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**Food Waste and Rescue in Israel 2018**

**Prepared for Leket Israel**

By BDO Ziv Haft

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Prepared by Chen Herzog, Matan Neheissi, Esther Azoulay, Nofar Vallach-Lazarsko, January 2019

# Uniqueness of Food Consumption and Production in Israel

Bold chapter head: **In Israel, food accounts for 17% of a household’s total expenses**

Expenditures for food represent approximately 17% of the average household’s consumption basket in Israel. In the lowest two percentiles of the population, expenditures for food amount to 20% of their total consumption. However, food is far more than a significant component of a family’s total consumption; food consumption is a basic human need and maintaining a balanced diet is essential to ensuring the health of the population as a whole, and for the physical and cognitive development of infants and children in particular. Therefore, a shortage of food, or insufficient consumption of basic nutritional components, can cause potential health issues with a cost exceeding the food’s market value, representing the cost of its production at all stages of the value chain.

In addition to the high cost of living in Israel which is among the highest in the developed world, the poverty rate is also quite high. As a result, food insecurity is a particularly severe problem in Israel. A 2018 report issued by the National Insurance Institute found that 17.8% of Israeli households are experiencing food insecurity, meaning that approximately 450,000 households in Israel are experiencing this. From an economic perspective, this indicates that a household spends approximately 30% less on food than the normative expenditure.

Food is a unique commodity, not only in terms of its consumption characteristics, but also in terms of its production properties. The nutritional components found in food are derived almost entirely from agricultural products: vegetables, fruits, legumes, dairy products, eggs, meat, fish, oils, etc. Concurrently, agricultural production has an inherently high level of uncertainty resulting from external factors including pests, weather, and disease.

The cultivation and production of food requires the utilization of natural resources that are relatively scarce or which have substantial economic costs such as land and water. In an arid country like Israel, water is an expensive and limited resource. Furthermore, Israel is a relatively densely populated country, meaning that land is also expensive and scarce, especially in high demand areas. As a result, housing insecurity is a challenge that parallels food insecurity. Therefore, the need to use land for surplus agricultural production that is later lost or wasted incurs additional social costs, beyond the direct economic costs.

The cultivation and production of food also has a significant environmental impact. The use of land, fertilizers and pesticides may pollute water sources, wildlife, plants, and the environment. Currently, 20% of GHG emissions in the world are generated during the various stages of food cultivation, production, and distribution. Moreover, the collection of food waste and its disposal in landfills carries added environmental costs.

This report examines the issue of food waste and the economic viability of its rescue, based on quantifiable estimates and assessments, and includes updated data and methodological improvements, based on the experience accumulated while preparing the previous three reports. Furthermore, this year’s report includes an expanded section on food waste occurring in the household sector.

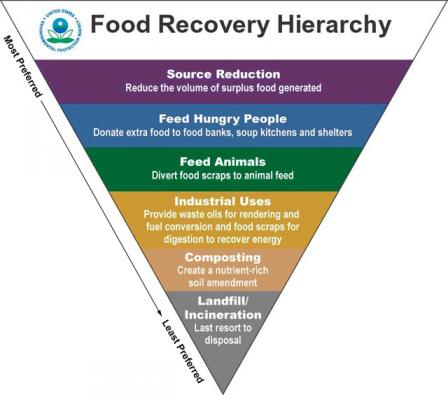
# Food Rescue: Integrating Economic, Environmental, and Social Contributions

Bold chapter head: **33% of all the food produced in the world goes to waste. ‘Food rescue’ is the economic endeavor of transforming food surplus, currently of zero or negative value, into food ‎with economic value and distributing it to the underprivileged populace. ‎**

According to estimates by the Food and Agriculture Organization of the United Nations (FAO), approximately one-third of all food produced worldwide, in quantitative terms, is wasted. This is equivalent to approximately one-quarter of the total caloric value. Food waste is an international phenomenon; it is not unique to the Israeli economy and exists on a similar scale in all Western economies.

The Food Recovery Hierarchy set out in the EU's Food Treatment Directive sets priorities for the treatment of food that is not consumed. This hierarchy gives clear priority to the prevention of food waste and the repurposing of unconsumed food for use by underprivileged populations.

