



# Food Waste and Rescue in Israel

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## Economic, Social and Environmental Impact

Seventh National Report, 2021

# Introduction

The National Food Waste and Rescue Report is being published for the seventh consecutive year by Leket Israel and BDO, with the cooperation – for the third time – of the Ministry of Environmental Protection.

According to estimates in the report, 2.6 million tons of food, worth NIS 21.3 billion was wasted in Israel in 2021. This quantity of food waste is equivalent to approximately 37% of Israel's annual domestic food production. Of this amount, approximately 1 million tons, worth NIS 7.5 billion, was rescuable.

Worldwide increases in food prices, because of the Russian invasion of Ukraine, as well as the shortage of goods caused by extreme climate events that impact the global economy, further intensify the growing need to rescue food.

In Israel, where food expenditure is relatively high by international standards, food waste is among the factors that contribute to the high cost of living, due to both overspending on food and because unnecessary waste drives food prices higher. In 2021, the overall impact of food waste on the cost-of-living was an additional NIS 6,900 per household annually.

Moreover, the climate crisis and the Israeli government's commitment to lower greenhouse gas emissions underscore the need to reduce food waste and increase food rescue, as policy tools that will help lower carbon emissions.

The prevention of food waste and promotion of food rescue are important economic and environmental tools for implementing the Government's July 2021 decision mandating a 71% reduction in the amount of waste sent to landfill by 2030. According to the report's findings, 2 million tons of food and packaging waste were discarded in the past year. The environmental damage caused by this waste was estimated at NIS 3.6 billion.

This report is based on an economic model for the food industry developed by BDO. It includes comprehensive, detailed research on the extent of different types of food waste in Israel. Furthermore,

the report reveals the potential for food rescue at each stage of the value chain in the food production process and the environmental costs of food waste at each stage.

The findings presented below show that food rescue is extremely worthwhile from an economic, social, and environmental perspective. Every shekel invested in food rescue produces a direct value of NIS 3.6. If the environmental impact of food rescue is considered, the economic value of each shekel invested in food rescue creates NIS 4.2 in value for the national economy.

The current report includes a special, expanded chapter presenting an international comparison of food waste per capita and policies on food rescue. This chapter was written in collaboration with the Global Food Donation Policy Atlas prepared by the Food Policy and Law Clinic of Harvard Law School (FLPC) and the Global FoodBanking Network (GFN). The comparison shows that the problem of food waste is not unique to the Israeli economy and that the extent of waste in Israel is similar to that in developed countries around the world. The chapter further shows that varied policy tools can be used to reduce food waste. For Israel to realize its potential to reduce food waste and encourage food rescue, thereby diminishing inequality and food insecurity among the country's population, it needs to formulate an expedient government policy that reduces food waste using advanced policy tools. The report ranks 18 countries according to their current policies for reducing food waste and increasing rescue. On that scale, Israel ranks last. This indicates that Israel needs to shift its priorities, and that all government agencies ought to be enlisted in implementing change.

It is our hope that this report will serve as the foundation for public discourse on food waste, and as a tool for developing national policy to stimulate genuine change in food waste and rescue patterns in Israel.



Volunteers, Leket Israel's Field

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# 1. The Uniqueness of Israeli Food Production and Consumption

**450** thousand Israeli households suffer from food insecurity

## The Uniqueness of Israeli Food Production and Consumption

The household expenditure on food consumption in Israel stands at about 17% of the average household's total expenditure and about 22% of the expenditure of households in the lower two deciles of the population. Food is much more than an essential component of a household's consumption budget. Food consumption is a basic need, and balanced nutrition is essential for ensuring the health of the general population and in particular the development of babies and children. Therefore, a shortage of food or insufficient consumption of essential nutrients can cause potential health issues, at a cost that exceeds the market value of the food, which represents its production cost through all stages of the value chain.

Israel is characterized by a food expenditure rate that is among the highest in the developed world; at the same time, it has the highest poverty rate among OECD countries<sup>1</sup>. As a result, food insecurity in Israel is a particularly severe problem. BDO's analysis of the report issued by the National Insurance Institute in December 2021 found that 16.2% of Israeli households suffer from food insecurity, which is equivalent to approximately

450 thousand households suffering from food insecurity in Israel<sup>2</sup>. From an economic perspective, this indicates that a food insecure household spends approximately 30% less on food than those who enjoy normative levels of consumption.

Food is a unique commodity, not only in terms of its consumption characteristics but also in terms of its production properties. Growing and producing food requires the use of natural resources that are relatively scarce or that have substantial economic costs, such as, energy, water, and land. Many of these are non-renewable resources<sup>3</sup> and their use also runs the risk of impacting water, land and air quality and harming biodiversity, along with greenhouse gas emissions that lead to climate change. Moreover, collecting and disposing of food surpluses in landfill carries additional environmental costs.

In a small, arid country like Israel, water and land are valuable, limited resources. The need to use land and water resources to grow surplus agricultural produce that is later lost or wasted, incurs further environmental and social costs, beyond the direct economic cost.

1. OECD, Poverty rate, 2020.  
2. National Insurance Institute, Measures of poverty, and income inequality, according to data from 2020 and an estimate for 2021.  
3. Value Chain Management Centre, Cut Waste, Grow Profit: How to reduce and manage food waste, leading to increased profitability and environmental sustainability, Background paper, 2012.

The nutritional components found in food are derived almost entirely from agricultural products, including vegetables, fruits, legumes, dairy products, eggs, meat, fish and oils. At the same time, agricultural production has an inherently high level of uncertainty resulting from external factors such as pests, weather, diseases, and more.

This report examines the issue of food waste and the economic, social, and environmental viability of its rescue, based on quantifiable estimates

and assessments. It includes updated data and methodological improvements based on experience accumulated during the preparation of the six previous reports. This year's report also includes a special, expanded section presenting an international comparison of food waste and rescue policy, written in cooperation with the Harvard Law School Food Law and Policy Clinic (FLPC)<sup>4</sup>, and the Global FoodBanking Network (GFN)<sup>5</sup> who have launched the Global Food Donation Policy Atlas<sup>6</sup>.

4. The Food Policy and Law Clinic of Harvard Law School (FLPC)  
5. The Global FoodBanking Network (GFN)  
6. Global Food Donation Policy Atlas



Israeli meal, Credit: KPegg



**2.**

**Food Waste:  
How Much Food is  
Wasted in Israel?**

# 2.6 Million tons of food wasted in Israel in 2021

## Food Waste: How Much Food is Wasted in Israel?

The findings of the 2021 National Food Waste Report indicate the scale of food waste was approximately 2.6 million tons, an increase of approximately 5% in comparison to the previous report (the 2020 National Food Waste Report).

Households returned to consuming more food outside the home, meaning in the institutional sector, which is characterized by high levels of food waste, rather than eating at home where food waste levels are generally lower. This transition made a significant contribution to the growth of food waste in 2021, compared to the previous

year which was characterized by unchanged levels of food waste because of the steep decline in institutional consumption [more on this in the following chapters]. The nearly total restoration of the institutional sector (other than catering halls) made a significant contribution to both an increase in consumption and an increase in food waste.

Food waste estimates in Israel are based on a unique value chain model for domestic food production<sup>7</sup>.

Estimated at approximately 2.6 billion tons, food waste in Israel constitutes about 37% of overall

7. The value chain model does not include beverages, energy boosters, sugar, honey and candy

### Estimated Food Waste in Israel\* in 2021

Waste/ household NIS/month	Agriculture	Processing & Packaging	Industry	Retail & Distribution	Institutional Consumption	Household Consumption	Total
 Fruit & Vegetables	64	21	2	74	37	134	<b>334</b>
 Grains & Legumes	2	1	1	21	35	92	<b>152</b>
 Meat, Fish & Eggs	11	2	13	50	29	46	<b>151</b>
 Milk & Dairy	4	1	1	5	4	23	<b>38</b>
<b>Total</b>	<b>81</b>	<b>25</b>	<b>18</b>	<b>150</b>	<b>106</b>	<b>295</b>	<b>675</b>

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

domestic food production. In the agricultural sector, the amount of food produced in 2021 was similar to that produced in recent years, about 6.9 million tons, an increase of 0.4% over 2020.

Total food waste in Israel through all stages of the value chain is the equivalent of NIS 675 per month per household.

In monetary terms, about 20% of the value of the wasted food, which is equivalent to approximately NIS 4 billion, occurs during various stages of production. This loss of NIS 4 billion in value represents approximately 13% of the total value of agricultural production in Israel. Approximately 80% of the waste, equivalent to approximately NIS 16.5 billion, occurs during the retail stages of distribution and consumption.

Economically, the value of agricultural commodities per ton increases as they progress along the production value chain, and food production involves the investment of additional costs for sorting, processing, transporting, distributing, and retailing. The authors of this report assessed the waste value in the early stages of production

(growing, packaging, and manufacturing) based on wholesale prices that were paid to farmers. Waste during the later stages in the value chain was estimated based on retail food prices.

A comprehensive value chain model for various food production and consumption stages was designed to assess food waste and the potential for food rescue in Israel. This model is based on a bottom-up approach and the analysis of data relevant to agricultural production, storage, import, export, distribution, and consumption of a sample of 50 different types of food<sup>8</sup>.

For each type of food, the volume was measured in terms of gross agricultural product and waste rate for every stage of the value chain of food production, distribution, and consumption in Israel. The assessment presented here is based in part on agricultural waste surveys conducted and updated by the Volcani Center<sup>9</sup>. The total estimated food waste for the economy as a whole and for each food type is based on the waste estimated for each stage and each product in the value chain.

8. These estimates may include deviations or inaccuracies that are inevitable due to the lack of official data. Likewise, the amount of annual food waste also depends on random variables, such as extreme weather conditions, natural disasters, and pests, deviations in demand, etc. The data is indicative and intended to serve as a basis for public debate and further research and analysis.

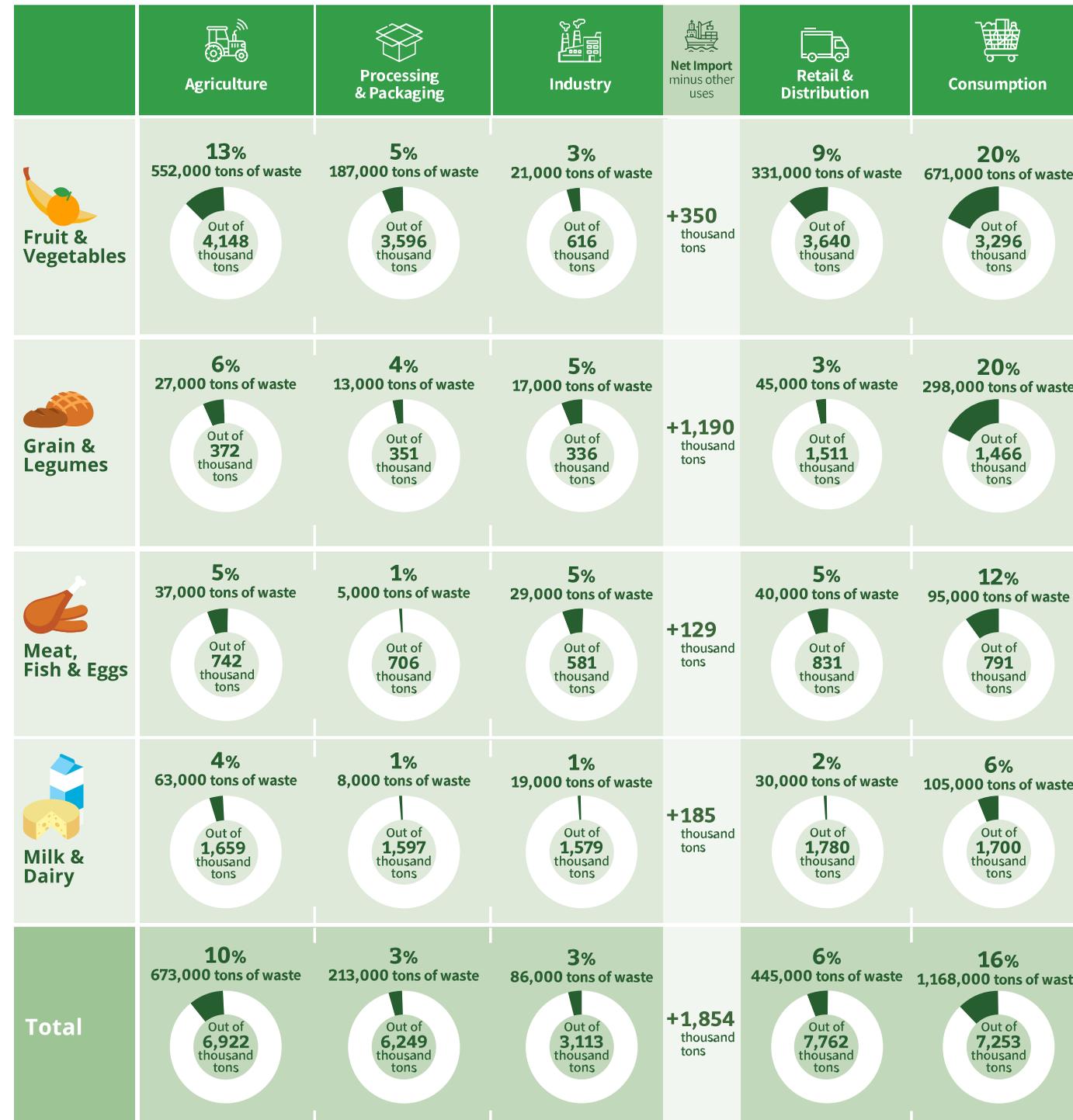
9. Dr. Ron Porat, 2015 and 2016.

### 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	552	187	21	331	671	<b>1,763</b>
 Grains & Legumes	21	13	17	45	298	<b>393</b>
 Meat, Fish & Eggs	37	5	29	40	95	<b>205</b>
 Milk & Dairy	63	8	19	30	105	<b>225</b>
<b>Total</b>	<b>673</b>	<b>213</b>	<b>86</b>	<b>445</b>	<b>1,168</b>	<b>2,586</b>

\* 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



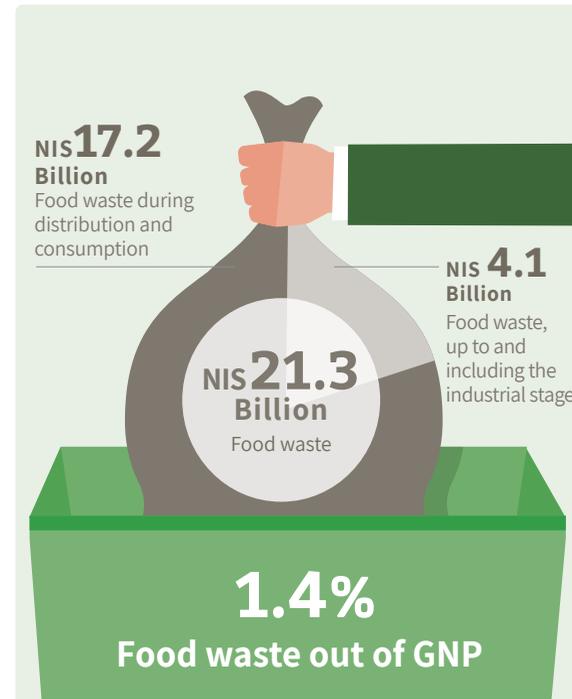
{ NIS 4.1 } **20%**  
Billion Lost

{ NIS 17.2 } **80%**  
Billion Lost

The data on food waste presented in this report is based on estimates from a wide range of sources and data that was available to the authors, with the cooperation of the Central Bureau of Statistics, the Ministry of Agriculture, the Ministry of Environmental Protection, and the Ministry of Social Affairs. Additional sources of information include conversations and interviews with experts working in the field, study findings, international comparative studies, and more.

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

- 1 From agricultural production to the final stage of industrial food processing (food waste in the production process)**
- 2 From retailing and distribution to the end consumer (food waste in consumption)**



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



Gleaning in the fields. Credit: Leket Israel

There are wide variations in food waste across the various food types and stages of the value chain. In each stage of the value chain, the amount of food waste out of the total amount of food produced or consumed was examined. Thus, for example, 10% of the total amount of food produced was wasted during the agricultural stage. Likewise, 16% of food produced was wasted during the consumption stage (household and institutional consumption).

Fruit and vegetables constitute a major part of food waste in Israel, which stems both from the fact that they are a substantial part of Israel's agricultural production and due to the high waste rate of produce. High waste rates for fruit and vegetables are not unique to the Israeli economy. An international comparison shows similar rates for fruit and vegetable waste in Europe. Compared to the United States, the waste rate in Israel is lower, however, it consists of lower waste rates in the agricultural and consumption stages and higher waste rates in the intermediate stages<sup>10</sup>.

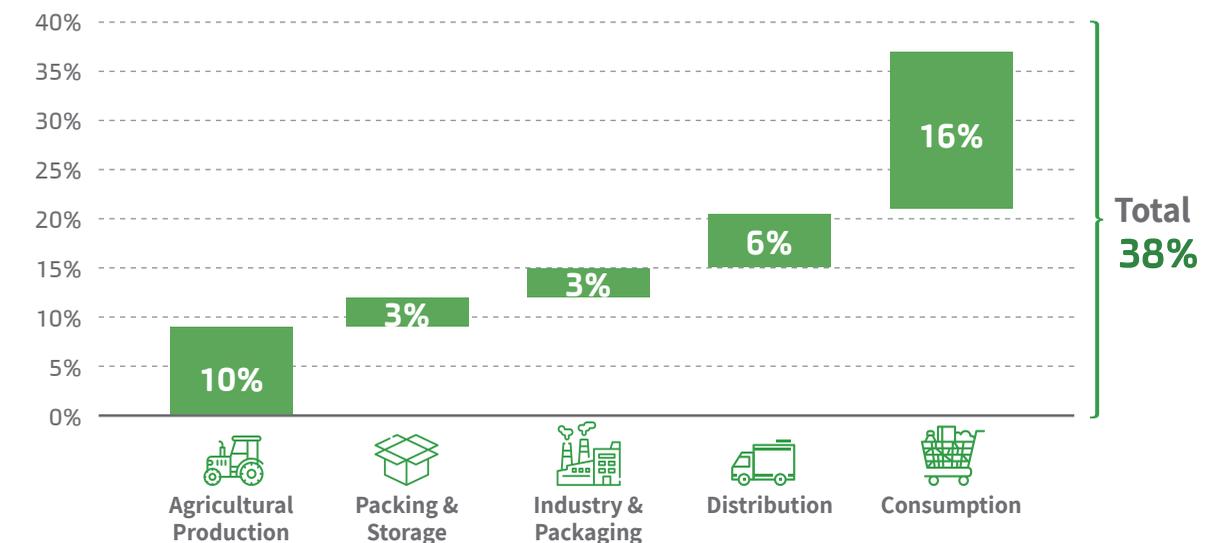
The economic value of wasted food in Israel is around NIS 23.1 billion, constituting approximately

1.4% of the Gross Domestic Product (GDP), as estimated by the authors of this report. Approximately 7% resulted from the unnecessary waste of natural resources (land and water). In addition, the unnecessary cost of greenhouse gas emissions and air pollutants in each stage of the value chain due to the growing and producing of unconsumed food, is estimated at NIS 1.4 billion. The cost of processing and packaging wasted food is estimated at around NIS 820 million. Therefore, the total cost of wasted food, including the waste of natural resources, the cost of greenhouse gas emissions and air pollutants, and the cost of waste processing, stands at approximately NIS 23.5 billion.

In quantitative terms, approximately 55% of the waste occurs in the stages of production, industry, retail, and distribution, even before the food has reached the household or consumer. In monetary terms, approximately 58% of the value of the food is lost in the stages of private and institutional consumption.

10. "Global Food loss and Food Waste," FAO, 2011

**The Rate of Food Waste throughout the Value Chain**





# 3.

## **Food Waste and Rescue in the Retail and Distribution Sector**

**NIS 5 billion** worth of food waste in the retail and distribution sector

## Food Waste and Rescue in the Retail and Distribution Sector <sup>11</sup>

The volume of food sales in Israel in 2021 stood at around NIS 90 billion a year, sold to consumers through supermarkets, open markets, grocery stores, small retailers, and the institutional sector. The total loss in the retail and distribution sector stood at 445 thousand tons of food, valued at approximately NIS 5 billion, which constitutes 5.5% of retail food sales. Of this, the amount of rescuable food was 356 thousand tons, valued at approximately NIS 4 billion <sup>12</sup>. In addition, the environmental cost of food waste in the retail and distribution sector was approximately NIS 785 million <sup>13</sup>.

The main causes of food waste in the retail and distribution sector are food that has reached or will soon reach its expiration date, food with aesthetic defects on the packaging or the product itself, and food damaged in the sales process. Food manufacturers, distributors, and retailers have an economic incentive to minimize food waste by managing their supply chain effectively,

maintaining proper storage conditions, and planning their inventory. That said, it should be noted that there are return agreements between retailers and distributors, and food manufacturers whereby unsold food can be returned to the manufacturer at no cost <sup>14</sup>. In these instances, there is no economic incentive to minimize food waste.

Nevertheless, it should be noted that surplus food in the retail and distribution sector is inevitable, even when the distribution and sales systems are planned optimally. This is because retailers must ensure that a wide variety of food is always available to their customers, as consumers do not tolerate shortages of food items they desire. Hence, the potential loss to retailers due to the unavailability of food products is far greater than the cost of creating surpluses. In other words, food surpluses are an inherent part of the retail process.

11. For waste analysis purposes, this report refers to the retail and distribution sector as a single sector and includes waste occurring from the end of the production stage until the produce is sold to the consumer. This includes finished produce that goes to waste at the manufacturers' facilities, wholesale waste, returns from retailers to manufacturers, and food wasted by retailers.

12. The amount of rescuable food in the retail and distribution sector is based on BDO's model for the retail sector, which is based on data from the Central Bureau of Statistics and information from the leading supermarket chains.

