



Food Waste and Rescue in Israel

Economic, Social, Environmental and Health Impact

Eighth National Report, 2022

Agriculture and Food Insecurity in Israel during the Swords of Iron War

The problem of food insecurity is expected to worsen as a result of the Swords of Iron War and its economic impacts

While the findings of this Report pertain to 2022, a section has been added with a preliminary discussion of the consequences of the war on food waste and food insecurity in Israel, and the feasibility of food rescue in light of the current events.

The Eighth Annual Food Waste and Rescue in Israel Report, which is being published for the eighth consecutive year by Leket Israel and BDO, is also published in partnership with the Ministry of Environmental Protection for the fourth time, and with the Ministry of Health for the first time. While the findings of this Report pertain to 2022, a section has been added with a preliminary discussion of the consequences of the war on food waste and food insecurity in Israel, and the feasibility of food rescue in light of the current events.

Food rescue is a tool for expanding food reserves and ensuring food security during normal times as well as crises. The Swords of Iron War highlights the national importance of implementing food rescue as a key policy tool to address the problem of food insecurity. This war has harmed vulnerable populations in Israel, and exacerbated food insecurity on two levels.

The war resulted in loss of about 40% of the industry workforce, a restriction of about 30% of the agricultural areas, located in the Western Negev and the conflict areas, and an increase in imported food by 60,000 tons.

1. Less food is available for rescue, as a result of damage to local agriculture.

The war has decreased the amount of agricultural produce available in the market, and has increased food waste due to:

- Loss of approximately 30,000 foreign and Palestinian workers, who represent about 40% of the workforce in the industry
- Restricted access to approximately 30% of the agricultural areas in Israel located in the Western Negev and the conflict areas
- The result has been an increase in imported food by 60,000 tons, and double-digit increases in the prices of agricultural products

About 30% of Israel's agricultural land lies in the frontline areas of the war. About 20% of all the country's agricultural land is located in the area around Gaza, known as "Israel's vegetable patch." This includes about 60% of the potato fields, 50% of tomato fields, and 40% of the areas where carrot and cabbage are grown¹. Additionally, about 10% of Israel's agricultural land is in the northern frontline conflict areas. This includes about 60% of the apple orchards and over 35% of the peach orchards. The northern border is also a major source of eggs and turkey meat².

Ripe agricultural produce was not harvested, and animals were not properly cared for. This increased food waste, and caused a shortage of produce, and higher prices.

Many agricultural areas in the Gaza border region and along the frontlines have become military zones. Crops have been destroyed by military activity, and fields have been abandoned, either because it is impossible to reach them, or because there is nobody to work the land. One immediate impact of the war was the loss of approximately 30,000 agricultural workers, representing about 40% of the workforce in the industry. This includes about 10,000 foreign workers who left Israel, and about 20,000 Palestinian workers who are no longer given permits to enter Israel³. The result has been a fatal blow to farmers and the agriculture industry.

Higher food prices, and prices of fruit and vegetables, alongside damage to the economy as a whole, mainly to small, independently-owned businesses, the families of military reserves, and evacuated families, plus higher unemployment rates, will exacerbate food insecurity among disadvantaged populations, and increase the number of people lacking food.

Ripe agricultural produce was not harvested, and animals were not properly cared for. This increased food waste, and caused a shortage of produce in the markets, and higher prices. To deal with this shortage, between October 8 and December 1, Israel imported an additional 60,000 tons of fresh produce; twice the volume of imports during corresponding months in previous years⁴. The main countries from which produce is being imported during this war are Turkey, representing about 44% of the imported produce, Jordan, which sends about 14% of the imported produce, and the Netherlands, with about 11% of the imported produce. Experience has shown that replacing local production with imports does not resolve the problem of food insecurity caused by damage to agriculture, because it is accompanied by a sharp increase in prices.

1. Israel Central Bureau of Statistics, Economic Impacts of the "Swords of Iron" War on the Agricultural Sector.

2. Israel Central Bureau of Statistics, United for Victory!

3-4. Data from the Ministry of Agriculture and Rural Development.

2. Higher prices for agricultural products decrease food security and lower the standard of living due to:

- Double-digit increases in the prices for fruit and vegetables
- Decreased economic growth and diminished purchasing power

Despite the increased imports, the war has caused in a significant increase in the wholesale prices of agricultural products. In the first week after the outbreak of war, tomato prices rose by about 50%, and by December the wholesale price was still 33% higher than it had been just before the war. The price of cucumbers increased by about 90% during this time. The price of potatoes rose by about 40% in the first two weeks of the fighting, and by December the wholesale price was still about 20% higher than their pre-war price⁵.

It is expected that the war will continue to impact the supply of agricultural produce. It has been predicted that this winter there will be a shortage of tomatoes of about 30% of the average production, a 10% shortage of cucumbers by January 2024, and that cabbage production will be lower by about 20%⁶. These shortfalls have a dual impact. Decreased agricultural production limits the potential for rescuing food in the field and distributing it to people in need. Additionally, increased prices of agricultural products mean that disadvantaged populations will eat even less fruit and vegetables.

Excess healthcare costs in 2022 to the Israeli economy due to food insecurity were NIS 5.2 billion (\$1.5b). A larger number of people unable to consume a healthy food basket will further increase healthcare costs in Israel.

Higher food prices, especially the prices of fruit and vegetables, alongside damage to the economy as a whole, and especially to small, independently-owned businesses, the families of military reserves, and evacuated families, plus higher unemployment rates, will exacerbate food insecurity among disadvantaged populations, and increase the number of people lacking food. This Report, as well as the Report on Poverty and Social Gaps Report for 2022 published by the Israel National Insurance Institute (Bituach Leumi), have shown a positive correlation between economic status and accessibility to healthy food. The war is expected to increase the number of people who are unable to consume a healthy food basket.

The Food Waste and Rescue Report published this year includes, for the first time, an examination of the health costs of food insecurity. The excess healthcare costs in 2022 to the Israeli economy due to food insecurity were NIS 5.2 billion (\$1.5b), equivalent to about 5% of the total national expenditures on healthcare. A larger number of people unable to consume a healthy food basket will further increase healthcare costs in Israel.

The economic reality after this war will be a larger percentage of the population facing food insecurity, and an exacerbation of the situation for those already experiencing food insecurity.

The current situation as a result of the war, including an unstable local food supply and higher prices, highlights the importance of local Israeli agriculture for the country's resilience and continued existence. The government's policy of importing produce did not successfully solve the problem of rising prices and the shortage of produce that resulted from this crisis. Even during routine times, importing agricultural produce cannot adequately ensure food security, and even represents a risk to it.

The economic reality after this war will be a larger percentage of the population facing food insecurity, and an exacerbation of the situation for those already experiencing food insecurity. At the same time, a greater volume of food is being wasted. This highlights the need to implement a policy tool of rescuing food and distributing it for consumption by vulnerable populations, to help them in normal times as well as times of crisis.

5. Ministry of Agriculture and Rural Development, Domestic Producer Price Index, prices of agricultural products in Israel.

6. Data from the Ministry of Agriculture and Rural Development



Introduction

The National Food Waste and Rescue Report, which is being published for the eighth consecutive year by Leket Israel and BDO, is also published in partnership with the Ministry of Environmental Protection for the fourth time, and with the Ministry of Health for the first time.

The Report, based on BDO's economic model for the food industry, includes comprehensive and detailed research regarding the scope of various types of food waste in Israel. It reveals the potential for food rescue at each stage of the food production value chain, as well as the economic, environmental, and health costs of food waste at each stage.

According to the estimates presented in the Report, the total volume of food waste in Israel stands at 2.6 million tons for 2022, valued at approximately NIS 23.1b (\$6.5b). The total waste constitutes about 37% of the food produced in Israel. Of this, over 1 million tons of food, valued at about NIS 8.1b (\$2.29b), is rescuable, and fit for consumption.

The current Report includes a special, extensive chapter on the impact of food rescue on nutritional security and health costs in Israel (focusing on fruit and vegetables). The economic accessibility of a healthy food basket ensures adequate nutrition vital for physical, mental, and cognitive functioning, and is an essential component for achieving nutritional security. Consuming a healthy food diet with an emphasis on fruit and vegetables may be expensive, however, unhealthy nutrition could be even more costly. The extended chapter in this Report examines and evaluates the excess health expenditures in Israel as a result of nutritional insecurity and the potential for their reduction from food rescue activities in Israel. The Report estimates that about 1.4 million people in Israel live in nutritional insecurity. The additional health cost for a person experiencing nutritional insecurity stands at NIS 3,700 (\$1,050) per year, translating to an additional health cost to the economy of about NIS 5.2b (\$1.47b) annually.

The rise in food prices over the past year, as well as shortages caused by extreme weather events, are impacting global economies and highlighting the growing need for food rescue.

Food expenditures in Israel are relatively high by international comparison. Food waste constitutes one of the factors affecting the cost of living in Israel, both from the excess expenditure on food and the effect of waste on increased food prices. The overall impact on the cost of living in 2022 amounts to an additional NIS 9,950 (\$2,818) per household in the household consumption sector.

In addition, the climate crisis and the Israeli government's commitment to reducing greenhouse gas emissions underscore the need to reduce food waste and use food rescue as a policy tool for reducing greenhouse gas emissions.

Preventing food waste and rescuing it instead constitute important economic and environmental tools for implementing Government Decision 171 from July 2021 to reduce the rate of landfilled waste by 71% by 2030. According to the Report's findings, 2 million tons of food waste and packaging were thrown away in the past year. The estimated environmental damage from food waste is NIS 3.9b (\$1.1b).

The findings of the Report indicate that food rescue is highly feasible from economic, social, health, and environmental perspectives. Every dollar invested in food rescue saves food with a direct value of \$3.6. When considering the environmental impacts of food production, transport, and supply, every dollar invested in food rescue generates \$4.3 for the national economy. After calculating the health benefits of rescuing nutritious food and supplying it to vulnerable populations, every dollar invested in food rescue generates \$11.8 for the national economy.


It is our hope that this Report will serve as a basis for public discussion on food waste and will be a helpful tool toward formulating national policy steps to meaningfully change food waste and rescue patterns in Israel.



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1

Distinctive Traits of Food Production and Consumption in Israel

460 thousand Israeli households suffer from food insecurity

Distinctive Traits of Food Production and Consumption in Israel

For the average household in Israel, food expenditure represents approximately 18% of its total market basket of consumer goods. For households in the lower two income deciles, this rate is 22%. But food is far more than part of a household's market basket; it is a basic existential need. A balanced diet is essential for ensuring the health of the population as a whole and for the development of infants and children in particular. The potential economic ramifications caused by a lack of food or inadequate basic nutrition, exceeds the market price of the food (the cost of its production at all stages along the value chain).

Food insecurity is a particularly serious problem in Israel: the average rate of expenditure on food is among the highest in developed countries, and Israel has one of the highest poverty rates among countries in the OECD¹. An analysis conducted by BDO on data from the December 2021 Israel National Insurance Report² found that 16.2% of Israeli households – approximately 460,000 Israeli households – live in conditions of food insecurity. In economic terms, food expenditure for a household living with food insecurity is approximately 30% lower than the normative level.

Food is a unique product, both in terms of the traits of its consumption and its production. Growing and producing food requires natural resources that are relatively scarce, expensive, and often non-renewable: energy, water, and land. Using these resources can damage water, soil, air, and biodiversity, and emit greenhouse gases that cause climate change³. Additionally, surplus food must be removed and buried in landfills, which leads to the use of more resources and further environmental costs.

In a small and arid country like Israel, water and land are precious and limited resources. Using land and water to grow agricultural products that are lost or wasted has direct economic, environmental, and social costs. Foods are mostly based on agricultural products: vegetables, fruit, legumes, dairy products, eggs, meat, fish, oils, etc. External factors such as pests, weather, diseases, etc. cause great uncertainty regarding the production of these agricultural goods.

This annual Report includes a special, expanded chapter dedicated to the impact of food rescue on food security and health costs in Israel.

1. OECD, Poverty rate, 2021.

2. Poverty and Income Inequality, 2020 According to Administrative Data, with an estimate for 2021, Report by the Israel National Insurance Institute.

3. Cut Waste, GROW PROFIT: How to Reduce and Manage Food Waste, Leading to Increased Profitability and Environmental Sustainability. Value Change Management Center and George Morris Center, 2012.

This Report examines the issue of food waste and the feasibility of food rescue, considering economic, social, environmental and health perspectives. It is based on quantitative assessments and estimates, and includes ways to update data and improve methodology, based on the experience gained from the preparation and publication of the previous seven Reports. This Report is a collaboration between the Israel Ministries of Health and Environmental Protection, and includes a chapter dedicated to the impact of food rescue (particularly fruit and vegetables) on food security and health costs in Israel.

Financial accessibility to healthy food and adequate nutrition is essential for physical, mental, and cognitive functioning, and is a vital element for the realization of food security. Consuming a healthy diet with sufficient fruit and vegetables may be expensive, but an unhealthy diet has even greater costs. This Report examines and evaluates excess health expenditures in Israel that result from food insecurity, and the potential for reducing these costs through food rescue in Israel.



Egg distribution center. Credit: Chayakornlot



2

Food Loss and Waste: How Much Food is Lost and Wasted in Israel?

2.6 Million tons of food were lost and wasted in Israel in 2022

Food Loss and Waste: How Much Food is Lost and Wasted in Israel?

The findings of the 8th Annual Food Waste and Rescue Report indicated that approximately 2.6 million tons of food were lost or wasted in Israel, an increase of about 1.5% compared to the findings of the 7th Annual Report (2.58m tons)⁴. Much of 2022 (September 2021-2022) coincided with the Hebrew year 5782 (תשפ"ב) during which a Shmita year took place. The laws of Shmita are based on when a fruit begins to form. Since fruit picked after Rosh Hashanah began to form in the previous year, it is permitted to be eaten during the Shmita year. However, because vegetables develop

during the same year, vegetables harvested during the Shmita year may not be eaten. As a result, in 2022 the yield of vegetables decreased by about 8% compared to 2021. Vegetables play a central role in food loss and waste in Israel. Although agricultural output increased by about 4% in 2022, there was a 4% decrease in food loss and waste in the agricultural sector as compared to 2021. However, the authors of this Report predict that the Shmita year caused an increase in the amount of lost and wasted fruit, which will only be felt next year.

4. The data was rounded up for easier reading: In 2021 waste was about 2.58 million tons, and in 2022 waste was about 2.63 million tons.

Estimated Food Waste in Israel* in 2022							
Waste/Household NIS/Month	Agriculture	Processing & Packaging	Industry	Retail & Distribution	Institutional Consumption	Household Consumption	Total
Fruit & Vegetables	68	23	2	81	39	126	340
Grains & Legumes	2	1	2	22	34	95	156
Meat, Fish & Eggs	12	2	15	54	30	46	160
Milk & Dairy	4	1	1	5	4	18	34
Total	87	27	20	163	108	285	689

* A waste of NIS 615 (\$174.2) per household per month reflects the waste throughout the entire value chain, including direct household expenditure. Source: BDO estimates

Food loss and waste in Israel were based on a model of the food production value chain⁵. The loss of food in Israel in 2022 is estimated at about 2.6m tons, which represents 37% of the volume of local food production. The amount produced in the agricultural sector in 2022 was similar to that of recent years and stands at approximately 7.1m tons. The total food waste at all stages of the value chain is equivalent to approximately New Israeli Shekels (NIS) 689 billion (United States Dollar \$195 billion⁶) per month per household in Israel.

About 20% of the loss, valued at some NIS 4.5b (\$1.27b), occurs during the production stages. This loss constitutes about 13% of the total value of agricultural output in Israel. The other approximately 80% of food waste, valued at some NIS 18.6b (\$5.27b), occurs during the retailing, distribution, and consumption stages. From an economic point of view, the value per ton increases along the production value

chain. Additional financial investment is made during the sorting, processing, transportation, distribution, and retailing of food products. In the first stages of production (agriculture / growing crops, packaging and handling, and industrial processing), the value of the loss is estimated according to the wholesale price to the farmer. The waste in later stages of the value chain is estimated according to the food's retail price.

To estimate and analyze food waste and the potential for food rescue in Israel, a comprehensive value chain model was developed, incorporating the production and consumption of all food categories. The model was built using the BOTTOM-UP method, based on the analysis of data from agricultural production, storage, import, export, industrial processing, distribution, and consumption of a sample of about 50 different types of food. The data include processed agricultural products, converted into fresh produce equivalents⁷.

5. The value chain model does not include beverages, stimulants, sugar, honey, or sweets.








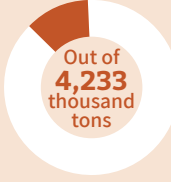
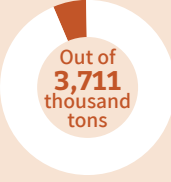
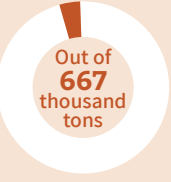
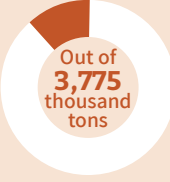
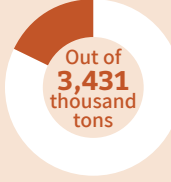

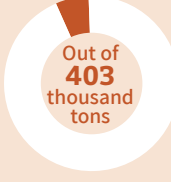



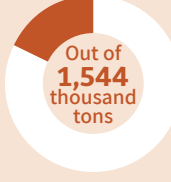



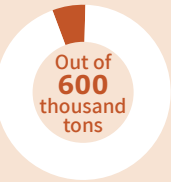
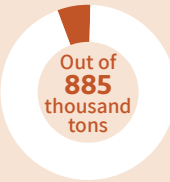
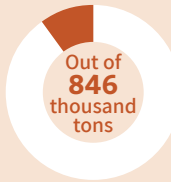






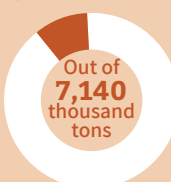
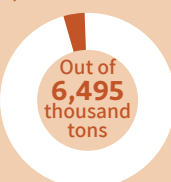
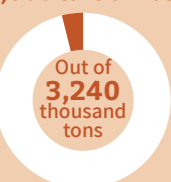
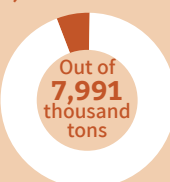
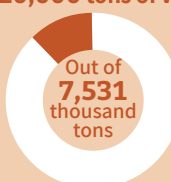
6. \$1 USD = NIS 3.53

7. Given the lack of official data, deviations or inaccuracies in these estimates may be inevitable. Additionally, annual food loss is affected by changing and random factors, such as extreme weather conditions, natural disasters, pests, fluctuations in demand, etc. The data are indicative and are intended to form a basis for public discussion and further research and analysis of the issue.

Estimated Food Waste in Israel, in Thousands of Tons per Year						
Waste/Household NIS/Month	Agriculture	Processing & Packaging	Industry	Retail & Distribution	Household Consumption	Total
Fruit & Vegetables	522	181	20	334	706	1,773
Grains & Legumes	21	15	18	48	309	411
Meat, Fish & Eggs	35	5	30	42	102	217
Milk & Dairy	64	9	19	29	103	224
Total	645	209	88	463	1,220	2,624

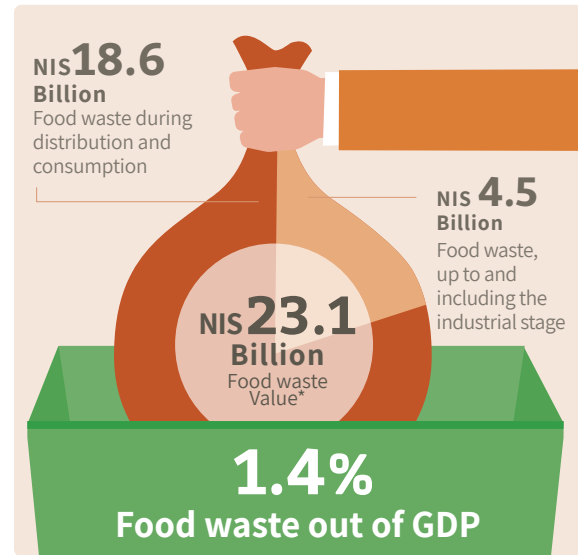
* The loss estimate in this sector does not include food waste that is recycled primarily as animal feed. Source: BDO estimates

Rate of Food Waste in Each Stage of the Value Chain in Thousands of Tons

	 Agriculture	 Processing & Packaging	 Industry	 Net Import minus other uses	 Retail & Distribution	 Consumption
 Fruit & Vegetables	12% 522,000 tons of waste  Out of 4,233 thousand tons	5% 181,000 tons of waste  Out of 3,711 thousand tons	3% 20,000 tons of waste  Out of 667 thousand tons	+299 thousand tons	9% 344,000 tons of waste  Out of 3,775 thousand tons	21% 706,000 tons of waste  Out of 3,431 thousand tons
 Grain & Legumes	5% 21,000 tons of waste  Out of 403 thousand tons	4% 15,000 tons of waste  Out of 382 thousand tons	5% 18,000 tons of waste  Out of 366 thousand tons	+1,243 thousand tons	3% 48,000 tons of waste  Out of 1,592 thousand tons	20% 309,000 tons of waste  Out of 1,544 thousand tons
 Meat, Fish & Eggs	5% 38,000 tons of waste  Out of 789 thousand tons	1% 5,000 tons of waste  Out of 751 thousand tons	5% 30,000 tons of waste  Out of 600 thousand tons	+170 thousand tons	5% 42,000 tons of waste  Out of 885 thousand tons	12% 102,000 tons of waste  Out of 846 thousand tons
 Milk & Dairy	4% 64,000 tons of waste  Out of 1,714 thousand tons	1% 9,000 tons of waste  Out of 1,651 thousand tons	1% 19,000 tons of waste  Out of 1,608 thousand tons	+9 thousand tons	2% 29,000 tons of waste  Out of 1,739 thousand tons	6% 103,000 tons of waste  Out of 1,710 thousand tons
Total	9% 645,000 tons of waste  Out of 7,140 thousand tons	3% 209,000 tons of waste  Out of 6,495 thousand tons	3% 88,000 tons of waste  Out of 3,240 thousand tons	+1,720 thousand tons	6% 463,000 tons of waste  Out of 7,991 thousand tons	16% 1,220,000 tons of waste  Out of 7,531 thousand tons

{ NIS 4.5 Billion } **20%** Lost

{ NIS 18.6 Billion } **80%** Lost



* Direct economic cost, without the cost of greenhouse gas emissions and air pollutants. Source: BDO estimates

The inputs and outputs for each food category were estimated in terms of the amount of raw agricultural produce and the rate of waste. This was done for each stage along the value chain in the processes of production, retailing, and consumption of food in Israel. Waste was assessed based on surveys conducted and updated by the Agricultural Research

Organization, Volcani Center (among other sources)⁸. Estimates of the total waste are based on the sum in each stage and the total is the sum for all stages across all categories.

The figures presented in this Report are based on estimates of food waste that consider a wide range of information sources and data available to the authors, as well as from collaborations with the Central Bureau of Statistics, the Ministry of Agriculture and Rural Development, the Ministry of Environmental Protection, the Ministry of Welfare and Social Affairs, conversations and interviews with experts in the field, previous studies and works, international comparative data and more.

8. Dr. Ron Porat, 2015 and 2016

Food waste is generally divided into two main stages of the value chain

- 1 Production: From agricultural growth through industrial processing**
- 2 Consumption: From retail and distribution to the final consumer**



Sorting and packing at the Logistics Center, Leket Israel. Credit: Leket Archive

Waste varies greatly across the various food categories value chain stages. For each food stage, waste is examined for the overall production or consumption stage. For example, 12% of the food is lost at the production stage and 16% of the food that reaches the consumption stage (home and institutional) is wasted.

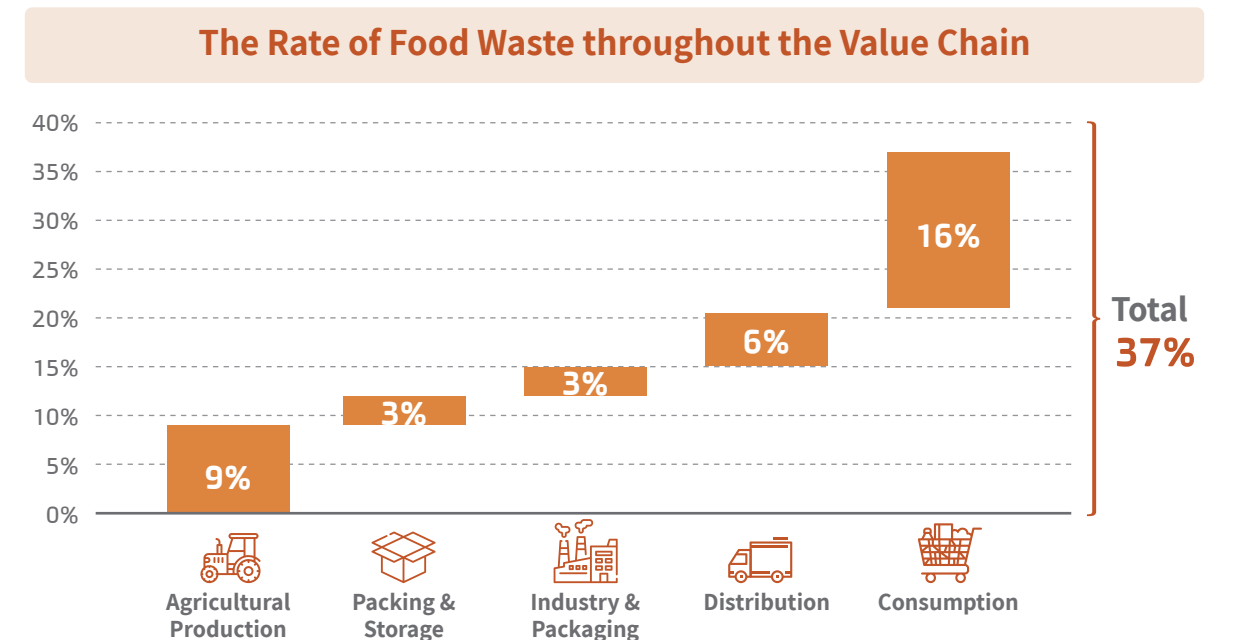
Fruit and vegetables play a central role in food waste in Israel. This stems both from the high percentage of fruit and vegetables produced by local agriculture, and their high rate of waste along the stages of the value chain. This is not unique to the Israeli economy, with an international comparison showing that the rate of waste of this produce is similar to Europe. Compared to the USA, the rate of waste in Israel is lower overall, with a lower waste rate in the agricultural production and consumption stages, and a higher waste rate in the intermediate stages⁹.

We estimated the economic value of food loss and waste in Israel at about NIS 23.1b (\$6.54b), which

represents about 1.4% of the GDP. Around 6% of this is attributed to unnecessary loss of natural resources (land and water). The cost attributed to unnecessary emissions of greenhouse gases and air pollutants at all stages along the value chain, as a result of growing and producing unconsumed food, is estimated at approximately NIS 1.5b (\$0.4b). The cost of packaging and handling food that is discarded is estimated at approximately NIS 860m (\$243m). Therefore, the total cost of food waste, including the loss of natural resources, the cost of greenhouse gas emissions and air pollutants and the cost of waste treatment, is about NIS 27.0b (\$7.6b).