The Economic-Environmental Hierarchy of Food Recovery



Source: EPA

Many policy measures exist to address the needs of underprivileged populations, and to help alleviate the problem of food insecurity. The most commonly used methods in Israel include donations, subsidies, allocations and allowances. The uniqueness of food rescue stems from its ability to help those in need at a low budgetary and economic cost. Instead of financing the full cost of food purchases, it is only necessary to finance the cost of its rescue.

In socioeconomic discourse, there is a prevailing disagreement, both in Israel and abroad, between proponents of prioritizing growth (“increasing the pie”) and proponents of prioritizing reduction of inequality.

Food rescue is unique because it is a policy tool that inherently integrates both approaches. **Rescuing food and transferring it to underprivileged populations for their consumption both increases the productivity of the economy and simultaneously reduces inequality.**

Food rescue is an economic action that transforms such surplus, with zero or negative value, into food with a positive economic value that is then distributed to the underprivileged populace.

The importance of rescuing food stems from three central advantages:

1. **Economic benefit** – Rescuing food transforms zero or negative value waste to an economically valuable commodity, thus increasing the gross national product and productivity;
2. **Social benefit** – The rescue and provision of surplus food to those in need reduces social gaps and prevents food insecurity in weaker, underprivileged populations;
3. **Environmental benefit** – Waste reduction reduces pollutant levels, GHG emissions, and use of finite land and water resources.

The combination of these three characteristics of food rescue creates a unique opportunity ‎that requires the formation of an appropriate policy to reflect such benefits.‎

Food waste is not a phenomenon unique to the Israeli economy, and is evident in similar volumes in comparable developed economies. However, unlike many other countries that have developed legislation, national policies and multi-year targets to encourage food rescue and decrease food waste, Israel still lacks a national policy regarding these issues.

Despite this, some initial steps have been taken in Israel in recent years, in terms of both regulation and incentives. In October 2018, the Knesset passed the Food Donation Act that absolves the donation chain ‎from civil or criminal liability as long as they act in accordance with law. Moreover, in the last two years, the State has budgeted two joint initiatives in which the Ministries of Welfare and Agriculture partner with Leket Israel. [More details on the government initiatives may be found in Chapter 11.]

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

Bold chapter head: **2.5 million tons of food is wasted in Israel annually**

Food waste estimates in Israel are based on a unique model of the value chain for domestic food production.[[1]](#footnote-1) Estimated at approximately 2.5 million tons, food waste in Israel constitutes 35% of overall domestic food production. This year, Israeli agriculture recorded a 2.4% decrease in production compared to the previous year, when there was a 2.3% increase in production.

Findings of the 2018 National Food Waste and Rescue Report indicate an increase in food waste, compared to the findings in the previous report. This was the combined result of an increase in imports, partially offset by the decrease in Israeli agricultural production, and updated data concerning food waste in the household sector, which underwent evaluation for the first time this year.

Food Waste in Israel

Monthly Value (NIS) of Food Waste per Household in Israel

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Waste/household (monthly NIS) | Agriculture | Processing & Packaging | Industry | Retail & Distribution | Institution consumption | Household consumption | Total |
| Fruit & Vegetables | ‎60‎ | ‎22‎ | ‎2‎ | ‎70‎ | ‏44‏ | ‎120‎ | ‎318‎ |
| Grains & Legumes | ‎2‎ | ‎1‎ | ‏2‏ | ‎21‎ | ‏44‏ | ‎84‎ | ‎153‎ |
| Meat, Fish & Eggs | ‎10‎ | ‎2‎ | ‎13‎ | ‎47‎ | ‏36‏ | ‎42‎ | ‎147‎ |
| Milk & Dairy | ‎4‎ | ‎1‎ | ‎1‎ | ‎5‎ | ‏6‏ | ‎21‎ | ‎17‎ |
| Total | **‎76‎** | **‎25‎** | **‎18‎** | **‎142‎** | **‏127‏** | **‎265‎** | ‎**656**‎ |

**Blue:** Food waste, up to and including the industrial stage **Orange:** Food waste during distribution and consumption