13. The environmental cost is not included in the market price of the wasted food, meaning that the natural resources wasted due to food waste in this sector are excluded.

14. These agreement permit returning a certain percentage (as agreed) of the unsold merchandise.

**25 thousand tons** increase in food waste in 2021 in the retail sector compared to 2020

From an economic perspective, the fact that surplus food is wasted rather than rescued reflects a market failure. Therefore, one of the government's policy challenges is to create a system of incentives for rescuing these surpluses and getting them to those in need.

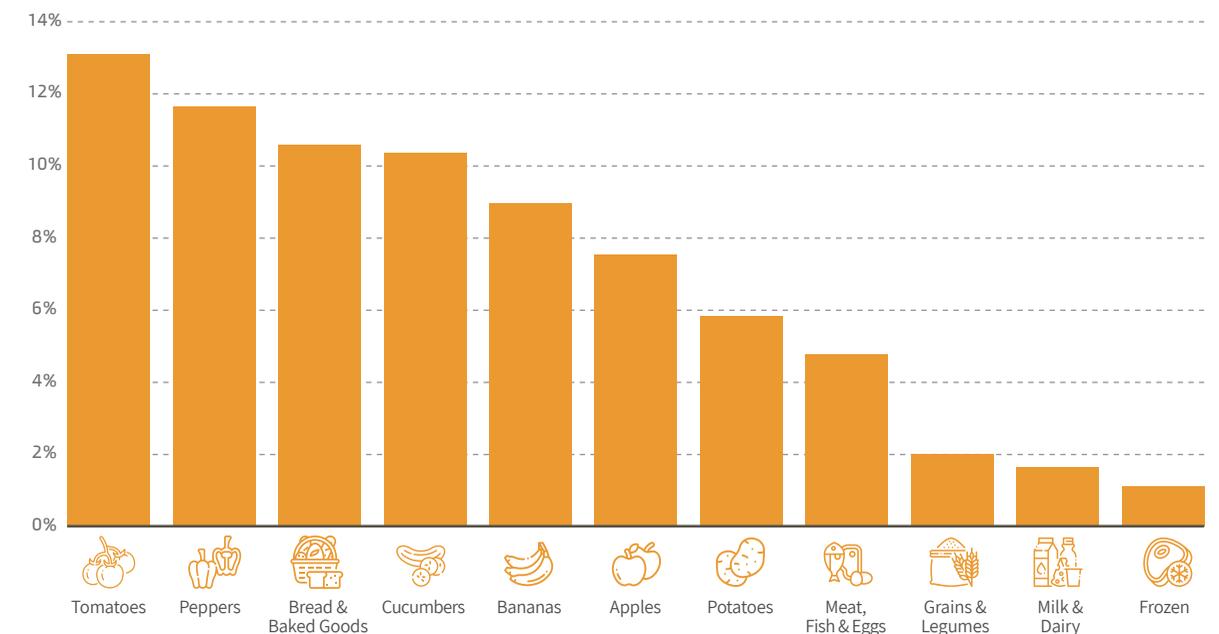
Naturally, the waste rate is higher for fresh produce and products with short shelf lives, such as fruit, vegetables, bread, and baked goods.

An international comparison shows that the waste rate in the Israeli retail and distribution sector is similar to that in the developed world, even though

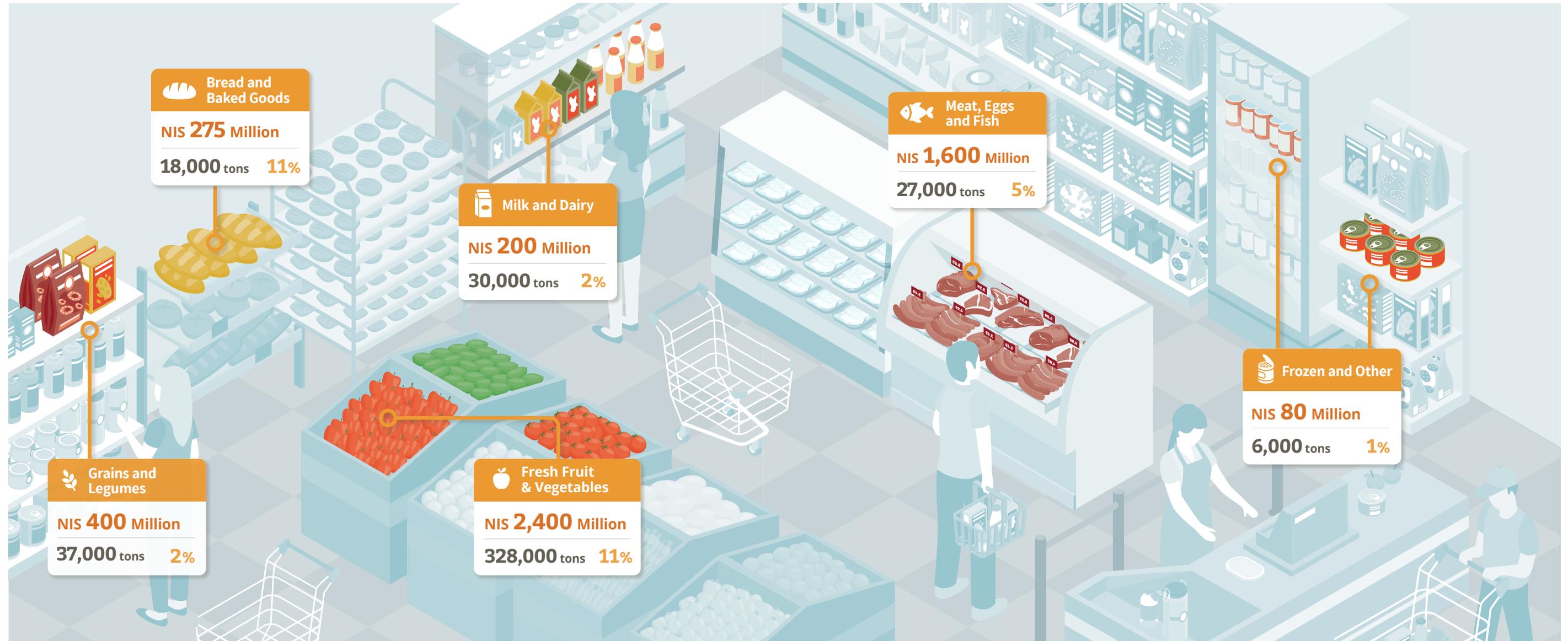
there is potential for higher waste rates due to Israel's warmer climate. This is a testament to the relatively high standards of inventory management practiced by the Israeli retail and distribution sector. The rate of food waste in developing countries is higher, primarily due to inadequate distribution, storage, and selling conditions.

Food sellers' investments in establishing logistics centers, online inventory management, demand planning systems, and keeping an unbroken cold chain have contributed to reducing the volume of waste in the retail and distribution sector.

### Economic Waste in the Retail and Distribution Sector



## Financial Loss in the Retail and Distribution Sector



**Primary Causes of Waste**

-   
 Expiration Date
-   
 Aesthetic Defects
-   
 Damaged Food

**Value of Loss**

# NIS 4.95 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.

During 2021, customers returned to a higher rate of purchasing from stores and markets where the waste rates are relatively high. Therefore, there was a slight increase in the food waste in this stage.

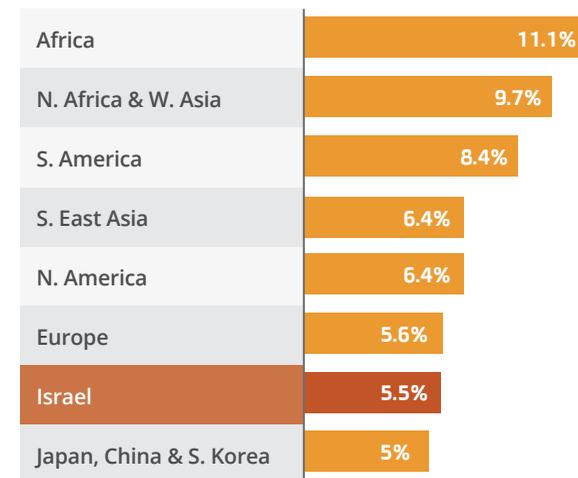
That said, consumers did continue purchasing from online retailers in 2021. Online retail may be more environmentally friendly than traditional retail, in part due to the decrease in number of individual trips to various stores and the consolidation of many items being delivered to multiple addresses in a single trip. A study conducted by the University of Washington<sup>15</sup> and published in 2014 found that if routes are planned efficiently, delivery services could potentially reduce up to 80% of carbon emissions produced by consumers traveling to stores.

Waste in the retail and distribution sector has high economic value as it includes all the previous investments made in growing, manufacturing, packaging, and transporting food. This waste refers to food that was ready to be sold and consumed but was wasted before it reached the end consumer. Due to the characteristics of

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

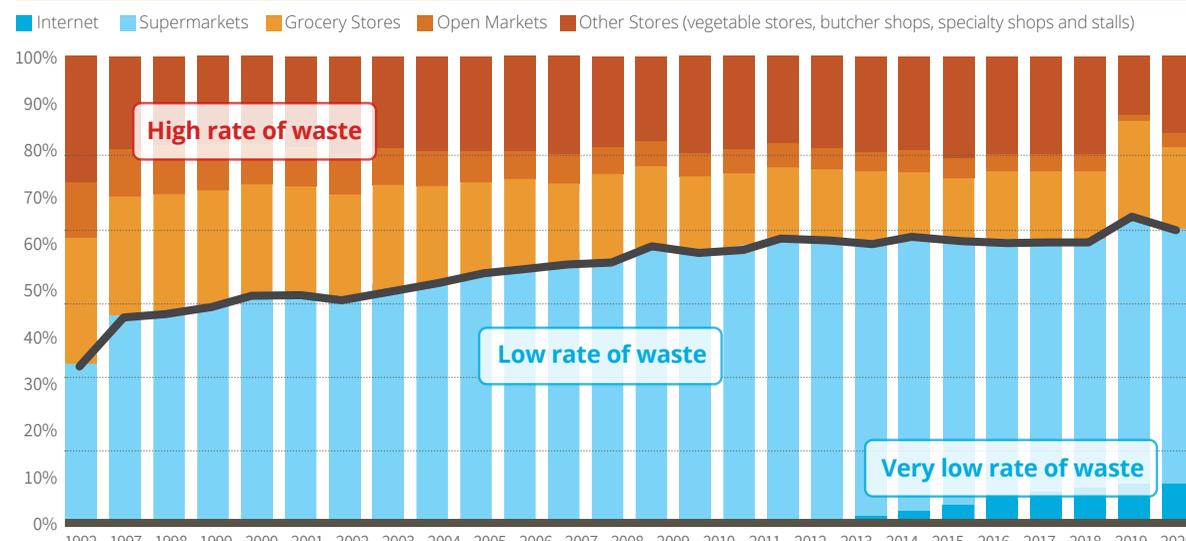
this waste, the vast majority of food at this stage is rescuable. Indeed, out of food valued at NIS 5 billion that is wasted, approximately NIS 4 billion is rescuable. Food waste in the retail and distribution sector stems from three primary causes.

**International Comparison: Rate of Waste in the Retail and Distribution Sector**



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

**Consumers Transition to Purchasing in Stores with Lower Percentages of Waste**



Source: CBS, analyzed by BDO

**Three primary causes of food waste in the retail and distribution sector**

1

**Short expiration dates**

Food products by nature have a limited shelf life and inevitably, some products will reach their expiration date before they are sold. Food that has reached its expiration date can no longer be sold or distributed to the needy. Therefore, rescuing food in the retail and distribution sector requires incentives to facilitate inventory management that ensures food with a short expiration date is sold at a lower price or distributed to the needy before it

expires. This type of inventory management is feasible, as the amount likely to be consumed can be statistically estimated and compared to the current inventory, allowing surpluses to be donated at an earlier stage and certainly before the food expires. Similarly, the food expiration classification policy should be reviewed and differences between various labels related to expiration dates should be explained to consumers.

2

**Aesthetic defects in the product and packaging defects**

Aesthetic defects lower the market value of food products, but in most cases do not reflect damage to these products' nutritional value. When such food is wasted,

this reflects a market failure, because while the market value of the defective product is low, the nutritional value it holds is completely intact.

3

**Damaged food**

Damage caused to food in the logistical process is a relatively minor cause of food waste. Damage can be caused in various stages of the retail and distribution process and includes broken eggs, spilled products, fruit and vegetables that have fallen or been damaged, leftovers from butcher shops and

deli departments, etc. This food cannot be rescued, but its volume is relatively small as maximal efforts are made to limit it. Moreover, it can be transferred for uses other than human consumption, such as animal feed and industrial use.

**Actions taken to Reduce Food Waste in the Retail and Distribution Sector**

Retailers and food manufacturers sometimes work to reduce waste and rescue food based on economic considerations. Food waste is reduced in several ways:

**1. Discounts on surpluses**

when products are about to expire or their packaging has defects, retailers sometimes offer them at a discount.

**2. Food donation**

This is done in a centralized and coordinated manner, based on agreements with food rescue non-profit

organizations or in other cases, as local initiatives in supermarket branches.

Food manufacturers are also involved in food rescue activities. Some work with non-profit organizations and donate production surpluses and food that is about to expire. In addition, products with aesthetic defects or defective packaging detected in the factory are sold in various secondary markets if the food is still safe and fit for human consumption.



# 4.

## **Food Waste and Rescue in the Institutional Sector**

**65%** Increase in food waste in the institutional sector in 2021 compared to the previous year

## Food Waste and Rescue in the Institutional Sector

In 2021, as a result of the economy's return to regular operations in the institutional sector<sup>16</sup>, households returned to consuming a significantly larger share of their food expenditure outside the home, decreasing household food consumption, a change that contributed in turn to the increase in food waste in 2021.

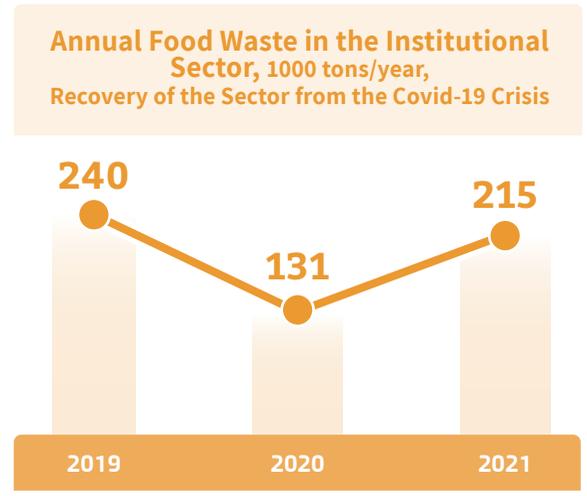
According to the 2021 Food Waste Report<sup>17</sup>, an average of 2 million people dined outside the home in Israel, eating an average of one meal per day,

totaling 650 million meals outside the home a year, approximately 720,000 tons of food. The expenditure on food purchased and consumed outside the home is currently NIS 13 billion annually.

The total amount of food waste from the institutional sector amounted to 215,000 tons, representing an increase of 65% over 2020 but a decrease of 9% compared to 2019. The value of this waste is approximately NIS 3.5 billion per year, in addition to the environmental cost estimated at NIS 235 million<sup>18</sup>.

About a third from the waste in the institutional sector is rescuable<sup>19</sup>, meaning that 71,000 tons of food can be rescued a year at a total value exceeding one billion shekels, which is the equivalent of about 63 million meals per year on average.

**71,000 tons of food can be rescued a year at a total value exceeding one billion shekels, which is the equivalent of about 63 million meals per year on average.**



16. Despite a lower rate of loss in households compared to the institutional sector, the large number of households combined with a high (daily) consumption frequency leads to a higher amount of waste in households.  
 17. The BDO model for food waste in the institutional sector is based on data from the Central Bureau of Statistics, the Restaurant Association, the Event Hall, Event Garden & Catering Business Owners Association in Israel as well as information from the security forces.  
 18. The environmental cost not included in the market price of the wasted food, i.e. the natural resources wasted due to food waste in this sector.  
 19. The BDO model for food waste in the institutional sector is based on data from the Central Bureau of Statistics, the Restaurant Association, the Function Hall, Event Garden & Catering Business Owners Association in Israel as well as information from the security forces.

**215** thousand tons of food wasted in the institutional sector

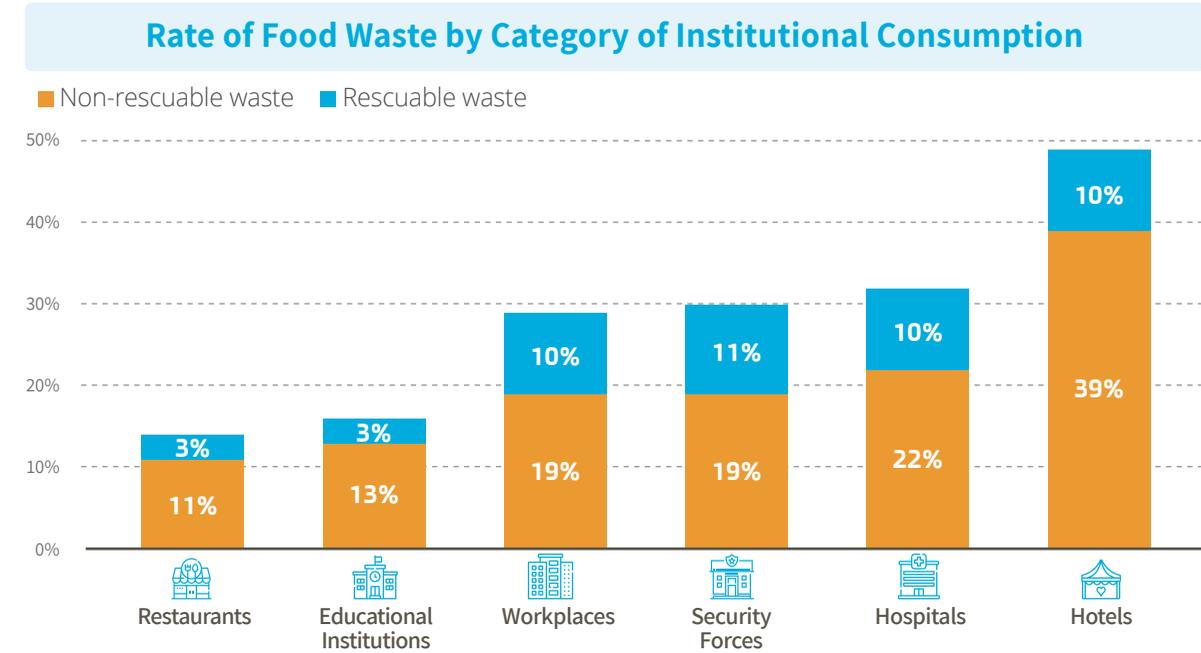
Generally, 20% of the food consumed in Israel is served through institutional catering activities, such as meals served at factories, workplaces, the security forces (the military, police stations, and prisons), hotels, catering halls, restaurants, schools, hospitals, etc.<sup>20</sup>. This sector, where many diners are gathered together in one location, holds the greatest potential for food rescue.

Food waste in institutional kitchens is an inevitable part of the economic activity of feeding a large number of diners and ensuring that the supply and variety of food meet their preferences while

taking into account unpredictable variables.

In recent years, most catering kitchens have transitioned to being operated by external companies with a high level of expertise in the field that focuses on maximizing efficiency and reducing waste. Moreover, the Covid-19 crisis has led to a change in how some caterers serve meals, and this has led to a reduction in waste. The Covid-19 crisis also led to the expansion of remote work in the economy<sup>21</sup>, and to a reduction in the activity of workplace kitchens, which reduced the amount of waste.

20. The model weighs the average weight of a meal in each of the industries, based on its characteristics.  
 21. According to the Bank of Israel Report 2021: Remote Work by Employees, approximately 14% of work by employees was done remotely in 2021.



Having said this, in the catering field, plans cannot be made based on averages alone; enough food must also be provided on days when consumption is below average. This means catering companies need to factor in risks stemming from variance and not rely solely on statistical averages.

The analysis in the report shows that in general, waste tends to be higher in kitchens with a higher level of uncertainty regarding the number of diners. For example, at open IDF bases and workplaces, food waste is higher than in schools and prisons, where there is less uncertainty regarding the number of meals that will be served.

In addition, the more varied the menu, the greater

the amount of waste due to the uncertainty regarding diner preferences. Accordingly, the level of waste is higher at events and in hotels, which offer a wider variety of food options compared to workplaces, military bases, and police stations.

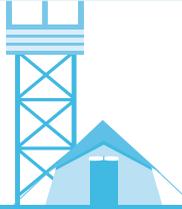
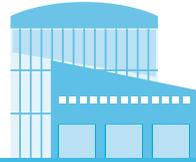
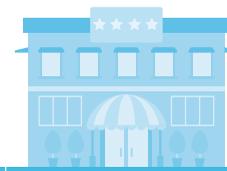
The way the food is served and who is paying for it also influences the amount of food waste. In restaurants, for example, where food is prepared only after it is ordered, there is less waste compared to buffet services, where food is prepared in advance. In other words, when consumers pay only according to their actual consumption there is less waste compared to the all-inclusive consumption method.

The total amount of rescuable food in the institutional sector in 2021 is estimated at approximately NIS 1.1 billion. The increase in the amount compared to 2020 was caused by the return of the economy rather than its limited activity in 2020, due to the Covid-19 crisis. About one-quarter of rescuable waste is from catering establishments, where we estimate approximately 20,000 tons of food, valued at about NIS 430 million, could have been rescued in 2021. Bases of the security forces, hotels, and workplaces, are also important rescue sources, from each division food valued at NIS 110–190 million could have been rescued in 2021. From hospitals, food valued at about NIS 60 million could have been

rescued and from restaurants, where there is a high rate of waste, food worth approximately NIS 140 million could be rescued annually. However, due to geographical dispersion and the lack of centralization of establishments, rescuing food from restaurants is generally not financially viable.