In quantitative terms, about 54% of the loss occurs during production, industrial processing, packaging, retail, and distribution, before the food reaches the home or institutional consumers. In financial terms, about 57% of the value of the waste occurs during the private and institutional consumption stages.

9. Global Food Losses and Food Waste, United Nations Food and Agriculture Organization (FAO), 2011





3

Food Waste and Food Rescue During Retail and Distribution

NIS 5.5 billion worth of food is lost and wasted during retail and distribution

Food Waste and Food Rescue During Retail and Distribution ¹⁰

In 2022, food sales in Israel were assessed at approximately NIS 100b (\$28b) annually. This includes food sold to consumers in chain stores, open markets (shuks), neighborhood food stores, small retail outlets, and the institutional sector. About 460,000 tons of food are lost and wasted during retail and distribution. This is valued at about NIS 5.5b (\$1.6b), representing 5.5% of the total retail sales of food. Of this, about 370,000 tons, worth some NIS 4.4b (\$1.2b), could be rescued ¹¹. Additionally, the environmental cost of food waste during retail and distribution is approximately NIS 860m (\$244m) ¹².

Waste during retail and distribution mainly involves food with a short shelf life that has passed its expiration date, or food with aesthetic defects or damage to its packaging. Food manufacturers, distributors, and retailers have an economic incentive to minimize food waste through effective supply chain management, maintaining proper storage conditions, and inventory planning.

However, this incentive is nullified by agreements that allow distributors and retailers to return a certain percentage of unsold food products to the manufacturers at no cost. Even with optimal planning for distribution and marketing, some food surpluses are inevitable because retailers are expected to provide a wide and varied food supply at all times. Consumers become quickly dissatisfied when the food products they want are unavailable. Therefore, the cost to retailers due to poor inventory is far greater than the cost of creating surplus, making surplus food an inherent part of the retail sales process. However, discarding food surplus rather than rescuing it is an economic failure of the market. One challenge facing government policymakers is to create a system of incentives for salvaging surplus and making it available to people in need. Naturally, the rate of waste is higher for fresh or perishable food products, such as fruit, vegetables, bread, and baked goods.

10. In this Report, waste from the retail and distribution sector refers to waste occurring from the end of the production phase up to sale to the consumer. This entails loss or waste of finished products that are ready to be marketed by the manufacturers, loss at wholesalers, returns from retailers to manufacturers, and loss during retail.

11. These figures for the rate of salvageable food in the retail and distribution sector were assessed using the BDO model, based on data from the Israel Central Bureau of Statistics and information from major marketing chains.

12. This environmental cost was not embodied in the market value of the lost and wasted food. That is, the market value of wasted food does not include the cost of natural resources wasted during retail and distribution.

370 thousand tons of food could be rescued during retail and distribution

An international comparison found that the rate of food waste during the retail and distribution sector in Israel is similar to that in most developed countries, despite the potential for greater waste due to Israel's hot weather conditions. This indicates that inventory management during retail and distribution in Israel is conducted according to relatively high standards. In developing countries, waste rates tend to be higher, mainly due to inadequate distribution, storage, and marketing.

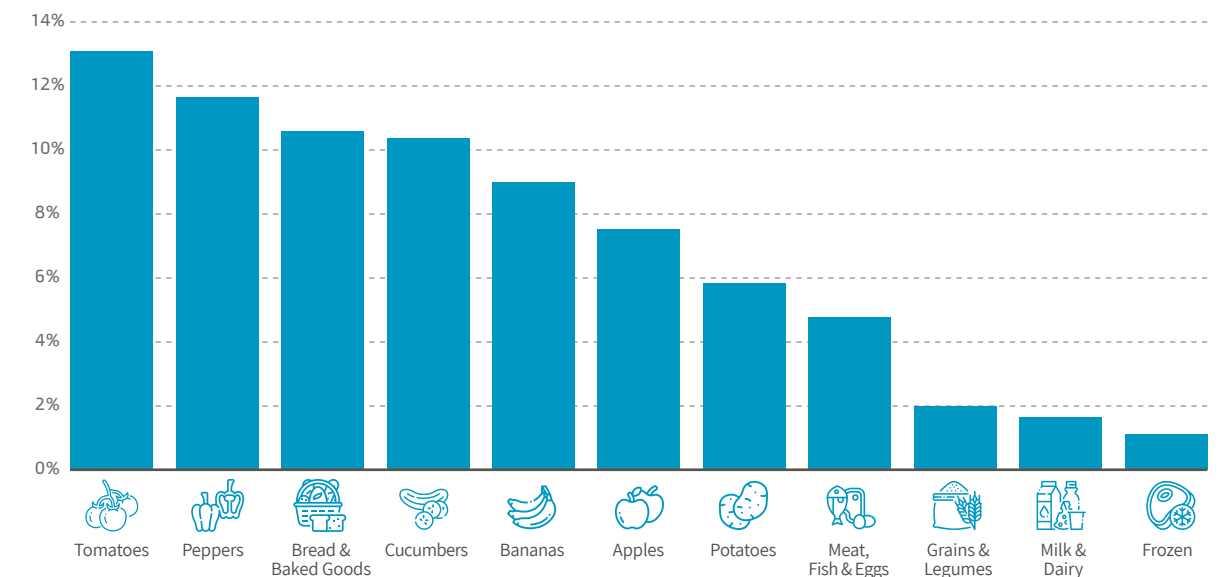
In recent years, food marketers in Israel have made efforts to establish advanced logistics centers, inventory management systems, online demand planning, and maintenance of the cold chain in distribution. This has reduced food waste during retail and distribution.

In 2022 there was a trend among consumers towards purchasing online or through chain stores, both of which are characterized by a relatively low waste rate. Accordingly, the rate of food waste in this sector decreased slightly this year.

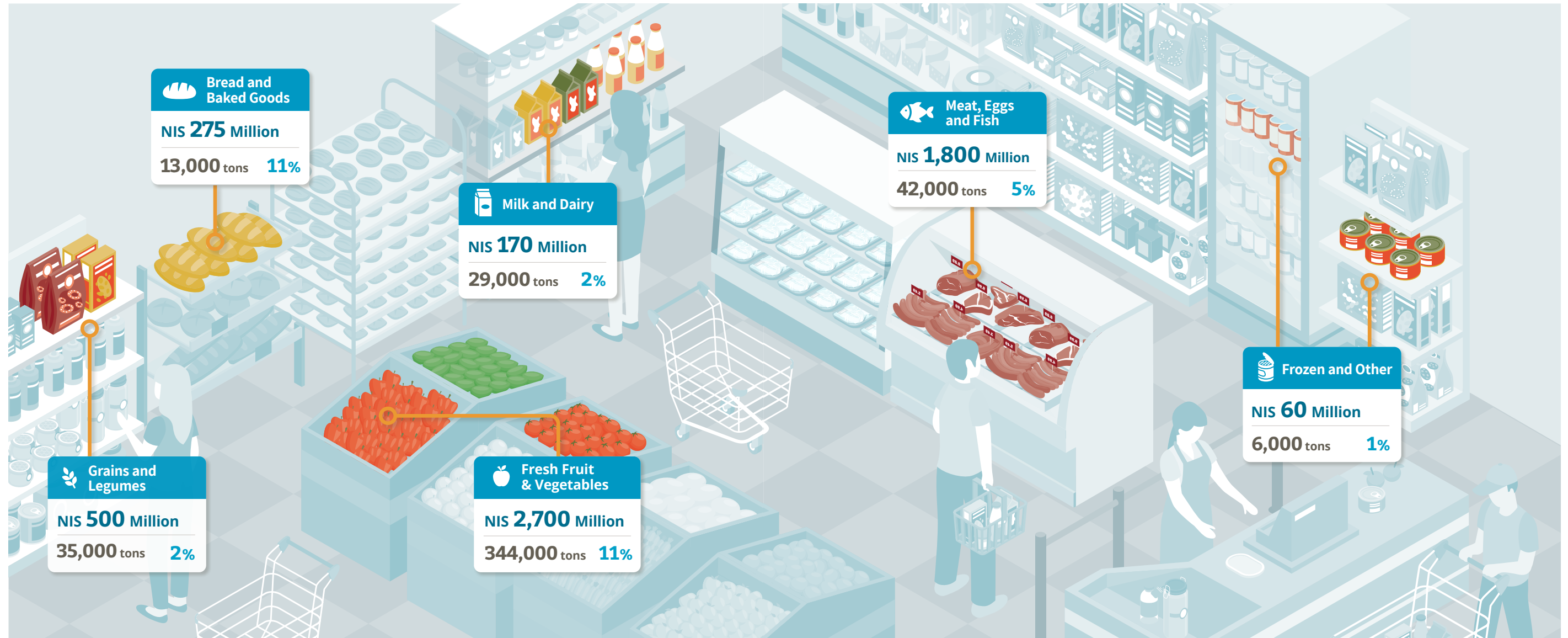
Online retail may also have an environmental benefit by reducing the number of consumers' trips to stores, and by consolidating shipments to multiple addresses on one delivery route. A 2014 study conducted at the University of Washington found that optimizing shipment and distribution routes could reduce carbon emissions by up to 80%, as compared to when consumers drive to stores to make purchases ¹³.

13. Changing Retail Business Models and the Impact on CO2 Emissions from Transport: E-commerce Deliveries in Urban and Rural Areas, Anne Goodchild




Rate of Waste in the Retail and Distribution Sector for Selected Foods



Financial Loss During Retail and Distribution



Primary Causes of Waste

- 
Expiration Date
- 
Aesthetic Defects
- 
Damaged Food

Value of Loss

NIS 5.5 Billion

* Numbers are rounded for ease of presentation.

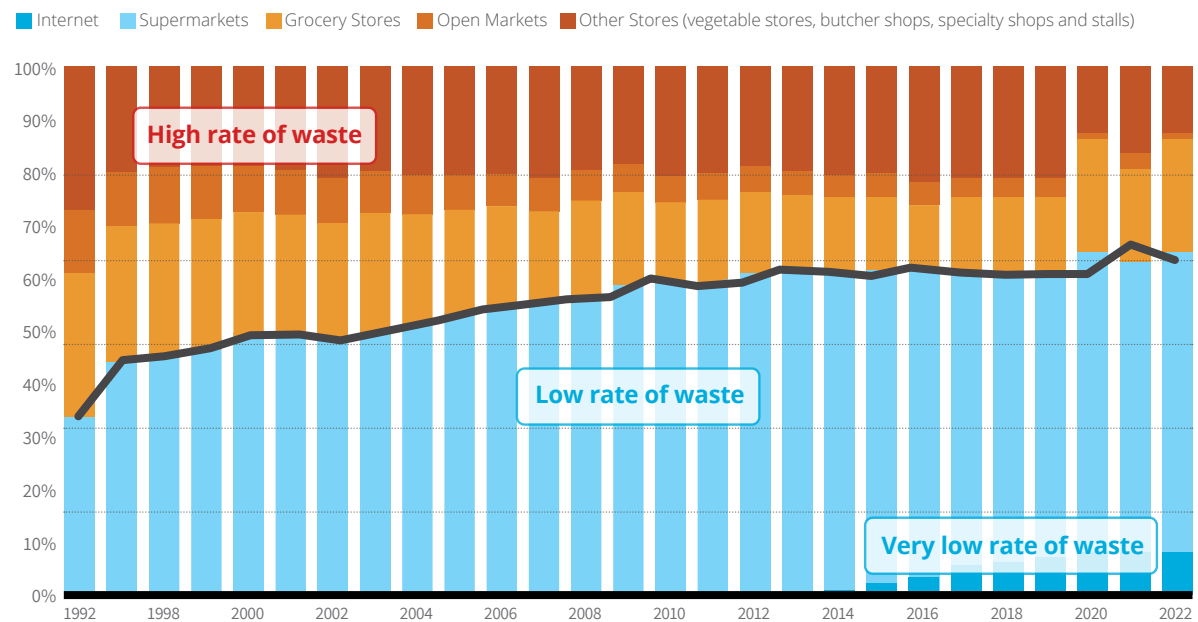
**The rate of the loss refers to the loss from the total production or consumption of the same food category at each stage in the value chain.

Waste from the retail and distribution sector has a high economic cost since it includes all the investment made thus far, in food cultivation, production, packaging, and transportation. This food is ready for marketing and consumption but is wasted before reaching the final consumer. The vast majority of food waste at this stage is potentially salvageable. Some NIS 5.5b (\$1.6b) worth of food is wasted at this stage; approximately 370,000 tons, including 345,000 tons of fruit and vegetables. Of this, it is estimated that some NIS 4.4b (\$1.25b) worth of food could be rescued. This represents about 70% of the food rescue necessary to close the nutritional gap for people living with food insecurity in Israel [for more information, see Chapter 7]. It would also prevent excess healthcare costs valued at about NIS 4.3b (\$1b) per year [see Chapter 8].



Source: Food and Agriculture Organization (FAO) data, processed by BDO

Consumers' Transition Towards Shopping Venues with Lower Waste Rates



Source: CBS, analyzed by BDO

There are three main factors behind food waste during retail and distribution

1 Perishability (short shelf life)
 Food products have a limited shelf life, and it is inevitable that some will pass their expiration date before being sold. Food that has passed its expiration date cannot be sold or given to those in need. To minimize food waste during retail and distribution, there is a need for inventory management systems that statistically assess the rate of consumption compared to the inventory. Also, incentives to rescue food could be developed. For example, foods that are nearing (but have not yet passed) their expiration date could be sold at a discount or donated to those in need. There should be a re-examination of policies around food viability classification. Additionally, consumers should receive explanations regarding the meanings of various markings related to food expiration dates.

2 Aesthetic defects in products or packaging
 Aesthetic defects lower products' market value, but in most cases do not impact nutritional value. Loss and waste of nutritious food due to low market value reflects an economic failure.

3 Damaged food
 Damage during logistical processes plays a relatively minor role in food waste because extensive efforts are already being made to minimize the waste. Damage can be caused at various stages of retail and distribution, such as broken eggs, spilled or dropped products, spoiled fruit and vegetables, leftovers from the butcher shop or delicatessen, etc. This food is not rescuable for human consumption, but it can be used for feeding animals or for industrial purposes.

Actions Undertaken to Reduce Food Waste During Retail and Distribution

Retailers and distributors already make efforts to reduce waste and rescue food, due to economic considerations. This is done in several ways:

1. Sales and promotions of surpluses
 Retailers offer discounts on perishables nearing their expiration date or products with damaged packaging.

2. Food donation
 This may be coordinated centrally through contracts with food rescue associations or as local initiatives by various branches.

Food producers may donate surpluses or perishables to food rescue associations.

When it is noted at the factory that products have damaged packaging or aesthetic defects but are still safe and suitable for human consumption, they may be sold to various secondary markets.



4

Food Waste and Rescue in the Institutional Consumption Sector

226 thousand tons of food were lost and wasted in institutional consumption settings in 2022

Food Waste and Rescue in the Institutional Consumption Sector

In 2022, Israeli households consumed a significant portion of their food outside the home, in various institutional settings¹⁶. This played a large role in the increased rate of food waste.

According to the 8th Annual Food Waste and Rescue Report, some 2 million people in Israel ate at least one meal (an average of 1.1 meals) outside the home each day¹⁷. This represents a total of about 690 million meals, comprising some 770 thousand tons of food. The financial expenditure on food purchased and consumed outside the home was about NIS 14b (\$4b) per year.

Food waste at the institutional consumption level amounted to 226 thousand tons, an increase of about 5% compared to 2021. The cost of this waste was about NIS 3.6b (\$1b), in addition to the environmental cost of about NIS 255m (\$72m)¹⁸.

It is possible to rescue about 74 thousand tons of food per year, with a value of approximately NIS 1.2b (\$340m), equivalent to about 64 million meals per year, on average.

It would be possible to salvage about a third of the food that is lost or wasted in institutional settings

each year; an average of about 64 million meals comprising 74 thousand tons of food valued at NIS 1.2b (\$340m).

Routinely, about 20% of the food consumed in Israel is eaten in the framework of institutions with catered meals: in cafeterias of factories and workplaces, on bases for the army, police, and Israel Security Agency (Shin Bet), in hotels, event halls, restaurants, schools, hospitals, etc¹⁹. Because a large number of people eat together in one place, there is significant potential for reducing waste and increasing food rescue. When feeding a large number of people in institutional settings, some food waste is inevitable because there is a need to ensure an adequate amount of food that is varied enough to suit people's preferences. There are also structural factors of uncertainty that must be considered.

It is possible to rescue about 74 thousand tons of food per year, with a value of approximately NIS 1.2b (\$340m), equivalent to about 64 million meals per year, on average.

16. In this Report, the institutional sector includes food consumption in event halls, hotels, hospitals, security force bases, workplaces, educational institutions, and restaurants.
 17. The BDO model for food waste in the institutional sector is based on data from the Israel Central Bureau of Statistics, the National Restaurant Association, the Association of Owners of Halls and Event Venues in Israel, and Israeli security forces.
 18. This environmental cost was not embodied in the market value of the food wasted in this sector.
 19. The model calculated the average size of a meal for each category, according to its characteristics.

5% increase in food waste from institutional consumption in 2022 compared to 2021

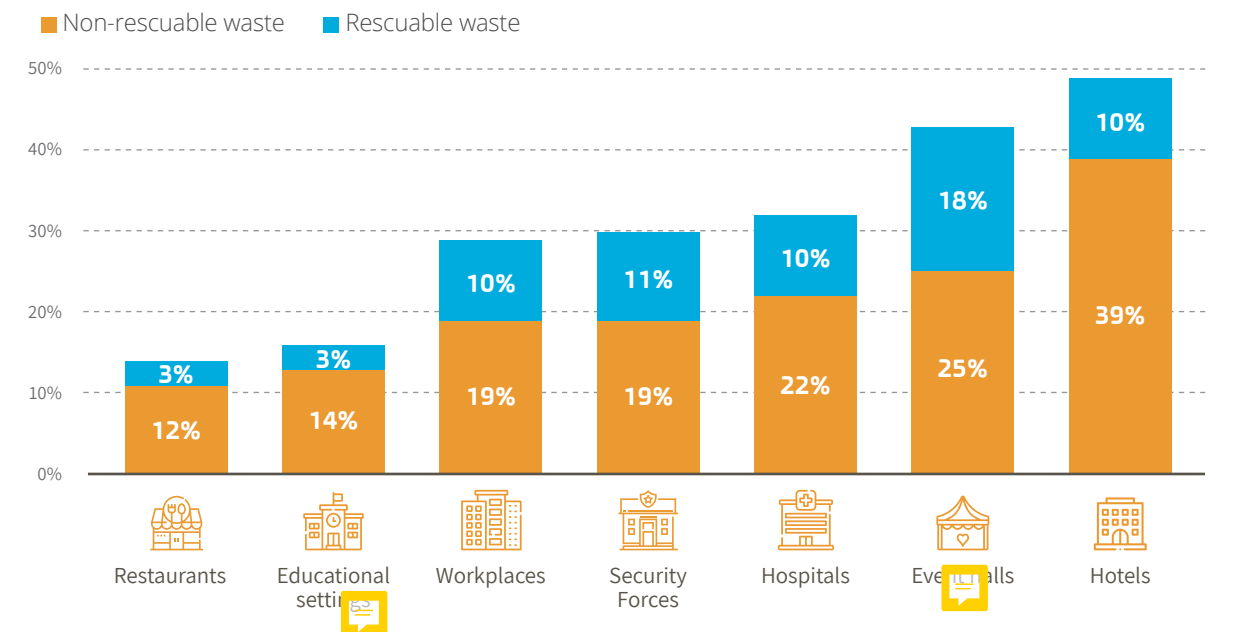
In recent years, most institutional kitchens are operated by external companies with a high level of expertise in the field. They strive to achieve maximum economic efficiency and minimize waste. Additionally, the Covid-19 crisis forced caterers to change their serving methods, which led to a reduction in waste.

Nevertheless, catering companies working in this field cannot plan only according to the average number of diners. They must calculate a margin of safety to ensure that they provide an adequate supply of food even on days where the number of diners exceeds the average.

The analysis in this Report shows that institutional settings with a high level of uncertainty regarding the number of diners tend to have a higher amount of waste. For example, at open military bases or workplaces where diners have other alternatives, waste is greater than in institutional settings where there is less uncertainty about the number of diners, such as schools or prisons.

In addition, there is greater waste when a higher variety of dishes is offered, due to uncertainty about diners' preferences. At event halls and hotels, where this is the case, the waste is higher compared to workplaces or military and police bases.

Rate of Food Waste from the Institutional Consumption Sector, by Venue



The nature of the food service and the population of diners also affect the extent of waste. In restaurants, where the food is prepared to order and consumers pay according to their actual consumption, the waste rate is lower than in settings that offer buffet-style serving, where the food is prepared in advance.

In 2022, the value of potentially rescuable food that was lost or wasted in the institutional sector was estimated at NIS 1.2b (\$340m). This represents an increase over the previous year, which is attributable to a return to routine

activity patterns following the Covid-19 crisis, the impacts of which were still being felt in 2021. Approximately 40% of the salvageable food waste occurred in event halls where it was estimated that about 22 thousand tons of food worth about NIS 464m (\$131m) could have been rescued in 2022. A significant amount of food could also be rescued from security force bases, hotels, and workplaces. It was estimated that in 2022, food worth between NIS 110m (\$31m) and NIS 190m (\$54m) could have been salvaged from each of these types of








settings. Food worth NIS 55m (\$16m) could be rescued from hospitals. In restaurants, there is a significant amount of potentially salvageable food, worth approximately NIS 150m (\$42.5m) per year. However, because of the physical distances between restaurants and lack of critical mass at each, the feasibility of actually salvaging food from restaurants is low.

The high yield of food that could be rescued in the institutional consumption sector is due to the relatively high value of the meals and the relatively low logistical costs of collecting food

from large kitchens that tend to be concentrated in city centers and industrial areas.

The 74 thousand tons of food per year that could potentially be rescued at the institutional consumption level constitute approximately 15% of the amount of food required to complete the nutritional gap in food insecurity in Israel [see Chapter 7]. This has the potential to reduce excess health costs valued at approximately NIS \$900m (\$255m) per year [for more, see Chapter 8].

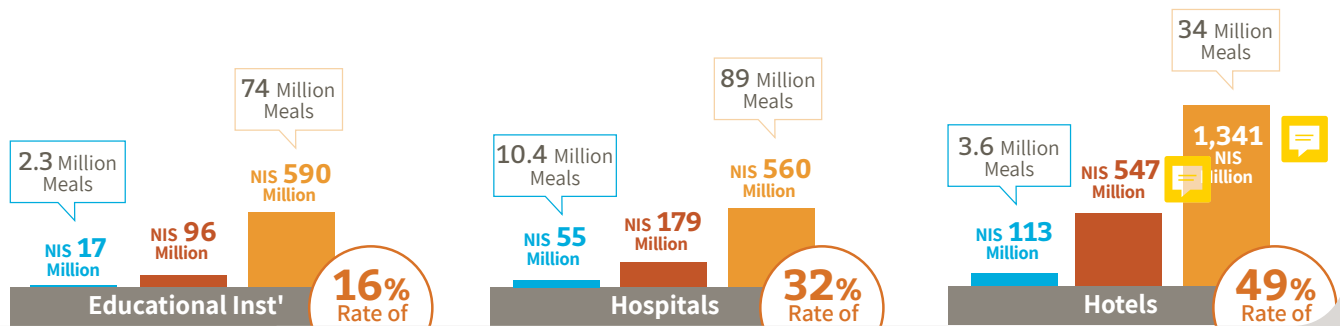
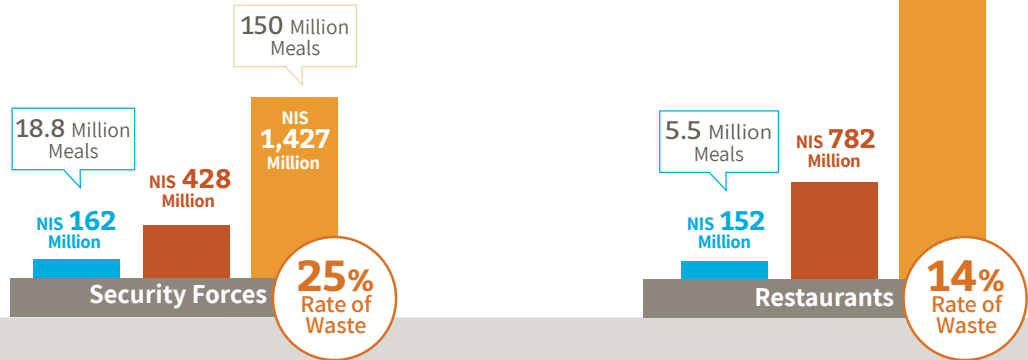
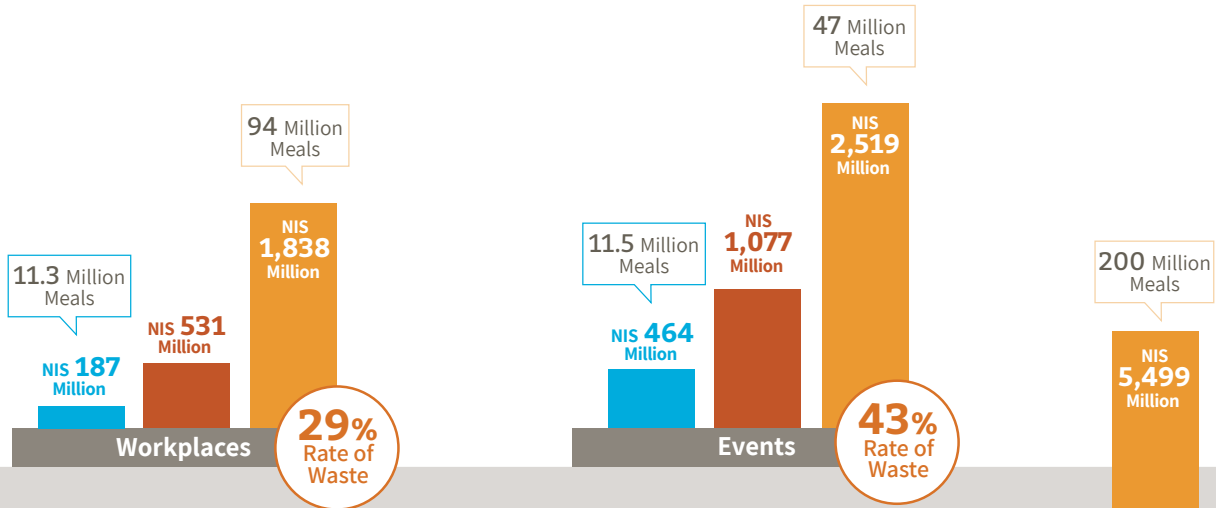
Summary of Estimated Food Waste in Institutional Settings

	 Event Halls	 Security Forces	 Workplaces		 Hotels	 Hospitals	 Restaurants	 Educational Institutions	Total
Relevant Population (Thousand people)*	117	239	430		57	184	488	413	1,928
Meals Served (yearly) (Million meals)	47	150	94		34	89	200	74	689
Food Consumed (yearly) (Thousand tons)	122	171	165		51	71	150	37	767
Annual Waste (Thousand tons)	52	51	48		25	23	21	6	226
Rate of Waste (%)	43%	30%	29%		49%	32%	14%	16%	29%
Rescuable Waste (Thousand tons)	22	19	17		5	7	4	1	74

* This figure was estimated according to the number of working days relevant for each category and distinguishes between the various populations within each category.