Food waste, up to and including the industrial stage: NIS 3.6 billion

Food waste during distribution and consumption: NIS 16.1 billion

Food waste out of GNP: 1.5%

Source: BDO estimates

Food Value Chain in Israel and Percentage of Food Waste at All Stages of the Value Chain   
(1000 tons)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Fruits & vegetables | Grains & legumes | Meat, eggs & fish | Milk & dairy | Total |
| Agricultural production, quantity | ‎4,151‎ | ‎418‎ | ‎738‎ | ‎1,670‎ | ‎6,978‎ |
| Waste during agricultural production | ‎518‎ | ‎23‎ | ‎31‎ | ‎58‎ | ‎631‎ |
| Percent wasted | ‎12%‎ | ‎6%‎ | ‎4%‎ | ‎4%‎ | ‎9%‎ |
| Quantity after harvesting and storage | ‎3,633‎ | ‎395‎ | ‎707‎ | ‎1,612‎ | ‎6,347‎ |
| Waste after harvesting and storage | ‎185‎ | ‎13‎ | ‎5‎ | ‎8‎ | ‎211‎ |
| Percent wasted | ‎5%‎ | ‎3%‎ | ‎1%‎ | ‎1%‎ | ‎3%‎ |
| Industrial usage | ‎645‎ | ‎379‎ | ‎593‎ | ‎1,567‎ | ‎3,184‎ |
| Lost during industrial usage | ‎20‎ | ‏19‏ | ‎30‎ | ‎19‎ | ‎88‎ |
| Percent wasted | ‎3%‎ | ‏5‏‎%‎ | ‎5%‎ | ‎1%‎ | ‎3%‎ |
| Net imports, minus other uses | ‎1‎ | ‎1,062‎ | ‎111‎ | ‎93‎ | ‎1,267‎ |
| Distribution and retail | ‎3,429‎ | ‎1425‎ | ‎783‎ | ‎1,678‎ | ‎7,315‎ |
| Waste during distribution | ‎313‎ | ‎43‎ | ‎37‎ | ‎28‎ | ‎421‎ |
| Percent wasted | ‎9%‎ | ‎3%‎ | ‎5%‎ | ‎2%‎ | ‎6%‎ |
| Consumption | ‎3,117‎ | ‎1,382‎ | ‎746‎ | ‎1,650‎ | ‎6,894‎ |
| Waste during consumption | ‎639‎ | ‎282‎ | ‎90‎ | ‎99‎ | ‏1,110‏ |
| Percent wasted | ‎20%‎ | ‎20%‎ | ‎12%‎ | ‎6%‎ | ‏16‏‎%‎ |
| Total waste | ‎1,675‎ | ‎381‎ | ‎193‎ | ‎213‎ | ‎2,461‎ |
| Percent wasted, out of agriculture production | ‎40%‎ | ‎91%‎ | ‎26%‎ | ‎13%‎ | ‎35%‎ |

Source: BDO estimates. Percentages of waste are rounded to the nearest percentile to facilitate presentation.

In monetary terms, some 18% of the value of food waste, worth approximately NIS 3.6 billion, occurs during the various stages of production, representing approximately 13% of the value of agricultural production in Israel. Nearly 82% of the waste, worth approximately NIS 16.1 billion, occurs during distribution and consumption.

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 includes analysis of data relevant to agricultural production, import, export, industry, distribution, and a sample of consumption patterns of 50 types of food.[[2]](#footnote-2) Processed produce included in the data is translated into terms of fresh produce.

For each type of food, the volume of input and output was measured in terms of gross agricultural product and loss rate for every stage of the value chain in the food production, distribution and consumption process. The loss assessment is based, in part, on agricultural waste surveys which were conducted and updated by the Volcani Center.[[3]](#footnote-3) The estimated total loss of food for the economy as a whole, and for each type of food, is based on the total loss for each product and stage.

One of the major challenges of analyzing food waste and the potential for food rescue in Israel is the lack of any data-gathering mechanisms, or monitoring of relevant data. This absence of data was discussed extensively in the 2015 State Comptroller's Report. The data regarding food waste presented in this report is based on estimates, weighing a wide range of information sources and statistics available, including conversations and interviews with experts in the field, study findings and results from previous reviews, international comparative studies and more.