The high return on investment for food rescue in the institutional sector stems from the relatively high value of rescued meals, as well as the relatively low logistical cost of collecting food from large kitchens located in relative proximity to one another that are concentrated in city centers and industrial zones.

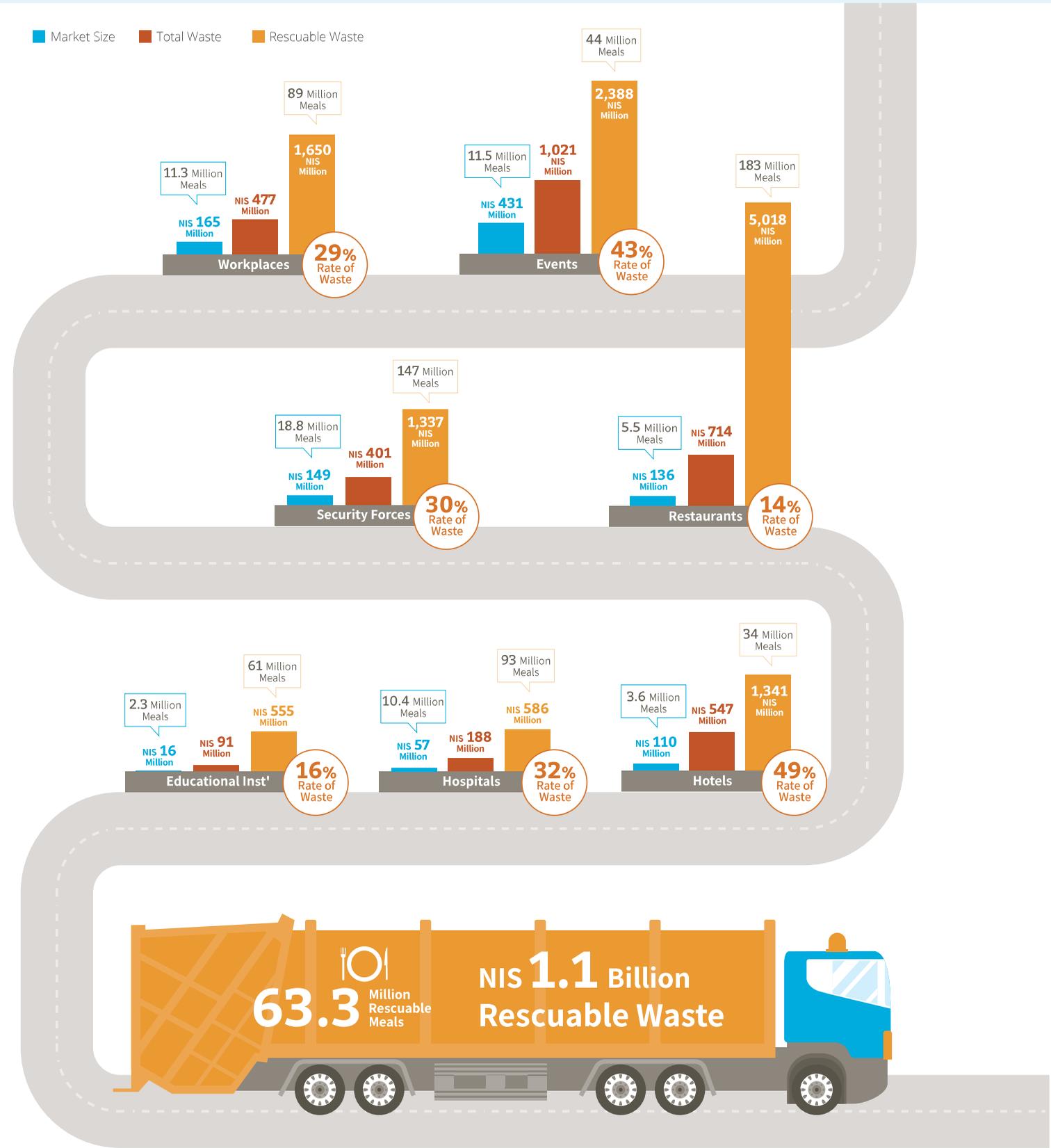
## Estimated Food Waste in the Institutional Sector

	 Security Forces	 Events	 Workplaces		 Hotels	 Hospitals	 Restaurants	 Educational Institutions	Total
<b>Relevant Population</b> (Thousand people)*	232	111	370		57	193	501	338	<b>1,802</b>
<b>Meals Served</b> (yearly) (Million meals)	147	44	89		34	93	183	61	<b>651</b>
<b>Food Consumed</b> (yearly) (Thousand tons)	167	109	155		51	75	137	30	<b>724</b>
<b>Annual Waste</b> (Thousand tons)	<b>50</b>	<b>47</b>	<b>45</b>		<b>25</b>	<b>24</b>	<b>19</b>	<b>5</b>	<b>215</b>
<b>Rate of Waste</b> (%)	30%	43%	29%		49%	32%	14%	16%	<b>30%</b>
<b>Rescuable Waste</b> (Thousand tons)	19	20	16		5	7	4	1	<b>72</b>

Estimated based on the number of relevant workdays in each category and distinguishing between various populations within a given category.

# Summary of Estimated Food Waste in the Institutional Sector

■ Market Size ■ Total Waste ■ Rescuable Waste



Estimated based on the number of relevant workdays in each category and distinguishing between various populations within a given category. Source: BDO



# 5.

## **Food Waste and Rescue in Household Consumption**

**NIS 8.8 billion** worth of food waste in the Household Sector

## Food Waste and Rescue in Household Consumption

In 2021, with the economy's return to normal activity, household food consumption patterns returned to normal, and there was an increase in the amount of food consumed at restaurants, workplaces, events, etc. Therefore, at-home consumption decreased by 2% compared to 2020<sup>22</sup>.

Accordingly, household food waste in Israel in 2021 amounted to approximately 950 thousand tons<sup>23</sup>, valued at about NIS 8.8 billion. Beyond this direct cost, the environmental cost of food waste in the household sector stands at NIS 1 billion<sup>24</sup>.

22. BDO's analyses of Stornext and data from the supermarket chains 2021.

23. Based on the food value chain model developed by BDO, using weighted data from the Central Bureau of Statistics for 2021, a national survey of the composition of household garbage conducted by the Ministry of Environmental Protection for 2012-13, the findings of a Geocartography survey conducted in January 2019, and a study on household garbage in Israel conducted by Dr. Ofira Ayalon and Efrat Elimelech, "What gets measured gets managed: A new method of measuring household food waste." Waste Management, 76 (2018): 68-81.

24. The environmental cost not included in the market price of the wasted food, i.e. the natural resources wasted due to food waste in this sector.

Household Food Waste, NIS per month			
	Monthly Expenditure on Food	Monthly Food Waste	% Waste
Fruit & Vegetables	610	134	23%
Grains & Legumes	700	92	14%
Meat, Eggs & Fish	625	46	8%
Milk & Dairy Products	365	23	7%
<b>Total</b>	<b>2,300</b>	<b>295</b>	<b>13%</b>

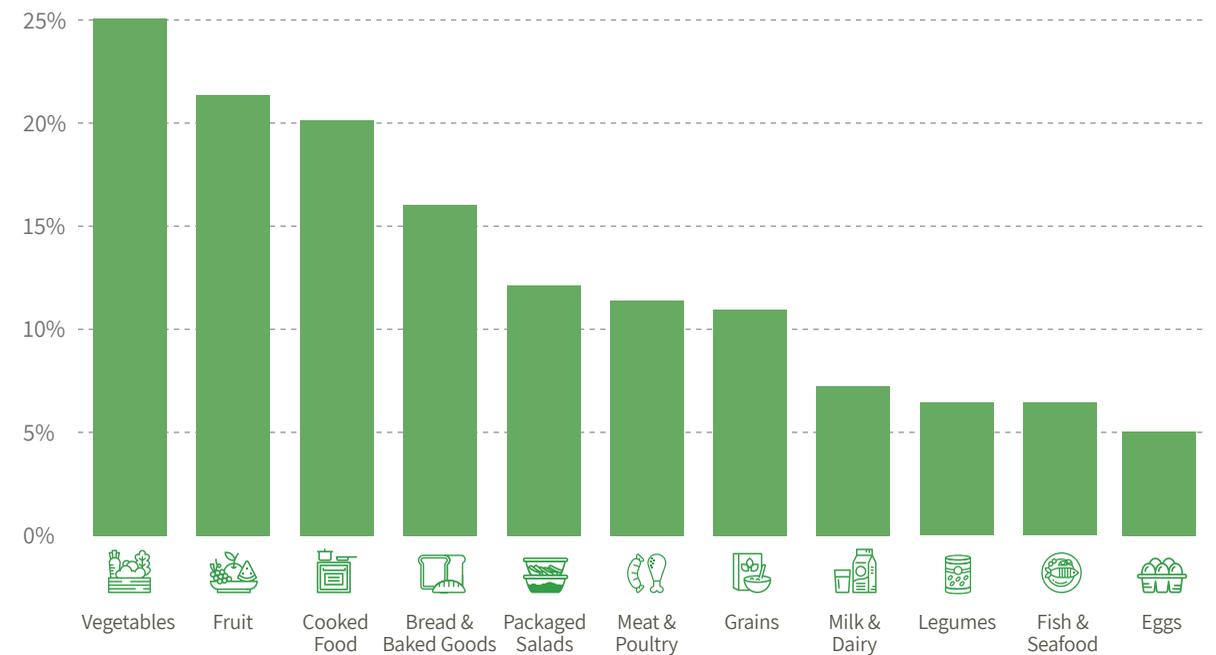
**NIS 3,500** worth of annual food waste per household in Israel

**Household food waste is caused by the combination of consumer habits, the culture of abundance, and the way food is stored and kept fresh at home**

average family in Israel in 2021 wasted food valued at about NIS 3,500, or the equivalent of a month and a half of food consumption. On a monthly basis, the average household's financial loss due to food waste was NIS 295, of this, NIS 134 resulted from wasted fruit and vegetables, NIS 92 from wasted grains and legumes, NIS 46 from wasted meat, fish, and eggs, and NIS 23 from wasted milk and dairy products.

The average household in Israel wastes about 13% of its food expenditure, meaning the

### Rate of Household Food Waste for Selected Products



Source: BDO estimates

**The main causes of household food waste: preparing too much food and food expiration**

Household food waste is caused by the combination of consumer habits, the culture of abundance, and the way food is stored and kept fresh at home. Household food waste in 2021 was approximately NIS 8.8 billion annually.

**The main causes of household food waste are<sup>25</sup>:**

**1.Preparing too much food** - preparing more than is needed, generally food that was cooked or prepared unnecessarily and was not consumed, often due to overbuying.

**2.Expired food** - food that expires before being fully consumed. It should be noted that expired food is connected to overbuying. The desire to have a variety of available food options, combined with the uncertainty surrounding the amount of food that will actually be consumed by the household members, creates a situation in which some of the food that was bought expires before it is consumed.

**3.Overbuying** - buying more food than is consumed, thereby increasing food waste. Staying home for long periods of time due to the waves of Covid-19 crisis and the transition to working at home led to an increase in household food consumption.

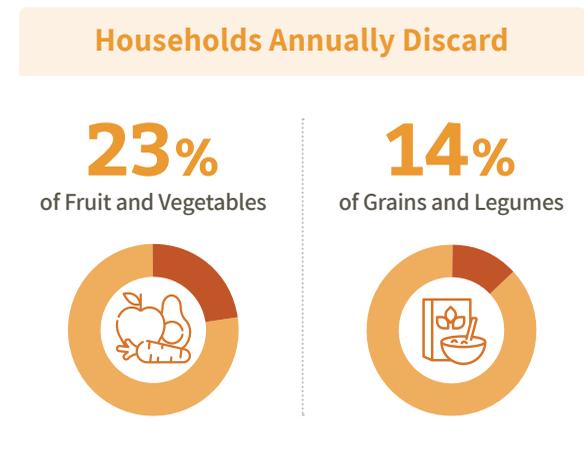
Other causes of food waste in household consumption include damaged or spilled food and food that was not prepared or cooked properly.

Household food waste is not unique to Israel, and waste rates in Israel are comparable to those in other developed countries. In Israel, as in other

western countries, the highest waste rate is in the fruit and vegetable category, with 23% of the fruits and vegetables bought in Israel going to waste, compared to 28% in the United States and 19% in Europe. The relatively high waste rate for fruit and vegetables primarily stems from their short shelf life and the fact that households do not take measures to ensure optimal storage conditions.

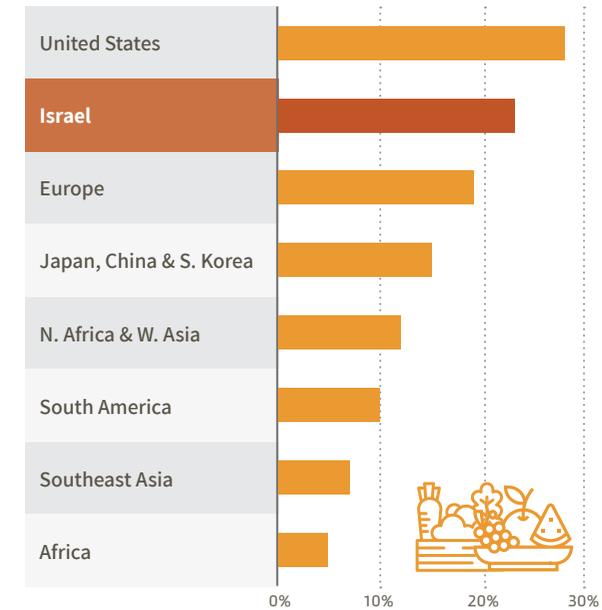
In regard to meat, fish, and dairy products, the waste rate is lower and stands at approximately 8%. The lower waste rate for these products stems, among other things, from the fact that it is possible to extend their shelf life by freezing them, and because these products are more expensive per unit of weight, which creates an additional incentive for households not to waste them as much. The waste rate for these products is similar to that in Europe, and lower than that in the United States.

In the grains and legumes category, the waste rate is approximately 14%. This waste rate is the result of combining waste rates of products with a short shelf life such as bread and baked goods, and products with a relatively long shelf life, such as raw grains and legumes.

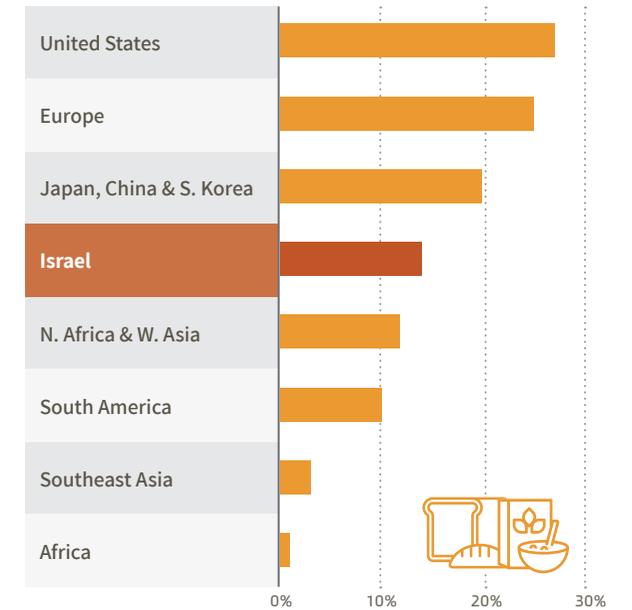


**An International Comparison of Rates of Household Food Waste**

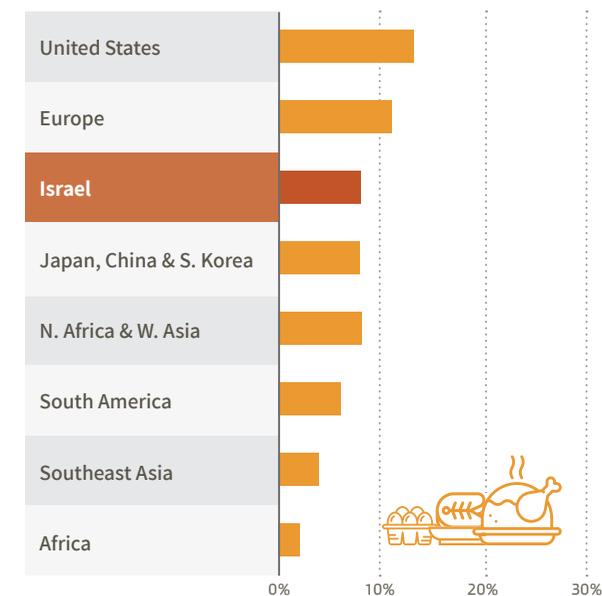
**Fruit and Vegetables**



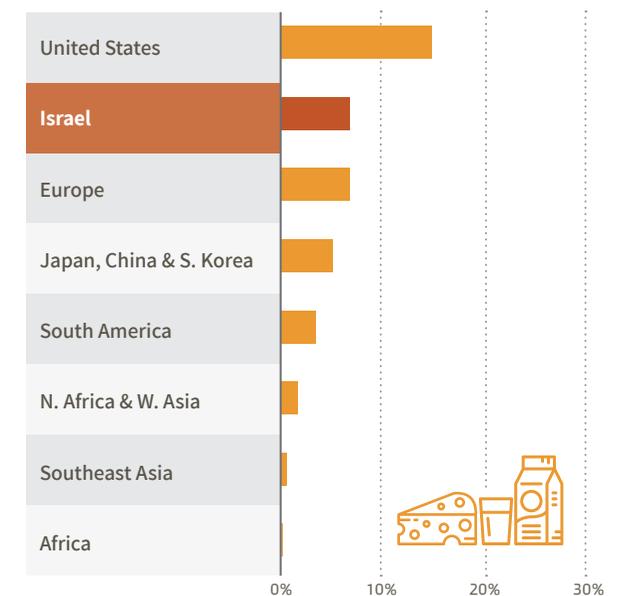
**Grains and Legumes**



**Meat, Eggs and Fish**

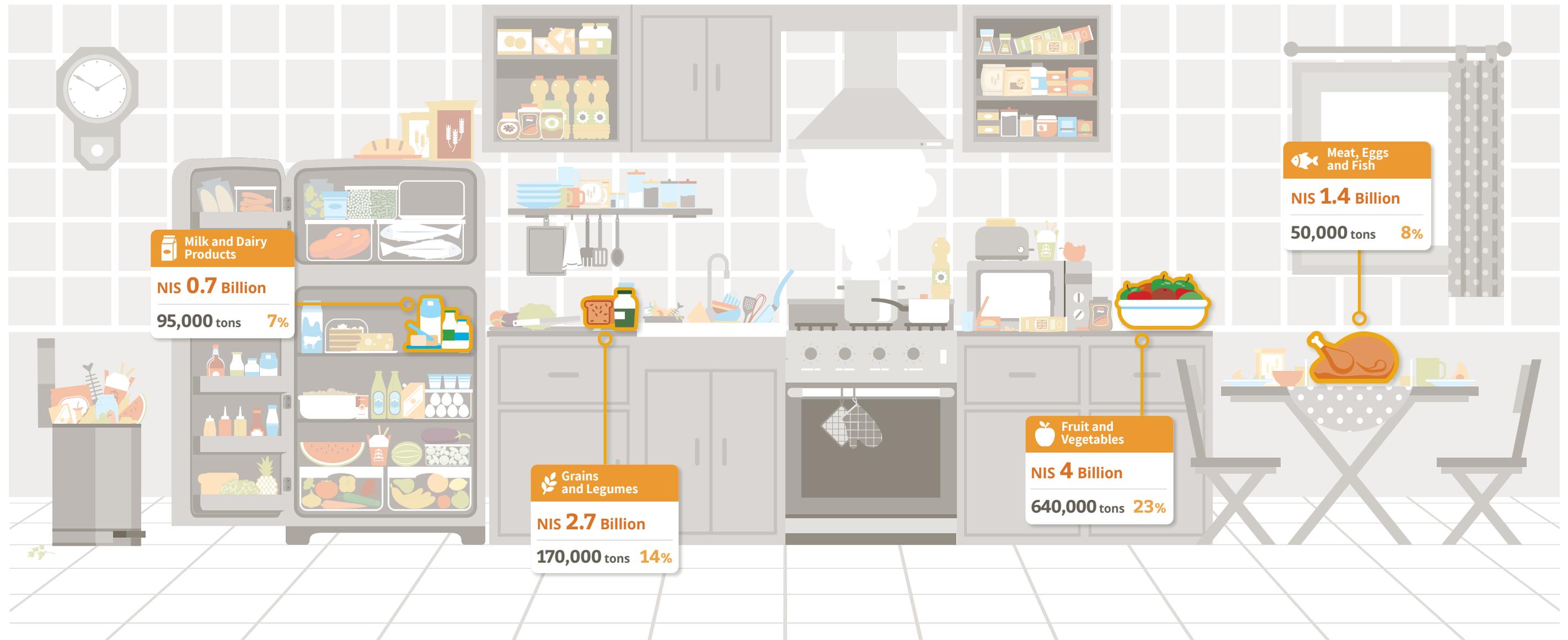


**Milk and Dairy Products**



25. Based on findings of the Geocartography survey, conducted in March 2021 by Leket Israel and BDO.

# 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 8.8 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 6,900**  
**the annual household impact of food waste on the cost of living**

In Israel, where household food expenditure is relatively high by international standards <sup>26</sup>, food waste is one of the factors that contributes to the high cost of living. Food waste effects the cost of living due to overspending on food and by increasing the cost of food. The overall impact on the cost of living is an additional NIS 6,900 per household annually.

**Cost of living – Overspending:**

Food bought and thrown away as waste constitutes a direct household cost. On average, the direct

monthly loss (excluding external costs <sup>27</sup>) due to food waste stands at NIS 295 per household, and accordingly, the annual loss stands at NIS 3,500 per household. The costs of collecting and disposing of the waste in landfill is ultimately passed onto consumers in the form of increased municipal property taxes and fees, leading to an additional annual cost of NIS 200 per household.