Summary of the Value of Rescuable Food Wasted via Consumption at the Institutional Level Each Year

■ Market share
 ■ Value of wasted food
 ■ Value of rescuable food





5

**Food Waste
and Rescue at
the Household
Consumption Level**

NIS 9.5 billion value of food wasted via household consumption in 2022

Food Waste and Rescue at the Household Consumption Level

In Israel in 2022, some 990,000 tons of food were wasted through household consumption. This was about 4% higher than the previous year, as a result of population growth and increased agricultural output²⁰. The value of the food wasted via household consumption in 2022 was

approximately NIS 9.5b (\$2.7b), reflecting a 5% increase in food prices between 2021 and 2022. Along with this direct cost, the environmental costs from household food waste were approximately NIS 1.0b (\$0.3b)²¹.

20. Based on the BDO value chain model, using weighted data from the Israel Central Bureau of Statistics for 2022, a national waste composition survey conducted by the Israel Ministry of Environmental Protection for 2012-2013, a survey conducted by Geocartography in January 2019, and the research article: Ayalon, O., Elimelech, E. and Art, E. (2018). "What gets measured gets managed: A new method of measuring household food waste," Waste Management 76, 68-81.

21. The market value of the food waste does not include the environmental cost of the natural resources wasted on unconsumed food during this stage.

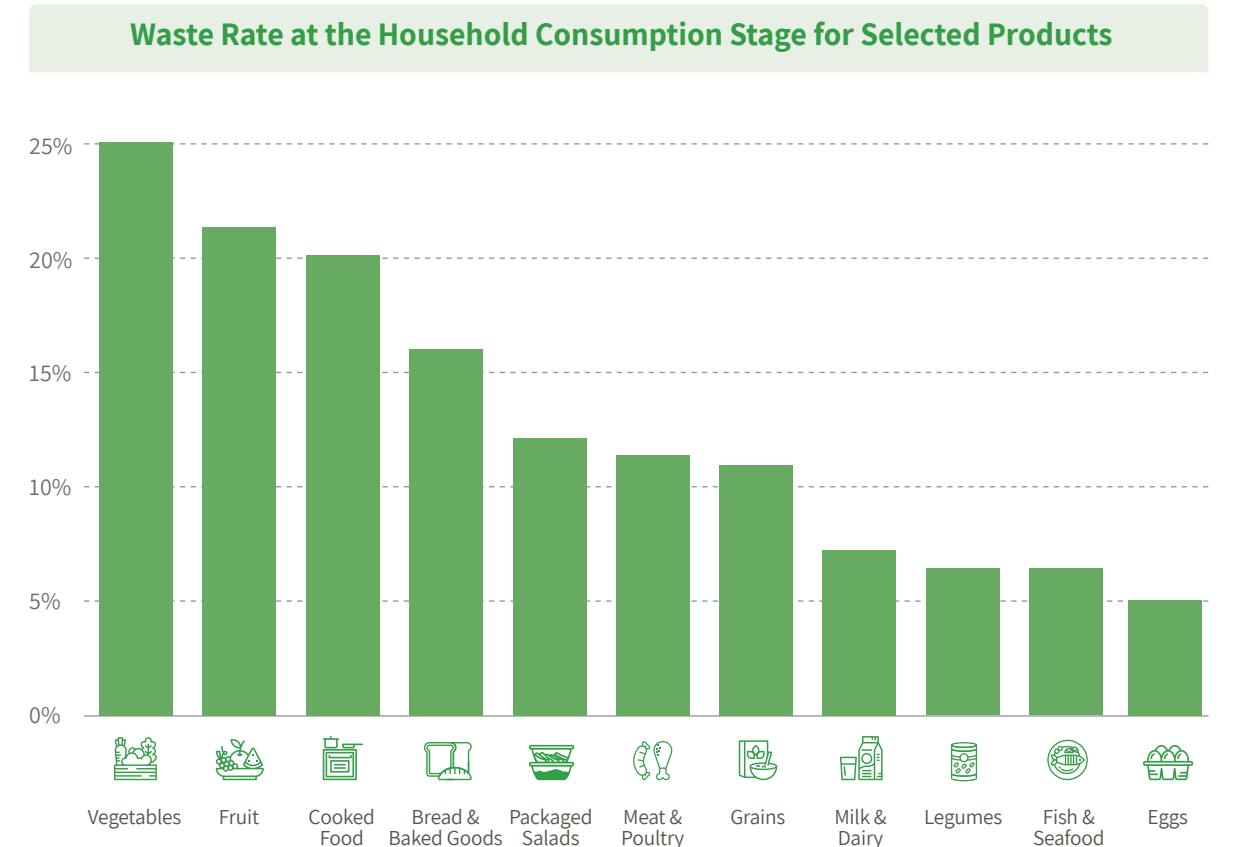
Costs of Food Waste			
	Monthly Expenditure on Food	Monthly Food Waste	% Waste
Fruit & Vegetables	NIS 640 (\$181)	NIS 148 (\$42)	23%
Grains & Legumes	NIS 800 (\$226)	NIS 111 (\$31)	14%
Meat, Eggs & Fish	NIS 695 (\$197)	NIS 54 (\$15)	8%
Milk & Dairy Products	NIS 320 (\$91)	NIS 21 (\$6)	7%
Total	NIS 2,455 (\$695)	NIS 335 (\$94)	14%

NIS 4,000 value of food wasted each year, per household in Israel

Food waste in households results from a combination of consumer habits & the culture of abundance, along with how food is stored and kept fresh.

2022, the average Israeli family threw away about NIS 4,000 (\$1,133) worth of food -- the amount they would spend on food in six weeks. The average household financial cost of wasted food was NIS 335 (\$95) monthly. Of this, NIS 148 (\$42) were fruit and vegetables, NIS 111 (\$31) of grains and legumes, NIS 54 (\$15) of meat, eggs, and fish, and NIS 21 (\$6) of dairy products.

An average household in Israel throws away about 14% of the food it purchases. This means that in



Source: BDO estimates

Primary Causes of Household Food Waste: Preparation of Excess Food and Expiration

Food waste within households results from a combination of consumer habits and the culture of abundance, and how food is stored. The value of food waste from household consumption is approximately NIS 9.5b (\$2.7b) per year.

The primary causes of food waste via household consumption are ²²:

- 1. Excess preparation:** Cooking and preparing more food than is needed, sometimes due to over-purchasing.
- 2. Expiration (spoiling):** Some food is not consumed before it spoils or passes its expiration date. This can also be related to overbuying. The desire for variety, together with uncertainty about how much the household will consume, creates a situation in which some of the purchased food expires before it is consumed.
- 3. Over-purchasing:** Buying more food than the amount consumed, results in high amounts of food waste.

4. Improper storage: Improper storage shortens the shelf life of food products. Consumers' lack of knowledge about optimal storage conditions or lack of attention to proper storage leads to spoilage and disposal of food products.

Other causes of food waste in household consumption include damaged or spilled food and food that was not prepared or cooked properly.

In Israel, where expenditure on food is relatively high compared to other countries, food waste is one of the factors that affects the cost of living.

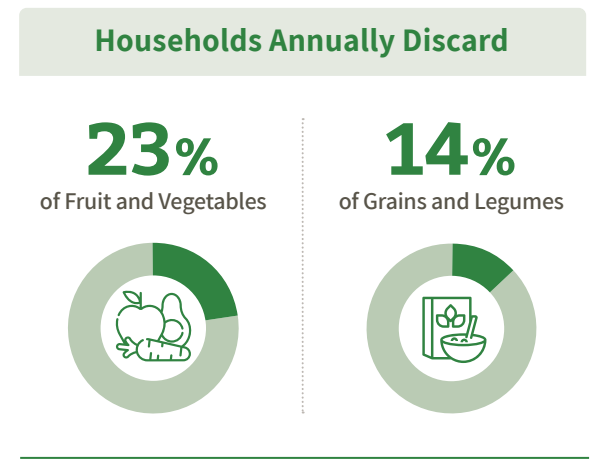
Loss and waste of food within households are not unique to Israel, and the waste rates in Israel are similar to those in other developed countries. The

highest rate of waste in Israel, as well as in other Western countries, is in fruit and vegetables: 23% of the vegetables and fruit bought in Israel are thrown away, compared to 28% in the USA, and 19% in Europe. This is mainly due to their short shelf life and failure to store them in optimal conditions.

For meat, fish, and dairy products, the rate of waste is about 8%. This lower rate is due, in part, to their extended shelf lives if frozen, as well as their higher cost per unit of weight, which creates an economic incentive to reduce waste. The waste rate of these products in Israel is similar to that in Europe, and lower than in the US.

For grains and legumes, the rate of waste is about 14%. This reflects the relatively short shelf life for breads and pastries alongside the long shelf life of uncooked grains and legumes.

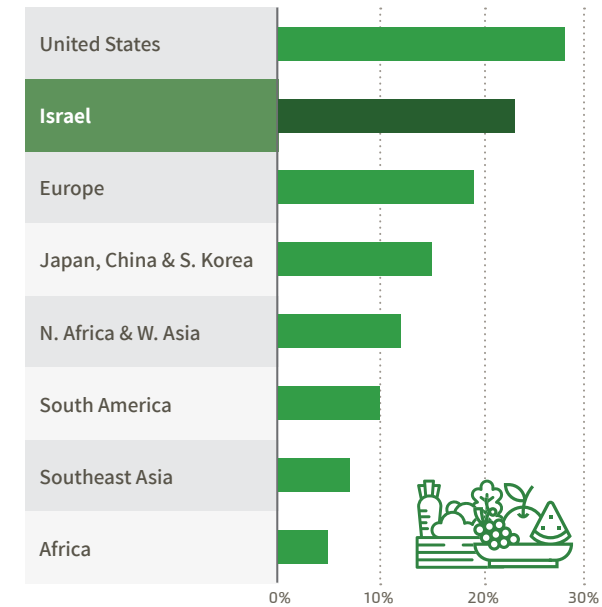
In Israel, where food expenditure is relatively high compared to other countries, food waste is a factor that affects the cost of living.



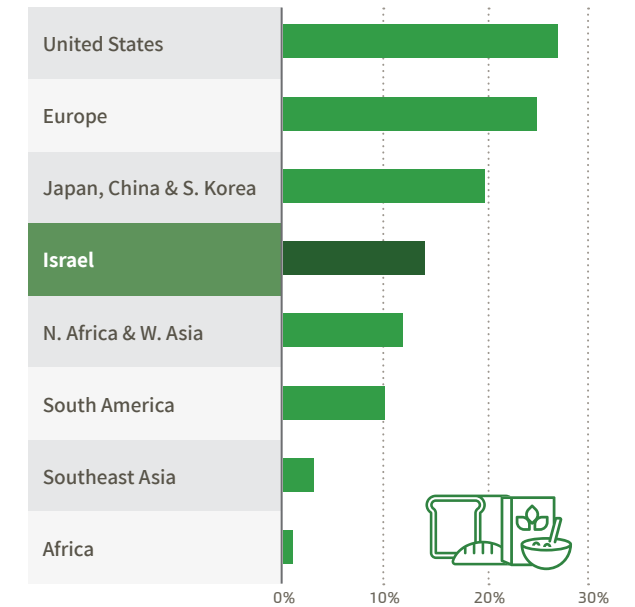
22. 2022 Global Food Security Index, Economist

An International Comparison of Rates of Household Food Waste

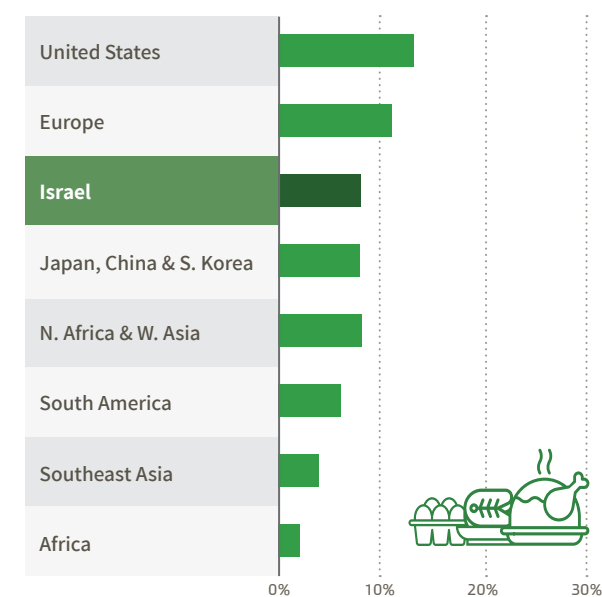
Fruit and Vegetables



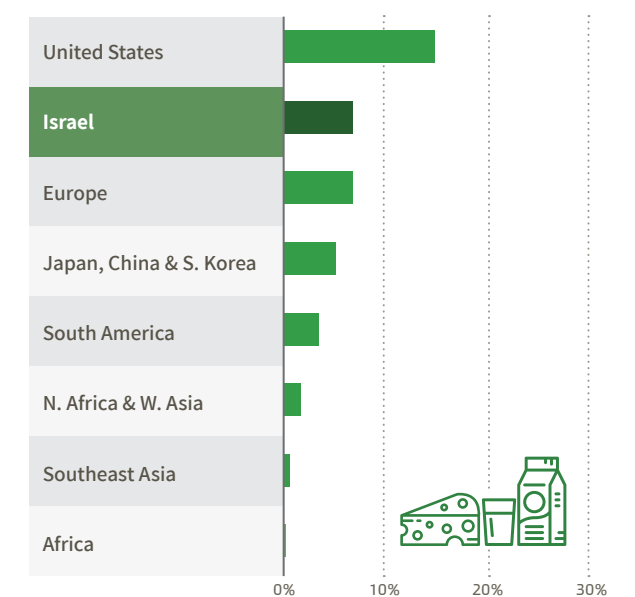
Grains and Legumes



Meat, Eggs and Fish

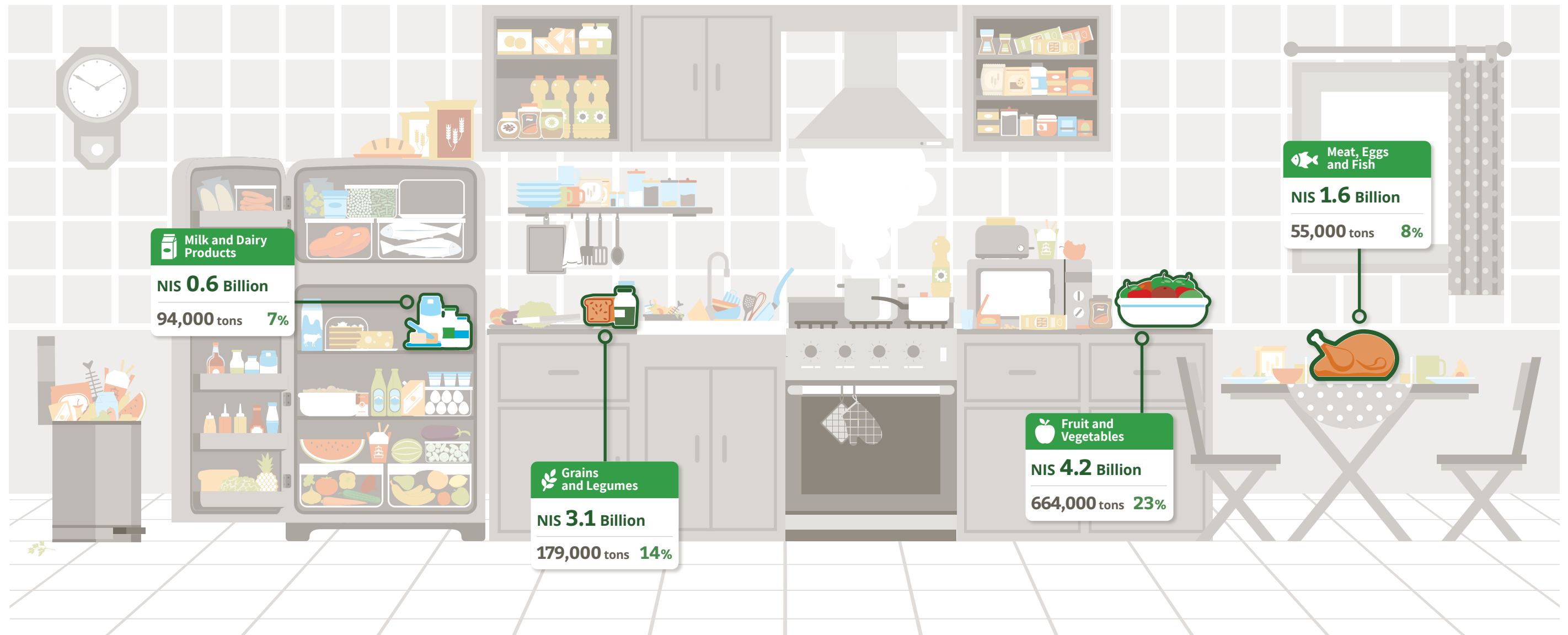


Milk and Dairy Products



22. 2022 Global Food Security Index, Economist

Household Food Waste in Israel Per Year



Primary Causes of Waste

- 1** Surplus preparation of food
- 2** Expired food
- 3** Damaged or spilled food
- 4** Poor preparation/cooking
- 5** Excess purchasing

Value of Loss

NIS 9.5 Billion

*From "Geocartography" survey findings, March 2021 by Leket Israel and BDO.

** The rate of the loss refers to the loss from the total production or consumption of the same food category at each stage in the value chain.

NIS 9,900
Total Value of Annual Food Waste per Household ²³

In Israel, where food expenditure is relatively high compared to other countries, food waste is a factor that affects the cost of living. This includes excess expenditures on food and the effect of loss and waste on increasing food prices. Overall, food waste from households drives up the cost of living by NIS 9,900 (\$2,800) per household per year.

23. Cost of living, including taxes and external costs
 24. External costs not included in this are: removing and burying the discarded food, the financial impacts of greenhouse gas emissions and air pollutants, and the increase in wholesale price due to loss in agriculture and industry.

Cost of living – Excess expenditures:

Buying food that is then thrown away is a direct cost to a household. On average, the direct financial loss per household (without indirect, external costs) ²⁴ from wasted food is NIS 335 (\$95) per month, or NIS 4,000 (\$1,133) annually. The costs of disposing of food and burying it in landfills also eventually come out of consumers’ pockets through property taxes and municipal taxes, causing an additional annual household cost of NIS 215 (\$61) for the removal of wasted food.

Cost of living – Increased food prices:

Beyond households’ direct excess expenditures on food that they purchased but did not consume, food loss has an impact at all stages of the value chain, prior to consumption. From an economic point of view, the cost of food reflects all production and sales expenditures at all stages of the value chain: cultivation, production, packaging, transportation,

Food Waste: Impact on the Cost of Living

	Annual cost per household	Impact on the cost of food
Value of food thrown away at home	NIS 4,000 (\$1,133)	-
Healthcare costs due to not utilizing food to its potential	NIS 2,200 (\$623)	-
Cost of removal and disposal of wasted food	NIS 215 (\$61)	-
Costs due to producing greenhouse gases and air pollutants	NIS 235 (\$67)	-
Retail price increases due to food waste via markets	NIS 1,950 (\$552)	6%
Wholesale price increase due to loss in agriculture and industry	NIS 1,300 (\$368)	5%
Total	NIS 9,550 (\$2,804)	11%

and marketing. Therefore, the price of food in marketing outlets includes food waste from the retail sector. Similarly, the wholesale food price reflects food loss in the agricultural and industrial sectors. Eventually, the consumer pays the costs of loss at all stages of the value chain, resulting in an additional NIS 3,250 (\$920) per year, due to an increase in food prices by 11%.

Food insecurity is a risk factor for chronic disease and mental illness, and it impacts the national economy by increasing healthcare costs.

Cost of living – Health costs from wasting food:

Food waste indirectly affects healthcare costs because not fully using the food purchased by households exacerbates food insecurity. Food insecurity is a risk factor for chronic disease and mental illness, and it impacts the national economy by increasing healthcare costs. The cost of these health impacts on the Israeli economy overall was estimated at about NIS 6.2b (\$1.75b) in 2022 or about NIS 2,200 (\$623) per household [see Chapter 8].

990,000 tons of household food waste were sent to landfills, causing an additional 310,000 trips per year, approximately, by garbage collection trucks.

Cost of living – Environmental impacts from emission of greenhouse gases and air pollutants:

The environmental effects of food waste indirectly impact the cost of living. The emission of air pollutants has negative effects on human health

and the environment. These external costs resulting from environmental damage affect the economy as a whole, mainly due to additional expenditures on healthcare ²⁵. The monetary value of these negative environmental impacts on social welfare in 2022 was estimated at about NIS 1.5b (\$0.42b) for the Israeli economy overall, and about NIS 235 (\$67) per household [see Chapter 10].

Beyond these direct impacts on the cost of living from wasted food, and the indirect costs from removing and transporting wasted food, burning fossil fuels, and environmental damage caused by greenhouse gas emissions, there are additional effects such as traffic congestion and soil pollution, which are not included in the environmental cost estimates in this Report [see Chapter 10].

When landfilled organic waste breaks down, it emits methane gas, a greenhouse gas whose Global Warming Potential (GWP) is 84 times higher than that of carbon dioxide in the short term (20 years), and 28 times higher in the long term (100 years) ²⁶.

According to the findings of the 2022 Food Waste and Rescue Report, 990,000 tons of household food waste were sent to landfills, causing an additional 310,000 trips per year, approximately, by garbage collection trucks that cause air pollution, road congestion, noise pollution, and accidents. Therefore, beyond the NIS 9.5b (\$2.7b) in costs due to household food waste, and NIS 0.5b (\$0.14b) for the removal of wasted food from households, additional external costs are incurred from traffic congestion and environmental impacts.

25. The Green Book: Estimating and Measuring Environmental Costs, The Ministry of Environmental Protection, 2021.
 26. IPCC, 2014: Climate Change 2014: Synthesis Report



6 Food Waste: How Much Food Can Be Rescued?

NIS 8.1 billion
value of
rescuable food

Food Waste: How Much Food Can Be Rescued?

Approximately 2.6 million tons of food per year -- 37% of the food produced in Israel -- is wasted during the production, retail, distribution, and consumption stages. The direct cost of this food waste is approximately NIS 23.1b (\$6.5b), which comprises 1.4% of the GDP. There are additional costs of greenhouse gas emissions and air pollutants from producing food that is wasted, bringing the total cost of food loss to approximately NIS 27b (\$7.6b). About half the food wasted is edible and could be salvaged.

In terms of food rescue, the most important element is edible food (with nutritional and health value) that does not reach the consumption stage. There are various and diverse reasons for this waste at each of the stages of food production. The common denominator is the lack of economic viability for the food producer (farmer, industrialist, retailer, etc.) to invest additional resources in the subsequent stages of food production or distribution.

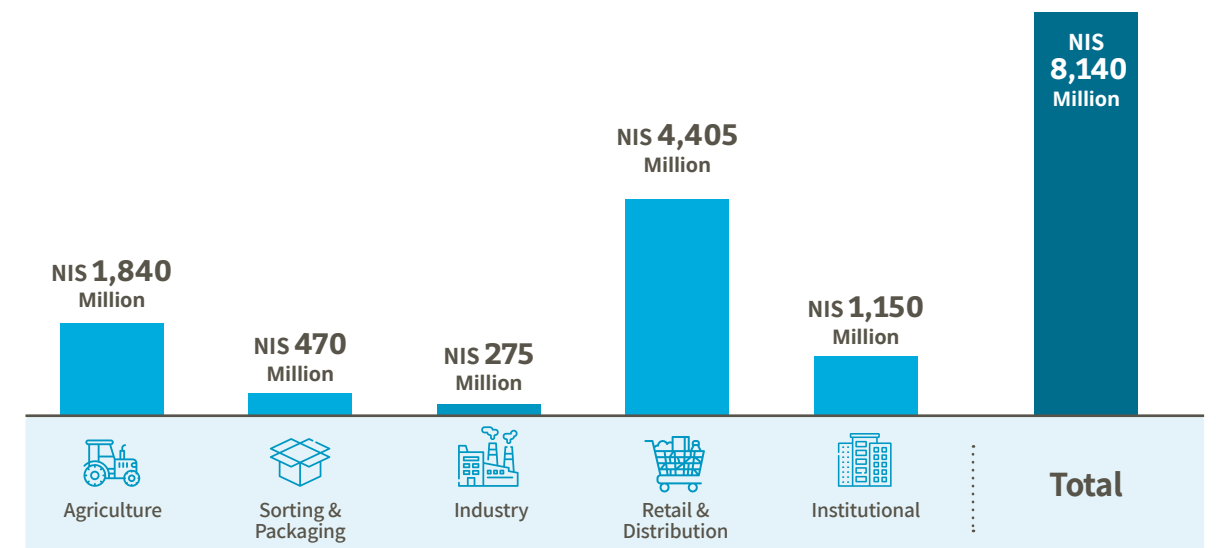
The goal of reducing the amount of food waste, whether by preventing its production or by saving surpluses that have been created, is at the top of the global public agenda. The estimates for salvageable food amounts were derived from the value chain model developed for the food industry. For each type of food and at each stage

along the value chain, the factors causing loss were examined and food waste was classified as either fit or unfit for human consumption. It is important to note that classifying food as rescuable does not refer to the economic viability of saving it, but rather to the safety of eating such food and the technical possibility of using it to feed people.

The value of salvageable food waste is approximately NIS 8.1b (\$2.3b). The worth of the lost food increases along the value chain, as more resources are invested in growing, production, packaging, and transportation. The following table shows that the greatest value of wasted food is in the retail and distribution sector. These food products are ready for marketing and consumption but are discarded before reaching the final consumer.

The value of rescuable wasted food is approximately NIS 8.1b (\$2.3b). The value of food waste increases along the value chain, as more resources are invested in growing, production, packaging and transportation.

Value of Rescuable Food Waste Along the Value Chain



These figures have been rounded for ease of presentation. Source: BDO estimates



Volunteers assisting in sorting and packing at the Leket Israel Logistics Center. Credit: Leket Israel

According to the estimates presented in this Report, about half of the food that is lost or wasted could be used to feed vulnerable populations experiencing food insecurity, if there were adequate resources to make salvaging it economically viable. On an individual level, food insecurity is a risk factor for chronic disease and mental illness. Rescuing even 20% of the food that is lost or wasted in Israel would fill the nutritional gap for people living with food insecurity [for more details, see Chapter 7]. This also has economic benefits on the national level because food insecurity results in some NIS 5.2b (\$1.5b) per year in excess healthcare costs [for more details, see Chapter 8]. Additionally, salvaging 50% of food waste would save about 200 million cubic meters of water, over 650 million kWh of energy, 40,000 tons of fuel, and many land resources.

Although there are different approaches to the subject of food loss or waste at the home

consumption stage, in this Report, food lost or wasted in the home is not considered to be salvageable. Western culture is one of consumption and abundance, and consumers derive benefit or pleasure not only from the consumption of food, but also from the existence of selection, variety, and even surpluses.

However, since food production involves the use of natural resources and causes environmental damage, the cost paid by the consumer does not embody all the economic external costs involved. Therefore, there is justification for activities to encourage the reduction of food waste, for example, through government outreach programs. Some Western countries have offered such programs to raise public awareness about the impacts of producing food that is not consumed, including money wasted by consumers and damage to the environment.