Food Waste Estimate in Israel (Thousands of Tons)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Waste  (1000 Tons) | Agriculture | Processing & Packaging | Industry[[4]](#footnote-4) | Distribution | Consumption | Total |
| Fruit & Vegetables | ‎518‎ | ‎185‎ | ‎20‎ | ‎313‎ | ‎639‎ | ‎1,675‎ |
| Grains & Legumes | ‎23‎ | ‎13‎ | ‏19‏ | ‎43‎ | ‎282‎ | ‎381‎ |
| Meat, Fish & Eggs | ‎31‎ | ‎5‎ | ‎30‎ | ‎37‎ | ‎90‎ | ‎193‎ |
| Milk & Dairy | ‎58‎ | ‎8‎ | ‎19‎ | ‎28‎ | ‎99‎ | ‎213‎ |
| Total | **‎631‎** | **‎211‎** | **‏88‏** | **‎421‎** | **‏1,110‏** | **‎2,461‎** |

Source: BDO estimates

There is great variance in the volume of food waste among the different foods types reviewed, as well as in each stage of the value chain in which the waste occurs. The value of agricultural produce per ton increases as it progresses along the value chain of production and as additional inputs are invested—including those required by sorting, processing, transport and distribution. Assessment of the value of waste in the early stages of production (growing, packaging and manufacturing) is based on the wholesale prices paid to farmers. Waste during the later stages in the value chain is estimated based on retail food prices.

**The economic value of food waste in Israel is estimated at approximately NIS 19.7 billion, constituting 1.5% of domestic production**.

Estimated Percentage of Food Waste in Israel, by sector

Source: BDO estimates

**Captions for graph**, from left to right:Percentage of waste (vertical); Waste during agricultural production; Waste after harvest and storage; Waste during manufacture and packaging; Waste during distribution; Waste during consumption

Food waste is ordinarily divided into two stages of the food value chain:

1. From agricultural production to final stage of industrial food processing (food waste in production).
2. From retailing and distribution to final loss at the consumer level (food waste in consumption).

|  |  |
| --- | --- |
| Food waste (value) | **NIS 19.7 billion** |
| Food waste, out of GNP | **1.5%** |
| Food waste up to and including the industrial stage | **NIS 3.6 billion** |
| Food waste prior to the industrial stage, from total agricultural production (%) | **13%** |
| Food waste in the retail and distribution stages, up to consumption | **NIS 16.1 billion** |
| Waste from the retails and distribution stage, from the value of food consumed | **21%** |

Source: BDO estimates

The large share of waste from fruits and vegetables in Israel stems both from their large share in domestic agricultural production, and from the high rate of waste (35%) during the value stages. The high rate of waste for fruits and vegetables is not exclusive to the Israeli economy. Compared to international data, Israel’s rate of waste in this category is similar to that in Europe. Compared to the US, the rate of loss is even lower, but is composed of a lower rate of loss during the agricultural production and consumption stages, and greater waste in the intermediary stages.

Total food waste in all value chain stages translates to a loss of approximately NIS 650 per month per household in Israel, equivalent to wasting approximately 70 kg of food per month per household. Quantitatively speaking, approximately 55% of this waste is incurred during production, manufacturing and distribution, before the food reaches household or institutional consumers. In monetary terms, roughly 60% is wasted during household or institutional consumption.

# Food Rescue = Alternative to Food Production

Bold chapter head: **Approximately 1.2 million tons of food can be rescued // From an economic perspective food rescue should be considered a viable alternative to additional food production**

During the growth, production, distribution and marketing of food in Israel, approximately 33% of domestically produced food is lost, becoming waste or surplus. Food rescue is an economic act of transforming this surplus food, that would otherwise have zero or negative value, into food that is distributed for the consumption of underprivileged populace

**Economically speaking, food rescue should be viewed as a viable alternative to excess food production**. However, in contrast to the usual food production processes, the raw materials required for food rescue are surpluses that would otherwise be wasted.

Consequently, food rescue produces food without utilizing the resources necessary during production, while also preventing the majority of the detrimental environmental impact attributed to the production process. **Food rescue is a winning formula for producing food without significant reliance on natural resources, land or water pollution, and use of fertilizers or pesticides**.