**the price of food in supermarkets incorporates the value of food waste in the retail sector. Similarly, wholesale food prices reflect food waste in the agricultural and industrial sectors. Ultimately, the cost of waste at all stages of the value chain is passed on to the consumer**

26. Global Food Security Index, The Economist, 2018  
 27. External costs not included: the cost of clearing and burying the food waste, the cost of greenhouse gas and air pollutant emissions, and the increase in wholesale prices due to food waste in agriculture and industry.

**Food Waste: Impact on the Cost of Living**

	Annual cost per household	Impact on the cost of food
Cost of food discarded at home	NIS 3,500	-
Cost of collection and landfill disposal for discarded food	NIS 200	-
Impact of GHG and Air Pollutants	NIS 210	-
Increase in the retail price due to food waste in the market sector	NIS 1,800	6%
Increase in the wholesale price due to food waste in the production sector	NIS 1,200	5%
<b>Total</b>	<b>NIS 6,900</b>	<b>11%</b>

**Cost of living – Higher food prices:**

In addition to a household’s direct expenditure on food that was bought but not consumed, the cost of living is affected by food waste throughout all stages of the value chain prior to household consumption. In economic terms, the cost of food reflects the total cost of production and sales at all stages of the value chain: growing, production, packaging, transport, and sales. Therefore, the price of food in supermarkets incorporates the value of food waste in the retail sector. Similarly, wholesale food prices reflect food waste in the agricultural and industrial sectors. Ultimately, the cost of waste at all stages of the value chain is passed on to the consumer, leading to an additional annual cost of NIS 3,000 due to an 11% increase in food prices.

**According to findings of the 2021 National Food Waste Report, 955 thousand tons of household food waste was transported to landfill, requiring sanitation trucks to make another 300 thousand trips throughout the year and thereby increasing air pollution, road congestion, noise pollution and the risk of accidents. Therefore, beyond the NIS 8.8 billion in household food waste and the NIS 0.5 billion it costs to dispose of it, the economy incurred additional costs due to the effects of traffic congestion and the resulting impact on the environment**

**Cost of living – Environmental impact of greenhouse gas and air pollution:**

The environmental impact caused by food waste has an indirect effect on the cost of living. Air pollution negatively affects human health and the environment, a cost the economy bears, mainly in the form of health expenditure. External costs resulting from these negative environmental factors, reflect the monetary value of a loss of societal wellbeing due to pollutant emission <sup>28</sup>, were calculated and estimated at around NIS 1.4 billion for the Israeli economy in 2021, about NIS 210 per household [see chapter 9].

Beyond the direct impact on the cost of living, other external costs incurred due to food waste include its transport, and landfill disposal, stemming from the indirect impact of waste incurred through transportation, fuel combustion, and the environmental damage caused by greenhouse gas emissions measured in this report. Likewise, there are other effects, such as road congestion and soil contamination, which are not included in the estimated environmental cost presented in this report [see chapter 9].

When organic waste is buried in landfill, it decomposes and emits methane, which is a greenhouse gas with a global warming potential (GWP) 84 times greater in the short term (20 years) and 28 times greater in the long term (100 years) than that of carbon dioxide <sup>29</sup>.

According to findings of the 2021 National Food Waste Report, 955 thousand tons of household food waste was transported to landfill, requiring sanitation trucks to make another 300 thousand trips throughout the year and thereby increasing air pollution, road congestion, noise pollution and the risk of accidents. Therefore, beyond the NIS 8.8 billion in household food waste and the NIS 0.5 billion it costs to dispose of it, the economy incurred additional costs due to the effects of traffic congestion and the resulting impact on the environment.

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



**6.  
How Much  
Food Can Be  
Rescued?**

# NIS 7.5 billion worth of food is rescuable

## How Much Food Can Be Rescued?

Approximately 40% of food produced in Israel is lost or wasted during the production, distribution, and consumption stages, totaling approximately 2.6 million tons annually. The direct cost of food waste in Israel is NIS 21.3 billion, which constitutes 1.4% of the GDP. When taking into account the cost of greenhouse gas and air pollutant emissions resulting from food waste, the total cost of food waste amounts to approximately NIS 23.5 billion. Of this, 50% is rescuable food fit for human consumption.

In terms of food rescue, the central component is unconsumed edible food (fit for consumption with nutritional value and health benefits). There are various reasons why waste occurs in each value stage of the production chain. The common denominator is the lack of economic viability for food producers (farmers, manufacturers, retailers, etc.) to invest additional resources in the next stages of production and distribution.

Reducing food waste, whether by preventing waste production or rescuing surplus, is a top global priority. The estimated amount of rescuable food is derived from a value chain model designed specifically for the food industry. Every type of wasted food at each stage of the value chain was

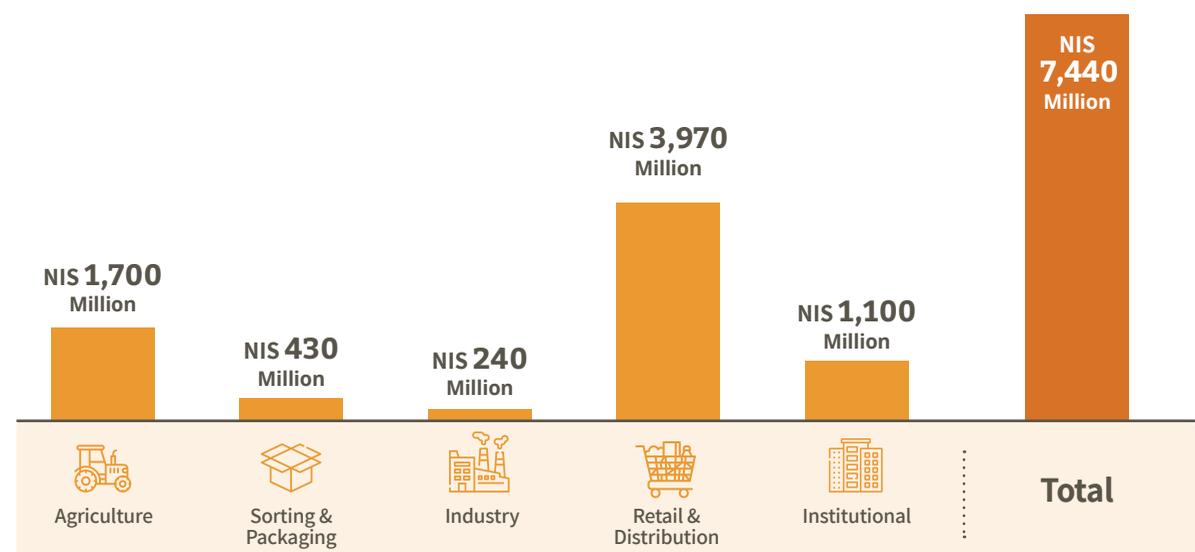
analyzed and classified as rescuable or unsavable (unfit for consumption).

It is important to note that when food is classified as rescuable this does not consider the economic viability of rescuing the food, but refers to the safety of its consumption and the capability to use the wasted food to feed people.

The value of rescuable food is approximately NIS 7.5 billion, with wasted food increasing in value as it progresses through each stage of the value chain and more resources are invested in producing, packaging, and transporting it. The table below demonstrates that most of the wasted value is concentrated in the retail and distribution sector, as the food wasted in this sector is ready to be sold and consumed but goes to waste before it reaches the end consumer.

**under economically viable conditions and given the appropriate resources, roughly 50% of food waste is rescuable and can be used to feed needy populations suffering from food insecurity**

## Value of Rescuable Food in the Food Chain



Numbers are 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 estimates, under economically viable conditions and given the appropriate resources, roughly 50% of food waste is rescuable and can be used to feed needy populations suffering from food insecurity. Furthermore, rescuing 50% of the food currently being wasted would save the Israeli economy approximately 200 million cubic meters of water, the production of over 600 million kWh, 38 thousand tons of fuel, and the use of significant land resources.

In the current report, household food waste is not classified as rescuable. There are various approaches to the issue of food waste in household consumption.

Western culture is based on consumerism and overabundance and it seems consumers derive benefit and joy not only from consuming food,

but also from having a variety of available options, even to the point of excess.

However, because food production entails the use of natural resources, it has an environmental impact, these external costs – in an economic sense – are not reflected in the price consumers pay for food.

Therefore, there is justification for taking action to encourage the reduction of food waste. This could be done for example, through government-sponsored campaigns, as has been implemented in several Western countries, in order to raise public awareness regarding the external impact of producing food that is left unconsumed, including wasting the consumers' financial resources and damaging the environment.

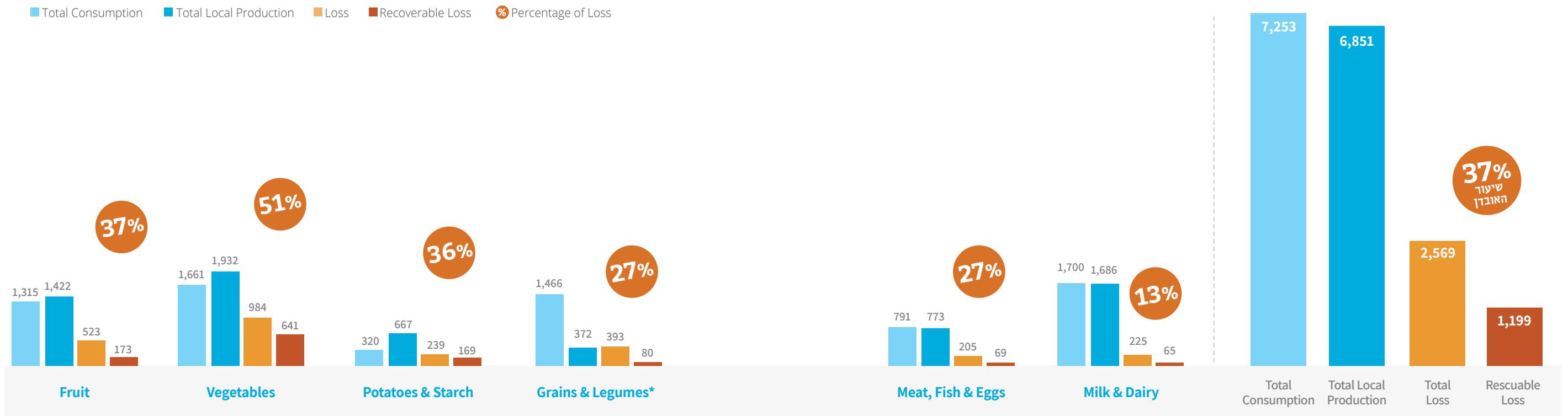
### Rescuable Food

- ✓ Pre-harvested edible agricultural produce
- ✓ Aesthetically flawed agricultural produce
- ✓ Agricultural produce not sold in wholesale markets
- ✓ Unsold food surplus in markets/stores
- ✓ Surplus prepared food from catering, industrial kitchens & restaurants
- ✓ Packaged food with damaged packaging or misshaped
- ✓ Food nearing its sell-by date that will not be sold

### Food Waste Unfit for Human Consumption

- ✗ Sick livestock or carcasses
- ✗ Diseased food
- ✗ Damaged or contaminated food (beyond aesthetic defects)
- ✗ Spoiled food
- ✗ Production leftovers (peels, seeds, skin, fat)
- ✗ Food already served and left unconsumed

### 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.

\*\*Loss rate refers to loss from the total production/consumption at each stage of the value chain

Source: BDO estimates



**7.**

**How Much Food Is  
Required to Close  
the Food Security  
Gap in Israel?**

**20%** of households in Israel suffer from food insecurity

## How Much Food Is Required to Close the Food Security Gap in Israel?

BDO's analyses of estimates based on the National Insurance Institute's report published in December 2021 calculated that the rate of food-insecure households in 2021 stood at 16.2%. According to this report, the Gini Inequality Index in Israel went up by 2%, before any government financial support, compared to 2020.

The report shows that the growth of the Israeli economy in 2021 did not reach all portions of the population equally. As a result, the inequality in economic income increased. Furthermore, because the assistance given as a social safety net

during the COVID-19 pandemic decreased during 2021, inequality in net income, after support and grants, increased by more than 3% over levels in 2020.

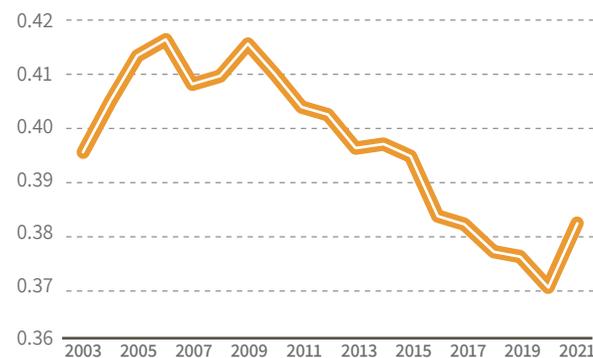
**Israel has the highest poverty rate of all OECD countries.**

According to OECD data measuring poverty after taxes and payment transfers (for a poverty line set at 50% of the median disposable income), the situation in Israel has deteriorated, with

### Israel's Ranking in Inequality and Food Insecurity Indexes

	Israel	OECD Average	Israel's OECD Ranking
Inequality (Gini Index)	0.38	0.32	5
Poverty Rate	19.8%	11%	1
Food insecurity index	78	77	12
% expenditure on food out of private consumption	17%	14%	6

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



BDO analyses of data from the Central Bureau of Statistics

poverty levels increasing over the previous year. Israel has the highest poverty rate of all OECD countries. The data further shows that Israel is among the countries with a high level of inequality as measured by the Gini index, in the fifth lowest place in the OECD above only The Czech Republic, Mexico, Turkey, and the United States.

Inequality in the distribution of income is one of the major challenges faced by the Israeli economy, and food insecurity is one result of the unequal distribution of income in the economy.

According to the definitions of the World Health Organization, which are also used by the National Insurance Institute (NII) in Israel, food security is based on three key pillars:

- 1 Food Availability** having a consistent supply of food in sufficient quantities.
- 2 Food accessibility** having enough resources to obtain enough food.
- 3 Food Use** having adequate water and sanitation conditions and knowing how to use food properly.

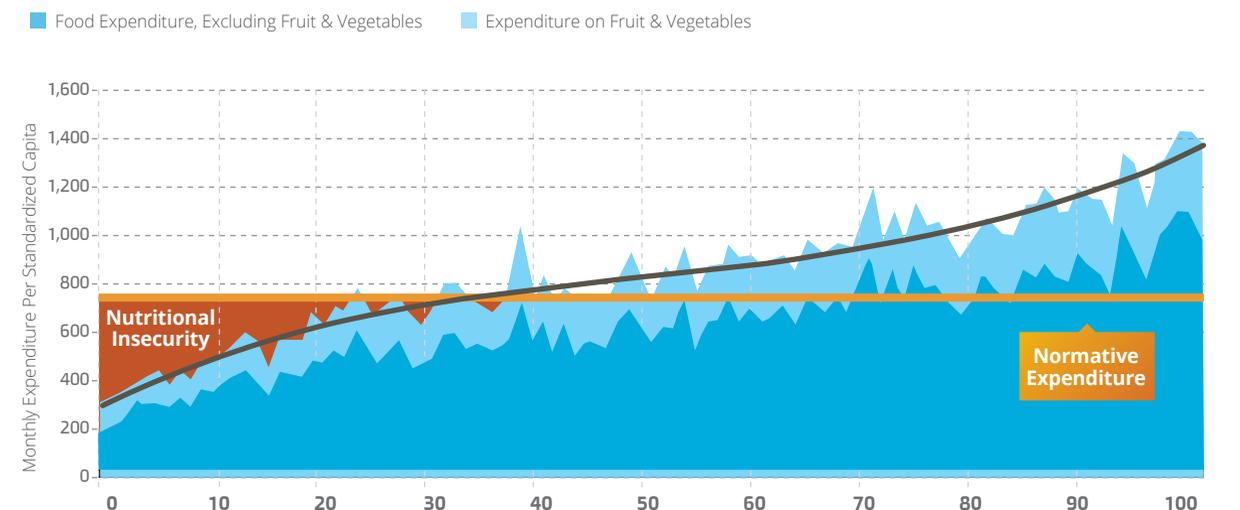
Using these criteria, which are primarily subjective, a report prepared by the NII<sup>30</sup> estimates that approximately 16% of Israel's population suffers from food insecurity; of this number, 8.2% are in severe food insecurity, and an additional 8% in moderate or mild food insecurity.

According to The Economist's Global Food Security Index 2021, Israel is ranked 12th in food insecurity among OECD member states. Among OECD countries, Israel ranks 6th in household expenditure on food.

**The volume of food required to bridge the gap between the actual consumption level of food insecure populations and the normative consumption level is valued at approximately NIS 3.3 billion**

30. Poverty and Income Inequality Indexes – 2020, National Insurance Institute

### Food Expenditure per Capita in Israel in Relation to Normative Food Expenditure Percentile Distribution



Source: CBS data for 2018 processed by BDO.

Household Percentile (By Consumption)

**The rescue of approximately 500 thousand tons of wasted food each year (constituting 20% of overall food waste in Israel), would enable the food expenditure gap in Israel to be closed**

Food expenses' share in the Personal Consumption Expenditure (PCE) in Israel is among the highest in the world, measured at 17%. Therefore, a policy of food rescue and distribution to the underprivileged population would be an especially effective welfare policy in Israel, where a significant portion of household expenditure is allocated to food.

The definition of food security is subjective. To examine whether food rescue would be an effective policy for increasing food security in Israel, this report uses the methodology of Chernichovsky and Regev<sup>31</sup>, which defines normative food expenditure as the level of a household's food expenditure that remains constant even when the household's income increases.

To examine normative food expenditure<sup>32</sup>, food expenditure in the lowest percentiles was compared to the normative levels. The analysis in this chapter shows that for the two lowest percentiles (in terms of standard consumption per capita), food expenditure was roughly half that of the normative level.

The volume of food required to bridge the gap between the actual consumption level of

food insecure populations and the normative consumption level (i.e. the average consumption of the second to fifth percentiles), is valued at approximately NIS 3.3 billion. The cost of eliminating this food expenditure gap for populations that are highly food insecure (8.2% of Israeli households) is estimated at approximately NIS 2.5 billion, and another NIS 0.8 billion is required to close the gap for moderately food insecure populations.

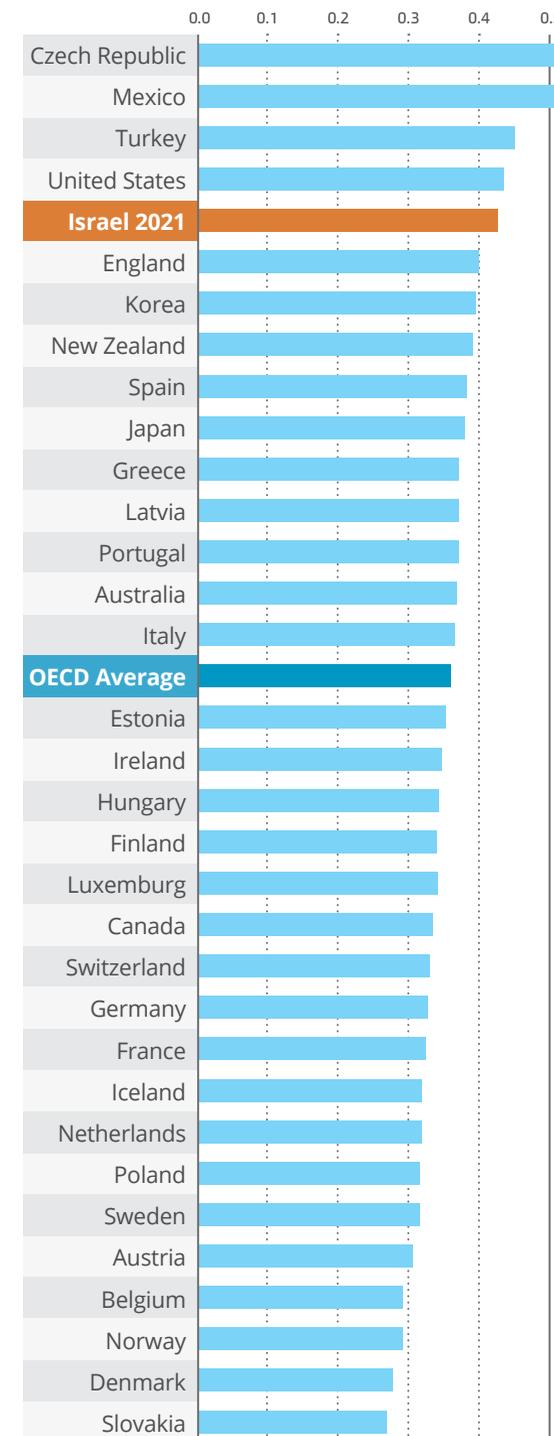
The rescue of approximately 500 thousand tons of wasted food each year (constituting 20% of overall food waste in Israel), would enable the food expenditure gap in Israel to be closed. According to the estimates presented in this report, it would cost NIS 0.9 billion to rescue food valued at NIS 3.3 billion, which is the total gap between the food expenditure of insecure populations and the normative food expenditure level. At the same time, it would save about 80 million cubic meters of water, 260 million kWh of electricity, approximately 15 thousand tons of fuel, and NIS 290 million as a result of reducing greenhouse gas and air pollutant emissions, and another NIS 170 million as a result of reducing waste treatment costs.

