storage system, such as the one proposed here, is for the user to question the ways in which they buy and consume. Given that food storage modules that we're going to propose below are mainly designed for raw and fresh foods, it would be complicated for the user feeding themselves with ready-made meals to benefit from the technical suggestions provided, for example.

The "Zero Waste" approach, originating from Franco-American Béa Johnson, is an excellent method to put into practice. It enables, at the same time, a significant reduction of waste produced globally (packaging, plastic, etc).

Zero Waste France is a very good resource for complementary information on helping consumers take action.

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## Step 2 - General Information on the Food Storage System

Since we mainly need to work on waste consisting of fruit, vegetables, and animal products, the focus is on short-term conservation.

Food conservation does not mean keeping cold but rather conserving the nutritional quality and taste of the foods.

For this reason, several storage environments are worth adopting for a built food storage solution.

Generally, for all short-term storage environments, the most interesting and basic technical offering, in our experience, is the grated drawer.

It's a technical solution that can be easily integrated into a kitchen, permits direct visibility of all contents, and facilitates easy access to all the food, as opposed to a cupboard or a refrigerator.

The main use of the drawers is to allow for good air circulation, a very important factor for keeping fruits and vegetables fresh. It can be made using wooden battens (between 2 and 3 cm wide each) or using wire netting or screen.

For the assembly of the food storage furniture, an air gap of 3-4cm is to be integrated into back side in order for "exhaust" air and humidity to flow and not stagnate, risking quicker spoilage.

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## Step 3 - Environment 1: Dry, Ventilated, In Room Light

We'll find our way around here by use of example: Apricot, eggplant, avocado, banana, citrus, tomatoes, as well as eggs or butter in a butter dish if it's not too hot.

In a kitchen for 2 people, we propose 2-3 grated drawers, measuring 15cm height by 40-50cm depth by 50cm width.

It is designed so that the front and back of the drawer allow for air circulation.



## Step 4 - Environment 2: Dry, Ventilated, Dark

This food-keeping environment is useful notably for potatoes, onions, garlic, squashes, etc. The dark atmosphere prevents the germination of tubers and roots and limits the ripening of certain fruits.

In a kitchen for 2 people, we propose 2 grated drawers lined with a fabric such as linen or jute, to create darkness while ensuring ventilation.

About 25cm height, 40-50cm depth, and 50cm width. They must be made a bit taller than the previous environment to be able to store carrots. They will be kept vertically in a box of slightly moistened sand in one of the drawers.



## Step 5 - Environment 3: Dark, Cold, Humid

### For an existing living space:

This environment is the most difficult to create in an existing space; however, it is very useful as it can allow you to keep the refrigerator off for a part of the year.

For existing spaces indoors, we can draw inspiration from the desert refrigerator, or the "zeer pot."

It is essentially made of one pot nested within a second. Sand is added between the two. The foods are placed in the central pot and the sand is regularly moistened. By evapo-transpiration, the interior temperature can drop between 5-10°C (41-50°F) lower than the room temperature.

### For a new living space:

In the case of a new living space, we can imagine the old Parisian pantries or "garde-mangers" with boxes opening to the outside--to the north--via a window dedicated to this usage. (Or in a non-insulated partition in this place).

In this environment, you can store artichoke, cucumber, beans, parsnip, butter during mid-season, etc.

For sizing, an interior volume of 40L divided in two is suitable (for example 40cm height, 40cm width, and 30cm depth).



## Step 6 - Environment 4: Dark and Cold

This environment is made using a refrigerator. The idea is to work to reduce the size of it, however, by keeping only leftovers, dairy, meat, fish, and cold beverages inside.

Another positive effect of reducing the size is that it directly reduces electricity consumption.

For two people, we propose the use of a 40L refrigerator (bar style). Depending on the allotted budget, we could find a drawer refrigerator that allows a direct view of all contents; however, they are noticeably more expensive.

Be careful, however, to choose a refrigerator where the vertical storage of standard-sized bottles is possible for more functionality. Avoid placing the refrigerator next to the oven (which is the case in many kitchens) for more efficiency.

Heat released from the back of the refrigerator into the air gaps of the food storage rack will benefit the circulation of air and humidity of the whole the storage system.



## Step 7 - Climacteric Fruits and Vegetables

In addition to the environments, a second factor comes into play in keeping fruits and vegetables fresh: whether or not they emit ethylene, a gas that promotes ripening, and whether or not they are sensitive to it.

Fruits and vegetables that produce ethylene and that continue to ripen after harvest are called "climacteric," while others can be very sensitive and rot more quickly upon contact with ethylene.

A simple rule is to keep foods that release ethylene separate from those that are sensitive to it. This is why it's good to have at least two drawers per environment and that they're rather large and ventilated, so the ethylene can properly escape.

## Step 8 - Overview Table

Environment by Food Type	Short-term Food Storage Environment				Climacteric Factor	
	Cool, Humid and Dark	Dry, Ventilated, In Room Light	Dry, Ventilated, In the Dark	Other?	Ethylene Producer	Sensitive to Ethylene
Apricot		x			x	x
Garlic			x			
Pineapple		x				
Artichoke	x					
Asparagus	x			Refrigerator Crisper		
Eggplant		x				x
Avocado		x			x	x
Banana		x			x	x
Chard	x					
Beet	x					

Broccoli	x			Refrigerator Crisper		x
Carrot	x					x
Celery	x					
Cherry	x	x				
Mushroom	x					
Cauliflower	x			Refrigerator Crisper		x
Cabbage	x					
Lemon		x				
Pumpkin		x				
Clementine		x				
Cucumber	x	x				x
Coriander, Cumin			x			
Squash		x				
Zucchini	x					x
Shallot			x			
Endive	x			Refrigerator Crisper		x
Strawberry	x					
Legumes (beans, lentils)			x			
Seed Spices			x			
Green Beans	x			Refrigerator Crisper		x
Kiwi		x				x
Mango		x				
Melon			x		x	x
Blackberry			x			
Turnip	x					
Onion			x			
Orange		x				
Parsnip	x					
Watermelon		x				
Sweet Potato			x			
Peach		x	x		x	x
Parsley, Chives, Mint, Fresh Coriander, Dill,				In a glass of water		
Pear		x	x		x	x
Leek	x					
Pepper		x			x	x
Pomelo		x				
Apple			x		x	x
Potato			x			
Plum		x	x		x	x
Radish	x					
Grapes		x				
Arugula	x					
Lettuce	x					x
Tomato		x			x	x
Leftovers				Refrigerator		
Dairy				Refrigerator		
Meat and Fish				Refrigerator		

# Notes and references

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ADEME

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