Food Rescue Benefits

|  |  |  |
| --- | --- | --- |
|  | Food Production | Food Rescue |
| Product | **Fully Nutritional Food** | **Aesthetically Flawed Fully 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 |

**Nearly 50% of wasted food is rescuable, equivalent to 1.2 million tons**.

Currently, the majority of food rescue in Israel and abroad is carried out by NPOs, supported by donations. However, even if funding for food rescue is derived from donations, **such activity is not primarily philanthropic or charitable, but an alternative economic method of food production, one that is clearly beneficial to the national economy, above and beyond its contribution to reducing social inequality.**

According to a study conducted in Australia, the multiplier for the value of rescued food relative to rescue costs is 5.7. In other words, every dollar invested in food rescue enables the recovery of surplus food worth 5.7 dollars. Moreover, food rescue generates additional environmental, social and health benefits.

Based on Leket Israel’s experience, the cost of food rescue is approximately NIS 1.4 for every kilogram of food. The direct value of the food is NIS 5.1 per kilogram, yielding a multiplier effect of 3.6. Therefore, each NIS 1.0 invested by NPOs in food rescue provides NIS 3.6 worth of food for the underprivileged populace. Food rescue in Israel is still in its infancy, so there is enormous potential for expansion, utilizing economies of scale to reduce the cost of food rescue, and/or raise the value of rescued products, which would in time enable the multiplier to increase. However, to be conservative in our estimates, we have based our assessments on the current cost structure.

In terms of benefit to the national economy, it is also necessary to consider the positive environmental and social contributions of food rescue. This report does not estimate these influences in the context of the Israeli economy. However, assuming that these environmental and social benefits are similar to the average costs around the world, the multiplier would increase to 7.2. A calculation that includes environmental benefits would show that every NIS 1.0 invested in food rescue generates NIS 7.2 to the national economy.

Food Rescue Feasibility Assessment

Food Cost / Benefit NIS (per kg. food)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **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 5.1 | Not included | NIS 5.1 | NIS 1.4 | NIS 3.7 | **3.6** |
| Benefit to national economy – including external factors | NIS 5.1 | NIS 5 | NIS 10.1 | NIS 1.4 | NIS 8.7 | **7.2** |

\* Market price of alternative product with similar nutritional value. Source: BDO estimates

# Food Waste in the Household Consumption Sector

Bold chapter heading: $2.2 billion worth of food was wasted by Israeli households in 2018. Each household discards food worth $890 per year on average.

In Israel, expenditures on household food consumption is a central component of each household’s monthly expenses, and averages approximately $555 per month per household (not including alcohol, soft drinks, and meals eaten outside of the home), which is about 17% of a household’s total expenditures.

Findings of the 2018 National Food Waste and Rescue Report indicate that Israeli households wasted approximately 1,940 million pounds of food,[[5]](#footnote-5) worth approximately $2.2 billion. This waste accounts for approximately 13% of the average household expenditure on food. This means that Israeli households discard food valued at $890 each year (equivalent to one-and-a-half months of a household’s food consumption).‎

On a monthly basis, a household’s financial loss from food waste is $75. Of the loss, fruits and vegetables account for $33, grains and legumes $25, and meat, eggs and fish $12 and milk and dairy $5

Household Food Waste, in Dollar per month

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Monthly expenditure for food ($)** | **Monthly food waste ($)** | **% Waste** |
| Fruit & vegetables | 140 | 33 | ‎23%‎ |
| Grains & legumes | 170 | 25 | ‎14%‎ |
| Meat, eggs, & fish | 150 | 12 | ‎8%‎ |
| Milk & dairy products | 90 | 5 | ‎7%‎ |
| Total | **550** | 75 | **‎13%‎** |

Household Food Waste in Israel per year

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Waste  (million $)** | **% Waste** | **Waste  (Million pounds)** |
| Fruit & vegetables | ‎1,000 | ‎23%‎ | ‎1,310 |
| Grains & legumes | ‎695‎ | ‎14%‎ | ‎310 |
| Meat, eggs, & fish | 335 | ‎8%‎ | ‎100 |
| Milk & dairy products | ‎170 | ‎7%‎ | ‎220 |
| Total | ‎2,200‎ | ‎13%‎ | ‎1,940 |

Rate of Household Food Waste for select products

**Column captions**: Vegetables, Fruit, Cooked food, Bread & baked goods, Packaged salads, Meat & poultry, Grains, Milk & dairy, Legumes, Fish & seafood, Eggs

Source: BDO estimates

Bold header: Primary causes of household food waste – Surplus preparation and expired or damaged food

Waste during household food consumption is caused by a combination of consumer habits and a culture of abundance. It is also influenced by how food is stored and kept fresh. The value of the food wasted by households is approximately $2.2 billion per year.