**It would cost NIS 0.9 billion to rescue food valued at NIS 3.3 billion, which is the total gap between the food expenditure of insecure populations and the normative food expenditure level.**

31. Food Expenditure Patterns in Israel, Taub Center, 2014.

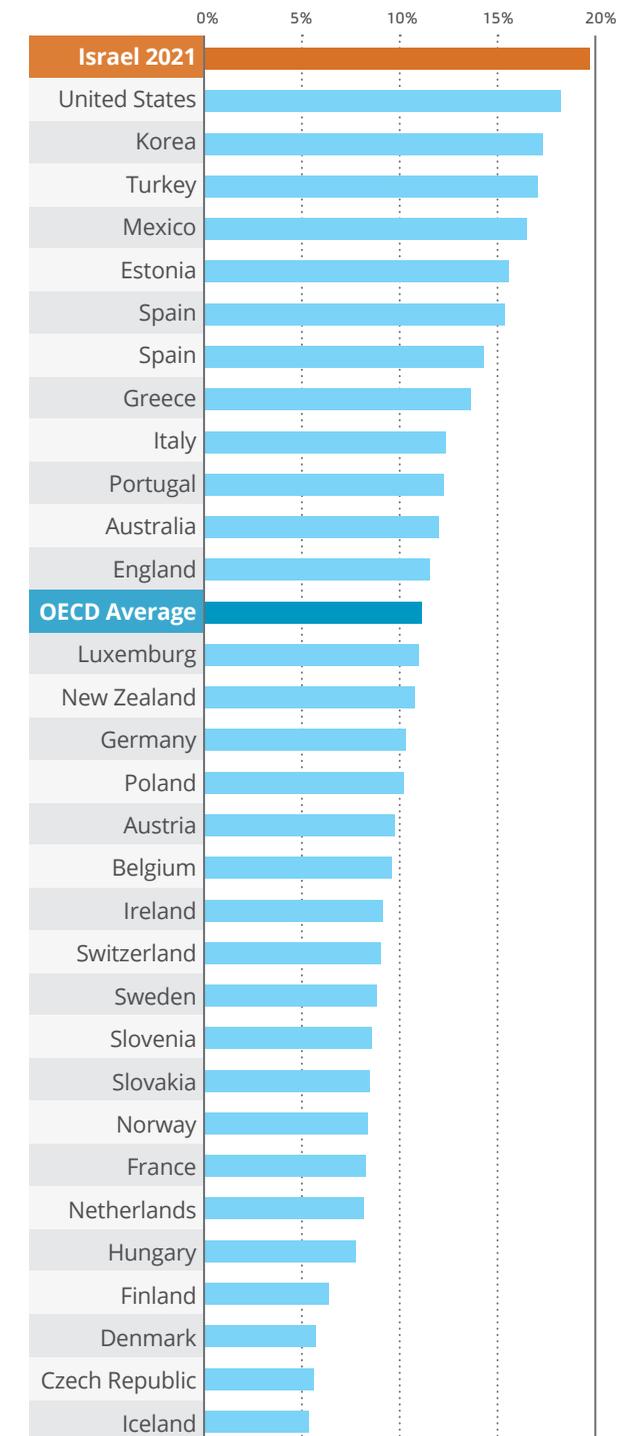
32. Not including dining out, spirits and alcoholic beverages, and soft drinks.

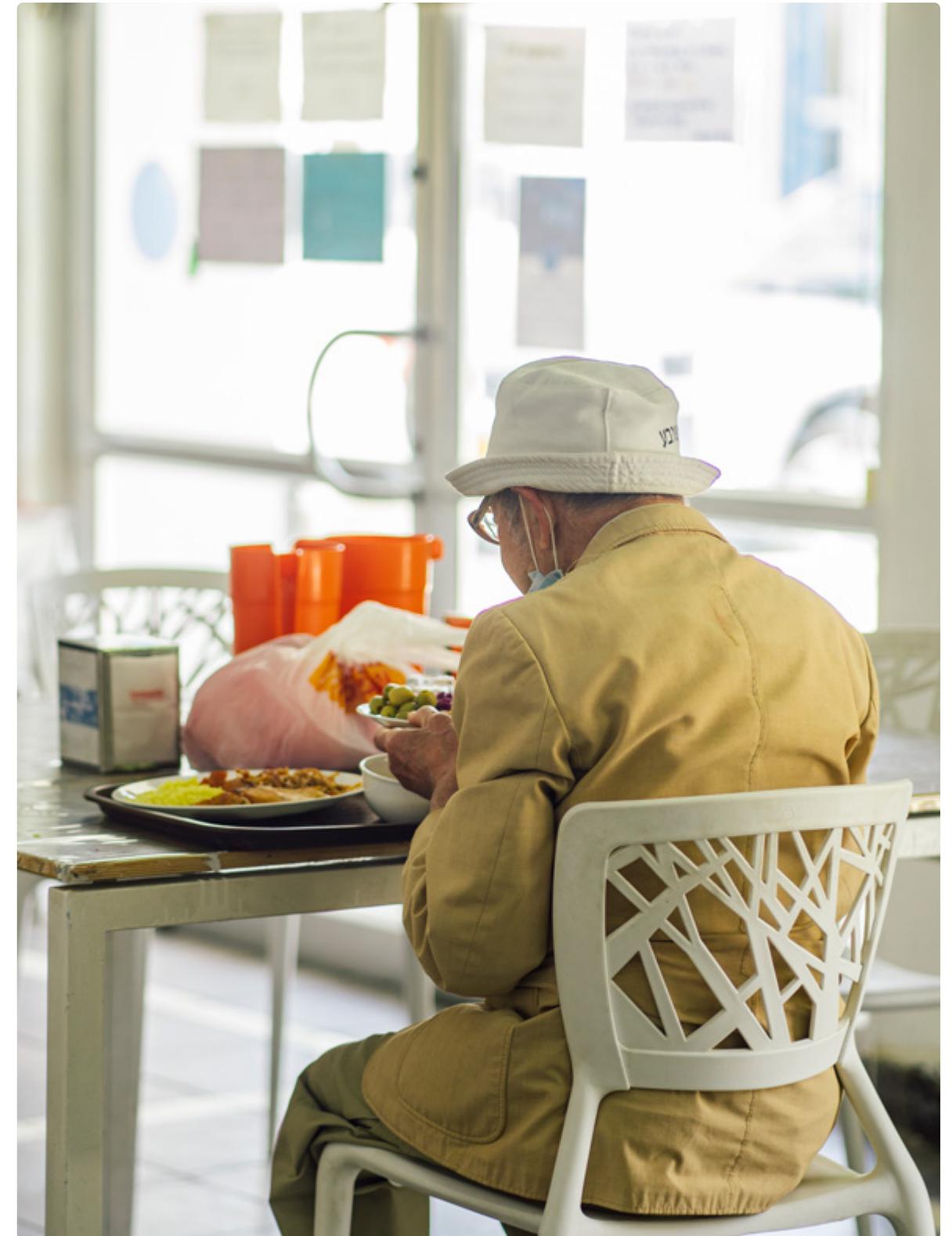
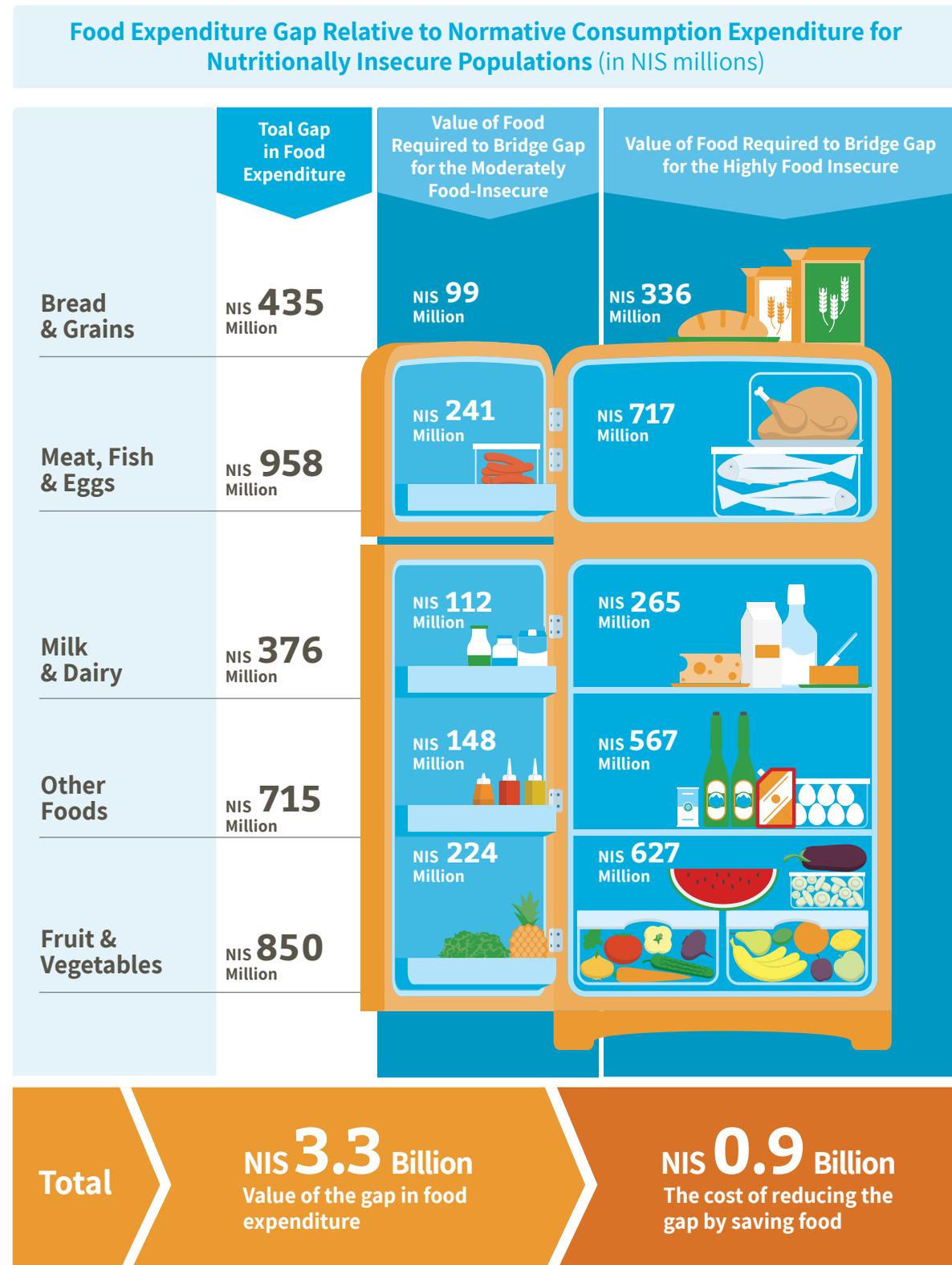
**Inequality (the Gini Index)  
An International Comparison 2021**



Source: Economist 2018 Global Food Security Index

**Poverty Rates  
An International Comparison 2021**





An elderly man eating in government housing. Credit: Ieket Israel



**8.**

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

**NIS 5 billion** saving potential for the national economy

## Food Rescue: Potential Savings for the National Economy

Rescuing around 500 thousand tons of wasted food annually, which constitutes around 20% of food waste in Israel, would enable the food insecurity gap between the general population's normative food expenditure and that of those suffering from food insecurity to be entirely closed.

**food rescue bridges the food insecurity gap while cutting costs by 73% and providing significant social and environmental benefits**

According to BDO and Leket Israel estimates, the current rescue multiplier is 3.6, and when taking into account greenhouse gas and air pollutant emissions as well as waste treatment costs, the rescue multiplier rises to 4.3. This means that every shekel spent on food rescue saves food worth NIS 3.6 or NIS 4.3, respectively. Based on these calculations, it would cost only NIS 0.9 billion to rescue food worth NIS 3.3 billion<sup>33</sup>. Food worth NIS 3.3 billion equals the value of the

entire food expenditure gap that exists between the population living with food insecurity and the normative consumption level.

Without food rescue, an annual cost of NIS 3.3 billion in financial aid would be required to close this gap completely. Hence, food rescue is clearly preferable to the alternatives of government allowances, donations, subsidies, or financial aid for the needy as a means of bridging the food insecurity gap. Food rescue makes it possible to reach the same social goal at a significantly lower cost of NIS 0.9 billion annually. In other words, **food rescue bridges the food insecurity gap while cutting costs by 73% and providing significant social and environmental benefits.**

The problem of food insecurity is not only expressed in the amount of money spent on food, but also in the types of food consumed. An analysis of the average consumption of those who are food insecure compared to the average consumption of the food-secure population reveals that **food insecurity often goes along with spending little on fruits, vegetables, meat, and fish, which have high nutritional value.**

33. The nutritional gap for food-insecure households was calculated based on Chernichovsky and Regev's report on food insecurity (Food Expenditure Patterns in Israel, Taub Center, 2014), the Central Bureau of Statistics's Household Expenditure Survey and the National Insurance Institute's Poverty Report.

**20%** of overall food waste, would allow complete closure of the food expenditure gap in Israel

Food Rescue: Summary of Estimated Savings to the National Economy (NIS millions/year)

Percentage of Rescued Food from Food Waste	1.5% (currently)	5%	10%	25%
Rescued Food (in thousand tons)	40	130	260	520
Food Rescued: Potential Share of the Nutritional Gap for Food Insecure Populations	8%	25%	50%	100%
Value of Rescued Food	230	890	1,800	3,300
Cost of Food Rescue	60	240	500	900
Savings to National Economy (before external factors)	170	650	1,300	2,400
Social and Environmental Contribution (FAO)	200	650	1,300	2,600
<b>Total Savings to National Economy from Food Rescue</b>	<b>370</b>	<b>1,300</b>	<b>2,460</b>	<b>5,820</b>

Source: BDO estimates

Thus, for example, the gap in expenditure for highly nutritious food such as meat, poultry, fish, and fresh fruit and vegetables ranges from 55% to 70% of the normative expenditure, while the gap for other products, such as potatoes, bread, and pitta, is lower, and ranges from 15% to 25%.

**In the case of food rescue, the unique set of circumstances presents a clear economic advantage to supporting the needy with products over money. This stems from the specific characteristics involved in transforming waste into food, i.e. that every shekel invested in food rescue generates a direct economic return of 3.6. Moreover, taking into consideration the environmental impact of greenhouse gas emissions, air pollutants, and waste treatment, the return on investment for the economy rises to 4.3.**

According to the principles of economic theory, income in the form of goods is less preferable than income in the form of money, because it deprives the recipient of the freedom to allocate resources according to their full range of needs. Therefore, in principle, the general

tendency is to prefer monetary support over the direct provision of products. This economic principle is also known as “subsidize people, not products.” However, in the case of food rescue, the unique set of circumstances presents a clear economic advantage to supporting the needy with products over money. This stems from the specific characteristics involved in transforming waste into food, i.e. that every shekel invested in food rescue generates a direct economic return of 3.6. Moreover, taking into consideration the environmental impact of greenhouse gas emissions, air pollutants, and waste treatment, the return on investment for the economy rises to 4.3.

In this context, it should be noted that those suffering from food insecurity also suffer from financial insecurity expressed in consumption gaps for other basic necessities (housing, health, education, etc.). It is likely that food rescue would enable these households to effectively allocate some of their increased disposable income towards the consumption of other goods. From a social perspective, these households view the consumption of such products as prerequisites for ensuring their financial security. Therefore, beyond the direct value of the rescued food distributed to them, they also benefit from having more resources available for purchasing other goods and services.

In September 2015, in the context of the Sustainable Development Goals<sup>34</sup>, the United Nations and the United States government adopted the national goal of reducing food waste by 50% within fifteen years. Analysis of the data in this report shows that achieving even less than half of that goal, and donating the rescued

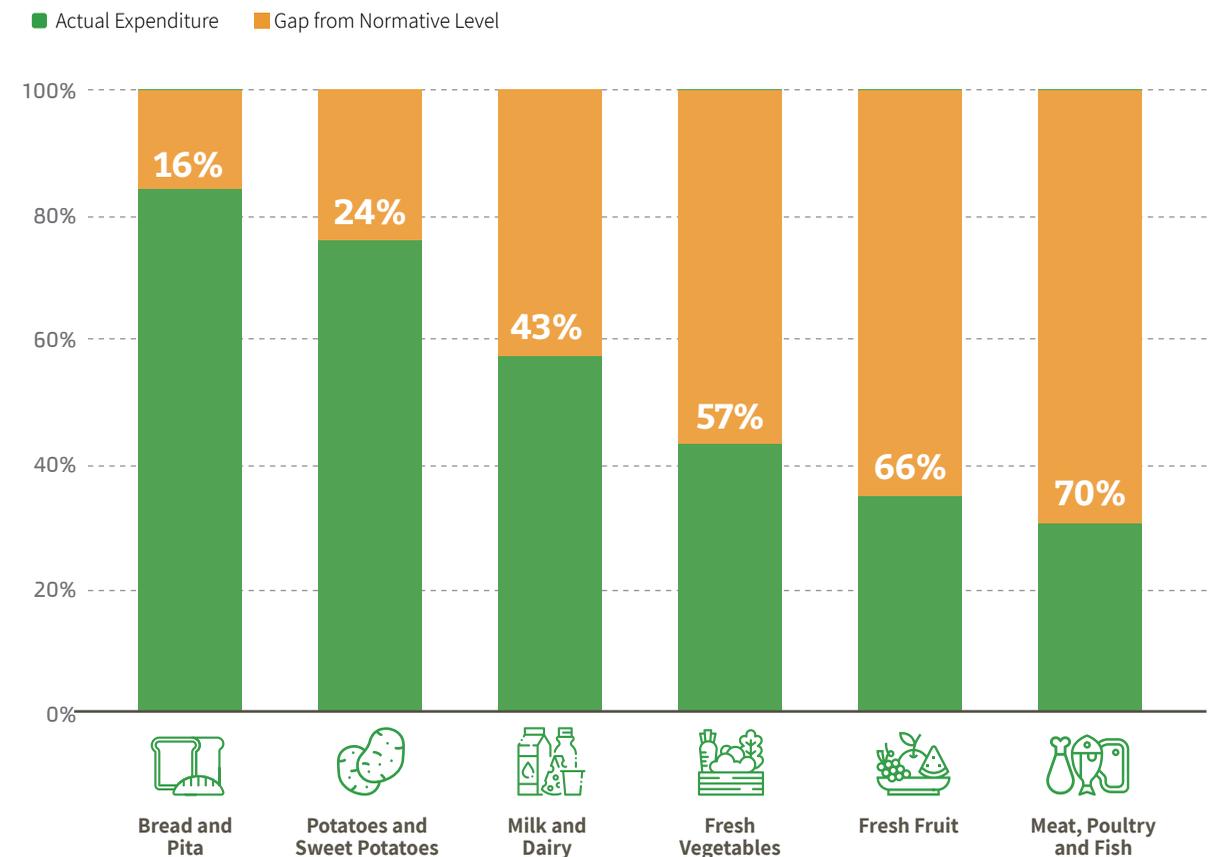
34. These 17 sustainable global development goals were adopted by the General Assembly of the United Nations in 2015.

food to approximately 450 thousand households suffering from food insecurity in Israel, would fully close the gap between their food intake and the normative level. In terms of the national economy, this would mean annual savings of about NIS 2.5 billion, bridging the gap between the value of the rescued food and the cost of rescuing it. This is before taking into account the added benefits resulting from the reduction of poverty and

inequality in the economy and before factoring in the external benefits to the environment.

It should be emphasized that the incremental implementation of the 50% national food waste reduction goal over a fifteen-year period is not expected to reduce the volume of agricultural production in Israel intended for local consumption, but only to slow down the growth rate of local food production.

### Impact of Food Insecurity on the Food Expenditure Patterns of Households Experiencing Severe Food Insecurity 100% = Diet of population with normative food expenditures



Source: BDO analysis and Survey of Household Expenses, CBS



# 9.

## The Environmental Impact and Cost of Food Waste

**NIS 3.6 billion**  
The environmental cost  
of food waste in Israel

## The Environmental Impact and Cost of Food Waste

The food production process requires various resources, including land, water, fertilizers, chemicals, and energy. It accounts for approximately one-fifth of all greenhouse gas emissions worldwide<sup>35</sup>. Many of these resources are nonrenewable<sup>36</sup>, and their use runs the risk of adversely affecting water, land, and air quality, as well as global biodiversity.

The environmental cost of food waste in Israel in 2021 is estimated at approximately NIS 3.6 billion, out of which NIS 1.4 billion accounts for the unnecessary use of natural resources, NIS 1.4 billion due to greenhouse gas and air pollutant emissions, and NIS 800 million for the direct cost of waste collection and processing. Food waste (including packaging) in all stages other than agriculture, produced 1.9 million tons of municipal waste, which constitutes approximately 34% of all municipal waste in Israel.

Despite the negative environmental impacts of growing and producing food, agriculture is not perceived to be a polluting industry and environmental taxes and fees are generally not imposed upon it. This is because the positive external impact of consuming food is greater than the negative external impact of producing it. Many developed countries even subsidize production and consumption either directly or indirectly.

However, when food is wasted, in other words, produced but not consumed, the full environmental impact remains, from growing, producing, and disposing of the food, as well as treating the resulting waste, without anyone deriving any positive benefit from its consumption. Considering this, food waste is especially damaging to the environment.

In recent years, the problem of food waste continues to gain recognition around the world. To support the global effort, the United Nations, UN Food and Agriculture Organization (FAO) and the United Nations Environment Program (UNEP) have been working on instituting a uniform international index for estimating the volume of global food waste. In addition, in 2019 the United Nations launched a report<sup>37</sup> emphasizing the importance of examining the environmental context of food waste, in addition to the socio-economic. According to the report, using the life cycle assessment (LCA) approach to food waste and treatment may assist in developing a policy for reducing food waste.

A policy to reduce food waste could include a variety of measures that would lead to a reduction in food surplus at the source, encourage the rescue of surplus food, and promote the use of composting and anaerobic digestion rather than disposing of

35. Food and Agriculture Statistics, fao.org

36. Cut Waste, GROW PROFIT. How to reduce and manage food waste, leading to increased profitability and environmental sustainability, 2012.

37. Waste Not, Want Not: Reducing food waste and waste in North America through life-cycle approaches, United Nations Environment Programme, 2019.

waste in landfills. Numerous countries are using various policy tools to reduce food waste.