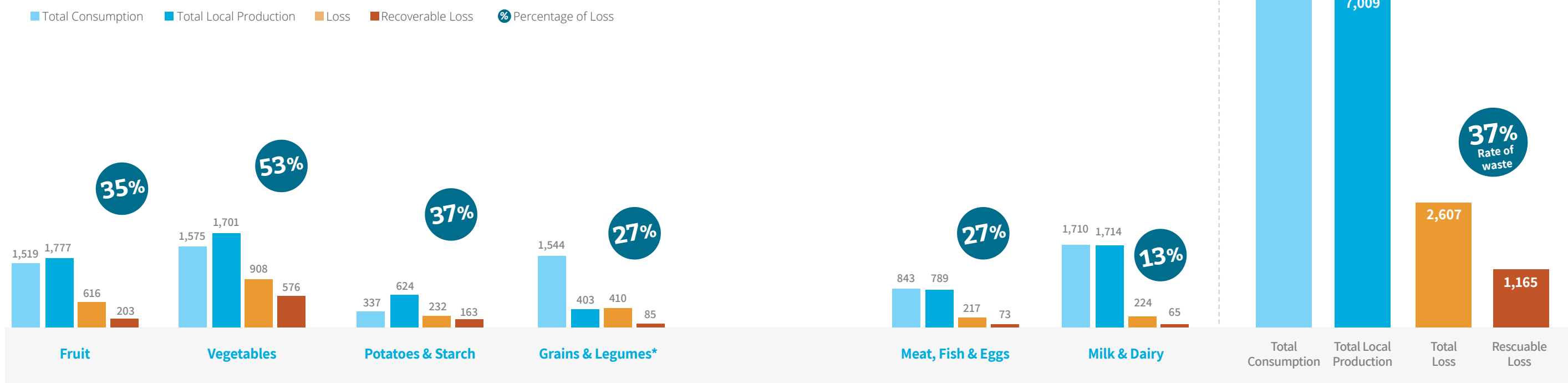
Rescuable Food

- ✓ Pre-harvested edible agricultural produce
- ✓ Agricultural produce with aesthetic defects
- ✓ Agricultural produce unsold in the wholesale markets
- ✓ Unsold food surplus in markets/stores
- ✓ Unsold surpluses in marketing chains and stores
- ✓ Surplus prepared food from catering, institutional kitchens, and restaurants
- ✓ Food with packaging or presentation defects
- ✓ Food approaching its expiration date and not expected to be sold

Non-Rescuable Food (Unfit for human consumption)

- ✗ Contaminated food
- ✗ Food damaged by natural hazards making it unfit for consumption
- ✗ Spoiled food
- ✗ Leftovers from food preparation processes (shells, kernels, skin, fat)
- ✗ Food that went from the kitchen to the catering area and/or was served but not consumed

Estimated Amount of Rescuable Food in Israel Throughout the Value Chain, Thousands of Tons



* Grains & legumes waste was calculated based on consumption as most grains are not produced in Israel.

**Rate of waste refers to loss from the total production/consumption at each stage of the value chain

Source: BDO estimates



7

Food Insecurity Around the World and in Israel

20% of the **Reusable** food wasted in Israel would fill the country's food consumption gap

Food Insecurity Around the World and in Israel



Food insecurity around the world

Food security refers to an adequate amount of food consumption to prevent hunger, as well as the quality of food.

The problem of food insecurity in Israel is among the most serious in the world.

The World Health Organization (WHO) and the United Nations define food security using four aspects. This definition is also used by the Israel National Insurance Institute. These four aspects are:

- 1 Physical availability of food**
There must be regular access to an adequate supply of safe and nutritious food at the national level. The quantity and quality of available food must be sufficient to enable normal growth, development and maintenance of an active and healthy lifestyle among the population.
- 2 Access to food**
Households must have adequate resources to obtain a sufficient quantity of calories.
- 3 Food consumption**
Individuals' dietary consumption habits must include diverse and nutritious foods. They must have access to an adequate water supply and be able to meet sanitary conditions. There should be awareness in households regarding the appropriate use and consumption of food.
- 4 Stable access to food**
Must exist at all levels.

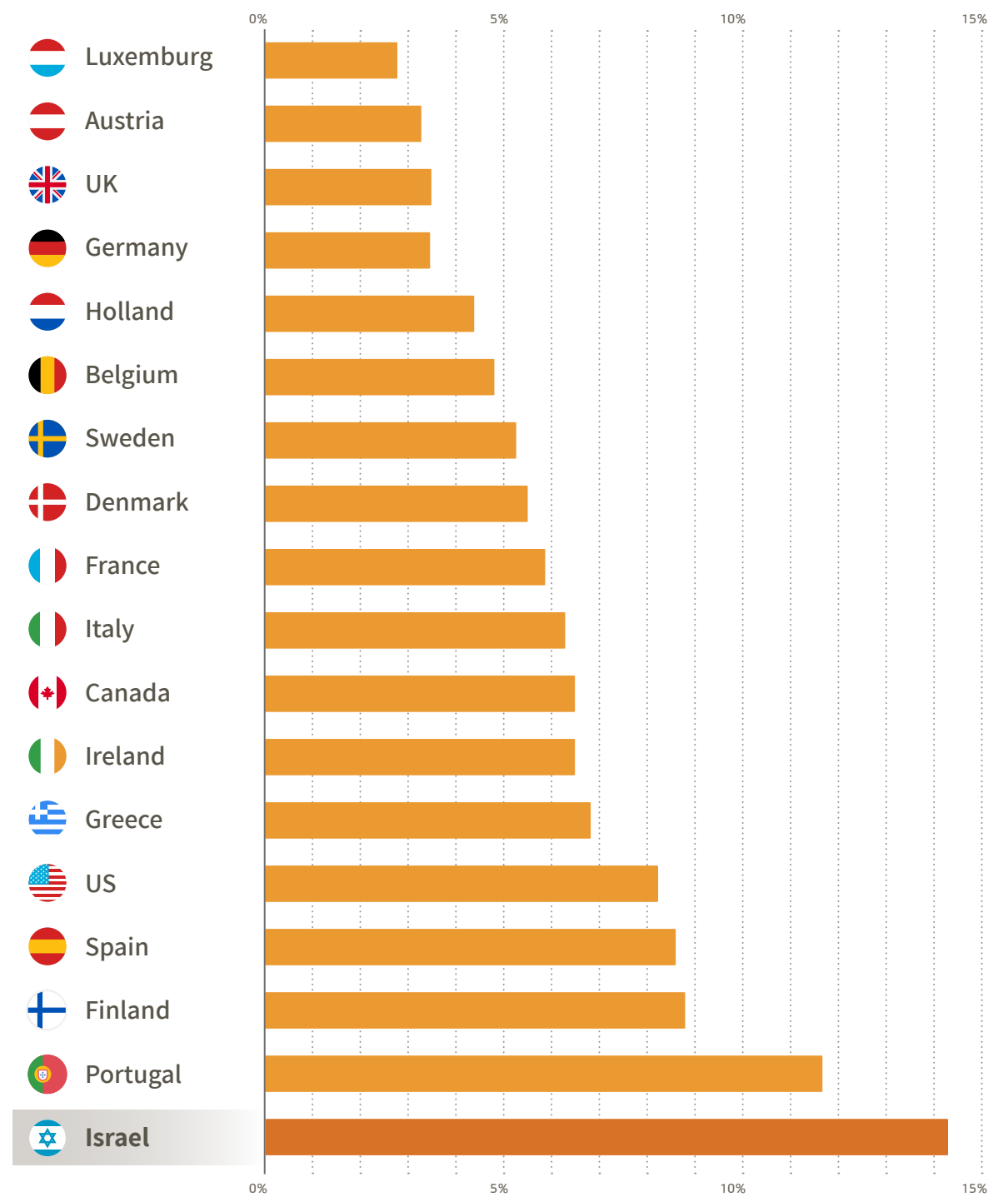
Food security refers to an adequate amount of food consumption to prevent hunger, as well as the quality of food. Thus, food security is not measured purely by caloric value, but also by food quality. Having the financial resources to access a healthy food basket that ensures adequate nutrition is essential for physical, mental, and cognitive functioning. This is necessary for the realization of food security.

The State of Food Security and Nutrition in the World, published in 2022 by the UN Food and Agriculture Organization (FAO) in collaboration with WHO, presents estimates of food insecurity rates in countries around the world. The Report's findings include indicators showing that food security around the world has deteriorated since 2020.

Long-term effects of the COVID-19 pandemic, disruptions in global supply chains, economic repercussions of the Russia-Ukraine war and its impact on grain production, and extreme climate events have led to higher food prices. This, in turn, has increased the number of people who do not have access to a sufficient supply of healthy food.

Data from the FAO shows that the food insecurity problem in Israel is among the most serious in the world.

Rate of food insecurity among the populations, average 2019-2021

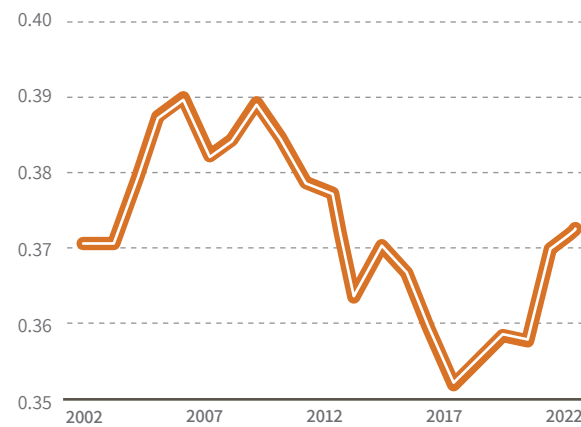


Source: FAO

Food insecurity in Israel

According to BDO estimates presented in a Report published by the Israel National Insurance Institute in December 2021, the rate of Israeli households living with food insecurity in 2021 was 16.2%. About 8.2% live in a state of severe food insecurity, and about 8% are in a state of moderate or mild food insecurity. Also, according to this Report, between 2021 and 2022, the Gini index²⁷ of inequality increased in Israel by about 1% (before the provision of financial aid and grants). According to this index, Israel was ranked fifth among the OECD countries, after the Czech Republic, Mexico, Turkey, and the USA, as shown in Table 1. Inequality in income distribution is one of the main challenges facing the Israeli economy. Food insecurity is an outcome of inequitable income distribution.

Israel's ranking according to the Gini index of inequality



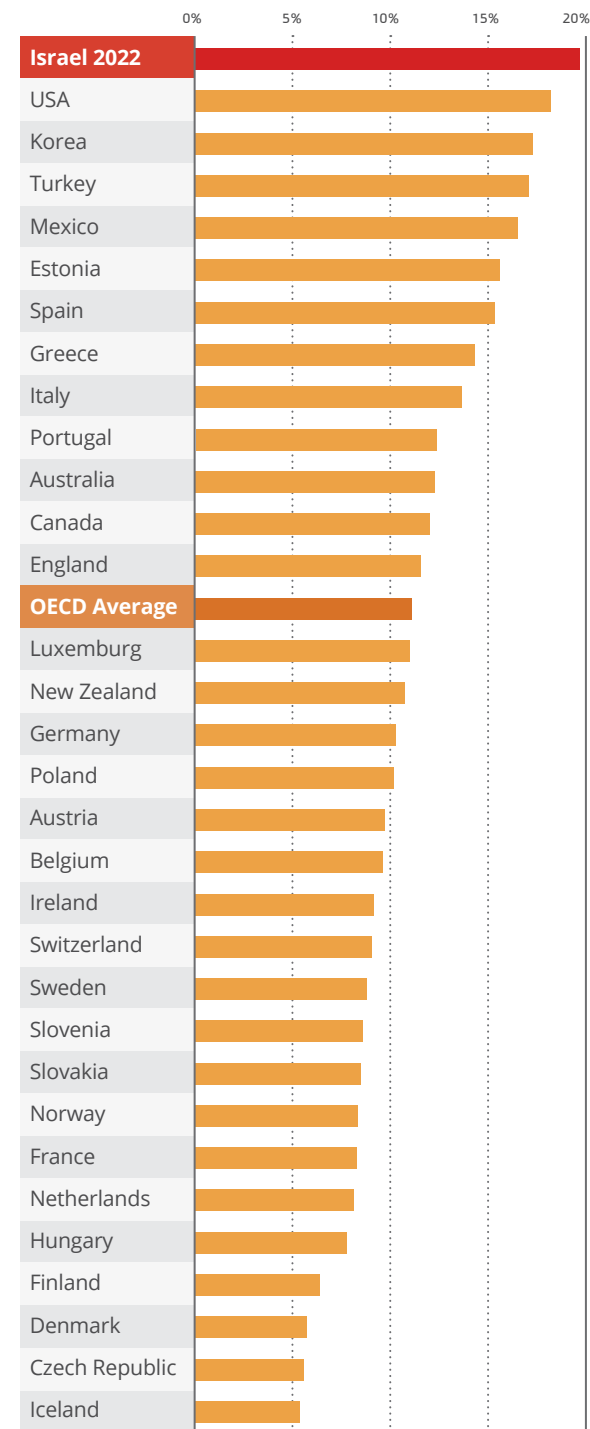
Israel Central Bureau of Statistics and the National Insurance Institute (social security) data processed by BDO

27. The Gini index is a measure of economic inequality based on the distribution of income in a country. This index ranges between 0 and 1, such that a score of 0 means that the state's income is divided equally among all citizens, and 1 means that one individual has all the income.

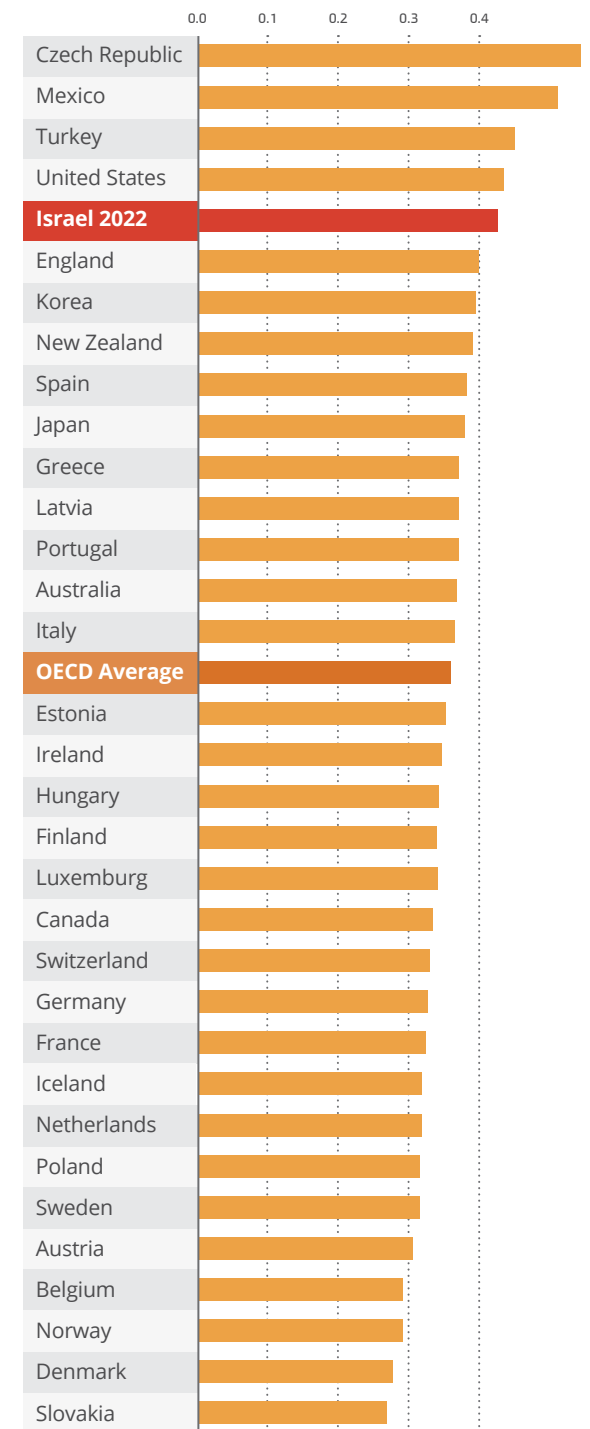


Elderly man receiving cooked food from Leket Israel NPO partner Credit Amir Yakoby

Inequality (the Gini Index) An International Comparison 2022



Poverty Rates An International Comparison 2022



Source: 2022 data from the Israel National Insurance Institute (social security), and OECD and 2021 UN statistics, processed by BDO

According to the food security index for 2022 published in *The Economist*, Israel ranks 24th among the OECD countries, a drop of 12 places from the previous year.

Among the OECD countries, Israel has the highest incidence of poverty after taxes and transfers, according to OECD data. Israel's incidence of poverty is similar to that of the US.

According to the food security index for 2022 published in *The Economist*, Israel ranks 24th among the OECD countries, a drop of 12 places from the previous year. This Report's analysis indicates two primary reasons for Israel's unusually high rate of food insecurity. The first is the high percentage of personal consumer expenditures that are spent on food in Israel. The second is the lack of a national policy to address food insecurity, such as the food stamp policy in the US.

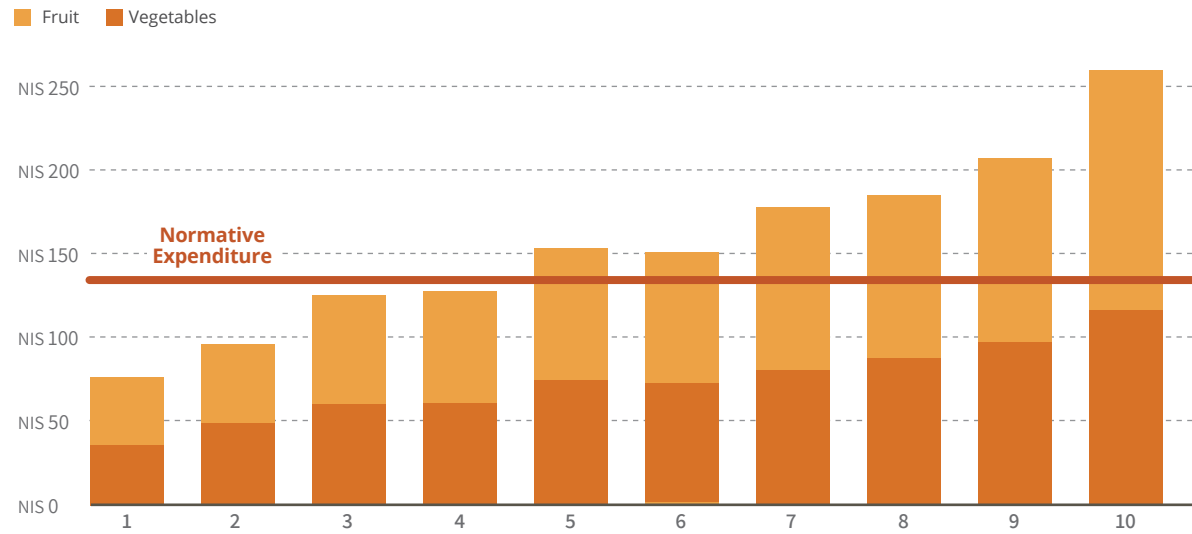
Israel's ranking in inequality and food security indices (2022)			
	Israel	OECD Average	Israel's OECD Ranking
Inequality (Gini Index)	0.37	0.32	5
Poverty Rate*	20%	11%	1
Food insecurity index**	75	77	24
% expenditure on food out of private consumption	18%	14%	5

Source: OECD statistics, inequality and poverty rates in Israel, BDO analyses of data from the National Insurance Institute for 2021, data from the Global Food Security Index

* The poverty index is the proportion of the population whose income is below the poverty line, as defined by the median disposable household income in the country.

** The food insecurity index ranges from 0-100, such that higher figures indicate a lower rate of food insecurity in the country. The higher a country is ranked (first, second, third, etc.), the lower the rate of food insecurity among the country's population.

Monthly expenditure on fruit and vegetables per person, by decile, in NIS



Source: CBS data processed by BDO

The rate of personal consumer expenditures spent on food in Israel is about 18%²⁸. Israel ranks sixth among the OECD countries. This means, for example, that a household that spends a total of NIS 20,000 (\$5,665) each month for all its various consumer goods, will spend about NIS 3,600 (\$1,020) on food²⁹. A population living in food insecurity spends an even higher percentage of its total expenditures on food, forcing them to reduce other expenses, such as education, leisure, and well-being. It should be noted that this data does not take into account the quality of the food purchased, or the extent to which it contributes to the health of those who consume it. It may be assumed that families living in food insecurity purchase less expensive, less healthy foods.

Therefore, the policy of rescuing food and distributing it to disadvantaged groups is an effective welfare policy for Israel, where a significant percentage of household spending is on food. This policy also has a health advantage. Food rescue that emphasizes fruit and vegetables can supply healthy food to populations living with

food insecurity, providing them with the nutrition essential for physical, emotional, and cognitive functioning.

The assessment of food rescue's effectiveness as a policy tool for improving food security in Israel presented in this Report was based on the methodology used by Chernichovsky and Regev³⁰, which defined normative expenditure as the average per capita expenditure on food among households in the second through fifth income deciles in Israel. According to a household expenditure survey in Israel, the normative expenditure per capita on food³¹ is about NIS 900 per month (\$255). The analysis presented in this chapter indicates that in the two lower strata (in terms of per capita consumption), spending on food is about half of the normative level.

Additionally, the analysis shows that the normative monthly expenditure on fruit and vegetables in Israel is NIS 134 (\$38) per capita. This is higher than the expenditure on fruit and vegetables among the lowest four deciles (in terms of consumption per capita).

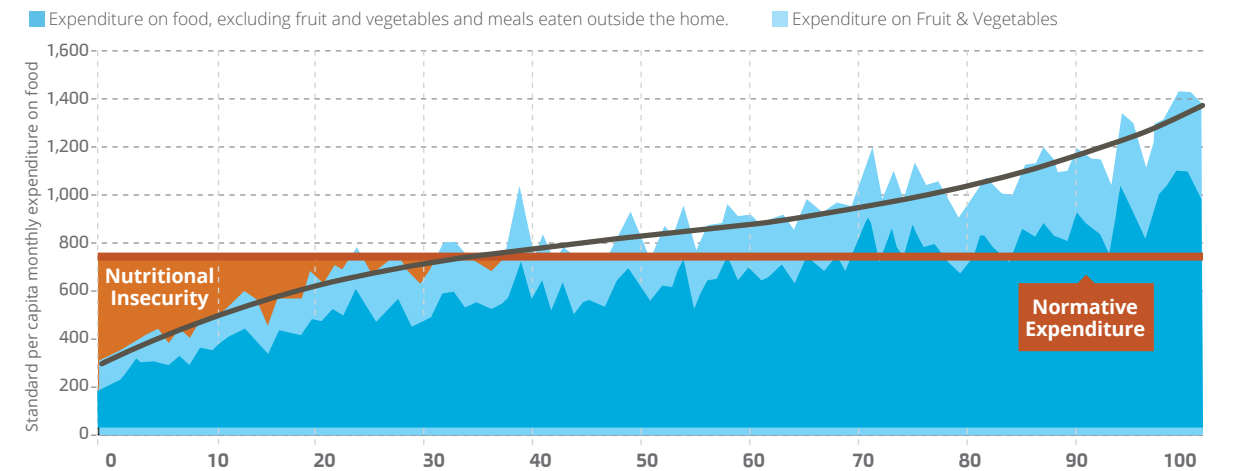
28. Israel Central Bureau of Statistics (CBS) household expenditure survey data, processed by BDO

29. Expenditure for private consumption on food, beverages, and tobacco, including meals eaten outside the home, Israel Household Expenditure Survey, CBS, 2021

30. Chernichovsky, D., & Regev, E. (2014). Patterns of expenditure on food in Israel. Taub Center for Social Policy Studies in Israel.

31. Not including meals eaten outside the home, alcohol, or soft drinks.

Food Expenditure per Capita in Israel in Relation to Normative Food Expenditure



Source: CBS data for 2018 processed by BDO.

Household Percentile (By Consumption)



8

The Effect of Food Rescue on Food Security and Healthcare Costs in Israel

NIS 5.2 billion Excess annual health cost³² to the economy from food insecurity in Israel

The Effect of Food Rescue on Food Security and Healthcare Costs in Israel



Healthy nutrition, food security and health

A healthy diet is up to five times more expensive³³; many cannot afford it.

According to the WHO, a healthy diet includes vegetables, fruit, legumes, unprocessed grains, less than five grams of salt per day, as little added sugar as possible, and unsaturated fats rather than saturated fats. WHO notes that due to changes in lifestyles, increased urbanization, and the proliferation of processed foods, people today tend to consume less fresh fruit and vegetables, and more foods that are high in calories, with added sugar and salt³⁴.

The national nutrition guidelines issued by the Israeli Ministry of Health³⁵ recommend a diet based on Mediterranean diet principles, rich in a variety of unprocessed plant-based foods including vegetables, fruit, legumes, whole grains, olive oil, nuts and seeds, and a combination of animal-based foods, such as eggs, chicken, and fish. The Ministry of Health recommends reducing the consumption of highly processed foods (foods that have undergone industrial processing and

32. **Excess health cost:** an increase in health expenses related to living in a state of food insecurity, and which would not have been caused under conditions of security

33. Food security and nutrition in the world 2022, FAO

34. Healthy diet, who.int

35. The guidelines file is available on the Ministry of Health website

often contain extracted food components or additives). Although processed foods are widely available and convenient, a diet based on them is unhealthy and has been linked to a range of ailments, including obesity, increased risk of chronic illnesses and cancer, a change in the microbiome, and more³⁶. The Ministry of Health's recommendations, reflected in the concept of the "food rainbow," have health, environmental, social, and economic benefits.

Historically, many countries have instituted policies to combat food insecurity that focus on the availability of a sufficient number of calories, not on the quality of the diet. Such policies prioritize sufficient daily caloric intake, without taking into account the quality, composition, or nutritional value of the food consumed. Globally, this policy has been a success, in that it has resulted in a decreased rate of malnutrition, from 12.3% in 2005 to 9.8% in 2021. Thanks to this policy, most of the world's population can now receive the necessary basic caloric intake.

A diet rich in vegetables and fruit may lower blood pressure, have a positive effect on blood sugar levels, prevent certain types of cancer, and reduce the risk of heart disease, stroke, eye problems, and digestive problems.

36. Israel Ministry of Health, Processed Foods

However, according to the WHO and the FAO, although this policy was successful in reducing the global rate of malnutrition, it did not promote a healthy diet. In fact, it was sometimes in complete opposition to national and international nutritional recommendations. This policy encouraged food-producing systems to develop in such a way that the cost of a healthy food basket is now up to five times more expensive than a "basic food basket" (a term for the food that can be stored or produced throughout the year, and contains a high number of calories in relation to its price). A basic food basket provides an individual with the necessary number of daily calories, but not the variety of food or the nutrients a person needs to be healthy.

A healthy diet is important for preventing non-communicable diseases (NCDs), such as diabetes, heart disease, kidney disease, and depression. NCDs are responsible for 74% of all deaths - 41 million a year, including 17 million under the age of 70.