According to findings of the consumer survey,[[6]](#footnote-6) three main factors causing food waste in household consumption are:

**Surplus preparation of food**– Preparing more than is needed, usually excess food that is cooked or prepared unnecessarily and not consumed.

**Expired food** – Food that reaches its expiry date before being fully consumed.

**Damaged or spilled food** – Food that has spoiled due to poor storage, poor cooking or human error.

Other causes of food waste in household consumption are poor preparation or cooking, and excessive purchasing.

**Column captions**: Damaged or spilled food; Expired; Surplus preparation; Excessive purchasing; Poor preparation/cooking

It should be noted that one-third of the survey respondents reported that a clearer presentation of expiration dates on food packages would be the principal factor causing them to reduce food waste. Similarly, 80% of the respondents said that they would prefer to buy food from a store that encourages waste reduction or protection of the environment.

Moreover, the survey findings suggest that there is potential for reducing food waste through increased awareness and planning at each stage of household food consumption; this would start with planning before shopping, and continue with informed purchasing appropriate to one’s household needs, proper storage conditions and packaging at home, preparing and cooking suitable quantities, changing eating habits, and reusing surpluses.

Since there is no way of knowing about the level of food safety and hygiene procedures employed in private homes, most of the surplus food in households, except for that food maintained in its original packaging, cannot be rescued. Moreover, from an economic point of view, it is generally not feasible to rescue surplus food from the household sector in a concentrated manner and transfer it to the needy, due to the due to the inherent characteristics of the food including geographical dispersion and relatively small quantities of surplus that exist in each household. Thus, for purposes of the estimates identified in this report, all household food waste is classified as food that cannot be rescued.

Therefore, reducing food loss in the household‎ consumption sector requires decreasing the amount of waste at the source, by changing habits and awareness as well as improving food storage conditions throughout all stages of household food consumption.

Stages of Household Food Consumption

Planning

Purchasing

Cooking

Packaging & Storage

Handling surpluses

Eating

Bold header: 23% of fruits and vegetables, and 14% of grain products and legumes are discarded by households

Food waste during household consumption is not unique to Israel, and the rates of loss in Israel are not exceptional compared to other developed countries. The highest percentage of waste in Israel, as in other Western countries, is from fruits and vegetables, with 23% of fruits and vegetables purchased in Israel being discarded, compared to 28% in the US and 19% in Europe. The relatively high waste of fruits and vegetables is primarily due to their short shelf-life and a households’ failure to adhere to optimal storage conditions.

International Comparison: Rate of Household Food Waste

Fruits and Vegetables

**Column captions**, from left to right: United States; Israel; Europe; Japan, China & South Korea; ‎North Africa & Western Asia; South America; Southeast Asia; Africa

Grains and Legumes

**Column captions**, from left to right: United States; Europe; Japan, China & South Korea; ‎Israel; North Africa & Western Asia; South America; Southeast Asia; Africa

Meat, Eggs and Fish:

**Column captions**, from left to right: United States; Europe; Israel; ‎Japan, China & South Korea; ‎North Africa & Western Asia; South America; Southeast Asia; Africa

Milk and Dairy Products

**Column captions**, from left to right: United States; Israel; Europe; Japan, China & South Korea; ‎South America; North Africa & Western Asia; Southeast Asia; Africa

The rate of loss for meat, fish and dairy products is lower and stands at approximately 8%, in part because these products are more expensive per unit of weight, which creates a higher economic incentive for reducing the loss. The rate of loss for these products are similar to those in Europe, and lower than those in the US.

For grains and legumes, the rate of loss is approximately 14%. The loss for these products stems from the combined result of the short shelf-life of products like bread and pastries, and the relatively long shelf-life of raw grains and legumes.

Based on an international comparison, the amount of food loss in Israel is no different than what exits in European countries. However, the survey found that the subjective feeling of respondents in Israel is that the amount of waste is higher than Europeans’ average subjective sense of food waste, according to a survey conducted in EU-27 countries. In our estimation, this discrepancy stems from the cost of living since the Israeli consumer places greater weight to the amount of food wasted.