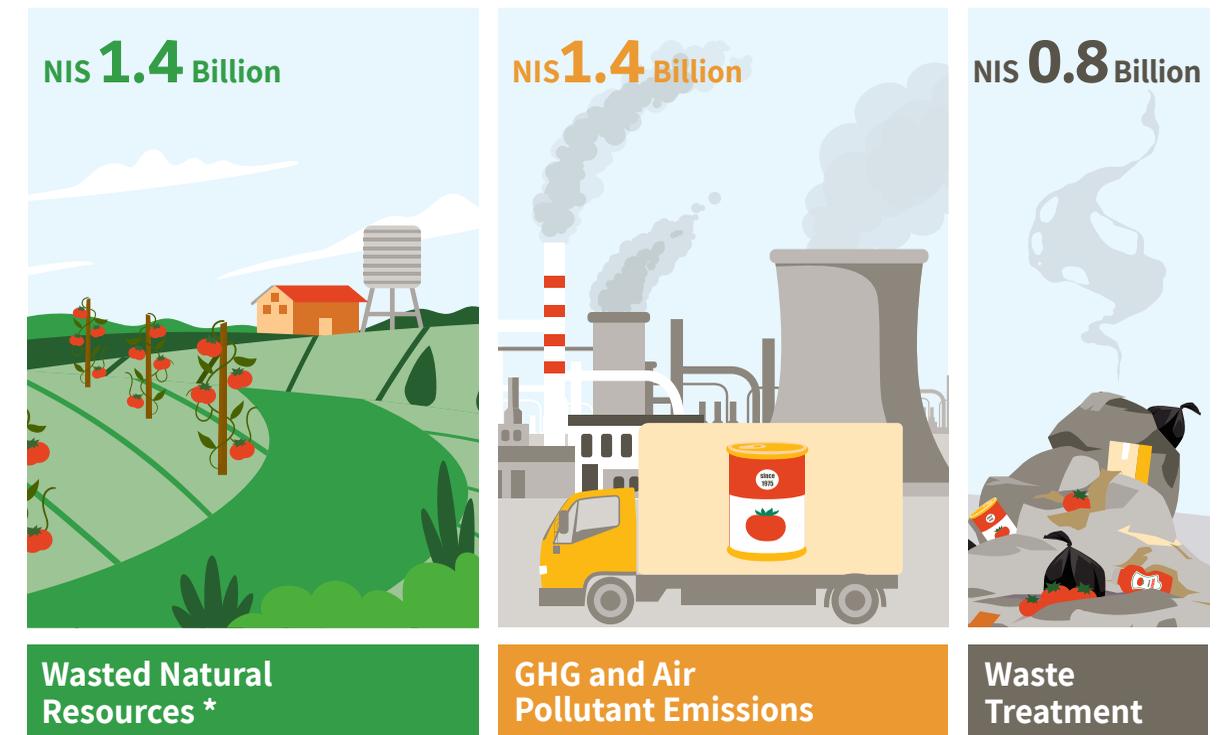
This report presents a study of the environmental impact of food waste and loss in Israel. This chapter examines the environmental impact of wasted food in the production, consumption, and disposal stages. Specifically, the greenhouse gases and air pollutants emitted because of this, the natural resources (water and land) that were lost as a result of this waste, and finally, the environmental impact resulting from the need to treat this waste. The external costs of greenhouse gases and air pollutant emissions were quantified according to the FAO's methodology<sup>38</sup>. The external environmental impact on land and water quality as well as damage to biodiversity were not considered in this examination. Therefore, the estimated environmental cost of food

waste in Israel presented in this chapter is an underestimation and provides a foundation for assessing this in the forthcoming years.

It is important to note that **the environmental impact quantified and presented in this chapter include only those that occurred within the geographical boundaries of the State of Israel**. Natural resources invested in growing food outside of Israel and the emissions from the growing and production process were not included in this report. A relatively large part of certain foods that are consumed in Israel, such as grains and meat products, are imported. Therefore, the environmental impact of food consumed and discarded in Israel is greater than the total environmental impact quantified in this chapter.

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

### NIS 3.6 Billion - The Environmental Cost of Food Waste in Israel:



\* The cost of wasted natural resources is internalized at a market cost of about NIS 19.1 billion from food waste.

**6%** of GHG emissions in Israel result from food waste

The environmental impact of food production at all stages (production, processing, sales, consumption, and disposal) results from the use of energy and resources, and these vary according to the crop type. These costs are added to the economic and environmental cost of treating food and packaging waste.

Additional resources that were lost along with the food wasted in Israel in 2021 include 1,290 million kWh of electricity, a quantity sufficient to manufacture all the computers and electronic devices in Israel for one year; 77 thousand tons of fuel, which is enough to fuel 170 thousand cars for one year; 185 million cubic meters of freshwater - enough to fill 57 thousand Olympic swimming pools, as well as 215 million cubic meters of wastewater; and one million dunams (1000 square kilometers) of agricultural land – 20 times the area of Tel Aviv. In addition, 200 thousand tons of waste (packaging, industrial waste, etc.) was created, 60 thousand tons of fertilizer was used, and livestock emitted 3,000 tons of ammonia over the course of the year.

Together, these contributed to 5 million tons of greenhouse gas emissions resulting from food waste in Israel, constituting approximately 6% of the total greenhouse gas emissions in the country. On the 25th of July 2021, (Gov. Decision No. 171) on the topic of transitioning to a low-carbon economy<sup>39</sup>, the Israeli government set an updated national goal of reducing greenhouse gas emissions by 27% by 2030 and by 85% by 2050, compared to greenhouse gas emissions in 2015. Moreover, in October 2021, the Prime Minister declared a goal of zeroing Israel's carbon emissions by 2050<sup>40</sup>.

39. Government Decision No. 171 In gov.il  
40. Announcement from the spokeswoman of the 36th Prime Minister's Office, Naftali Bennett, gov.il

To achieve these goals, in that same decision the Israeli government also set sectorial targets to reduce greenhouse gas emissions and make energy consumption more efficient. These included "reducing greenhouse gas emissions caused by solid waste by at least 47% by 2030 compared to emissions measured in 2015," "reduce greenhouse gas emissions from municipal waste by at least 92% by 2050 compared to emissions measured in 2015, which stood at 5.5 million tons a year," and "a 71% reduction in the volume of landfilled municipal waste by 2030 compared to the amount of municipal waste landfilled in 2018, which stood at 4.5 million tons a year." Reducing the amount of food waste in Israel would assist the national effort to meet the targets of reducing greenhouse gas emissions and the amount of municipal waste landfilled.

**Water expended and lost as a result of food waste would fill:**

**57,000** Olympic swimming pools

In an arid country such as Israel, water is a valuable and limited resource. The 185 million cubic meters of freshwater lost as a result of food waste could fill 57 thousand Olympic swimming pools, or alternatively, raise the water level in the Sea of Galilee by over 1 meter, or provide enough water for about 3.6 million residents for an entire year<sup>41</sup>. An examination of the water costs wasted along with the food reveals that the water loss cost the Israeli economy approximately NIS 640 million.

Land is another limited and valuable resource in Israel. The one million dunams (1000 square kilometers) of agricultural land used to grow food that became waste is valued at approximately NIS 800 million.

41. Based on household water consumption.

**1/3** Food waste constitutes a third of total household waste in Israel

The environmental impact of food waste stems not only from excess food production and consumption patterns that involve the waste of natural resources and air pollution, but also from the way food is treated once it is discarded. Treating food waste once it is discarded and in particular, transferring it to landfill causes additional environmental impact. It's known that 34% of household waste in Israel consists of organic matter originating in food. Thus, food waste increases the total amount of waste that needs to be treated, and when unsorted, makes it difficult to recycle other materials found in household waste.

42. Water and land contamination costs were not quantified in this report.

43. Estimated by the Ministry of Environmental Protection for 2018.

44. About 870 million tons were from the agricultural stage where food remained in the field and generally did not require any further treatment.

Most of the waste in Israel is landfilled, and this has many negative environmental impacts. Landfills require large areas of land and thereby contribute to the depletion of land resources in Israel. In addition, a variety of air pollutants and greenhouse gases are emitted when waste is transported to distant landfill sites around the country. Moreover, landfills can potentially contaminate adjacent land and water resources due to environmentally harmful substances seeping through layers of water and soil<sup>42</sup>.

The amount of municipal waste produced in Israel each year is estimated at approximately 5.6 million tons<sup>43</sup>. Food waste in Israel in 2021 was estimated at around 2.6 million tons, out of which 1.7 million tons<sup>44</sup> require end facility treatment (as part of the municipal waste that is treated in Israel). Added to this, 200 thousand tons of waste resulted from food packaging, leading to a total of 1.9 million tons of food and packaging waste,

### 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)
<b>Waste</b>	1.9 million tons municipal waste 0.9 million tons agricultural waste	0.5	0.8	-
<b>Electricity Generation</b> not including electricity for water desalination & purification	1,290 Million kWh	0.2	-	-
<b>Emissions from Animal Sources</b>	3,000 tons ammonia	0.4	-	-
<b>Fuel Combustion</b>	77 thousand tons	0.1	-	-
<b>Water</b>	185 million m <sup>3</sup> fresh water 215 million m <sup>3</sup> treated waste water	0.1	-	0.6
<b>Fertilizer Use</b>	60 thousand tons	0.03	-	-
<b>Land Use</b>	1 million dunams agricultural land			0.8
<b>Total</b>		<b>1.4</b>	<b>0.8</b>	<b>1.4</b>

Source: BDO

which constituted about a third of the waste in Israel requiring treatment. Treating this amount of waste required approximately 190 thousand compacting garbage trucks <sup>45</sup>, which is the equivalent of 520 loaded trucks operating every day for an entire year.

The volume of waste requiring treatment necessitates the allocation of significant resources, including economic and statutory support for sorting and disposing. Waste treatment costs consist of several factors, including the costs associated with waste storage, collection, and removal, sorting and transit facilities, and transportation, as well as the cost of the treatment itself, depending on the type of treatment required, as well as landfill fees. The direct annual cost for treating food waste and associated packaging <sup>46</sup> in Israel stands at NIS 800 million (based on waste

treatment cost estimates conducted by the Ministry of Environmental Protection, Waste Policy 2030). In addition, the external costs of greenhouse gas and air pollutant emissions caused by treating the waste stand at NIS 500 million. The total economic cost for treating food waste in Israel in 2021 stands at approximately NIS 1.3 billion.

**50%** of the environmental impact resulting from food waste is caused during the consumption stage

The environmental impact related to agricultural produce is quantified by the product's entire lifecycle, including production, post-harvest handling, storage, processing, distribution,

45. Compacting garbage trucks with a 10-ton capacity.  
46. Not including food waste from agriculture.

**Environmental Costs of Israel's Food Waste, 2021, By Stage of Food Waste, in NIS millions**

	Agriculture*	Processing	Distribution	Consumption**	Total
<b>Fruit &amp; Vegetables</b>	402	29	424	803	<b>1,658</b>
<b>Grains &amp; Legumes</b>	116	65	109	325	<b>614</b>
<b>Milk &amp; Dairy</b>	111	42	69	247	<b>469</b>
<b>Meat, Fish &amp; Eggs</b>	131	139	182	454	<b>906</b>
<b>Total</b>	<b>759</b>	<b>274</b>	<b>784</b>	<b>1,830</b>	<b>3,647</b>
<b>Percentage of Total</b>	<b>21%</b>	<b>8%</b>	<b>21%</b>	<b>50%</b>	<b>100%</b>

\* The agricultural stage also includes waste and losses from the processing and packaging stage.  
\*\* Emissions due to the use of water, electricity, and gas were not included in the consumption stage. Source: BDO

consumption, and disposal. The further along a product is in its lifecycle when it is wasted or discarded, the greater its environmental impact. This is because the environmental footprint of food waste stems from three different components: impact resulting from the stage of the value chain when the product is discarded; impact stemming from the product ending up as waste; and impact stemming from previous stages of the value chain (if there are any).

Food wasted at the consumption stage accounts for approximately 50% of the environmental cost of food waste. Consumer food waste includes all the cumulative environmental impact resulting from its production, transport, processing, and distribution prior to reaching the consumer. In 2021, food worth NIS 12 billion and weighing 1.2 million tons (including packaging) was discarded during the consumption stage <sup>47</sup>. In addition to the cost of the food waste itself, the unnecessary cost of waste treatment should also be considered, which consumers paid indirectly through municipal fees totaling NIS 500.

47. The consumption stage includes household and institutional consumption.

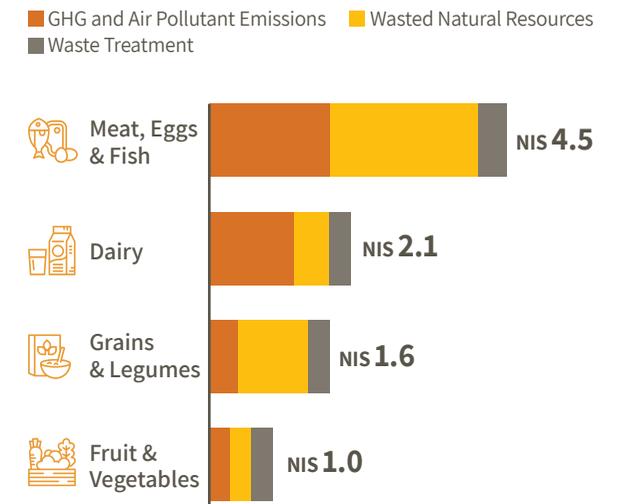
**Animal-based food products have the greatest negative environmental impact**

Examination of the different food product categories reveals that animal-based food products have the greatest environmental impact. The environmental cost (because of air pollutants and GHG emissions) to the economy for meat, eggs, and fish wasted during the agricultural production stage is approximately NIS 5.2 per kilogram. If those foods are wasted in the consumption stage, the environmental cost is NIS 7.4 per kilogram.

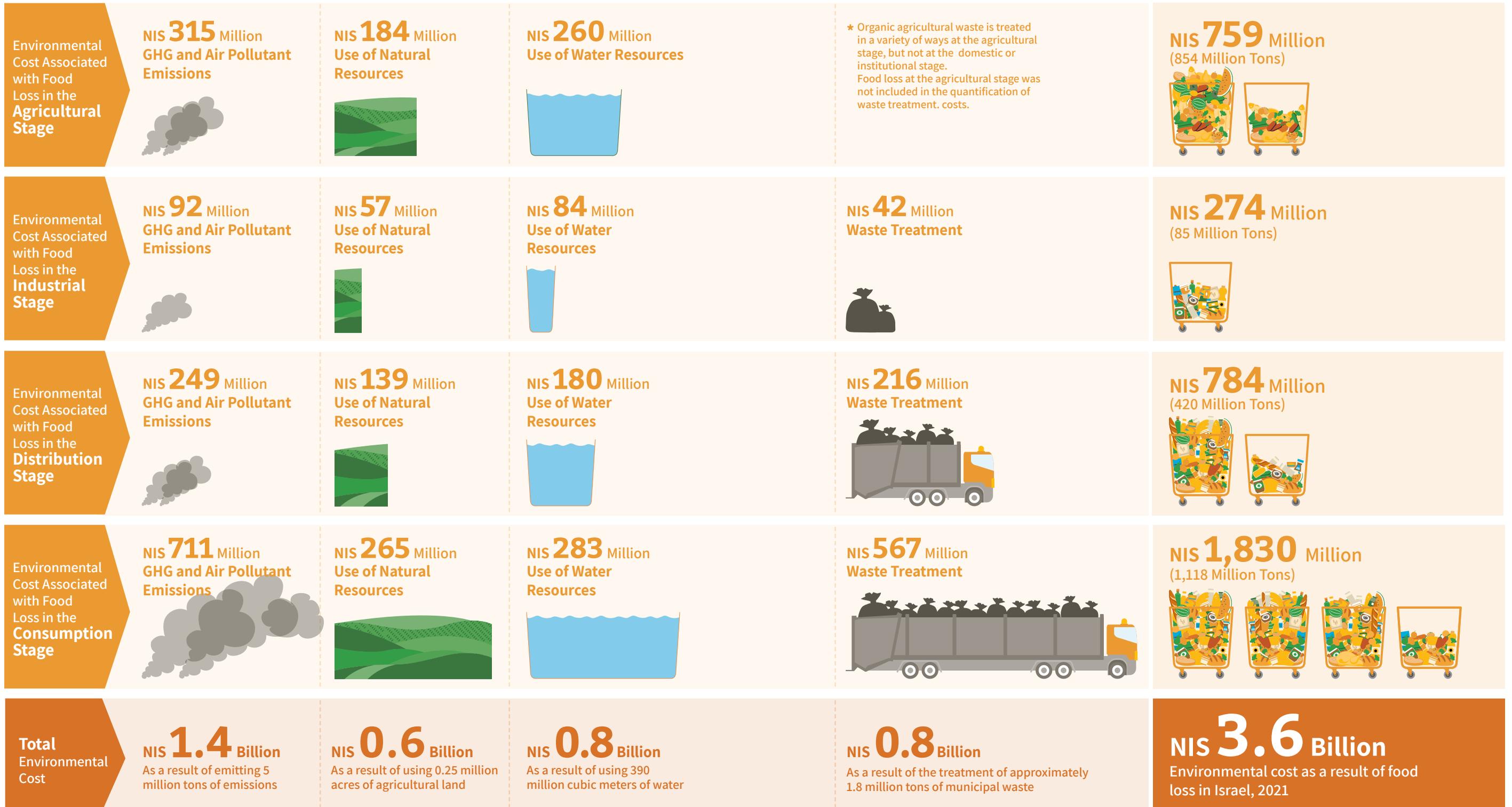
The environmental cost to the economy for milk and dairy products wasted during the agricultural production stage is approximately NIS 2.0 per kilogram. If dairy foods are wasted in the household consumption stage, the environmental cost is NIS 2.8 per kilogram. Fruit and vegetables left in the field have an environmental cost of NIS 0.90 per kilogram, and nearly double that if discarded by the consumer.

Examination of the different food product categories reveals that animal-based food products have the greatest environmental impact. For wasted meat, eggs, and fish, about half of the environmental cost stems from the loss of natural resources. For dairy products, most of the cost is due to greenhouse gas emissions and air pollutants, while for fruit and vegetables, the cost is evenly distributed between the cost of waste treatment, the loss of natural resources, and greenhouse gas emissions and air pollutants.

**Cumulative Environmental Cost per Kilogram of Wasted Food, Israel 2021**



## Environmental Cost of Food Waste by Stage





**An international comparison: greenhouse gas emissions caused by food waste**

According to UN assessments, the amount of food wasted globally is approximately 1.7 billion tons per year. The total amount of greenhouse gases emitted as a result of growing and producing unconsumed food was estimated at approximately 4.3 billion tons. This amount includes greenhouse gas emissions from every stage of the food growing and production stages, as well as the emissions caused by food being discarded and treated as waste<sup>48</sup>.

The global cost of greenhouse gas emissions from food waste is estimated at approximately \$515 billion a year<sup>49</sup>. This cost depends on local conditions and varies according to the specific type of agricultural product.

The comparative international research conducted by FAO, together with the new UN study, shows that the level of greenhouse gas

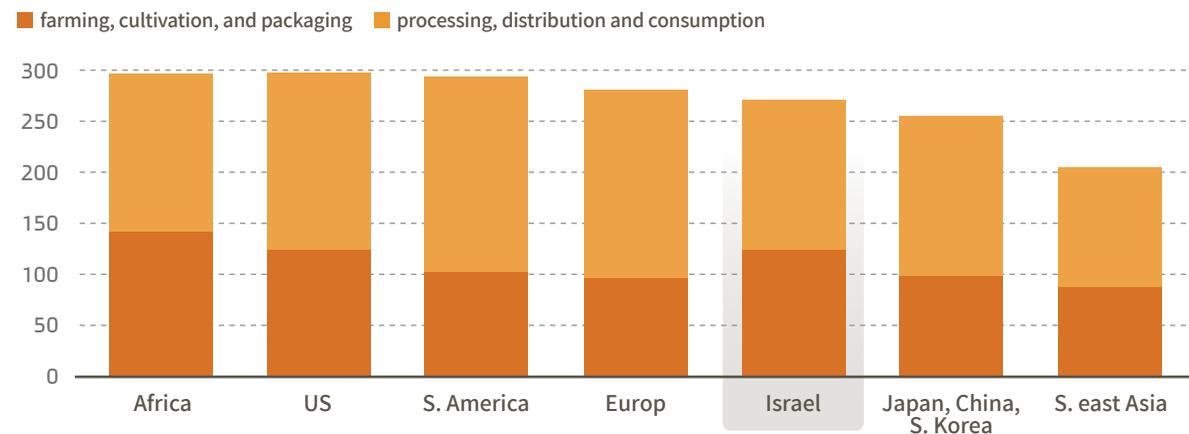
emissions per capita in low-income countries is not demonstrably different from those in higher-income countries. The UN report found that food waste per capita at the consumption stage is very similar in all countries. The conclusion contradicts the prevailing assumption that most of the food waste in developed countries occurs during the retail and consumption stages while the source of most food waste in developing countries occurs during the producing, packaging and transporting stages.

The findings of the UN report, as presented in the graph below, show that food waste per capita in Israel is similar to that in the United States, and lower than that in Africa. However, it is also clear that food waste per capita during the consumption stage is lower than in Europe.

In Israel, 5 million tons of greenhouse gases are emitted due to growing and producing unconsumed food, constituting approximately 6% of greenhouse gas emissions in the country each year. Overall, most food waste occurs during the consumption stage.

48. As the FAO study did not quantify air pollutants resulting from the production and discarding of food, the comparison presented below includes only greenhouse gas emissions caused by food waste.  
49. Estimated by the FAO in 2014.

**GHG Emissions Caused by Food Waste by Geographical Regions, Kg per Capita**



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



Harvesting surplus agricultural produce. Credit: Leket Israel



# 10.

## **Food Rescue: An Integrated Economic, Environmental, and Social Contribution**

# 1 Million Tons of rescuable food in Israel in 2021

## Food Rescue: An Integrated Economic, Environmental, and Social Contribution

Food waste is an international phenomenon. It is not unique to the Israeli economy and exists on a similar scale in all Western countries. The United Nations estimates that, in quantitative terms, more than one-third of all the food produced worldwide is wasted, which translates into approximately one-quarter in terms of the total calorific value.