37. Harvard T.H. Chan School of Public Health

38. Noncommunicable Diseases Fact Sheet. (2022) WHO.

In other words, this global policy focused on the supply of daily calories to be consumed, rather than on a supply of varied and nutritious food. Variety of food is just as important as quantity. Fruit and vegetables are a significant component of a healthy diet because they contain many essential nutrients. A diet rich in vegetables and fruit may lower blood pressure, have a positive effect on blood sugar levels, prevent certain types of cancer, and reduce the risk of heart disease, stroke, eye problems, and digestive problems³⁷. A healthy diet is important for preventing non-communicable diseases (NCDs), such as diabetes, hypertension, heart disease, kidney disease, and depression. NCDs are responsible for 74% of all deaths - 41 million a year, including 17 million under the age of 70³⁸. Often, households experiencing food insecurity have diets consisting largely of unhealthy food products.

The food rainbow, Israel's national nutritional recommendations



- Diversify and incorporate vegetables, fruit, and whole grains into several meals a day, and increase water intake throughout the day.
- Diversify and include at least once a day from each of the following groups: Legumes, Plant-based fats, unsweetened dairy products or alternatives.
- Diversify and incorporate chicken, turkey, fish, and eggs several times a week.
- Limit the amount of red meat and beef to a maximum of 300 grams per week.
- Avoid or significantly reduce the consumption of sweetened beverages, candies, snacks, processed meat products, and other highly processed ultra-processed foods.

Source: "A Healthy Possible," the National Program for Active and Healthy Living, Ministry of Health, available at who.int, under "Healthy diet."

A study conducted in the UK³⁹ examined the relationship between food security status and consumption of fruit and vegetables and found that food security status is a significant predictor of fruit and vegetable consumption. For every one-unit increase in the food security score (i.e., more precarious food security), there was an 11% decrease in the incidence of high fruit and vegetable consumption. Thus, the population suffering from food insecurity is also at a higher risk of health problems such as fatigue and frailty, cardiovascular diseases, hypertension, osteoporosis, anemia, birth defects, premature birth, and obesity⁴⁰.

On a personal level, food insecurity poses a risk factor for chronic physical and mental illness, decreased academic achievement, diminished earning capacity, and financial distress. On a national level, food insecurity leads to an increase in healthcare expenses and reduces productivity.

Likewise, ongoing food insecurity causes a deterioration of mental health, psychological distress, depression, and anxiety. Moreover, children from food-insecure families often lack access to medical care. An inadequate diet causes cognitive damage that affects children's learning, memory, thinking skills, and overall damage to well-being. Poor nutrition during critical periods of the development of a fetus or young child can cause developmental delays, which may be apparent

among preschool and kindergarten-aged children. Food insecurity impairs concentration in school and increases the likelihood of poor academic achievement and dropping out of educational frameworks early. Compared to children growing up in families with food security, these children may suffer from low psychosocial functioning, and exhibit symptoms such as aggression, hyperactivity, or apathy⁴¹.

The current high cost of healthy food in relation to disposable income limits access to a healthy food basket in both rich and poor countries.

The US White House recently published the Biden-Harris Administration National Strategy on Hunger, Nutrition, and Health, which states that on a personal level, food insecurity poses a risk factor for chronic physical and mental illness, decreased academic achievement, diminished earning capacity, and financial distress. On a national level, food insecurity leads to an increase in healthcare expenses and reduces productivity. Accordingly, the White House Report recommends a shift from addressing the problem of hunger to addressing the problem of food insecurity and poor nutrition. It clearly states that financial access to a healthy food basket, which ensures adequate nutrition essential for physical, emotional, and cognitive functioning, is necessary for realizing food security.

However, the current high cost of healthy food in relation to disposable income limits access

39. Food insecurity: Its prevalence and relationship to fruit and vegetable consumption. J Hum Nutr Diet. 2021

40-41. Food insecurity: the experiences of food aid recipients, Ahuva Ibn-Zahar.

to a healthy food basket in both rich and poor countries. Therefore, rescuing healthy food products and distributing them to people in a state of food insecurity, who are unable to purchase and consume enough healthy food, can help ensure adequate nutrition, improve their health, and therefore reduce healthcare expenses for the national economy.

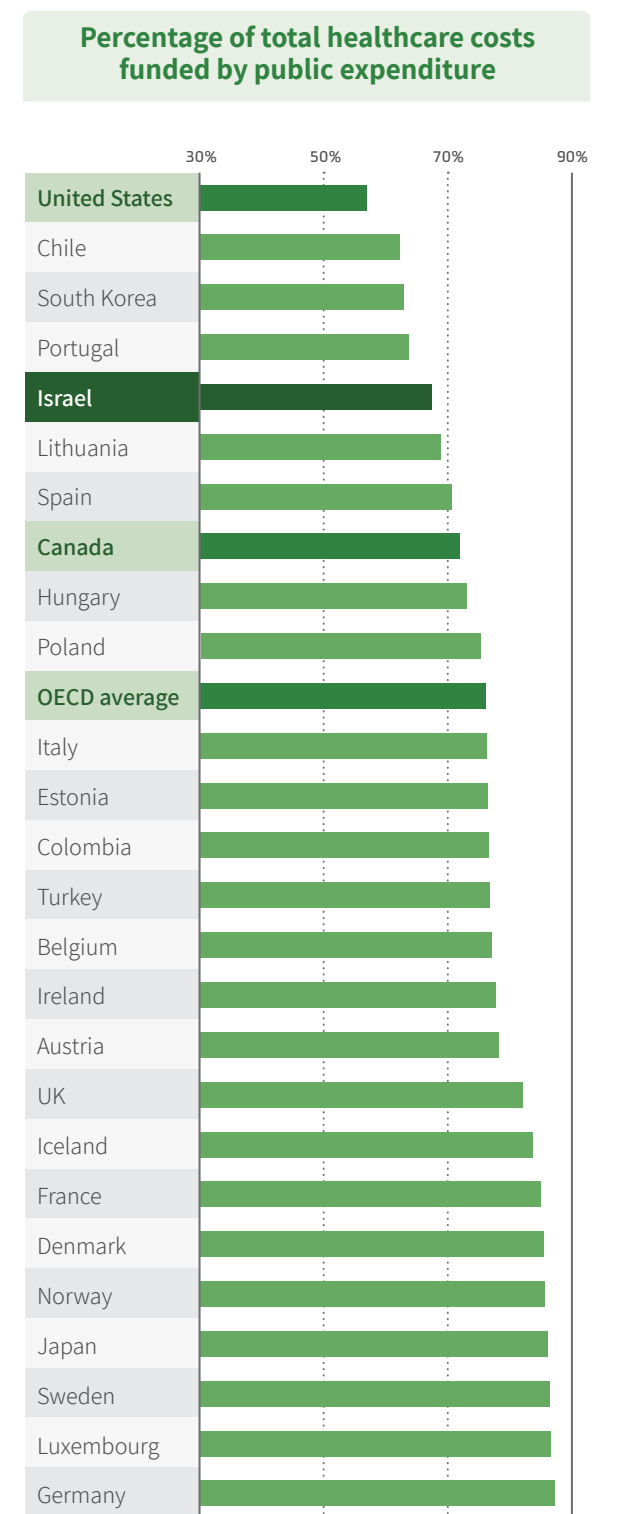
An international review of healthcare costs as a result of food insecurity

Background: Financing healthcare systems in Western countries

In general, the healthcare systems in developed countries around the world include a combination of public and private entities, in terms of their funding and organization. State-owned public hospitals, and hospitals owned by non-profit organizations, operate alongside private for-profit hospitals and even compete with them. Public healthcare facilities may also provide private services to patients. Physicians and other healthcare professionals may work in public or private settings, and some combine the two.

Most Western countries provide their citizens with universal health insurance, alongside the option to voluntarily purchase private insurance. Healthcare services are funded by general or designated state taxes, as well as from citizens' pockets, in the form of direct expenses and co-payments⁴². The public-private mix of spending on healthcare varies between countries. Some tend towards a higher rate of public financing of the healthcare system, while in other countries, primarily the United States, a significant portion of healthcare costs are paid for privately.

42. Israel Medical Association. A mixture of "public" and "private" in healthcare systems: An international comparison of the regulation of insurance coverage and the work of physicians in various countries.



Source: Ministry of Finance and World Bank data processed by BDO

Analysis of the proportion of government spending, out of the total spending on healthcare in Western countries, shows that in the US, public spending is relatively low, only about 55%, while a significant portion of healthcare spending is paid for privately. In both Israel and Canada, about 70% of healthcare costs are funded by the government⁴³. Additionally, healthcare spending as a percentage of per capita GDP in the US is particularly high, about 17%. In Canada the corresponding figure is about 11%, while in Israel it is about 8%.

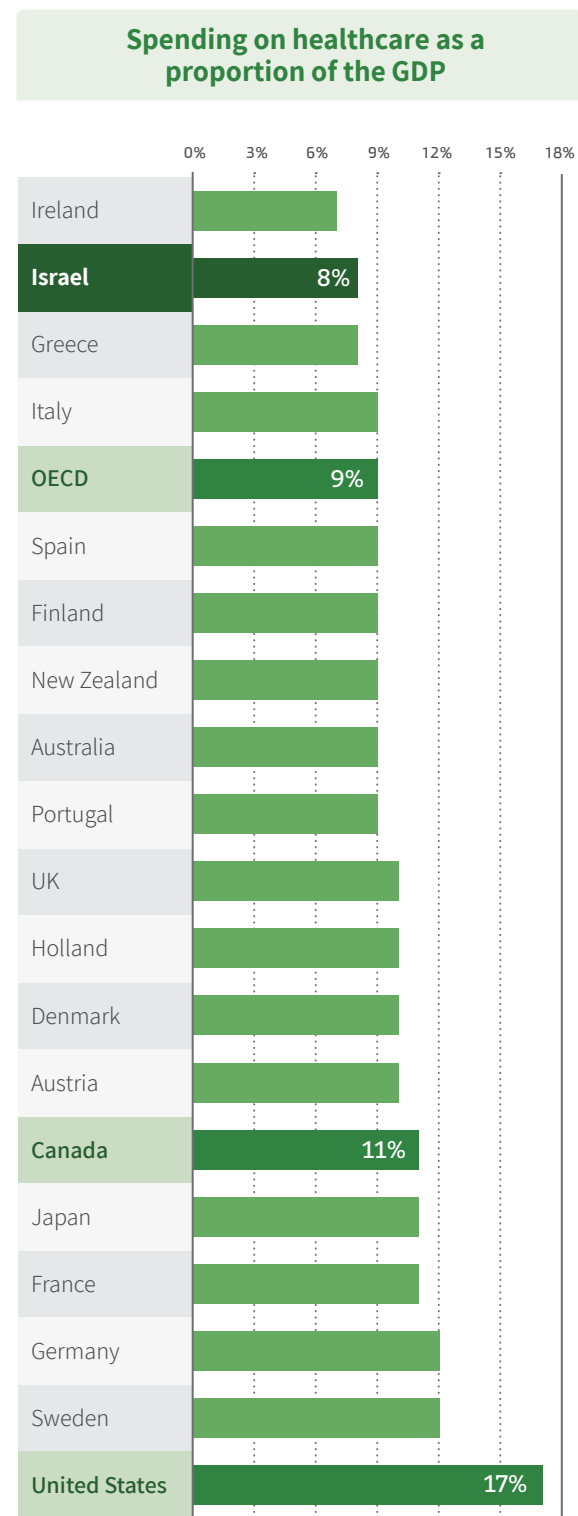
Increased healthcare expenses resulting from poor nutrition and food insecurity

Although the FAO study indicates that consuming a healthy food basket with plentiful fruit and vegetables is expensive, and may cost up to five times more than a basic food basket, this chapter will demonstrate that an unhealthy diet may be even more expensive.

Studies and projections from around the world have indicated that unhealthy diets and food insecurity are related to increased expenses both for public healthcare systems and for private individuals. The studies link these increased costs to health conditions that are related to living in a state of food insecurity, and which would not have occurred if the same person had food security. These expenses include hospitalizations, emergency room visits, doctors' appointments, purchasing medications, etc.

In a study from the US published in 2019, researchers concluded that annual expenditures on healthcare services among the adult population (ages 18 and older) living in food insecurity are higher per person, as compared to adults who have food security.

43. World Bank data.



Source: Ministry of Finance and World Bank data processed by BDO

A study conducted in the US in 2016 reviewed a set of studies published between 2005 and 2015 that evaluated the relationship between food insecurity and various diseases⁴⁴. It found that food insecurity is related to about 4% of self-reported cases of arthritis, about 6% of reports of diabetes, about 15% of reports of dental problems, about 13% of reports of vitamin deficiency, about 7% of reports of obesity, about 11% of reports of mental disorders, about 30% of reports of depression among adults and about 34% of prescription drugs for children.

In another study from the US published in 2019, researchers focused on the relationship between levels of households' food insecurity and their health expenditures. Using data from the National Health Interview Survey (NHIS) and the Medical Expenditure Panel Survey (MEPS), they estimated the additional healthcare costs that are linked to food insecurity in various states and regions within the US⁴⁵.

44. Hunger Report, Bread For the World, 2016
 45. BDO analysis of data from: State-level and county-level estimates of health care costs associated with food insecurity. American Center for Disease Control.

The researchers concluded that annual expenditures on healthcare services among the adult population (ages 18 and older) living in food insecurity are higher by approximately \$2,030 per person⁴⁶, as compared to adults who have food security.

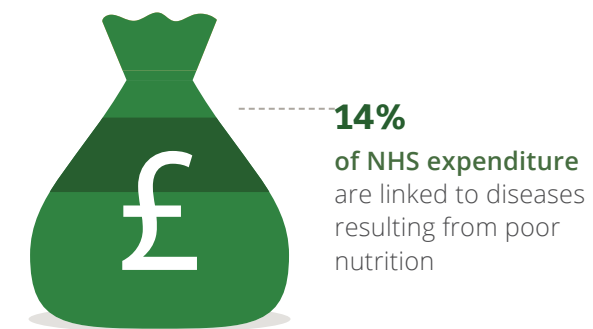
A study conducted in Canada, published in 2015, showed that total healthcare costs, and the average costs for hospital admissions, emergency department visits, physician services, emergency surgeries, home care services, and prescription drugs, rose systematically as household food insecurity worsened.

A study conducted in the United Kingdom found that about 46% of the expenses for the country's National Health Service (NHS) are linked to poor nutrition, lack of physical activity, smoking, alcohol consumption, and obesity. The NHS annually spends approximately GBP £43b (\$52b), and of this, approximately GBP £6b (\$11.5b) are linked to diseases resulting from poor nutrition, including metabolic and endocrine problems, cancer and cardiovascular diseases. This is higher than for any other factor examined in the study⁴⁷.

A longitudinal study conducted in Australia over 15 years found that the health expenses of women who regularly ate fruit and vegetables were lower than those who did not⁴⁸. The authors assessed that subsidizing fruit and vegetables and raising taxes on unhealthy food could potentially yield an annual savings of AUD \$3.4b (USD \$2.3b) for Australia's healthcare system.

46. 2019 prices, in 2022 terms.
 47. The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK
 48. Taxes and Subsidies for Improving Diet and Population Health in Australia: A Cost-Effectiveness Modelling Study

Poor nutrition is the biggest spender of the NHS* budget



* National Health Service in England.
 Source: The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK

A study conducted in Canada, published in 2015, examined the relationship between food insecurity and health costs of the population in the province of Ontario, aged 18-64. The researchers examined the link between this population's food security status (assessed according to data from a community health survey) and data on administrative healthcare costs, in order to determine the medical treatment costs for the population over the course of 12 months. The study, published in *The Canadian Medical Association Journal*, showed that total healthcare costs, and the average costs for hospital admissions, emergency department visits, physician services, same-day (emergency) surgeries, home care services, and prescription drugs, rose systematically as household food insecurity worsened⁴⁹.

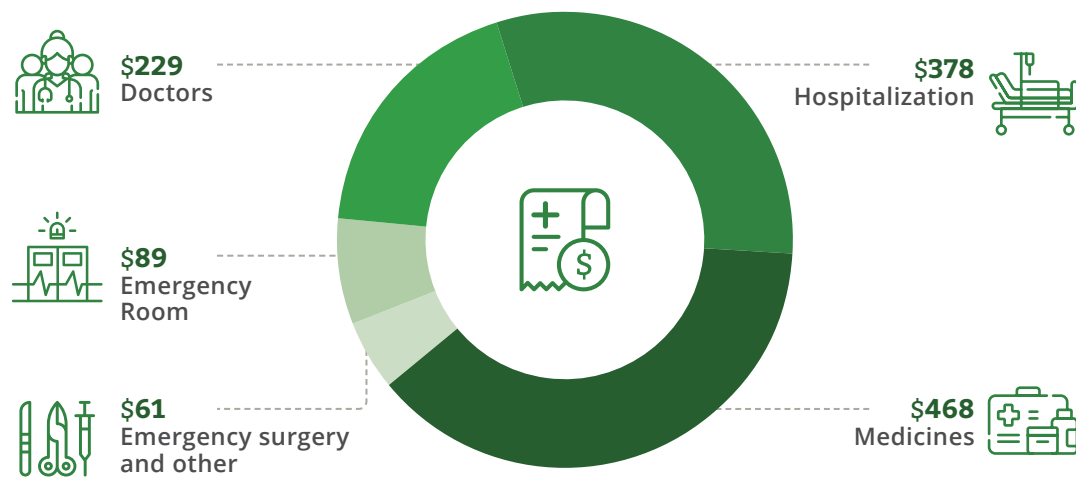
The study found that the more severe the level of food insecurity, the higher the health expenses. The average additional annual cost of healthcare costs for an adult living with food insecurity in Ontario was found to be CAD \$1,224⁵⁰. (USD \$907)

The increased costs were primarily attributed to three factors: hospitalizations, the purchase of medications, and physician services. The researchers concluded that household food insecurity is a strong predictor of the use of healthcare services and healthcare costs for working-age adults, independent of other social factors that affect health. They stated that government interventions to reduce food insecurity could significantly offset public expenditures on healthcare.

49. Association between household food insecurity and annual health care costs.

50. 2012 prices in 2022 terms

Additional annual per capita healthcare costs resulting from food insecurity in Ontario, Canada (in USD)



Source: Association between household food insecurity and annual health care costs

Assessing the health costs of food insecurity in Israel

The excess healthcare costs to the economy resulting from food insecurity in Israel: NIS 5.2b (\$1.47b) per year.

FAO data show that the problem of food insecurity in Israel is among the most serious in the world. While the poverty rate in Israel is similar to that in the US, the food insecurity rate in Israel is 1.7 times higher. This means that the burden on Israel's healthcare system as a result of food insecurity is greater than in any other country.

1.4 million people in Israel live with food insecurity. The total excess healthcare cost to the Israeli economy from food insecurity is assessed at NIS 5.2b (\$1.47b) per year, equivalent to about 5% of national healthcare expenditures.

To estimate the additional national healthcare costs that result from food insecurity in Israel, data pertaining to the healthcare systems in Canada, the US, and Israel were compared. The findings show that Canada is a more relevant country for comparison to Israel, regarding expenditures on healthcare. Canada and Israel have similar rates of public spending on healthcare, and spending on healthcare as a percentage of GDP⁵¹. In the US, public spending on healthcare is significantly lower, while the percentage of the GDP spent on healthcare is significantly higher, as compared to Israel or Canada. Therefore, the US cannot be used as a relevant reference point for Israel,

51. GDP - an index for assessing the total healthcare expenditures in a country (public + private, not including investments) in relation to the country's total GDP expenditures. GDP refers to the total value of goods and services produced in a country during a given period (usually a year).

regarding national healthcare expenditures. Since the analysis indicated that Canada is a relevant comparison country for Israel in relation to healthcare expenditures, the annual health expenditures per capita in these two countries were compared. Analysis of World Bank data on annual healthcare expenditures shows that per capita spending on healthcare is about 20% higher in Canada than in Israel⁵².

In the above-cited study, the additional annual per capita healthcare costs due to food insecurity in Canada were assessed at CAD \$1,224 (USD \$907). To make a comparison with Israel, a downward correction of approximately 20% is necessary. Following this adjustment, it appears that the additional annual per capita healthcare cost due to food insecurity in Israel is approximately \$980 (about NIS 3,700).

According to the analysis presented in this Report, about 1.4 million people⁵³ in Israel live with food insecurity. The total excess healthcare cost to the Israeli economy from food insecurity is assessed at NIS 5.2b (\$1.47b) per year, equivalent to about 5% of national healthcare expenditures⁵⁴.

52. In accordance with World Bank data, standardized according to Israel Ministry of Health capitation coefficients.

53. Standard person.

54. According to data from the Ministry of Health, National Expenditure on Health, 2021

Annual health expenditure per capita

Israel **NIS 2,990**

Canada (20% higher than Israel) **NIS 3,750**

Source: Ministry of Finance and World Bank data processed by BDO

This Report examined the economic impact of food insecurity in terms of excess healthcare costs in Israel. This chapter focuses on the direct impact food insecurity has on healthcare costs in Israel for 2022. Other indirect economic costs related to food insecurity were not measured.

Bread for the World, a US-based anti-hunger organization, assessed the indirect impacts of food insecurity, such as missing work days as a result of illness or caring for ill relatives, costs of special education in public primary and secondary schools for children living with food insecurity, and the costs of school dropout. They estimated that in 2016, these costs were approximately \$24 billion; an additional 16% over the direct costs of food insecurity that were assessed in the study⁵⁵.

Other indirect effects of food insecurity were described in a report by the Second Harvest North Central Food Bank, including: poor cognitive and physical development of children with iron deficiency, increased risk of birth defects, development or exacerbation of mental illness, and the risk of suicide due to hunger and poor nutrition⁵⁶.

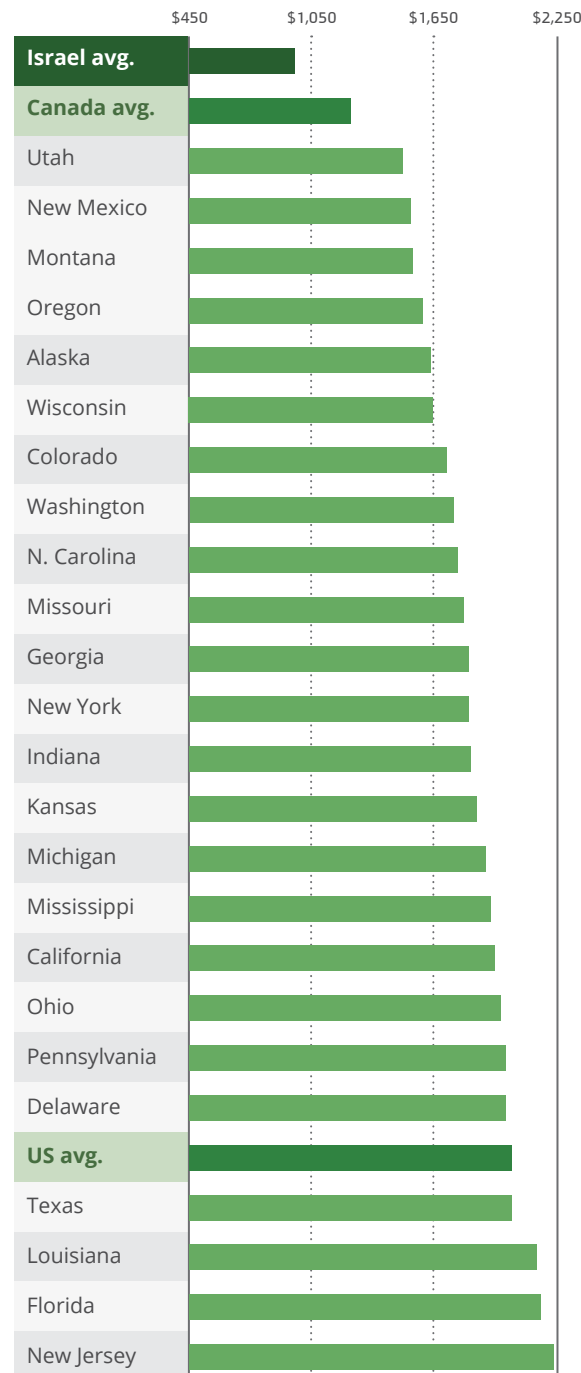
Therefore, the assessment presented in this chapter of the direct healthcare costs that result from food insecurity is not exhaustive. It serves as a basis for future assessments of the total economic cost of food insecurity in Israel.

However, even this partial assessment makes it clear that rescuing healthy food and providing it to the population experiencing food insecurity – who do not usually purchase and consume healthy food – may enable them to improve their nutrition and health, which will reduce healthcare costs to the national economy.

55. "Hunger Report", Bread for the World, 2016.

56. "Cost/Benefit Hunger Impact Study" Second Harvest North Central Food Bank and Hunger Free Minnesota, 2010

Additional annual health costs per capita from food insecurity



Source: Analysis by BDO on data from the Central Bureau of Statistics and the World Bank

Health costs in Israel as a result of food insecurity

1 out of 6 families in Israel suffer from food insecurity



1.4 Million people suffer from food insecurity



NIS 3,700 Excess annual health expenditure per capita

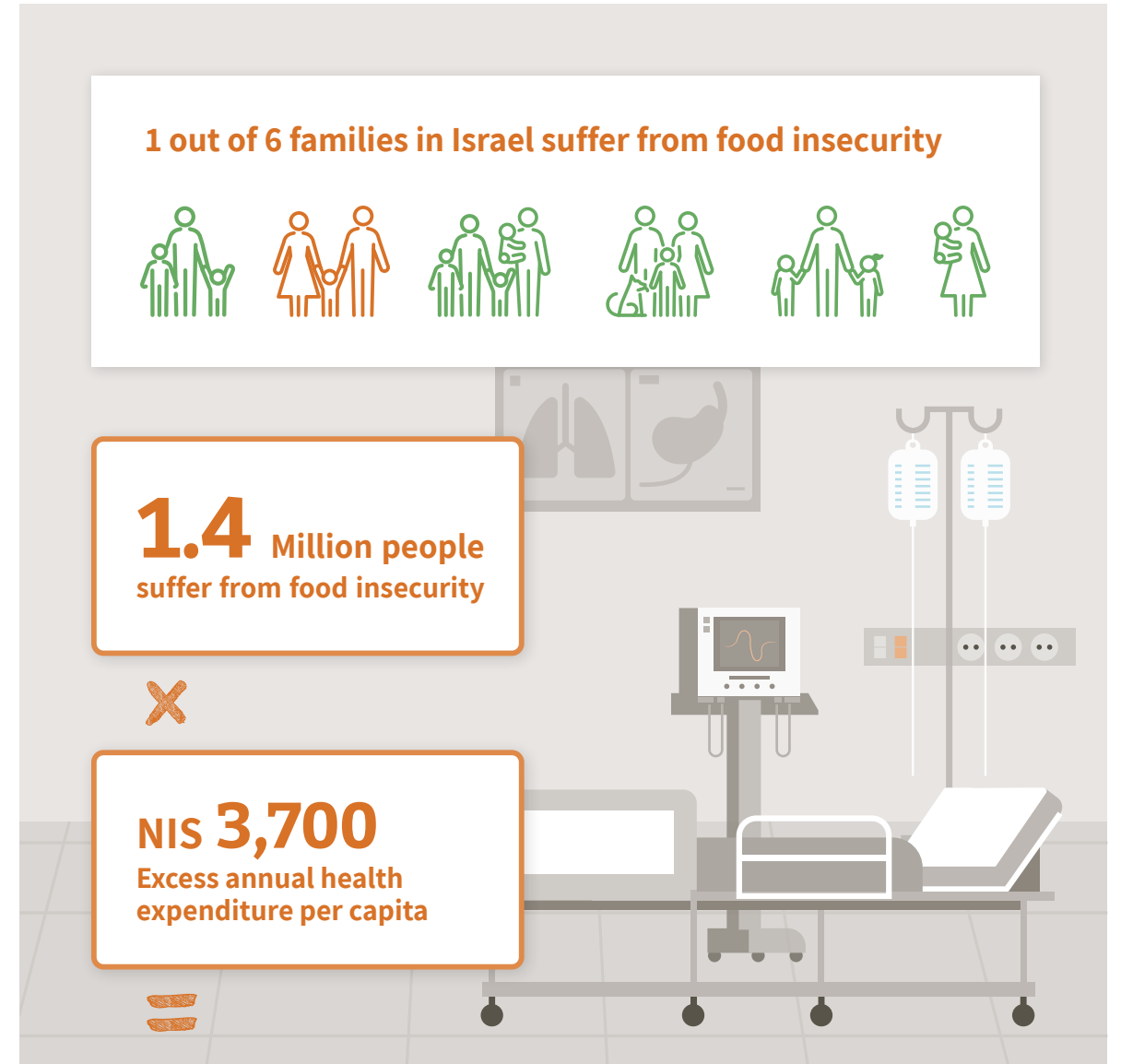


NIS 5.2 Billion

The total excess health cost to the economy as a result of nutritional insecurity

5%

of total national health expenditures





9

Environmental Impacts and Costs of Food Loss and Waste

NIS 3.9 billion The environmental cost of food waste in Israel

Environmental Impacts and Costs of Food Loss and Waste

Food production utilizes resources such as land, water, fertilizers, chemicals, and energy and is responsible for about one-fifth of all greenhouse gas emissions in the world⁵⁷. Many of the resources required to grow and produce food in the modern era are non-renewable, and their use potentially damages the quality of water, soil, air, and biodiversity⁵⁸.