**Rescuing food and distributing it to underprivileged populations increases economic productivity while simultaneously reducing inequality**

The Food Recovery Hierarchy set forth in the European Union's directive on food waste sets priorities for the treatment of unconsumed food. Each stage in this hierarchy focuses on a different strategy for managing food waste. Within the hierarchy, preventing food waste and using wasted food to feed underprivileged populations is clearly preferred, because these methods for managing food waste have the greatest environmental, economic, and social advantages, and therefore are the most efficient.

Many policy measures exist to address the needs of underprivileged populations and to help alleviate the problem of food insecurity. The most common methods used in Israel include donations, subsidies, allowances, and financial aid. Food rescue is unique in that it makes it possible to help those in need at a low budgetary and economic cost: instead of having to finance the full cost of buying food, only the cost of food rescue needs to be financed.

In the socioeconomic discourse in Israel and around the world, there is an ongoing dispute between those who advocate prioritizing growth ("increasing the pie") and those who believe the reduction of inequality should be prioritized as the main goal.

Food rescue is unique because it is a policy tool that inherently integrates both approaches. **Rescuing food and distributing it to underprivileged populations increases economic productivity while simultaneously reducing inequality.**

Furthermore, crises and emergency situations – such as Covid-19 and the climate crisis – underscore the possible scenarios for instability in the local and international food supply chains. Thus, food rescue is also a tool for expanding food reserves and ensuring food security in times of crisis.



The combination of an increase in food waste, the climate crisis, the problem of food insecurity and the percentage of households living with food insecurity in Israel, all reinforce the national need to use food rescue as a central policy tool.

### The importance of rescuing food stems from three main benefits

#### 1. The economic benefit

Food waste is detrimental to economic productivity because of the production and labor costs that are irretrievably lost. Food rescue means converting waste with zero or negative value into a product that has economic value and giving it to underprivileged populations to consume, without the need to invest additional production resources. It costs less to rescue food than it does to produce and transport it. This, and the fact that rescued food retains its full nutritional value, explains how food rescue contributes to increasing productivity in the economy.

#### 2. The social benefit

The cost of food waste throughout the entire value chain, from growing and production through to distribution, sales, and consumption, is ultimately passed onto the consumer and affects the cost of living in Israel. Therefore, food rescue contributes to closing gaps in society and lowering the cost of living, as well as reducing food insecurity among underprivileged populations.

#### 3. The environmental benefit

During the growing, production, distribution, and sales processes, about 35% of the volume of local food production is lost and turns into waste or surplus. When that happens, all the resources required to cultivate and produce the food are irretrievably lost. These include land, water, fertilizers, chemicals, and energy. Some food production also requires animal feed and

uses resources to grow and produce it. Many of the resources used by the food industry are non-renewable and their use adversely affects water, soil, air, and biodiversity. Furthermore, agricultural production causes air pollution because of energy and fuel consumption.

### Food Rescue Benefits

	Food Production	Food Rescue
Product	Nutritional Foods	Nutritional Foods*
Nutritional Value	100%	100%
Land Use	Yes	Negligible*
Water Use	Yes	Negligible*
Greenhouse Gas Emissions During Production	Yes	None
Use of Fertilizers and Pesticides	Yes	None
Logistics, Distribution and Transportation Costs	Yes	Yes

\*Most of the resources have already been invested during the agricultural and production stages therefore any additional investment in food rescue is negligible.

**More than one million tons, which is about half of the total amount of wasted food, is rescuable. Rescuing it would prevent 3% of greenhouse gas emissions in Israel** <sup>53</sup>

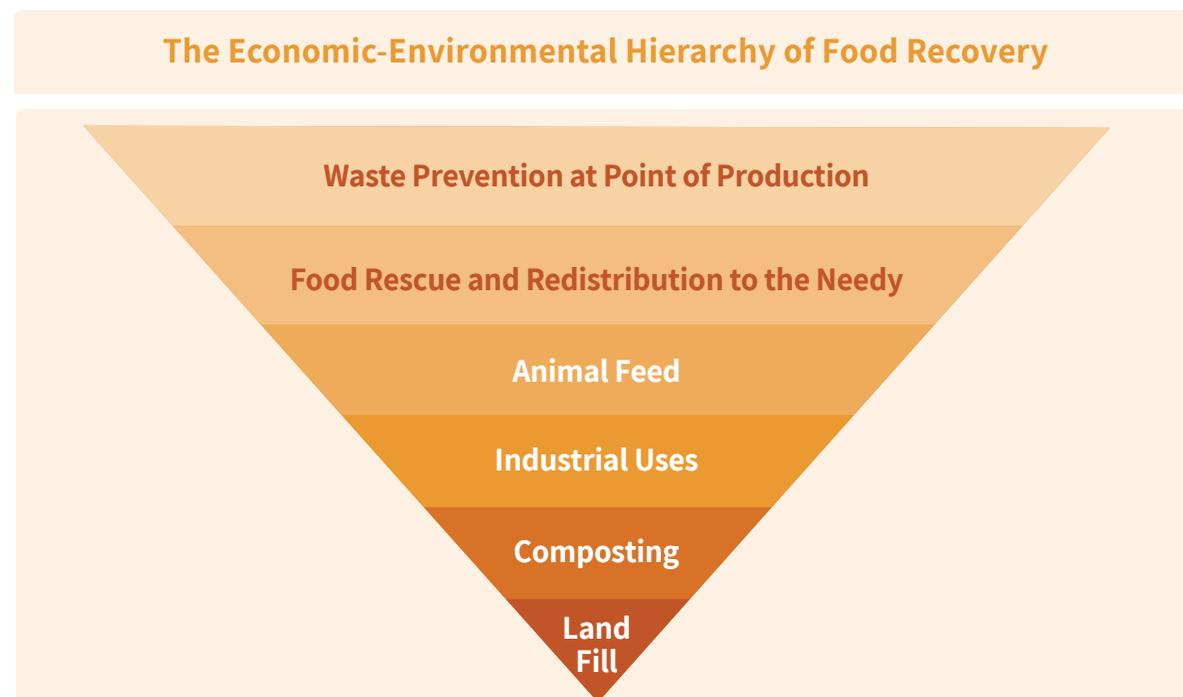
However, the environmental impact of food waste is not only the result of excessive food production. It is also caused by food waste treatment, as most food waste is transferred to landfill. Landfills damage the soil and contribute to climate change due to methane emissions produced by the decomposition of organic waste. Moreover, approximately one-third of household waste consists of organic matter originating in food. Therefore, discarded food increases the volume of waste requiring treatment and affects the quality of other recyclable materials found in household waste. Food rescue maximizes the use of the resources already invested in producing food and prevents the need to use additional resources.

The combination of these three characteristics of food rescue calls for appropriate policies that reflect these benefits.

More than one million tons, which is about half of the total amount of wasted food, is rescuable. Rescuing it would prevent 3% of greenhouse gas emissions in Israel <sup>53</sup>.

**The main foundation of food rescue activity is not primarily philanthropic or charitable, but an alternative economic method of food production that is clearly beneficial to the national economy, above and beyond its important contribution to reducing social inequality**

53. Out of a total of 80 million tons of greenhouse gas emissions in Israel annually.



Source: EPA

The majority of food rescue in Israel and abroad is carried out by nonprofit organizations (NPOs) that are supported by donations. However, even if funding for food rescue is derived from donations, the main foundation of food rescue activity is not primarily philanthropic or charitable, but an alternative economic method of food production that is clearly beneficial to the national economy, above and beyond its important contribution to reducing social inequality.

The direct cost of food rescue averages at NIS 1.5 for every kilogram of food. The direct value of rescued food is NIS 5.4 per kilogram, yielding a multiplying effect of 3.6. In other words, every NIS 1 invested by NPOs in food rescue provides income in the form of products worth NIS 3.6 for underprivileged people. Food rescue in Israel is still in its infancy and there seems to be potential for expanding the activity, utilizing economies of scale to reduce the cost of food rescue, and raising the value of rescued products. However, for reasons of conservatism, the assessments here are based on the current cost structure.

In terms of benefit to the national economy, it is also necessary to consider the positive environmental contributions of food rescue [see Chapter 9]. The environmental benefit of reducing greenhouse gas and air pollutant emissions as well as waste treatment stands at NIS 0.8 per kilogram, yielding a multiplying effect of 4.3. In other words, when incorporating greenhouse gas and air pollutant emissions as well as waste treatment [see Chapter 9], every NIS 1 invested in food rescue generates a value of NIS 4.3 for the national economy.

The volume of food waste in Israel is not unique and is similar to that in comparable developed economies around the world. However, unlike many other countries that have developed legislation, national policies, and multi-year targets to encourage food rescue and reduce food waste, in Israel there is still no national policy for dealing with this issue.

Food Rescue Feasibility Assessment Food Cost / Benefit / NIS per Kg						
	Rescued Food Value*	Environmental Social Contribution (FAO)	Total Value to the National Economy	Rescue Cost	Gain from Food Rescue	Multiplier Value of Rescued Food/ Rescue Cost
Benefit to National Economy – Excluding External Factors	NIS 5.4	Not Included	NIS 5.4	NIS 1.5	NIS 3.9	3.6
Benefit to National Economy – Including External Factors	NIS 5.4	NIS 1.0	NIS 6.4	NIS 1.5	NIS 4.9	4.3

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



# 11.

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



**2021 UN Food Waste Index report findings: The Share of Food Waste at the Consumer Level Doubles From Previous Estimates**

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



**Food Waste around the World**

In March 2021, The United Nations Environment Program (UNEP) published its Food Waste Index Report 2021<sup>54</sup>. Its findings show that the UN's previous estimate of food waste in the consumption sector (household and institutional) fell considerably short. According to the new findings, the extent of global food waste is approximately 1.7 billion tons annually, 30% more than the previous estimate of 1.3 billion tons, or one-third of all food produced worldwide.

This was the first time that the UN updated its decade-old estimate regarding the volume of food waste globally.

The UN Food and Agriculture Organization (FAO) defines food waste as: a “reduction in the quantity or nutritional value of edible portions of food intended for human consumption along the food production value chain.”

The World Food Waste Index<sup>55</sup> was designed to support the UN Sustainable Development Goal: “By 2030, halve per capita global food waste at the retail and consumer levels and reduce food waste along production and supply chains, including post-harvest losses.” This indicator complements the food waste goal published by the FAO, which

relates to food waste in the agricultural, sorting, packaging, and industrial processing sectors.

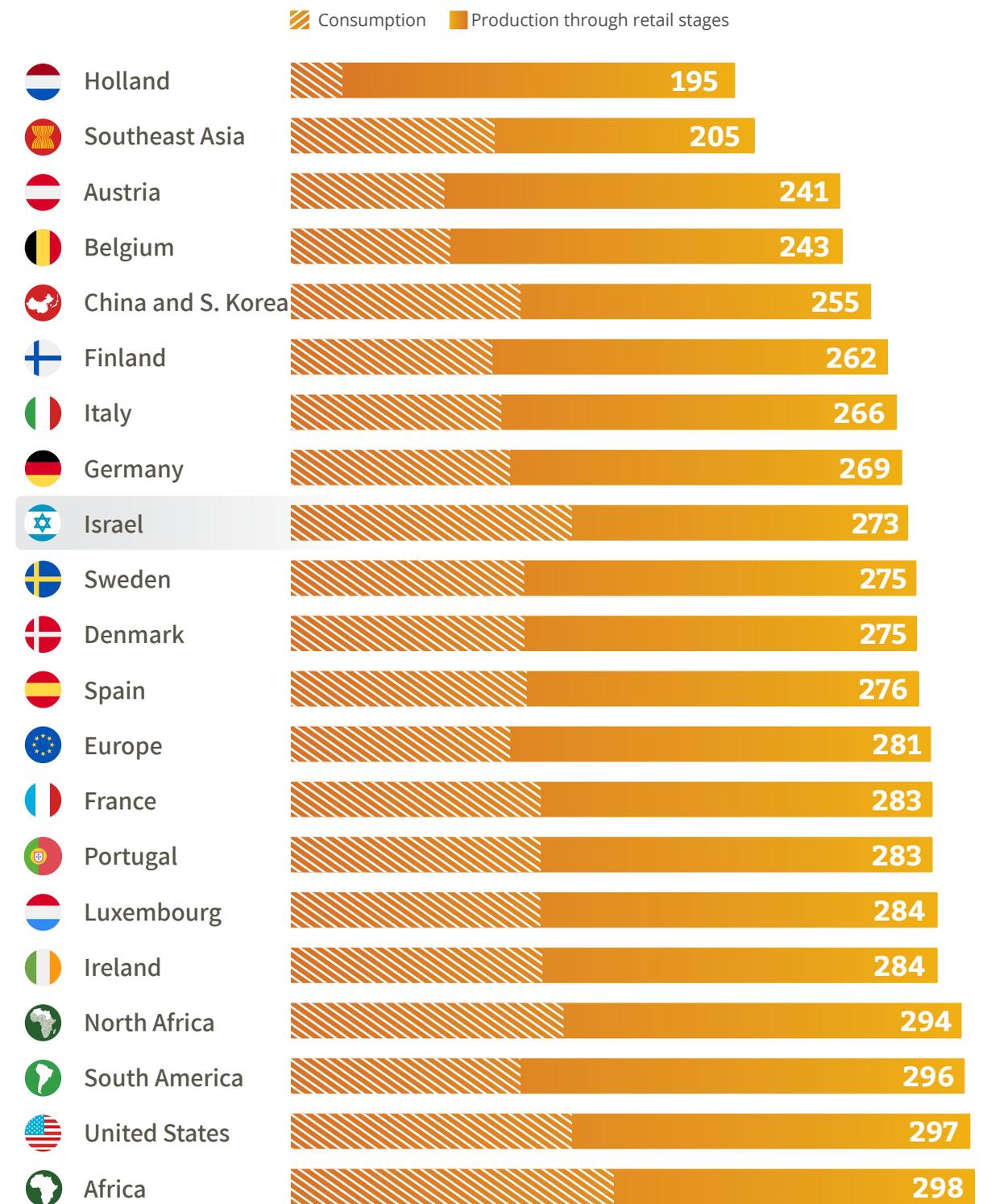
**Regarding Israel, the UN report quotes and relies on the Food Waste and Rescue in Israel Report prepared and published by Leket Israel, the Ministry of Environmental Protection and BDO.**

The UN report states that the extent of international food waste was underestimated in the past, primarily because the prior estimates were based on data from a small number of countries, many of which used outdated data. The new UN report presents a current portrait based on a broad range of data concerning worldwide food waste in the retail and consumption (both household and institutional) sector and calculates a new estimate of global food waste.

The new report encompasses 84 studies about food loss and waste from many countries. Of these reports, 52% were academic, 33% were conducted by government institutions, 10% by nonprofit organizations, and 6% by other agencies. Regarding Israel, the UN report quotes and relies on the Food Waste and Rescue in Israel Report prepared and published by Leket Israel, the Ministry of Environmental Protection and BDO.

54. United Nations Environment Program (2021). Food Waste Index Report 2021, Nairobi  
55. Sustainable Development Goals, Goal indicator 12.3.1, FAO

## Food Loss and Waste per Capita: International Comparison kg/year



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

The findings of the UN report, as reflected in the graph above, reveal that per capita food waste in the household sector in Israel is similar to that in the United States and less than in Africa. However, it is also evident that per capita food waste in the household sector in Israel is higher than in Europe. There are several possible explanations for this. Firstly, Israeli households tend to consist of a larger number of people. Research on food waste in Israeli households<sup>56</sup>, conducted by Professor Ofira Ayalon, Professor Efrat Elimelech and Dr. Eyal Ert, shows that the larger the household, the more food it wastes. Their research also found that households waste less food when waste separation is done at home, which is generally not practiced in Israel unlike other countries.

56. "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.

It must be noted that the UN report itself does not provide any explanation for the variations in per capita food waste in different countries.

The UN has defined dealing with food waste as a key issue for promoting sustainability and reducing food insecurity around the world. In its new report, the UN determined that some opportunities for reducing food waste were not utilized because previous estimates of international food waste were unreliable. Therefore, the UN report concludes that countries around the world must measure and monitor food waste in their territory while promoting effective policies for dealing with the problem.

In Israel, where expenditure on food is a significant portion of a household's expenses, coupled with



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

the high cost of living in Israel, it is especially challenging and highlights the importance of dealing with the issue of food loss and waste.

Moreover, discarding or destroying food that still has alternative economic value is evidence of a market failure that requires supportive government policy to facilitate more effective utilization of the resource.

Against this background, it is worth our while to examine the leading policy tools being used to reduce food waste rates in countries around the world.



### Policy tools for Reducing Food Waste Around the World and in Israel

in cooperation with the Global Food Donation Policy Atlas<sup>57</sup>

Considering the increase in international recognition of the global food waste problem, the United Nations FAO and UNEP have been working to promote complementary international indices for estimating the amount of food waste worldwide. These indices were intended to create uniformity, help establish baselines for food waste, and assist countries in developing policies to reduce waste and monitor their progress. Indeed, a variety of policy tools are being used around the world, to reduce the amount of food waste by decreasing the amount of surplus food, increasing food rescue, and/or encouraging the use of composting and anaerobic digestion instead of landfill.

### OECD Countries Use Integrated Policy Tools to Reduce Food Waste

57. <https://atlas.foodbanking.org/atlas.html>

Work is being done around the world to make data and policy more accessible, thereby encouraging efforts to reduce food waste. For example, the EU Food waste and Waste Prevention Hub (FLWPH) conducts surveys and shares its findings on relevant policies and legislation in European countries. Moreover, the Harvard Law School Food Law and Policy Clinic (FLPC)<sup>58</sup> together with the Global Food Banking Network (GFN)<sup>59</sup> launched the Global Food Donation Policy Atlas in February 2019. Conducting comparative legal research in dozens of countries around the world, their goal is to map the global food donation policy landscape and promote best practices for food rescue and food waste mitigation.

### The ongoing work of the Atlas includes:



Identifying and making accessible legislation related to food rescue and donation in an increasing number of countries;



Analyzing the most common obstacles to food rescue and donation in these countries;



Sharing best practices in order to overcome these obstacles whilst providing technical assistance for policy implementation in certain partner countries.

They share a generous amount of information, including in-depth legal analysis for each country regarding a variety of policy and regulatory areas related to reducing food waste and increasing food rescue. The Atlas has identified several key policy tools and highlights countries in which they are being implemented effectively.

58. Food Law and Policy Clinic, Harvard Law School

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

## Best practices according to the Atlas and the European Union

### 1. Food safety for donations

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

 **India** - Food Safety and Standards (Recovery and Distribution of Surplus Food) Regulation <sup>60</sup>

- Specifies the responsibility of food donors and organizations distributing surplus food, including designating the Food Safety and Standards Authority as the guiding authority.
- Defines requirements for labeling donated food.
- Creates an obligation to record and monitor food surpluses.

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

 **Israel** - Law for the Protection of Public Health (Food) 5776-2015 <sup>61</sup>

- Section 11 of the law regulates the use of leftover food.
- Section 159 exempts non-profit food distribution organizations from needing licenses for manufacturing, transporting, and storing food.
- Section 162 permits food distribution organizations to use food that has passed its best before date if it is a type of food safe to consume after this date, and if they have received written authorization from the manufacturer confirming this.

61. 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 for food donations

Legislation that exempts organizations that donate, store, transport, and deliver donated food from criminal or civil liability for any damage caused, if they act in accordance with the law and are not negligent.

 **United States** - The Bill Emerson Good Samaritan Food Donation Act (1996) <sup>62</sup>

- Federal protection from civil and criminal liability for food donors and non-profit organizations that distribute donated food, subject to certain conditions (that the food was donated in good faith to an organization that distributes food to needy people, at no charge, and meets safety standards).
- Some states grant broader protections for more kinds of donations: Arizona, California, Massachusetts, Minnesota, Nevada, New Hampshire, New Mexico, Vermont, Rhode Island and Tennessee protect direct donations to people experiencing food insecurity; Alaska, Arizona, Hawaii, Kentucky, Maine, Massachusetts, New Hampshire, New Jersey, Ohio, Rhode Island and Tennessee explicitly allow post-date donations.
- In 2021, an amendment was submitted to both the Senate and the House of Representatives, which would expand the feasibility of food donations across the US. The amendment would allow direct donations to individuals, e.g., from grocery stores, school cafeterias, etc. but is yet to be approved.

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

 **Israel** - Food Encouragement Donation Act 5779-2018

The law encourages the rescue of surplus food by exempting those who donate food to organizations that transport, store or distribute donated food from civil or criminal liability for damages caused as a result of the food donation, if they comply with food safety standards and are not negligent.

### 3. Expiration Dates

**In order to reduce confusion about the meaning of date labels affixed to food products—and ensure safe, edible food that is past its expiration date is donated rather than discarded—best practice policy includes complimentary use of three policy tools:**

- Regulations that define two options for date labels on food products: one based on food safety (“use by”) and one based on food quality (“best by”). Only in rare instances when consuming food after a specific period becomes dangerous as the food poses a safety hazard would the first label be used. Otherwise, the food would have a quality-based label.
- Legislation that explicitly allows donating food after the quality-based date has passed, although not for safety-based dates.
- Launch a campaign to educate consumers about the meaning of date labels in order to prevent confusion regarding expiration dates and reduce needless food waste.

 **Great Britain - “Label better, less waste”<sup>63</sup>**

- In accordance with recommendations from the UN Codex Alimentarius, Great Britain adopted a policy that divides foods into two groups and defines a safety-based label (“use by”) or quality based (“best before”) for each product<sup>64</sup>.
- This policy explicitly forbids sale or donation of food after a safety date (“use by”) but explicitly permits sale or donation of food after a quality date (“best before”).
- The British government, in cooperation with the organization WRAP<sup>65</sup>, has launched several campaigns to educate the public about strategies for reducing food waste, including the significance of product dates.