The environmental cost of food waste in Israel for 2022 is estimated at approximately NIS 3.9b (\$1.1b). Of this, approximately NIS 1.5b (\$425m) is due to the unnecessary waste of land and water resources, NIS 1.5b (\$425m) is from emissions of greenhouse gases and air pollutants, and NIS 0.9b (\$255m) is the direct cost of waste treatment. About 2 million tons of food and its packaging from the various sectors (not including the agricultural sector) are discarded, comprising approximately 34% of the municipal solid waste in Israel.

However, because the positive external benefits of food consumption are higher than the negative environmental impacts associated with growing and producing food, agriculture is not viewed as a polluting industry. Generally, environmental levies and taxes are not imposed on food production, and in many developed countries there are

direct or indirect subsidies for food production or consumption. However, growing, producing, and disposing of food that is not consumed has all of the negative environmental impacts, with no benefit to anyone; therefore, food waste represents a net damage to the environment.

In recent years, there has been increased recognition of the problem of food waste around the world. To assist in global efforts to address this, the Food and Agriculture Organization (FAO) of the United Nations and the United Nations Environmental Program (UNEP) are working to implement a uniform international index for estimating the scope of food waste. In 2019, the United Nations published a report emphasizing the importance of considering environmental aspects of food waste, in addition to economic and social ones⁵⁹. The Report advocates using a life cycle assessment (LCA) approach to food waste and its disposal to formulate policies to reduce food waste. Currently, countries around the world have adopted varying policies and methods aimed at reducing food waste, including measures to minimize food surpluses at the source, rescuing food surpluses, and treating organic wastes through composting or anaerobic digestion, rather than landfilling.

57. FAO, Food and Agriculture Statistics.
58. Value Chain Management Center (2012). Cut Waste, GROW PROFIT: How to Reduce and Manage Food Waste, Leading to Increased Profitability and Environmental Sustainability.

59. Heller, M. (2019). Waste Not, Want Not: Reducing Food Loss and Waste in North America through Life Cycle-Based Approaches. United Nations Environment Programme.

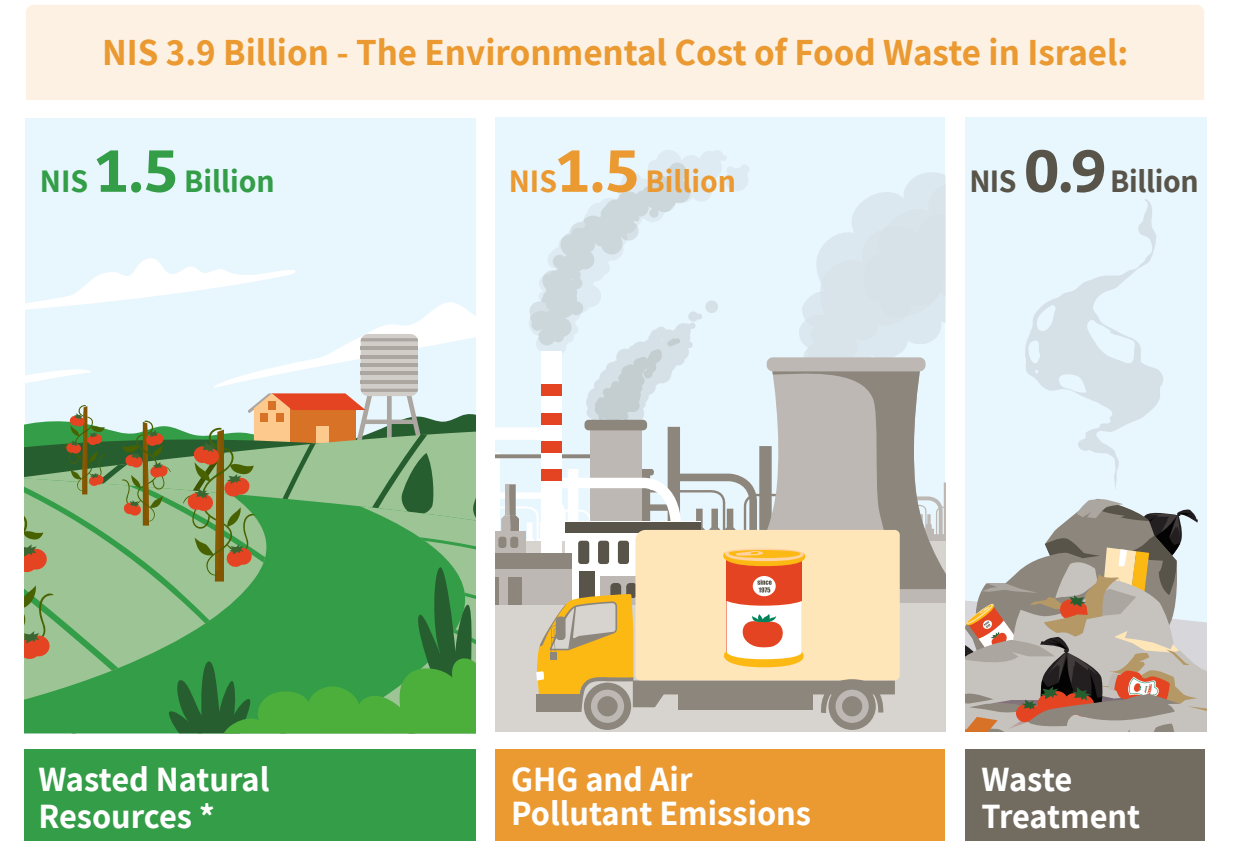
This Report examines the environmental impacts of food loss and waste in Israel. This chapter focuses on environmental impacts in 2022 as a result of food waste, including emissions of greenhouse gases and air pollutants along the entire production and consumption chain, wasted natural resources (water and soil), and disposing of wasted food. The quantification of the external costs of greenhouse gas emissions and air pollutants is based on the methodology established by the FAO⁶⁰. Externalized environmental impacts concerning water and soil quality and biodiversity were not examined at this stage. Therefore, the assessed environmental costs resulting from food waste in Israel presented in this chapter are a partial estimate. The missing elements may

be considered in future assessments of the overall environmental costs of food loss and waste in Israel.

It is important to note that this chapter only presents quantified environmental impacts originating within the geographical area of the State of Israel. The use of natural resources or emissions of pollutants associated with growing and producing food outside of Israel are not considered. Israel imports a significant proportion of its food, particularly certain types (cereals and grains, sugars, oils, fish, meat). Approximately 80% of the calories consumed by people in Israel come from imported food products⁶¹. Therefore, the total environmental impact of food that is wasted and disposed of in Israel is greater than the environmental impacts quantified in this chapter.

60. FAO, Food Waste Footprint Full Cost Accounting, 2014.

61. Amador, L. (2022). The Climate Crisis and Our Success: Policy Paper. Yesodot



* The cost of wasted natural resources is internalized into the market price of approximately NIS 23.1b (\$6.5b) of food waste.

6% of GHG emissions in Israel result from food waste

The energy consumption and resource use associated with food production along all stages (growing, processing, marketing, consumption, and disposal) have environmental impacts. Additionally, there are economic and environmental costs associated with disposing of wasted food and its packaging. These impacts vary between various types of crops.

The year addressed in this Report was a shmita year, during which there was an 8% decrease in vegetable production in Israel. Nevertheless, there was an increase in the scope of environmental impact, even without taking into account the impacts caused by the increased imports necessary to compensate for decreased local production⁶².

In addition to the food products themselves, the other resources related to food that were squandered in Israel in 2022 were assessed as follows: 1.3b kilowatt hours of electricity - equivalent to the amount needed to produce computers and electronic and electrical equipment in Israel each year; 80 thousand tons of fuel - enough to fuel about 175,000 cars for a year; 180m cubic meters of fresh water – enough to fill 55,000 Olympic-sized swimming pools; 210m cubic meters of wastewater; 1m dunams (around 247 thousand acres) of agricultural land - 20 times the area of Tel Aviv; 200,000 tons of garbage (packaging, industrial waste, etc.);

62. Environmental impacts occur along the entire food value chain, not only as a result of production. Although the volume of vegetables grown in Israel decreased in 2022, there was an increase in the volume of other foods produced, food imports, and thus an increase in the total food waste along the value chain, resulting in a cumulative increase in the scope of the environmental impact.

60,000 tons of fertilizers; 3,000 tons of ammonia emissions from animals.

Taking these factors together, about 5 million tons of greenhouse gases were emitted in 2022 as a result of food waste; about 6% of the total for the country⁶³. Government Decision 171, Transition to a Low-carbon Economy (July 25, 2021) set a national goal of a 27% reduction in greenhouse gas emissions by 2030, and an 85% reduction by 2050 (based on greenhouse gas emissions in 2015)⁶⁴. In October 2021, the Prime Minister announced an intention to reach the goal of zero carbon emissions in Israel by 2050⁶⁵. Decision 171 established goals for reducing greenhouse gas emissions and optimizing energy consumption in various sectors of the economy. Reducing food waste in Israel will contribute to the national effort to meet these goals, which include: at least a 47% reduction in greenhouse emissions from all sources of solid waste by 2030 as compared to the 2015 level; at least a 92% reduction in greenhouse gas emissions originating in municipal waste by 2050 as compared to the 2015 level (which was about 5.5m tons); at least a 71% reduction in the amount of municipal waste landfilled by 2030, as compared to the amount landfilled in 2018 (about 4.5m tons).

On September 12, 2023, the Israel Ministerial Committee for Legislation also approved the Climate Law, which established a national goal of a 30% reduction in greenhouse gas emissions by 2030 and zero net emissions by 2050. However, the text of the law must be discussed in Knesset committees and be approved by a majority in three readings before it is formally accepted into Israeli law.

63. In 2022, 4,88m tons of greenhouse gases were emitted, compared to 4,76m tons in 2021.

64. Government Decision No. 171 In gov.il, Transition to a low-carbon economy.

65. Announcement from the spokeswoman of the 36th Prime Minister's Office, Naftali Bennett, gov.il

66. Based on household water consumption.

Water expended and lost as a result of food waste would fill: **55,000** Olympic-sized swimming pools

In an arid country like Israel, water is a precious and limited resource. In 2022, 180 million cubic meters of potable (drinking quality) water, valued at NIS 670m (\$190m), went down the drain together with wasted food. This could fill 55,000 Olympic-sized swimming pools, raise the level of the Sea of Galilee by over a meter, or provide water to approximately 3.5m residents for a year⁶⁶.

Land is another valuable and limited resource in Israel. Some 1 million dunams (around 247 thousand acres) of agricultural land, with a value of approximately NIS 0.8b (\$227m), were used to grow food that was eventually discarded.

66. Residential water consumption.

1/3 Food-derived Waste Comprises about a Third of Household Waste in Israel

The environmental impacts of food waste are not only due to natural resource use and pollutant emissions associated with excess production of food and consumption patterns, but also from the way food is treated after it is discarded. Treatment of food waste after it has been thrown away, especially landfilling, has environmental impacts. It has been assessed that 34% of household waste in Israel is organic waste originating from food⁶⁷. Discarded food increases the volume of waste required for treatment and, in the absence of waste separation, impairs the ability to recycle other materials in the household waste stream.

67. According to the waste composition survey conducted for the Israel Ministry of Environmental Protection, 2013.

Environmental Costs of Food Waste, 2021, By Cost Driver, in NIS billions

Cost Driver	Wasted Resources	Emissions Cost	Waste Treatment Cost	Natural Resources Cost (Land and Water)
Waste	2.0 million tons municipal waste 0.9 million tons agricultural waste	0.5	0.9	-
Electricity Generation <small>not including electricity for water desalination & purification</small>	1,340 Million kWh	0.3	-	-
Emissions from Animal Sources	3,000 tons ammonia	0.4	-	-
Fuel Combustion	80 thousand tons	0.2*	-	-
Water	185 million m ³ fresh water 215 million m ³ treated waste water	0.1	-	0.7
Fertilizer Use	60 thousand tons	0.04	-	-
Land Use	1 million dunams agricultural land			0.8
Total		1.5	0.9	1.5

*The cost of fuel emissions in 2022 was over NIS 150 million, an increase of about NIS 20 million compared to 2021.

Source: BDO

Most of Israel's solid waste is landfilled. This has many negative environmental impacts. Landfills take up significant space and deplete Israel's limited land resources, while transporting waste to remote landfill sites throughout Israel emits air pollutants, in addition to the emission of greenhouse gases.

Municipal waste in Israel is estimated at 5.9 million tons per year⁶⁸. In 2022, it was estimated that 2.6 million tons of food was wasted⁶⁹. Of this, about 1.8 million tons of food and an additional 200,000 tons of its packaging had to be treated as part of the municipal waste stream⁷⁰. This resulted in a total of 2 million tons of food and packaging waste, which comprises about a third of the volume of the solid waste in Israel that requires treatment. About 200,000 compactor trucks are required to collect,

remove, and transport this waste each year; that is 550 trucks loaded with solid waste every day⁷¹.

Additionally, treating this solid waste necessitates financial and statutory support including storage, collection, removal, sorting and transit stations, transportation, the treatment itself (costs vary depending on treatment type), and landfill levies. The direct annual cost of treating waste in Israel that originates from wasted food and its packaging is NIS 0.9b (\$255m) according to waste treatment cost estimates in the Ministry of Environmental Protection⁷². Beyond that, the external cost of greenhouse gas emissions and air pollutants from waste treatment is NIS 0.5b (\$142m). The total direct and indirect economic costs for the treatment of food waste in Israel for 2022 is approximately NIS 1.4b (\$400m).

68. As estimated by the Ministry of Environmental Protection in 2020.

69. Including agricultural produce left in the field

70. About 860 million tons is food waste from the agricultural stage, which is generally left in the field and does not require treatment.

71. Compactor trucks with a capacity of 10 tons.

72. Waste Policy 2030. This figure does not include food waste in the agricultural phase.

Environmental Costs of Food Waste in Israel 2022, by Stage at which the food was thrown away, in millions of NIS

	Agriculture*	Processing	Distribution	Consumption**	Total
Fruit & Vegetables	387	29	461	874	1,750
Grains & Legumes	104	69	122	346	642
Milk & Dairy	121	45	71	257	494
Meat, Fish & Eggs	143	150	204	494	991
Total	754	294	858	1,970	3,876
Percentage of Total	19%	8%	22%	51%	100%

* The agricultural phase includes losses during packaging and handling.

** Emissions due to the domestic use of water, electricity, and cooking gas were not included in the consumption phase.

Source: BDO

50% of the the Environmental Costs of Food Waste Occur During the Consumption Phase

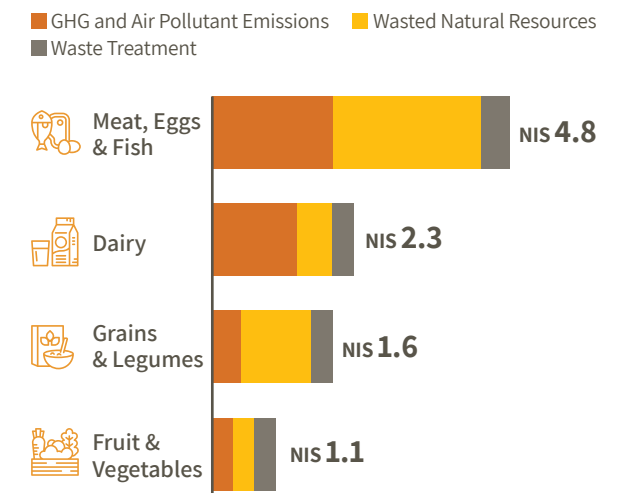
The quantification of the environmental impacts of agriculture refers to the full life cycle of the products, including growing and harvesting the crops, post-harvest treatment, storage, processing, distribution, consumption, and disposal. The later in this process that the product is wasted or discarded, the greater its environmental impact. Three factors affect the environmental footprint of food waste: the impacts during the value chain stage during which food was discarded; the impacts of the product ultimately becoming waste; all the previous stages (if any). For example: food thrown away in the grocery store embodies all the greenhouse gas and emissions attributed to growing it (the production phase), transporting it from the field to the packing house and then to the grocery store, storage at the grocery store (cooling and lighting), transportation to the landfill, and emissions from landfilling the waste.

Approximately half the environmental costs of food waste occur during the consumption phase⁷³. A product thrown away by consumers embodies all the environmental impacts involved in its production, transportation, processing, and distribution. In 2022, 1.2 million tons of food (including its packaging), worth NIS 13b (\$3.6b), was discarded during the consumption phase. In addition to the cost of the food waste, this results in economic damage in terms of the cost of waste treatment, assessed at approximately NIS 0.5b (\$142m), which consumers paid indirectly through municipal taxes. Additionally, there was environmental damage, costing approximately NIS 0.9b (\$255m), as a result of emissions of greenhouse gases and air pollutants.

73. The consumption phase includes household and institutional consumption.

This analysis according to the stage during which the environmental impacts originate indicates that approximately 60% of the environmental impacts originate during the agricultural stage. This is because the total costs associated with food that was discarded at the subsequent stages of processing, distribution, or consumption, embody all the costs of the preceding stages. Emissions in the agricultural phase are caused, among other things, by the use of fuels and electricity, fertilizers, sludge and compost, water desalination, and emissions from animals. A significant amount of water and land are used to grow food. Environmental impacts of food that was discarded during the consumer phase include those from all the previous phases, including fuel for transportation and electricity for cooling, but the non-agricultural phases require minimal amounts of water and soil compared to the agricultural phase. Therefore, the environmental impacts during the agricultural stage, which are attributed to all wasted food, are estimated at about 60% of the total environmental impacts of food waste that are considered in this Report.

Cumulative Environmental Costs per Kg of Food Lost and Wasted in Israel 2022



Source: BDO

Environmental Costs of Food Waste, by Stage during which it was Discarded, 2022



Animal-based Food Products Have the Greatest Environmental Impact

Examining the environmental impacts of the various categories of food products shows that animal-based food products have the greatest environmental impact. Meat, eggs, and fish products that are wasted in the agricultural stage have an environmental cost of NIS 5.6 (\$1.7) per kg (resulting from greenhouse gases and air pollutants). If these products are thrown away during the consumption stage, this cost rises to NIS 7.7 (\$2.2) per kg. Dairy products wasted at the agricultural stage have an environmental cost of NIS 2.2 (\$0.62) per kg, and this rises to about NIS 2.8 (\$0.79) per kg if they are thrown away in consumers' homes. Fruit and vegetables wasted in the field have an environmental cost of NIS 90 (\$25.5) per kg, which almost doubles if they are thrown away by consumers.

The factors affecting environmental costs differ between the various types of foods. For meat, eggs, and fish, about half of the environmental costs are attributed to the loss of natural

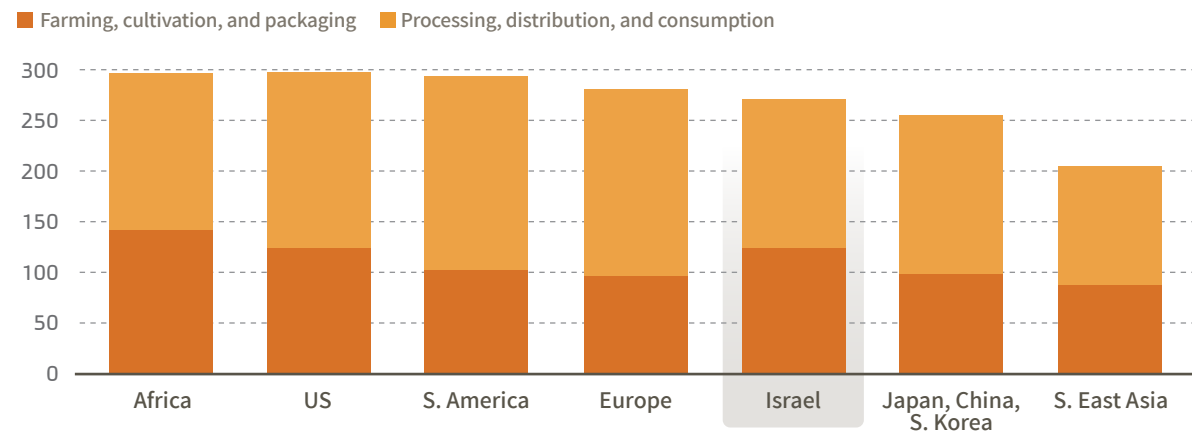
resources. For dairy products, the main cost results from greenhouse gas emissions and air pollutants. For fruit and vegetables, the cost is divided equally between waste treatment, loss of natural resources, and emissions of greenhouse gases and air pollutants.

International Comparison: Greenhouse Gas Emissions from Food Waste

According to UN estimates, about 1.7 billion tons of food are wasted each year around the world. An estimated 4.3 billion tons of greenhouse gases were emitted as a result of growing and producing food products that were not consumed. This includes greenhouse gas emissions during all of the stages of the value chain, from growing, and producing food through treating it as part of the waste stream⁷⁴.

74. Since the FAO study did not quantify air pollutant emissions as a result of food production and disposal, the comparison presented below only deals with greenhouse gas emissions as a result of food waste.

GHG Emissions from Food Waste by Geographic Region, Kg per Capita*



*The FAO and UNEP draw on studies published in the various countries, which may use different methodologies to make these estimates. Source: UNEP, FAO and BDO analyses; data for Israel is from the BDO estimates.

The global environmental cost of greenhouse gas emissions as a result of food waste is estimated at approximately \$515b per year⁷⁵. This cost varies according to local conditions and the types of crops.

An international comparison based on the FAO study and the most recent UN Report, indicates that it is not possible to assert that greenhouse gas emissions per capita in low-income countries differ significantly from those in higher-income countries. The UN Report states that food waste per capita in the consumption phase is similar across countries. This contradicts the prevailing perception that in developed countries waste

occurs predominantly in the consumption and retail segments, whereas in developing countries waste occurs predominantly in the production, storage, and transportation stages.

The findings of the UN Report reflected in the graph above indicate that emissions of greenhouse gases (GHG/k) resulting from food waste per capita during the consumption segment in Israel is similar to that in the USA, lower than in Africa, but higher than in Europe.

In Israel, 5 million tons of greenhouse gases are emitted as a result of the production and growing of food that is not consumed, comprising about 6% of the greenhouse gases emitted there annually.

75. Assessed by the FAO in 2014.



Municipal waste ready for processing in a factory, Eastern Europe. Credit: Yura White



10

**Food Rescue:
Potential Savings
for the National
Economy**

NIS 5.2 billion The potential savings for the national economy from food rescue

Food Rescue: Potential Savings for the National Economy

To bridge the gap between the amount of food actually consumed by food insecure populations in 2022, and the normative level of consumption (the average consumption in the second to fifth deciles), would have required about 510,000 tons of food, a value of about NIS 3.6b (\$1b). The cost to fill the gap between the food expenditure of the population living with severe food insecurity (about 8.2% of households in Israel), in relation to normative expenditure on food, is approximately NIS 2.5b (\$1.47b). An additional NIS 1.1b (\$0.3b) would be needed to fill the food expenditure gap for the population living with moderate food insecurity.

It would be possible to fill the gap between food expenditures among the food-insecure population in Israel and normative food expenditure by rescuing about 510,000 thousand tons of wasted food. This represents about 20% of the volume of food that is wasted in Israel each year, and about 45% of the volume of wasted food that is rescuable. According to the estimates presented in this Report, it would cost about NIS 1b (\$0.3b) to rescue food worth about NIS 3.6b (\$1b). This is equivalent to the entire gap between the expenditures on food among the population living with food insecurity and the normative level of expenditure on food in Israel.

Additionally, rescuing this amount of food would save approximately 80 million cubic meters of water, 260 million kWh of electricity, 15,000 tons

of fuel, NIS 300m (\$85m) as a result of reducing emissions of greenhouse gases and air pollutants, and NIS 170m (\$48m) as a result of reducing waste treatment costs. Further, the economy would save approximately NIS 5.2b (\$1.47b) per year in excess healthcare costs accrued due to ailments caused by food insecurity.

It would cost approximately NIS 3.6b (\$1b) per year to fully finance filling this gap in food security through means other than through food rescue. Therefore, food rescue has a clear advantage over the alternatives for filling the food insecurity gap, such as providing allowances, donations, subsidies, or other types of support to those in need. Food rescue would cost approximately NIS 1b (\$0.3b) per year, making it possible to achieve the same social goal at a significantly lower cost. That is, rescuing healthy food, with an emphasis on vegetables and fruit, could reduce food insecurity while saving about 72% of the costs. It also has health, social, and environmental benefits.

The problem of food insecurity is reflected not only in monetary expenditures on food, but also in the variety of food consumed. Comparing the food baskets consumed by food-insecure and food-secure populations shows that the former is characterized by a lower level of expenditure on fruit, vegetables, meat, and fish, which have high nutritional value.

For example, for food products such as meat, poultry, fish, and fresh fruit and vegetables, which have high nutritional value, expenditure is between 55% to 70% lower than the normative level. For products such as potatoes, bread and pita, the gap narrows to between 15% to 25%. According to the principles of economic theory, income received in the form of goods is an inferior alternative to monetary income, since it deprives the recipients of the freedom to allocate resources according to their full needs. Therefore, there is a tendency to prioritize financial support over in-kind support. This economic principle is also called “subsidy for the consumer, not for consumer goods.”

However, there are unique traits of food rescue, which offer a clear economic advantage to supporting the needy through goods rather than money. This advantage stems from the characteristics of transforming surpluses intended for destruction into consumable food, which means that every shekel invested in food rescue yields a direct economic return that is 3.6 times greater. Moreover, if the environmental impacts of the emission of greenhouse gases and air pollutants, and waste treatment are taken into account, the return to the economy is even higher, with the yield approximately 4.3 times the investment. When the health benefits from reducing food insecurity in Israel are also considered, the economic return rises to 10.68 times.

Summary of benefits to the national economy via food rescue in USD millions per year				
% of rescued food, within the total amount of wasted food	1.5% existing situation	5%	10%	20%
Amount of rescued food, in thousands of tons	40	13	260	510
Rescued food as a percentage of the food insecurity gap	7%	25%	50%	100%
Value of rescued food	62	283	567	1,020
Cost of food rescue	17	76	156	283
Savings for the national economy (before external impacts)	45	207	411	737
External environmental and social benefits (according to FAO)	57	184	368	737
External health benefits	110	368	737	1,473
Total savings from food rescue for the national economy	212	759	1,516	2,946

Source: BDO estimates

In this context, it should be noted that the population characterized by food insecurity also suffers from general economic insecurity, reflected in gaps in consumption of other basic needs (housing, healthcare, education, etc.). It is likely that in practice, when food is donated to these households, they will be able to direct part of their disposable income to purchasing other products. From a social point of view, these households see consumption of these other goods and services as primary needs, in terms of their economic security. Therefore, donating food to them improves their wellbeing beyond the direct value of the food itself, because their resources can be redirected towards acquiring other goods and services.

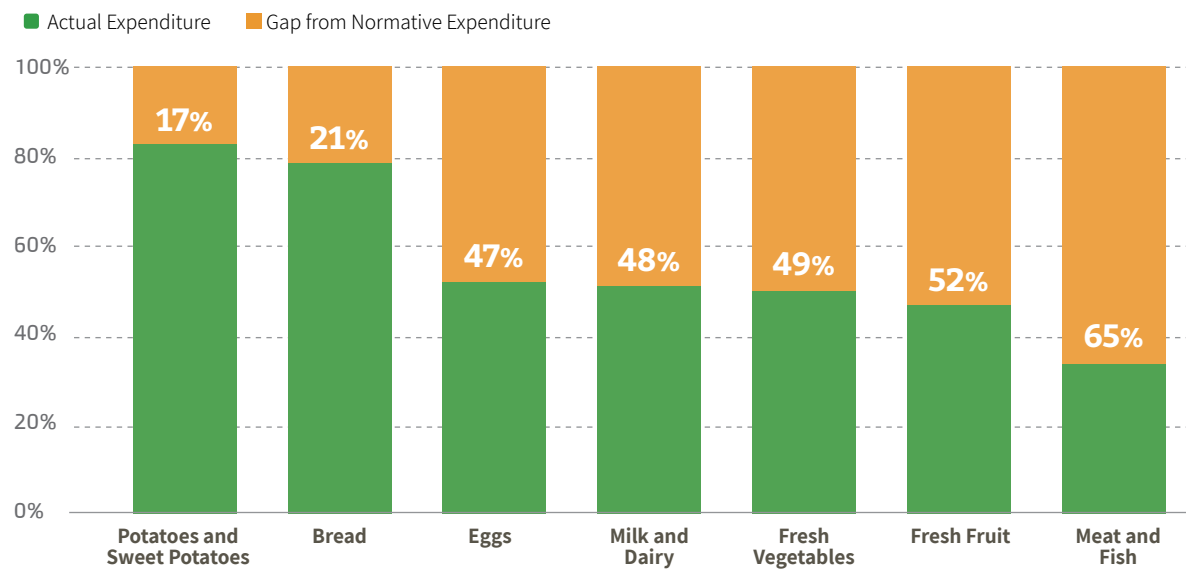
In September 2015, the UN and the US government adopted Sustainable Development Goals (SDGs), and within this framework, set a national goal of reducing food waste by 50% within 15 years⁷¹.

71. Global Sustainable Development Goals set by the UN General Assembly in 2015.

Data analyses presented in this Report show that rescuing food, at a rate of even less than half of this target, and distributing it to the approximately 460,000 Israeli households that live with food insecurity, would provide them with food valued at the full amount of the gap between their level of food expenditures and the normative level. In terms of the national economy, this means savings of approximately NIS 3.6b (\$1b) per year; the difference between the value of the food that is rescued and the cost of rescuing it. Moreover, this does not take into account the additional economic benefits resulting from reducing poverty and inequality, and external environmental and health benefits.

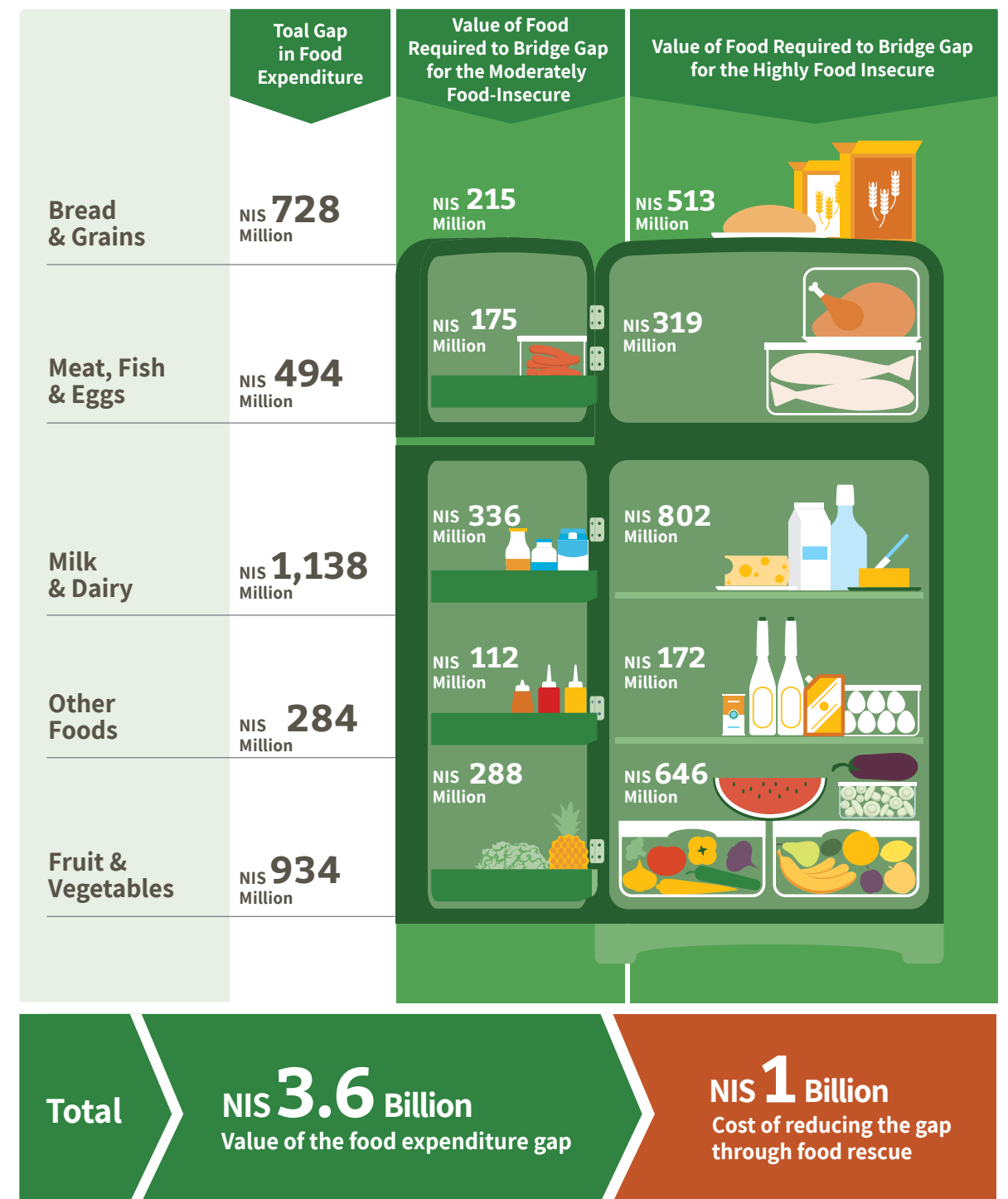
It is essential to emphasize that reaching a national goal of reducing the amount of food wasted in Israel by 50%, gradually over the course of 15 years, is not expected to cause any damage to the scale of agricultural production in Israel for local consumption, as compared to the current situation. Rather, it will only slow down the rate of growth in local food production.

Composition of food expenditures among households suffering from severe food insecurity (100% = diet of a population with normative food expenditures)



Source: BDO processing of data from the CBS household expenditure survey

Gap between expenditures on food among population living with food insecurity and normative food expenditures, Israel, NIS millions





11

Rescuing Food: Economic, Social, Health, and Environmental Benefits

1.1 Million Tons of rescuable food in Israel in 2022

Rescuing Food: Economic, Social, Health, and Environmental Benefits

The combination of increased food waste, the climate crisis, the high proportion of Israeli households living with food insecurity, and resultant health and economic costs, all indicate that food rescue needs to become a key national policy tool.

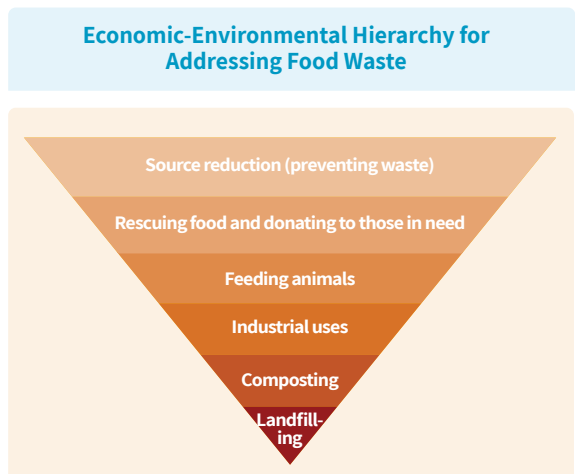
The phenomenon of food waste is not unique to Israel. This problem exists worldwide, and to a similar extent in all Western economies. According to UN estimates, in terms of quantity, over a third of all food produced is wasted, or about a quarter of it, in terms of caloric value.

The European Union's Waste Framework Directive established a hierarchy of priorities for handling unconsumed food. Each level in the hierarchy highlights a different management strategy for reducing food waste. The clear priority is on preventing food waste and using rescued food to feed disadvantaged populations. These strategies have the greatest environmental, economic, and social benefits, and therefore most effectively address the problem.

There are many policy tools to help disadvantaged populations and address food insecurity. In Israel, the most common policy measures are donations, subsidies, stipends, and relief assistance. Food rescue is unique in that it assists people in need, at a low cost, as it is only necessary to finance the cost of rescuing the food, rather than the full cost of purchasing it.

There is a socio-economic debate, in Israel and around the world, between an approach whose central goal is encouraging growth ("growing the pie") versus reducing inequality. Rescuing food waste intrinsically combines these approaches. Distributing rescued food to disadvantaged populations increases economic output while reducing inequality.

Additionally, food rescue policies can increase food reserves and promote food security in times of crisis and emergencies that disrupt local and global food supplies, such as the Covid-19 pandemic and climate change.



Source: Environmental Protection Agency

 The combination of increased food waste, the climate crisis, the high proportion of Israeli households living with food insecurity, and resultant health and economic costs, all indicate that food rescue needs to become a key national policy tool.

There are four main benefits of rescuing food

1. Economic

Food waste decreases economic productivity, since investments and labor inputs are lost. Wasted food with no value or a negative value is given positive economic value when rescued and distributed for consumption by disadvantaged populations who benefit from its full nutritional value. Food rescue increases economic output and productivity, since its cost is lower than the cost of investing, producing, and transporting additional food products.

2. Social

The costs of food waste along the entire value chain, from growing and producing food, through marketing, distribution, and consumption, are ultimately paid by consumers. This affects the cost of living in Israel. Food rescue can reduce social disparities, lower the cost of living, and lessen food insecurity among disadvantaged sectors of the population.

3. Health

Food security is not measured only in caloric terms, but also relates to the nutritional value and quality of the food. Being able to afford healthy food that provides adequate and essential nutrition for physical, emotional, and cognitive functioning is a necessary aspect of realizing food security. On a personal level, food insecurity is a risk factor for chronic physical and mental illness, lower academic achievements,

and diminished earning capacity. On a national level, it leads to economic distress, increased healthcare expenses, and lower productivity. Rescuing healthy food, particularly fruit and vegetables, and distributing it to people in need, may lower the proportion of the population that lives with food insecurity and thus improve their health. This can reduce unnecessary healthcare costs borne by the Israeli economy.

4. Environmental

About 37% of Israel's local agricultural products become waste or surplus. All the resources used during the processes of growing, producing, distribution, and marketing – land, water, fertilizers, chemicals, and fuel – are also lost. Agriculture and industries that produce food for human and animal consumption utilize many non-renewable resources, which cause pollution and negatively impact the quality of water, soil, air, and biodiversity around the world. In addition to the environmental impacts of producing unconsumed food, the wasted food must be disposed of. In Israel, the majority of waste is buried in landfills. Decomposing organic waste in landfills emits methane, a greenhouse gas linked to climate change, and causes soil pollution. About a third of household waste is organic food waste. Rescuing food maximizes utilization of the resources already invested in producing it, and reduces the need to use additional natural resources and other inputs.

The combination of these four benefits is distinctive to food rescue activities. There is a need to formulate appropriate policy tools to advance them in the field.

About half of the total wasted food in Israel is rescuable, representing more than 1.1 million tons. Rescuing it could prevent about 3% of the greenhouse gas emissions in Israel and reduce healthcare costs to the Israeli economy by NIS 5.2 billion.

About half of the total wasted food in Israel is rescuable, representing more than 1.1 million tons. Rescuing it could prevent about 3% of the greenhouse gas emissions in Israel and reduce healthcare costs to the Israeli economy by NIS 5.2b (\$1.47b). Most food rescue activities, in Israel and around the world, are carried out by nonprofit social organizations supported by donations. Nevertheless, the main basis for food rescue is not to give charity, but to offer an alternative to producing food, which has direct economic benefits and reduces economic inequalities.









The direct cost of rescuing food is, on average, about NIS 1.6 (\$0.45) per kg. The direct value of the saved food is about NIS 5.7 (\$1.61) per kg, representing a value multiplier of 3.6. That is, every shekel invested by the food rescue organizations generates NIS 3.6 (\$1) worth of food products for the populations receiving the donations. Food rescue in Israel is still in its infancy, and there is great potential for increasing its scope. Taking advantage of economies of scale could reduce the cost of food rescue operations and increase the value of the rescued produce. However, to be conservative, the estimates presented here are based on the current cost structure.

In terms of national economic benefits, the impact on the environment and healthcare must also be considered. Every kilogram of rescued food is estimated to represent a reduction in greenhouse gas emissions, air pollution, and waste treatment valued at NIS 1.1 (\$0.3) (see Chapter 10), such that every shekel invested in food rescue yields a value of NIS 4.3 (\$1.2) to the national economy. Every kilogram of rescued food is estimated to reduce

healthcare costs by about NIS 12.5 (\$3.54) (see Chapter 8) such that every shekel invested in food rescue yields a value of NIS 11.8 (\$3.34).

The scope of food waste in Israel is similar to that of developed countries around the world. In recent years, the Israeli government has taken the first steps in promoting initiatives to reduce food waste (see Chapter 12). However, while many other countries have formulated legislation, national plans, and multi-year goals to encourage food rescue and reduce waste, Israel does not yet have a national policy on this issue.

Comparing Food Production and Food Rescue

	Food Production	Food Rescue
Product	 Nutritional Foods	 Nutritional Foods*
Nutritional Value	100%	100%
Use of land	Yes 	Minimal*
Use of water	Yes 	Minimal*
Greenhouse gas emissions while raising crops	Yes 	No
Use of fertilizers and pesticides	Yes 	No
Cost of logistics, distribution, and transportation	Yes 	Yes 

*Most of the resources are invested while growing and producing the food, and only minimal additional resources are needed in the process of rescuing it.



Food Rescue, Leket Israel Harvest Farm. Credit: Leket Israel

Estimating the Profitability of Rescuing Food: Cost / Benefit per kg of Food

	Benefit to the National Economy		
	Without external influences	By reducing greenhouse gas emissions, air pollution, and waste treatment	By reducing greenhouse gas emissions, air pollution, waste treatment and healthcare costs
Value of rescued food, per kg	NIS 5.7 (\$1.7)	NIS 5.7 (\$1.7)	NIS 5.7 (\$1.7)
Environmental benefit	Not applicable	NIS 1.1 (\$0.3)	NIS 1.1 (\$0.3)
Health benefit	Not applicable	Not applicable	NIS 12.2 (\$3.6)
Total value to the national economy	NIS 5.7 (\$1.7)	NIS 6.8 (\$2.0)	NIS 19.0 (\$5.6)
Cost of food rescue	NIS 1.6 (\$0.5)	NIS 1.6 (\$0.5)	NIS 1.6 (\$0.5)
Profit from food rescue	NIS 4.1 (\$1.2)	NIS 5.2 (\$1.5)	NIS 17.4 (\$5.1)
Value multiplier = Value to the national economy/the cost of rescue	NIS 3.6	NIS 4.3	NIS 11.8

* Market value of an alternative product with the same nutritional value. Source: BDO estimates



12

**An International
Comparison –
Food Waste and
Policies for its
Reduction**



**UN Report 2021:
Consumer Food Waste is Significantly
Higher than Previous Estimates**

An International Comparison – Food Waste and Policies for its Reduction



**Food Waste
around the World**

The United Nations Environment Programme (UNEP) Food Waste Index Report states that they had underestimated the extent of global food waste during the consumption stage (residential and institutional) ⁷². Ten years before, they estimated that globally 1.3b tons of food were wasted per year; about a third of all the food produced in the world. According to the more recent report, the first update in a decade, about 1.7b tons of food are wasted per year during the consumption phase; 30% more than the previous estimate.

The Food and Agriculture Organization (FAO) of the United Nations defines food waste as: “the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers, and consumers.”

The UN Food Waste Index cites findings from the Food Waste and Rescue in Israel Report by Leket Israel, the Israel Ministry of Environmental Protection, and BDO.

The United Nations set a Sustainable Development Goal of reducing global food waste per capita by 50% by 2030. Toward this end, they developed the

72. United Nations Environment Program (2021). Food Waste Index Report 2021, Nairobi

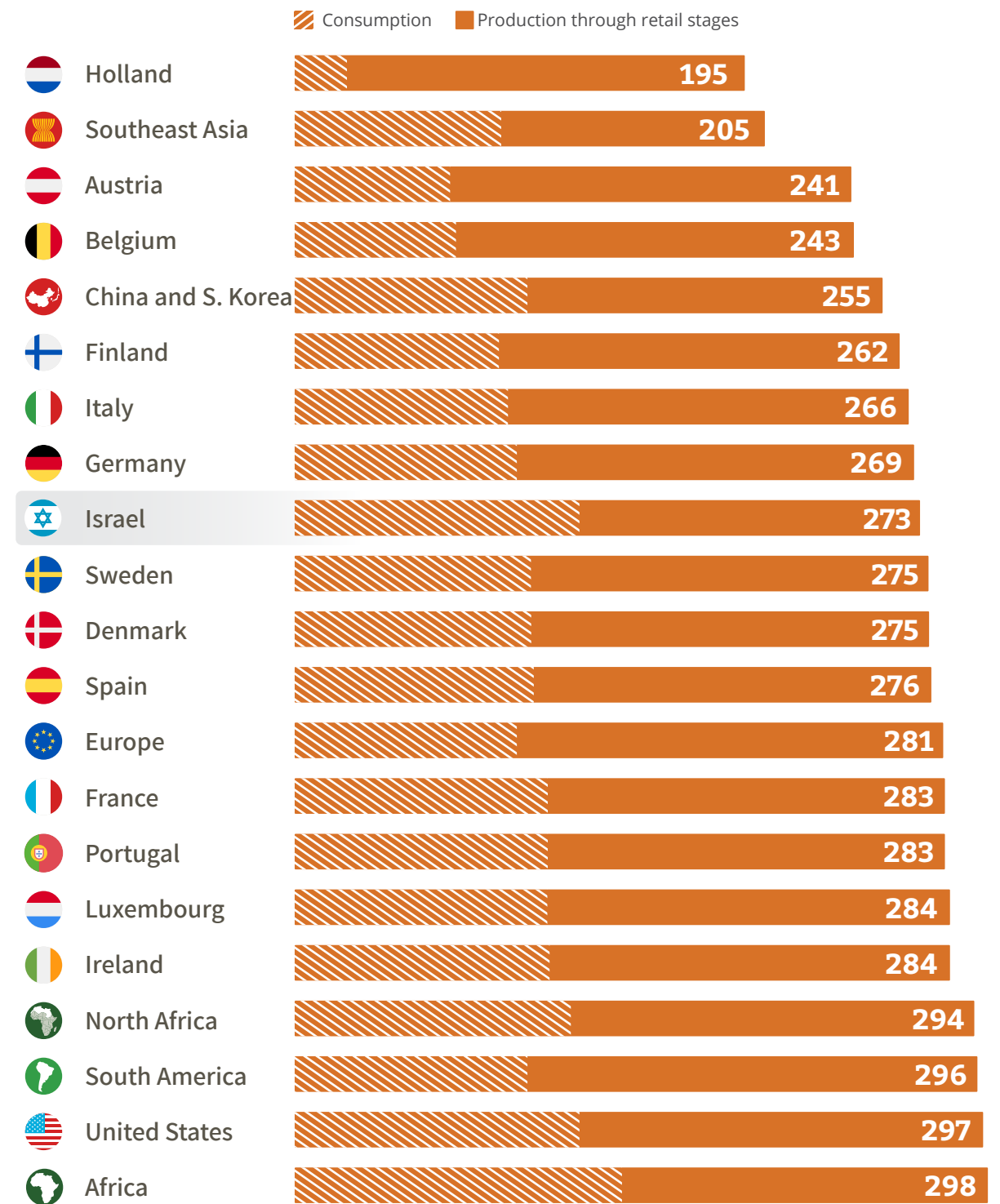
Food Waste Index ⁷³. This complements the FAO’s *Food Waste Index*, which primarily addresses food waste in the agriculture, sorting, packaging, and industrial processing stages.

The UN Food Waste Index cites findings from the Food Waste and Rescue in Israel Report by Leket Israel, the Israel Ministry of Environmental Protection, and BDO.

The UN Report states that they did not previously understand the full extent of global food waste because their earlier estimates relied on often outdated information from a small number of countries. The new UN Report presents a picture of global food waste at the retail and consumption stages, both institutional and domestic, based on up-to-date and comprehensive data. The new Report cites 84 studies about food waste in various countries; 52% of these are academic studies, 33% were carried out by government institutions, 10% by nonprofit organizations, and 6% by other agencies. In referring to Israel, the UN Report cites and relies on the findings of the Food Waste and Rescue in Israel Report by Leket Israel, the Israel Ministry of Environmental Protection, and BDO.

73. Sustainable Development Goals, Goal indicator 12.3.1, FAO

International Comparison of Food Waste Per Capita kg/year



Source: UNEP, FAO and BDO analyses; data for Israel is from the BDO estimates

The findings of the UN Report presented in Figure 1 indicate that food waste per capita in the consumption segment in Israel is similar to that in the USA, lower than in Africa, and higher than in Europe.

The UN Report does not offer any explanation for the international differences in food waste per capita. However, a study on factors affecting food waste conducted by Israeli researchers found that household food waste is lower in countries where garbage is separated at the source. Unlike the prevailing trend in Europe, there is no source separation of household waste in Israel, which may explain the country's high level of waste in the consumption sector⁷⁴.

The UN considers reducing food waste a key issue for sustainable development and reducing food insecurity around the world. Its recent Report

notes that there are untapped opportunities to address this problem, since estimates of the extent of global food waste are still not sufficiently reliable. The UN Report concludes that countries around the world must measure and monitor their own food waste and promote systematic policies to reduce it.

This recommendation is in line with work already being done in the Food Waste and Rescue in Israel Report. Leket Israel and BDO have issued these Reports for the past eight years; the Israel Ministry of Environmental Protection became a partner in the project for the past four annual Reports, and recently the Israel Ministry of Health has joined this effort as well. The Reports include annual estimates of the extent of food waste in Israel and policy recommendations for reducing it. In this sense, Israel is a pioneer.

74. "Household Food Waste," Prof. Ofira Ayalon, Prof. Efrat Elimelech, University of Haifa, Dr. Eyal Ert, The Hebrew University, on behalf of the Chief Scientist, Ministry of Agriculture, managed by the Volcani Institute.



City Harvest, Union Square Greenmarket Rescue, New-York. Credit: Bloomberg

The cost of living is high in Israel, and food expenses represent a significant component of household spending. Therefore, addressing the problem of food waste is doubly important.

Moreover, discarding or destroying food that has an alternative economic value indicates a market failure. A supportive government policy to enable more efficient utilization of this resource is needed.

Against this background, it is appropriate to examine the main policy tools being used around the world to reduce food waste.



Policy Tools for Reducing Food Loss and Waste Globally and in Israel

In collaboration with the Global Food Donation Policy Atlas⁷⁵

Given the growing global recognition of this problem, the FAO and UNEP are striving to develop international indicators to produce a unified quantitative baseline of data on food waste, which can help countries formulate policies to reduce it and to monitor their progress. Various policy tools have been used around the world to reduce food waste, such as measures to minimize food surpluses at the source, to rescue food surpluses, and to encourage treating organic waste through composting and anaerobic digestion rather than landfilling.

OECD Countries Use Integrated Policy Tools to Reduce Food Waste.

Efforts are being made around the world to disseminate information about food waste and the policy tools available to reduce it. The European Commission, under the European Union's Food Loss and Waste Prevention Hub (FLWPH), reviews

75. Global Atlas of Food Donation Policy, atlas.foodbanking.org

and shares information regarding relevant policy and legislation in European countries. The Harvard Law School Food Law and Policy Clinic (FLPC)⁷⁶ and the Global Food Banking Network (GFN)⁷⁷ launched the Global Food Donation Policy Atlas⁷⁸ in February 2019. This project focuses on countries that are not members of the EU and aims to promote policies, legislation, and regulations to rescue food, reduce waste, and remove the barriers to doing so.

The Atlas partnership's activities include:



Locating and providing accessibility to legislation related to food rescue and donation, among an updated and expanding list of countries.



Analyzing the most common barriers to food rescue and donation in these countries.



Sharing best practices to overcome these barriers.

Within this broad framework, in-depth reviews are being published for individual countries regarding their policies and regulatory activities related to reducing food waste and rescuing food. The Atlas partnership has identified key relevant policy tools and which countries are implementing them in an optimal way (best practices).

The *Report on Surplus Food Donation in Israel: Legal Guide and Policy Recommendations* was published in June 2023, in collaboration with Harvard's FLPC, the Global Food Donation Policy Atlas partnership, the Israel Ministry of Environmental Protection, GFN, and Leket Israel⁷⁹.