- Section 162 of the same law discusses the feasibility of NPOs distributing food that has passed its expiration date.
- In 2017, the standard for labeling packaged food in Israel was re-examined. The Ministries of Environmental Protection and Economy proposed updates to the language, in order to reduce food waste and raise public awareness of the different labels. The updates included the comparison of products currently exempt from being labeled with an expiration date to those exempt by the European Directive, as well as the consideration of expiration dates consisting of only a month and a year, or even just a year, depending on the safety of consuming the product after its expiration date, and finally the promotion of a public information campaign explaining the labels and their use. Some of the proposed updates were approved, but in practice, a manufacturer can mark a full expiration date on any product and there has been no change in customary labels.

63. Labelling guidance - Best practice on food date labelling and storage advice, wrap, Food Standard Agency, Department for Environment Food & Rural Affairs, 2019  
 64. From product design and development through sale/distribution.  
 65. Water and Resources Action Programme.

 **Expiration Dates in Israel**

- There are two types of expiry dates in use, “use by” and “best before” that relate to food safety and food quality, respectively.
- The law states that food may not be sold/donated after its expiration date (regardless of whether it is marked by a safety or quality date).
- However, section 12 of the Public Health Protection Law permits using food after this date, in certain situations.



**4. Tax Incentives**

- Tax incentives create an economically competitive alternative to discarding edible food.
- An exemption from Value Added Tax on food donated to food banks as a way for removing potential obstacles.

 **United States - Internal Revenue Code<sup>66</sup>**

- Tax incentives for businesses in order to encourage the donation of surplus food.
- The law permits double tax credits for food donations:
  1. General tax deduction equal to the cost of acquiring the food<sup>67</sup>;
  2. Increased tax deduction as an additional incentive, allows the food donor to deduct either (a) twice the cost of purchasing the food that was donated or (b) the cost of the

food that was donated plus half of the profit expected from selling the food if it had been sold at fair market value. This deduction can reach twice the general deduction, with a business being entitled to deduct up to 15% of its taxable income for food donations<sup>68</sup>.

 **Israel**

The Income Tax Ordinance states that the donation of food with a value above NIS 190 is entitled to an income tax credit for 35% of the value of the donation.

66. 26 U.S. Code § 170 - Charitable, etc., contributions and gifts, Legal Information Institute  
 67. 26 CFR § 1.170A-1 - Charitable, etc., contributions and gifts; allowance of deduction, Legal Information Institute

68. 26 CFR § 1.170A-4A - Special rule for the deduction of certain charitable contributions of inventory and other property, U.S. Government Information



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



## 5. Obligation to donate surplus food

Requiring food suppliers to engage with an NPO for the distribution of unsold food that is suitable for human consumption.



### France - Legislation to prevent food waste

- The Combating Food waste Law 2016<sup>69</sup> requires large supermarket chains (stores with an area in excess of 400 square meters) to donate surplus food to food banks rather than discarding or destroying it. Chains that violate the law are liable to a fine ranging from €3750 to €75,000.
- There was an increase of 20% in food donations from supermarket chains following the enactment of this law<sup>70</sup>.
- The Egalim Law<sup>71</sup> enacted in 2019 expanded the obligation to large catering establishments (those serving more than 3000 meals/day), food manufacturers and large wholesalers (those with a turnover of more than €50 million).



### In Israel

Food suppliers are not required to engage with an NPO for redistribution of unsold food suitable for human consumption.



## 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.



### United States - Legislation to prohibit large waste producers from sending organic waste to landfill.

- In California, Connecticut, Massachusetts, Rhode Island and Vermont there are laws that ban disposing of food waste in landfill.
- In 2012, Vermont enacted a Universal Recycling Law<sup>72</sup> that prohibits disposing of food waste in landfill. The law called for gradual implementation, concluding with complete implementation by 2020, for both businesses and residents. According to the Vermont Food Bank, this law led to an increase in food donations worth approximately \$40 million.
- In Massachusetts, businesses that create more than one ton of food waste/ per week are forbidden to dispose of food waste in landfill<sup>73</sup>. Research conducted in 2016 found that this ban yielded economic activity worth \$175 million and created more than 900 jobs with companies transporting food, rehabilitation organizations and other employers.

72. VERMONT'S UNIVERSAL RECYCLING LAW

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

69. LOI n° 2016-138 du 11 février 2016 relative à la lutte contre le gaspillage alimentaire (1), REPUBLIQUE FRANCAISE

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

71. LOI n° 2018-938 du 30 octobre 2018 pour l'équilibre des relations commerciales dans le secteur agricole et alimentaire et une alimentation saine, durable et accessible à tous (1), REPUBLIQUE FRANCAISE



### In Israel

No prohibition on disposing of organic waste in landfill.



### Scotland - Incremental fee on disposal of organic waste<sup>74</sup>.

- Establishes two tariffs for disposing of waste in landfill: the standard fee is currently £98.6/ton; and a lower rate of £3.15/ton for waste that is less likely to produce greenhouse gases and pollution (containing a low percentage of organic matter, not recyclable and not including hazardous substances, etc.).
- The graduated fee is intended to decrease the amount of food disposed of in landfill according to the hierarchy of food usage.



### In Israel

- There has been a fee for landfill disposal of waste since 2007<sup>75</sup>. Provisions of this law require that landfill operators pay for each ton of waste sent to landfill. The price of landfill disposal<sup>76</sup> in Israel is lower than both - the world average, and relative to other treatment types. The disposal fee in Israel applies to all types of waste and there is no incentive for not disposing of organic waste in landfills.
- There is a voluntary mechanism that permits municipalities and local authorities to charge businesses a specific fee for collecting surplus commercial waste<sup>77</sup>. Criteria for the fee collection and amount is still not regulated.

74. Scottish Landfill Tax, Scottish Government.

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

76. NIS 111.34/ton as of January 2022

77. Based on the principle that the polluter pays, according to uniform criteria for "excess waste" as defined by the Ministry of the Interior.



## 7. Government grants and incentives

Grants and incentive programs funded at the national or local level offer an important resource for food donation initiatives.



### United States

- 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.
- Several individual states also allocate funds to purchasing food for emergencies.



### In Israel

The 2022 Food Security Initiative included recognizing food rescue as an alternative to purchasing. The text of the tender defines "rescued food" as edible food with nutritional and health value that is saved from destruction, including agricultural produce that remains unpicked in the field or unsold in markets and shops, as well as agricultural produce that has aesthetic flaws or is misshapen.

## 8. National goals for reducing food waste

Setting a national goal for reducing food loss by 50% by 2030 in accordance with the UN's SDG.

The United States, Canada, most European countries and Australia have declared a goal of reducing food loss by 50% by 2030.

### In Israel

Israel adopted the UN Sustainability goals, including a target for reducing food waste, in 2015.

An official national goal for food loss reduction has not been established.



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

## 9. National strategy for food loss reduction

Adopting a comprehensive national framework for reducing food loss and waste along the entire supply chain. The strategy would dictate a clear and comprehensive national policy for the purpose of reducing food waste as well as promoting and encouraging food rescue. It could include many of the policy tools discussed above.

- The supportive policy focuses on four areas:
  1. Creating a national baseline for food loss and a methodology for measuring its reduction;
  2. Identifying relevant fields for focused investment;
  3. Promoting voluntary commitments to reduce food loss;
  4. Promoting legislation supporting food loss and food rescue.
- To date, progress towards these goals is yet to be measured.

### Australia - National Food Loss Strategy 2017<sup>78</sup>

- Set a goal of reducing food loss by 50% by 2030
- In order to do this, a comprehensive feasibility study on halving food loss by 2030 was conducted. This research found that the goal could be accomplished in seven years, if the following conditions are met:
  1. Significant investment in innovation
  2. Offering incentives
  3. Adopting strict regulation
  4. Promoting voluntary commitments to reduce food loss
  5. Involvement of the food industry and civil society
- Accordingly, the National Food Loss Strategy was written and published by the Australian Department of Agriculture Water and Energy (DAWE) focusing on four areas: promoting supportive policy, improving performance in the private sector, market development and behavioral change.

### In Israel

Israel has yet to develop comprehensive national strategy for reducing food loss. However, in October 2021, the government approved a 100-Step Climate Action Plan, which includes a chapter dealing with food systems.

The Waste Management Policy published by the Ministry of Environmental Protection in January 2021 includes sections related to reducing food loss at the early stages of production, as well as food waste occurring at later stages of production and distribution. The Ministry of Environmental Protection is currently developing a plan for implementing this strategy.

78. NATIONAL FOOD WASTE STRATEGY HALVING AUSTRALIA'S FOOD WASTE BY 2030, Australian Government, 2017

### Financial tools have the widest influence on reducing food loss and waste

Among the countries surveyed, it was found that 89% regulate the expiration dates printed on food products; 78% offer tax incentives for food donations and have a national food loss and waste reduction strategy; 72% have established a food loss reduction goal for 2030; 67% require that businesses donate food and/or tax discarding food waste; 61% offer government grants for food donations; 56% offer government grants for food donations; 56% of the countries have food

safety procedures for donations and 44% offer protection from legal liability for food donations. By implementing varied policy tools for reducing food loss and waste, Great Britain has reported a 27% decrease in food loss per capita (after the agricultural stage) from 2007 (the baseline year) to 2018. By 2019, Holland had recorded a 29% reduction of food waste in the consumer stage, compared to 2010. The European Commission is expected to publish interim reports for all European nations later this year.

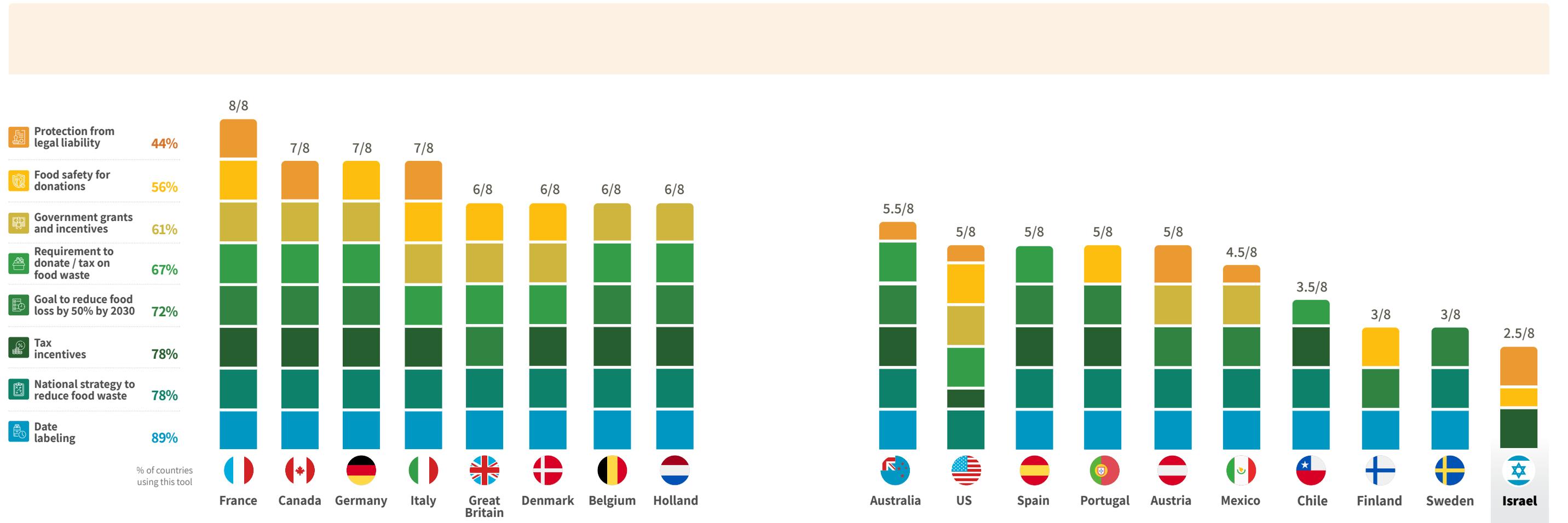
A study conducted in 2020 by Wageningen Food & Biobased Research, which was commissioned by the Dutch Ministry of Agriculture, Nature and

### The lack of an expedient government policy to encourage the reduction of food waste and increase food rescue means that Israel remains far from realizing its potential to reduce inequality and food insecurity

Food Quality, examines the influence of national regulatory measures in Europe on the reduction of food loss. The researchers found that among the policy tools surveyed above, financial tools have the widest influence on reducing food loss and

waste. Taxation for landfill disposal of organic loss has the greatest impact, followed by an exemption from Value Added Tax on food donations to food banks, as a means for removing obstacles to potential donations.

Although the issue of food loss and waste has received attention in Israel during recent years with the enactment of the Food Donation Law in 2018, the lack of an expedient government policy to encourage the reduction of food waste and increase food rescue means that Israel remains far from realizing its potential to reduce inequality and food insecurity among its population.



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

## Developments in Israel: Government Action on Food Waste and Loss

Israel, as previously mentioned, remains far from realizing its potential for reducing food waste and increasing food rescue, because it lacks an expedient government policy that encourages this. Despite this lack of official government policy, several ministries are working on this issue in their respective fields of responsibility.

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

### Major steps taken by the Ministry in the last two years:

- In October 2021, the government approved a 100-Step Climate Action Plan, which includes a chapter dealing with food systems.
- In accordance with this plan, for the last year, the Ministry has led an Inter-Ministerial Committee on Preparing Food Systems for Climate Change. The committee includes representatives from the Ministries of Agriculture and Rural Development, Health, Intelligence, and Education, as well as the Institute for National Security Studies (INSS). The committee's objective is to develop targets and a medium-range action plan (through to 2030) to prepare food systems in the State of Israel for climate change, incorporating measures for both adaptation and mitigation, i.e., reducing GHG emissions. The committee's work is being done by subject-oriented working groups, including one focused on reducing food waste.
- The Ministry led the State of Israel's preparations for the UN Food Systems Summit in September 2021. The purpose of the summit was to advance sustainable, healthy, egalitarian food systems, in accordance with the UN's Sustainable Development Goals. In relation to this, the Ministry conducted wide-ranging dialogue with other government ministries, civil society organizations, academia, farmers, and

other key actors in the food industry.

- The Waste Management Policy published by the Ministry of Environmental Protection in January 2021 includes sections related to reducing food loss at the early stages of production, as well as food waste occurring at later stages of production and distribution.
- In November 2020, the Ministry began publishing, together with Leket Israel, the Food Waste and Rescue in Israel Report, which includes a chapter on the environmental impact.

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

Under the initiative, benefit cards worth NIS 500 were distributed to approximately 11,000 families suffering from severe food insecurity. The pilot program was launched in February 2017 in 36 municipalities around the country, at a total cost of approximately NIS 65 million annually. Families accepted into the program, were issued a monthly card loaded with NIS 500, by the Ministry of Welfare and Social Affairs via Eshel Jerusalem-Colel Chabad. The card could be used for purchasing food products worth NIS 250 (not including tobacco and alcohol) in select supermarkets and local stores. The remaining NIS 250 was for buying rescued vegetables, fruit, and dry foods, which were delivered to the families' homes (NIS 180 for fruit and vegetables and NIS 70 for dry foods).

**In May 2021**, a new tender for operating the National Food Security Initiative was issued, after several changes were introduced. The number of people participating in the initiative increased to approximately 26,000 families, who now receive a benefit card worth NIS 350, and a home delivery of fruits and vegetables worth NIS 150.



Picking surplus produce in the fields. Credit: Leket Israel.



# 12.

## **Policy tools for Reducing Food Waste Around the World and in Israel**



## 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 tools for Reducing Food Waste Around the World and in Israel

The 2021 National Food Waste and Rescue Report, similar to preceding reports, demonstrates the significant economic, social, and environmental benefits of food rescue. The comparative review of recommended policies and best practices used to reduce food loss and waste internationally highlights the need to use food rescue as a national policy tool.

**Setting a national goal will place the issue on the national agenda, and will create a commitment to act towards this objective.**

- **Economically:** This is a clear case of market failure. At market prices, rescuing food is not economically viable. However, when taking into account the true value and nutritional benefits, food rescue becomes highly worthwhile.
- **Socially:** Rescuing food and donating it to those in need would reduce inequality and increase the food security of the country's residents.
- **Environmentally:** This effort would save energy, water, land, and chemical resources, and would reduce greenhouse gas and air pollutant emissions as well as the amount of waste sent to landfill.

Other benefits of food rescue, relating to the areas of health and politics were not covered in

this report. However, it is important to note that dealing with food today is done within the context of food security and the need to feed the world's inhabitants. This considers population growth as well as political, environmental, and health crises that plague the globe and have a direct impact on its food reserves. Therefore, it is no longer possible to ignore the issue and the following policy tools, which are used in several countries around the world to encourage the reduction of food waste and to promote food rescue should be implemented.



### Recommended Policy Tools to Reduce Food Waste and Reduce Food Waste

## 1 Set a National Goal

The goal should be to reduce food loss and waste by 50% by the year 2030, in accordance with principles laid out by the UN.

Setting a national goal will place the issue on the national agenda, and more importantly, will create a government commitment to act towards this objective.

In addition to setting a goal, it is necessary to establish measurement & monitoring tools to facilitate ongoing review of compliance with the goal.

## 2 Develop a National Plan for Food Waste

The plan should address food loss and rescue at all stages of the value chain and include the necessary operational, budgetary, and regulatory conditions and incentives for gradually achieving the national food loss and waste reduction and rescue goal. Implementing the plan would require significant involvement of government ministries and it should be coordinated by the Prime Minister's Office or the Council for Food Security. For example:

**The Ministry of Environmental Protection** would examine, among other things, policy tools for reducing food waste and promoting food rescue as a means for meeting emission targets in industry and agriculture. Tools could include paying for commercial waste, or a mechanism for pricing carbon created by landfilling etc., in accordance with the Ministry's reduction policy.

The Ministry of Agriculture would review an incentive and reimbursement policy for compensating farmers and growers who donate food instead of destroying it.

**The Ministry of Economy** would review an incentive and reimbursement policy for compensating manufacturers who donate healthy food instead of destroying it. In addition, they would examine ways to introduce dynamic pricing in supermarket chains, in order to reduce the loss of food as its expiration date approaches. Furthermore, new regulations regarding expiration dates are necessary.

**The Ministry of Welfare and Social Security** would examine the possibility of financially supporting food waste reduction and food rescue projects and activities. These types of projects would enable the Ministry to support broader sections of the population experiencing food insecurity without having to allocate additional budgets.

**The Ministry of Justice** would look into the development of legal instruments to support government ministries involved in supporting food rescue, preventing food from being destroyed and reducing food loss and waste at the source. Legal

instruments could include legislating laws that encourage/oblige public bodies and large economic enterprises to donate surpluses, creating shelf-life extension protocols, and dynamic pricing, etc.

**The Ministry of Education** (in cooperation with the Ministry of Environmental Protection) would introduce educational tools and programs, beginning in preschool, that encourages healthy, sustainable nutrition, the prevention of food loss and the encouragement of food rescue, whilst teaching students about the environment and sustainable practices, emphasizing the importance of correct nutrition and food rescue.

**The Procurement Administration** would examine the possibility of obligating private entities participating in government tenders for providing services to the state, that have rescuable food sources (not only in the food industry), to engage with recognized food rescue NPOs as a prerequisite for entering the contract. Likewise, the possibility should be examined (together with the Government Companies Authority) of obligating state-funded bodies that operate a kitchen feeding over 1,000 people a day (either directly or through a subcontractor) to engage with a recognized food rescue NPO as a condition for receiving a budget from the government (including security services, school catering operations, government companies, etc.).

## 3 Reevaluate Expiration Dates

- Enact regulations that establish only two types of labels for food products: those based on food safety and those based on food quality. The regulations will state that consuming food with a safety-based date after the date appearing on the label might be dangerous but that it would not be dangerous in the case of food with a quality-based label.
- Promote legislation that allows selling and donating food after the date on quality-based labels, as per the British model.
- Launch a campaign to educate consumers to prevent confusion regarding expiration dates.

## 4 Tax Benefits

Promote increasing the tax credit for food donations, as an incentive to encourage manufacturers, marketers, importers, and others working in the food industry, and growers of agricultural produce and animal-based food products to donate food, including surplus food, and to engage with NPOs that distribute food at no charge to the population experiencing food insecurity.

## 5 Mandatory Food Donations

- Promote legislation requiring the donation of surplus food.
- The legislation must mandate a requirement for all manufacturers, suppliers, and marketers of food, including institutional caterers, to donate unsold food that is fit for human consumption, or alternately donate it for animal feed or to a related industry to reduce food waste.
- The legislation will regulate the transfer of surplus food to its destination.

## 6 Examine a Ban on Transferring Organic Waste to Landfill

Similar to the practice in some US states, we recommend forbidding manufacturers from sending more than a certain amount of organic waste to landfill each month, and when this limit is reached, they are required to find another solution – that could be composting, anaerobic digestion, or donation, for the remainder. This would require establishing criteria to determine which businesses and organizations are covered by this prohibition and the threshold above which the prohibition will apply.

Alternately, **examine payment for commercial waste** - A voluntary mechanism currently allows local authorities to charge businesses a special fee for the collection of commercial waste. This mechanism should be made binding on all Israeli municipalities. To this end, criteria must be established for determining the payment charged to all businesses for commercial waste collection. The amount should be set at a level that creates an economic incentive to reduce disposal in general, and food waste from industry, retailers, restaurants, hotels and banquet halls in particular. Any business that is responsible for creating organic waste will be required to bear the cost of its treatment. The payment will create an incentive for the food industry, food distributors, and caterers to donate the food rather than discard it.

## 7 Multi-year ongoing governmental support for efforts to reduce food waste and encourage food rescue

Allocate a budget for ongoing efforts and initiatives for reducing food waste and encouraging food rescue.

Allocate funding for food rescue and food security as part of the economic preparation for emergencies, crises, and pandemics.



Harvesting surplus agricultural produce. Credit: Leket.