76. Harvard Law School Food Law and Policy Clinic.

77. The Global FoodBanking Network

78. Quick-view food donation policy atlas, The Global Food Donation Policy Atlas.

79. Israel: Policy Highlights and Opportunities.

Best practices according to the Atlas Partnership & the European Commission



1. Safety regulations for food donations

Creating a legal framework that provides clear guidelines regarding safety standards for rescued or donated food.

India - Food Safety and Standards (Recovery & Distribution of Surplus Food)⁸⁰

- Details the responsibility of food donors and surplus food distribution organizations, and clearly designates the Food Safety and Standards Authority of India as the guiding entity.
- Defines labeling requirements for donated food.
- Requires registration of surplus food distribution organizations in order to monitor them.

80. Gazette Notification, FSSAI (Food Safety And Standards Authority Of India), 2019



Israel - Public Health Protection Law (Food), 2015⁸¹

- Section 11 of the Law regulates the use of leftover food.
- Section 159 exempts nonprofit food distribution organizations from needing production, transport, or storage licenses. This exemption was extended as part of the Arrangements Law for 2021-2022, but the law's regulations have not yet been amended.
- Section 162 permits food distribution organizations to use certain types of food after the “best before” date if they receive written permission from the manufacturer confirming that it is safe to consume after this date.

81. Law for the Protection of Public Health (Food), Nevo Legal database



Milk on sale near expiry date, a supermarket in the UK. Photography: Nigel J. Harris



2. Protection from legal liability in food donations

Legislation exempting organizations that store, transport, and distribute donated food from criminal or civil liability for damage caused as a result of these activities, provided that they acted lawfully and were not negligent.



USA - Good Samaritan Food Donation Act (1996)⁸²

- Federal protection against civil and criminal liability for food donors and nonprofit organizations that distribute food donations, under certain conditions: the food must be donated in good faith to an association that distributes food to needy people free of charge, and the food must meet safety standards.
- Some states provide more extensive protection for other types of donations: Arizona, California, Massachusetts, Minnesota, Nevada, New Hampshire, New Mexico, Vermont, Rhode Island, and Tennessee protect donations made directly to needy people; Alaska, Arizona, Hawaii, Kentucky, Maine, Massachusetts, New Hampshire, New Jersey, Ohio, Rhode Island, and Tennessee protect donations of food that have passed their expiration date.
- In 2021, a proposal to amend the law was submitted to the Senate and the House of Representatives which would expand options for food donations throughout the US by allowing direct donations to individuals by food service businesses and institutions such as grocery stores, school cafeterias, etc., but the amendment has not yet been passed.

82.42 U.S. Code § 1791 - Bill Emerson Good Samaritan Food Donation Act, Legal Information Institute



Israel - Food Donation Act, 2018

This law encourages the rescue of surplus food by stating that donors to food distribution organizations and the employees and volunteers for organizations that collect, store, or distribute food donations, will not be held civilly or criminally liable for damage caused by the food donation, if they acted in accordance with the provisions of any applicable law and did not act negligently.



3. Labeling expiration dates

To reduce the confusion regarding the meaning of the date on food product labels and to ensure the safety of the donated food, the complementary use of three policy tools is recommended:

- Regulations defining two types of labels for food products: a safety-based label and a quality-based label. In the first case, consuming food after the date shown on the label may involve risk, and in the second case it does not.
- Legislation that allows donations of food after the date on the quality-based label.
- Launching consumer education campaigns to reduce confusion about expiration date labels.



United Kingdom - Expiration date labeling guidelines - “Label better, less waste”⁸³

- In accordance with the recommendations of the UN Codex Alimentarius, the UK adopted a mandatory policy to divide food products into two groups; for one, products have a safety-based (“use by” expiration date) label, and the other has a quality-based label (“best before” date).

83. WRAP Food Labelling Guidance Toolkit 2019

- This policy prohibits the donation of food after the safety-based date (“use by”) but permits the sale or donation of food after the quality-based “best before” date.
- The UK government, in collaboration with the Waste and Resources Action Programme (WRAP), launched several public education campaigns to reduce food waste, including explanations of the types of expiration dates.
- Section 162 discusses the possibility of nonprofit organizations distributing past-date food.
- In 2017, standards for labeling packaged foods in Israel were re-assessed. The Ministry of Environmental Protection and the Ministry of the Economy proposed updates to the labeling in order to reduce food waste. Updates included comparing the list of products that are exempt in Israel from having an expiration date marked on them to the list of such products in the European directive, marking the expiration date with both month and year or only the year, depending on the product type and its perishability and educating the public to clarify the labels used. Some of these proposed updates were accepted, but in practice a manufacturer can mark a full expiration date on all products and there has been no apparent change in the labeling customarily used.

Expiration Dates in Israel

- There are two different types of expiration dates for food, safety-based (“use by”) and quality-based (“best before”).
- The law prohibits selling or donating food after either type of expiration date, whether it indicates safety or quality.
- Sec. 12 of the Public Health Protection Law allows food to be used after its expiration date under certain circumstances.



Volunteers at the Michigan University Food Bank. Credit: Steve Jessmore

4. Tax Incentives

Tax benefits produce an economically competitive alternative to discarding food that is safe for human consumption. Granting exemptions from VAT on food donations to food banks addresses a potential barrier to donations.

USA - Internal Revenue Code (IRC) ⁸⁴

- Tax incentives for businesses to encourage donations of surplus food.
- The law allows a double tax credit for food donations:
 1. A general tax deduction at the rate of the cost of purchasing the food ⁸⁵.
 2. An increased tax deduction that provides an incentive by allowing food donors to deduct the lower of these two options: (a) twice the cost of purchasing the donated food or (b) the cost of purchasing the donated food plus half of the expected profit on the sale of the food, if it had been sold at fair market value. This deduction may reach twice the amount of the general deduction, in which each business is allowed to deduct up to 15% of its taxable income for food donations ⁸⁶.

Israel

A food donation worth over NIS 190 (\$54) will be given an income tax credit at a rate of 35% of the value of the donation.

84. U.S. Code § 170 - Charitable, etc., contributions and gifts

85. I.R.C. § 170(e)(1); 26 C.F.R. § 1.170A-4(a)(1) (2018)

86. C.F.R. 1.170A-4A(b)(2)(ii)(A) (2019)

5. Obligation to donate surplus food

Food suppliers may be required to contract with organizations that will distribute unsold food that is fit for human consumption.

France - Legislation to Prevent Food Waste

- Food Waste Prevention Legislation 2016: large marketing chains (over 400 m²) are required to donate surplus food to food banks ⁸⁷. Violators may be fined between €3,750 - €75,000. (\$4,020 - 80,500) ⁸⁸ Following passage of this law, food donations from marketing chains increased by 20%.
- The Egalim Law of 2019 ⁸⁹ extended this obligation to large institutional caterers (serving more than 3,000 meals per day); and food manufacturers and large wholesalers (with a turnover of over €50m (\$54m)).

Israel

- Food suppliers have no obligation to contract with organizations to distribute unsold food that is fit for human consumption.
- The Government Companies Law (Amendment - Obligation to Donate Excess Food), which would obligate government companies in Israel to donate surplus food, was passed in a preliminary reading by the Knesset in July 2023.

87. LAW no. 2016-138, 2016 relating to the fight against food waste.

88. Webinar Review: Waste Bans Penalties, CHLPI (Center for Health Law and Policy Innovation)

89. LAW no. 2018-938, 2018 for the balanced commercial relations in agricultural and food sectors for healthy, sustainable and accessible food for all.

6. Prohibition/ taxation for sending organic waste to landfill

Prohibiting/ taxing the disposal of organic waste in landfill as a tool for influencing business behavior.

USA - Legislation to prohibit large waste generators from landfilling organic waste.

- California, Connecticut, Massachusetts, Rhode Island, and Vermont have laws prohibiting landfilling food waste.
- In 2012, Vermont enacted the Universal Recycling Law, which prohibits the landfilling of food waste. The law establishes a graduated ban, leading to a total ban by 2020, both for businesses and residents. According to the Vermont Food Bank, following the enactment of this law, food donations increased by approximately \$40m⁹⁰.
- In Massachusetts, there is a ban on landfilling food waste by businesses that produce over a ton of food waste per week. A 2016 study found that this ban generated \$175m in economic activity and created over 900 jobs for organizations and businesses that remove, transport, process, and recover waste⁹¹.

Scotland - Scottish Landfill Tax ⁹².

This graduated tax aims to reduce the landfilling of food waste, according to the hierarchy of food use, by establishing a system with two fees for waste disposal in landfills: a standard fee (currently £102.10 per ton); and a lower fee (currently £3.25 per ton) for waste that is less polluting waste and has a lower potential for greenhouse gas emissions (low organic content, non-biodegradable, non-hazardous materials, etc.).

Israel

- There is no ban on landfilling organic waste in Israel.
- Since 2007, landfill operators must pay a levy for each ton of landfilled waste⁹³. This levy (NIS 111.34 (\$32) per ton of waste as of January 2022) is very low, both compared to what is accepted in other countries and relative to other waste treatment methods. The landfill levy in Israel applies equally to all types of waste and therefore does not encourage diverting organic waste from the landfill.
- Local authorities may voluntarily collect a fee from businesses for collecting “excess” commercial waste⁹⁴, but neither the criteria for what comprises excess commercial waste nor the fee to be charged for it are regulated.

90. VERMONT'S UNIVERSAL RECYCLING LAW

91. Commercial Food Material Disposal Ban, Massachusetts Department of Environmental Protection

92. Scottish Landfill Tax, Scottish Government.

93. According to the Maintenance of Cleanliness Law, amendment 9.

94. NIS 111.34/ton as of January 2022

7. Government grants and incentives

Funding through grants or incentive programs at the national or local level provide important resources for promoting food donation and rescue.

USA

- The Federal Emergency Food Assistance Program (TEFAP) allocates \$100 million and \$500 million dollars each year for administrative support and food rescue, respectively, by local organizations.
- The Federal grant program also supports food banks and food rescue efforts.

In Israel

- Several individual states also allocate funds to purchasing food for emergencies.
- The 2022 National Food Security Initiative recognizes rescuing food as an alternative to purchasing it.
- The text of the initiative defines “rescued food” as edible food with nutritional and health value that has been saved from being destroyed, such as agricultural produce that was not been harvested, food that was not sold in supermarkets or stores, and agricultural produce that is misshaped or has aesthetic flaws.



Volunteers with food rescue organization Cyrenians FareShare, Scotland. Credit: Asda

8. Setting national goals to reduce food waste

In accordance with the UN Sustainable Development Goals for 2030, each country should set a national goal to reduce food loss by 50% by 2030.

This goal has been adopted in the USA, Canada, most European countries, and Australia

Israel

In 2015, Israel adopted the UN Sustainable Development Goals, including the goal to reduce food waste, but no official and specific national goal to reduce food waste has been defined.

9. Setting a national strategy to reduce food waste

A comprehensive national strategy may be adopted to reduce food waste along the supply chain. Such a strategy should dictate a clear and comprehensive policy aimed at reducing food waste and promoting food rescue. The strategy may include all the policy tools mentioned above, and more.

Australia - National Food Waste Strategy, 2017⁹⁵

- A study was carried out regarding the feasibility of reaching the stated national goal of reducing food waste by 50% by 2030. The study found that this goal could be achieved within seven years, given the following conditions:

- Making significant investments in innovations
 - Providing incentives
 - Adopting strict regulations
 - Encouraging voluntary commitments to reduce food waste
 - Involvement of the food industry and civil society organizations
- A national strategy for reducing food waste was written and published by the Australian Department of Agriculture, Water and Environment, focusing on four areas: promoting supportive policies, improving performance in the business sector, market development, and behavior change. Supportive policies were formulated for the following four areas:
 - Creating a national baseline of data on food waste and a methodology for measuring its reduction in relation to the goal
 - Identifying relevant areas for targeted investment
 - Encouraging voluntary commitments to reduce food waste
 - Promoting legislation supporting food waste reduction and food rescue
 - So far, progress compared to the baseline has not been measured.

Israel

No comprehensive national strategy for reducing food waste has yet been formulated. However:

- In October 2021, the government approved a 100-step action plan to deal with the climate crisis. It includes a section on food systems, with a specific reference to reducing food loss and waste.

- In January 2021, the Ministry of Environmental Protection published its new waste strategy, which includes a reference to reducing waste, including food waste, at the source. The Ministry of Environmental Protection is currently formulating an implementation plan for this strategy.

Notably, the Israeli Climate Forum, an initiative of the Office of the President, set the following goals: Making a commitment for the State of Israel to be at the forefront of the global discussion on the climate crisis; Raising awareness among the Israeli leadership regarding all aspects of the

climate crisis; Promoting cooperation between the various groups and sectors of Israeli in addressing the climate crisis; Promoting regional and international cooperation to address the climate crisis.

The forum includes representatives from the Office of the President, the national government, the Knesset, local governments, academia, and civil society organizations operating in this field. Leket Israel is a member of the Israeli Climate Forum, and rescuing food has been accepted as one of the initiatives to be promoted as part of the solution to the climate crisis.



An initiative of the OzHarvest organization, a supermarket based on the 'take what you need, give what you can' philosophy aiming to make rescued food available to those who need it most. Credit: OzHarvest

95. National Food Waste Strategy: Halving Australia's Food Waste by 2030, Department of the Environment and Energy, 2017

Among the countries surveyed, 94% have regulations for labeling expiration dates on food products; 78% offer tax incentives for food donations; 78% have developed a national strategic plan to reduce food loss; 72% have set a goal to reduce food waste by 2030; 67% require businesses to donate food and/or tax food waste; 61% have government incentives to promote food donations; 56% have safety regulations for food donations, and 44% protect food donors against legal liability.

By implementing these various policy tools, the United Kingdom reduced food waste per capita (after the agricultural phase) by 27% by 2018,

as compared to 2007 (the baseline year of measurement). In the Netherlands, food waste was reduced by 29% (during the consumer phase) by 2019, as compared to the baseline year 2010. An interim report about all European countries is expected to be published by the European Commission later in 2023.

Among the policy tools discussed above, financial tools have the most extensive impact on reducing food waste.

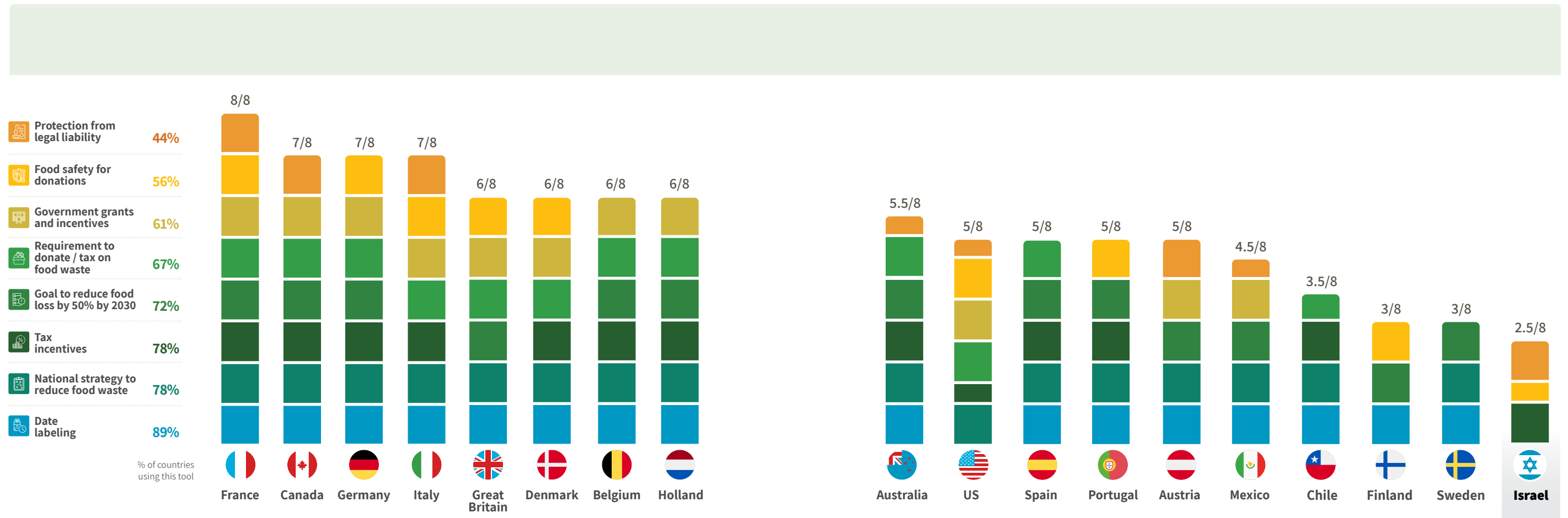
A 2020 study examined the impact of policy and regulatory measures in Europe on reducing food waste, and found that among the policy tools discussed above, financial tools have the most extensive impact on reducing food waste⁹⁶.

In the absence of a systematic government policy, Israel remains far from realizing its potential for reducing food waste, promoting food rescue, and thereby reducing malnutrition and food insecurity among the population.

In terms of reducing barriers to reducing food waste, the tool with the most widespread impact is setting tariffs for landfilling organic waste, followed by exempting food donations to food banks from VAT.

In Israel, the issue of food waste has received attention in recent years, particularly with the enactment of the Food Donation Act in 2018. However, in the absence of a systematic government policy, Israel remains far from realizing its potential for reducing food waste, promoting food rescue, and thereby reducing malnutrition and food insecurity among the population.

96. Wageningen University Food & Biobased Research, commissioned by the Dutch Ministry of Agriculture, Nature and Food Quality.



Source: Global Donation Policy Atlas, FLWPH, Food redistribution in the EU and BDO

Developments in Israel Governmental Activity in the Field of Food Waste

Although Israel remains far from realizing its potential for reducing food waste and rescuing food, since it lacks a systematic government policy, some government ministries are working to promote the issue within their areas of responsibility:

The Ministry of Environmental Protection works to reduce food loss and waste.

In the past two years it has undertaken the following actions:

- This Ministry led an inter-ministerial Committee for Preparing Food Systems for Climate Change, with representatives from the Ministry of Agriculture and Rural Development, Ministry of Health, Ministry of Intelligence, Ministry of Education, and the Institute for National Security Studies. The purpose of this committee is to formulate mid-range goals (for 2030) and an action plan to prepare food systems in the State of Israel for climate change, while integrating issues of acclimation (adaptation) and reducing greenhouse gas emissions (mitigation). The committee addressed reducing food waste, and one of its conclusions was that it is necessary to set goals for reducing food waste and to include this issue as part of the concept of resilience for the country. The committee's Report is published on the Ministry of Environmental Protection's website.
- The Ministry was a leader in preparing the State of Israel for the UN Food Systems Summit. Within this framework, the Ministry held dialogues with government ministries, civil bodies, academics, agriculturalists, food manufacturers, and more.

- In June 2023, the Ministry partnered with Leket Israel in publishing Surplus Food Donations in Israel: Legal Guide and Policy Recommendations. This Report presents a comprehensive view of the legal and practical aspects of donating food in Israel, while comparing it to what is happening in 20 other countries around the world.
- Together with the Ministry of Health, the Ministry of Environmental Protection promotes implementing criteria for healthy and sustainable food in food catering services and public procurement in Israel. The criteria include reducing food waste and rescuing food.
- Through a call for proposals to environmental organizations, the Ministry is supporting activities to reduce food waste, and in this framework is supporting a series of activities for the general public, households, and local authorities to raise awareness of this issue, change behaviors, develop policy tools to reduce food waste, develop local food rescue systems, and more. The Ministry also supports policy studies on reducing food waste.
- Publicity: The Ministry produced and published several videos on social media that dealt with various aspects of reducing food waste including: information about the phenomenon and its scope, related activities of organizations, and tips for consumers.
- The Ministry of Environmental Protection's waste strategy advocates reducing food waste at the source.
- Starting in 2019, the Ministry partnered with Leket Israel in publishing the annual Food Waste and Rescue in Israel Report, which includes a chapter on environmental impacts.

The Ministry of Agriculture promotes initiatives to reduce food waste during the production, distribution, and consumption stages, including:

- The Ministry of Agriculture stated that from September 2023, producers and importers must ascertain the shelf life of animal products that pose a health risk if they become contaminated. They extended the valid shelf life of fresh chicken from five days to seven days; of frozen meat from 15 months to 24 months, and of frozen internal organs from six months to a year. This will help reduce food waste.
- The Ministry of Agriculture's extension services offers professional training to promote the adoption of methods of growing and climate control to reduce waste in the fields, orchards, and in agricultural production process.
- These initiatives are supported by grants to agriculturalists offered through the Ministry's investment department.
- Researchers with the Agricultural Research Organization offer assistance to food packing houses and sorting stations in the use and implementation of storage technologies to reduce food waste during the storage phase, and advanced methods for identifying and removing damaged produce during the sorting and distribution phase.
- To reduce food waste in the marketing and consumption phases, the Ministry began conducting a Life Cycle Assessment to examine the use of special packaging that creates a controlled environment around produce to extend its shelf life. The results of this experiment will help implement a dramatic change in the marketing and sale of fresh agricultural produce.

In 2017, the Ministry of Labor, Welfare and Social Services launched the National Food Security Initiative in collaboration with Eshel Jerusalem-Colel Chabad and Leket Israel.

Renewable cards with a value of NIS 500 (\$142) are distributed to approximately 11,000 families suffering from severe food insecurity. The pilot program was launched in February 2017 in 36 municipalities across the country, with a total annual cost of approximately NIS 65m (\$18.4m). Families accepted into the program receive a card worth NIS 500 (\$142) every month from the Ministry of Labor, Welfare and Social Services via Eshel Jerusalem-Colel Chabad. The family can use this card to purchase NIS 250 (\$71) worth of food products (not including tobacco or alcohol) in selected chain supermarkets and local stores and they receive an additional NIS 250 (\$71) worth of rescued fruit and vegetables NIS 180 (\$51) and dry foods NIS 70 (\$20), which are delivered to their homes.

In May 2021, a tender for operating the National Food Security Initiative was published, after several changes were made to it. The number of families participating in the project has increased to approximately 26,000 families, who receive a card worth NIS 350 (\$100) and a basket of fruit and vegetables worth NIS 150 (\$42.5) delivered to their homes. The tender specifically refers to distributing rescued agricultural produce. The project continues to operate under the auspices of Eshel Jerusalem-Colel Chabad, in cooperation with Leket Israel.



13

Policy Recommendations to Encourage Food Rescue and Reduce Food Waste



The Time is Ripe to Adopt International Best Practices and an Orderly Government Policy for Reducing Food Loss and Encouraging Food Rescue in Israel.

Policy recommendations to encourage food rescue and reduce food waste

The National Food Waste and Rescue Report 2022, like previous Reports, indicated that food rescue is highly worthwhile, in terms of economic, health, social, and environmental considerations. A comparative review of policies and best practices used around the world for reducing food waste, and information about the health benefits of rescuing nutritious food, underscore the need for food rescue to be a national policy tool.

Current concern with food in general, and healthy and sustainable food in particular, should be seen in the broad context of food security and the need to provide food for everyone. Population growth and the political, environmental, and health crises that plague the world are having a direct impact on food reserves.

Economic: This is a clear case of market failure. Rescuing food at market value is not economically viable. However, if food's economic value reflects its alternative value and nutritional value, then food rescue becomes economically worthwhile.

Social: Donating rescued food to people in need can reduce inequality and increase food security among Israel's population.

Health: Rescuing nutritious food and distributing it to people who lack sufficient food or are experiencing food insecurity can provide them with adequate nutrition. This directly benefits

this population's health and reduces healthcare expenses for the national economy.

Other advantages of food rescue were not reviewed in this Report. However, it is notable that the current concern with food in general, and healthy and sustainable food in particular, should be seen in the broad context of food security and the need to provide food for everyone. Population growth and the political, environmental, and health crises that plague the world are having a direct impact on food reserves. It is not possible to simply stand by in the face of this situation. Therefore, the following policy tools are recommended for consideration, to encourage food rescue and reduce food waste in Israel. These tools are widely used in many Western countries.



The Recommended Policy Tools

1 Establish a national goal to rescue food and reduce waste

The established target should be a 50% reduction in food waste by 2030, in accordance with the principles formulated by the United Nations.

Setting a national goal puts the issue on the public agenda and creates an obligation to take steps to achieve it.

In addition to setting a goal, it is necessary to create measurement and monitoring tools to regularly assess compliance toward meeting the target.

2 Formulate a national plan for food rescue and reducing food waste

The plan for food rescue and reducing food waste should emphasize healthy and nutritious food. The plan should cover the entire value chain, and all the relevant conditions (operational, regulatory, economic), so that the goal of reducing food waste and rescuing food can gradually be achieved. The plan should be submitted to the government, for approval and budgeting.

Because this broad issue pertains to multiple government ministries, the plan will be compiled by an inter-ministerial team. The Ministry of Environmental Protection expressed a willingness to lead and coordinate the team's work. The proposals are as follows:

The Ministry of Environmental Protection will promote, among other things, policies to reduce food waste and to rescue food as a means toward meeting emission-reduction goals in waste treatment and industry. Such policy tools may include fees for excess waste, a ban on landfilling organic waste that has not been stabilized, an economic mechanism for carbon pricing, etc.

The Ministry of Health will outline a policy promoting a healthy diet among the general population, and among disadvantaged populations in particular. It will formulate a policy that will remove barriers facing nonprofit organizations and food banks whose work focuses on food rescue and donating fresh and healthy food. The Ministry will assess various tools and programs to promote public awareness of healthy dietary practices and their consequences.

The Ministry of Agriculture and Rural Development will make efforts to improve the planning and coordination of agricultural production. It will formulate a policy offering incentives and assistance to farmers who donate surplus food products rather than disposing of them. They will examine policy tools and technologies for transforming food designated for disposal into a resource.

The Ministry of Economy and Industry will formulate a policy offering incentives and aid to food producers who donate edible, nutritious

food rather than disposing of it. They will examine ways to implement dynamic pricing practices in marketing networks that will help reduce waste as a result of food products approaching their expiration dates. The Ministry will explore the possibility of a new expiration date system.

The Ministry of Welfare and Social Security will support activities and initiatives to reduce food waste and to rescue healthy food for distribution to disadvantaged populations. Supportive measures will focus on distributing healthy food and recognizing rescue as a food source. This will be combined with nutritional education programs, counseling, and guidance targeting disadvantaged populations. This will allow the Ministry to expand the scope of their support to these populations, without allocating additional budgets for this.

The Ministry of Education (in collaboration with the Ministry of Environmental Protection and the Ministry of Health) will make a plan to implement curriculum, beginning in early childhood, that encourage healthy and sustainable nutrition, preventing food waste, and food rescue. Environmental and sustainability studies will emphasize saving resources, including food, and advocating food rescue.

Government Procurement Manager will implement a threshold condition for private entities that participate in government tenders to provide any services to the state (not only in the food sector), that should there be rescuable sources of food, such entities must contract with a recognized food rescue association. In cooperation with the Government Companies Authority, state-funded entities that manage (directly or through a subcontractor) kitchen facilities that feed over 1,000 people a day will also be required to contract with recognized food rescue organizations as a precondition for receiving a budget from the government. This includes security services, school cafeterias, companies, etc.

The Ministry of Defense and the National Emergency Management Authority will budget for food rescue and food security within its economic assessments for emergencies and crises.