Rate of Food Waste as Estimated by Household Respondents

The rate of households who estimate high loss rates

**Column captions**: Denmark, Israel, Sweden, Netherlands, Ireland, Greece, Finland, Latvia, Belgium, United Kingdom, Luxemburg, Italy, Portugal, Germany, EU-27, France, Romania, Hungary, Austria, Slovenia, Bulgaria, Cyprus, Slovakia, Poland, Lithuania, Spain, Estonia, Czech Republic, Malta.

**Source**: BDO analysis of data from the 2019 Geocartography survey, and research published in Journal of Food Policy Economics, 2015.

Bold headline: Overall effect of food waste on the cost of living: $1,750 per household annually

In Israel, where expenditure on food is relatively high by international standards,[[7]](#footnote-7) food waste contributes to the high cost of living. Food waste impacts the cost of living by leading to excessive expenditures for food while also having an effect on food prices. The overall impact on the cost of living is an additional $1,750 per year per household.

***Cost of Living – Surplus expenditure***: Food purchased and discarded as waste directly influences the cost to a household. On average, the annual loss from discarded food was determined to be $890 per household. The costs of waste collection and landfill disposal ultimately come from consumers’ pockets as well, in the form of municipal property taxes and fees, adding an additional $55 expenditure per household to dispose of food waste .

***Cost of Living – Higher food prices***: In addition to a households’ direct surplus expenditure for food purchased but not consumed, food wasted during all stages of the value chain prior to household consumption influences the cost of living. In economic terms, the cost of food reflects total production and sales costs at all stages of the value chain: growing, production, packaging, transport and marketing. Therefore, the price of food in supermarkets incorporates the value of food waste in the retail sector. Similarly, the price of wholesale food reflects its loss in the agricultural and industrial sectors. Ultimately, the cost of waste at all stages of the value chain is passed on to the consumer, causing an additional annual cost of $805, in the form of an 11% increase in food prices.

Food Waste: Impact on the Cost of Living

|  |  |  |
| --- | --- | --- |
|  | Annual cost per household ($) | Impact on the cost of food |
| Cost of food discarded at home | ‏890 | ‏-‏ |
| Cost of collection and landfill disposal for discarded food | ‏55 | ‏-‏ |
| Increase in the retail price due to food loss in the marketing sector | ‏470 | ‏6%‏ |
| Increase in the wholesale price due to food loss in the production sector | ‏335 | ‏5%‏ |
| Total | ‏1,750 | ‏11%‏ |

Beyond the direct impact on cost of living and cost of disposal to landfills, other external costs are incurred by the public through the transportation of waste, fuel combustion, road congestion, environmental damage caused by emissions of greenhouse gases, and soil contamination. When organic waste is buried in landfills, it decomposes and emits methane gas, a greenhouse gas whose impact on global warming is twenty-five times greater than that of carbon dioxide.

According to findings of the 2018 National Food Waste and Rescue Report, 1,940 million pounds of household food waste in Israel was disposed of in landfills, causing 280,000 additional trips per year by sanitation trucks, thereby increasing air pollution, road congestion, noise and the risk of accidents. Therefore, beyond the $2.2 billion value of household food waste itself and $140 million for its disposal, additional external costs are also incurred due to the effects of traffic congestion and resulting impacts to the environment.

Bold headline: International Experience – Measures to Reduce Household Food Waste

Several countries have begun efforts to reduce household food waste. These efforts are being made on several levels including: increasing consumer awareness of food wastage, education to prevent loss, the use of technology to reduce waste, taxation and more.

In 2013, the British Food Rescue Organization WRAP began the “Love Food Hate Waste” project, a campaign to raise awareness about the importance of reducing food loss and helping people take action on the issue. The project included digital publications and community events, such as cooking classes. As part of the project, a dedicated website was created, containing information to help facilitate the reduction of food waste. By way of example, subjects included the calibration of refrigerators to optimal temperatures, and the importance of preparing a shopping list, etc.

WRAP examined the effects of its activities in west London over a six-month period from October 2012 to March 2013. At the end of the campaign, the quantity of food waste dropped by 14%, from 5.7 pound per household in the week before the campaign, to 4.8 pound per household in the week after the campaign. A cost-benefit analysis of the project revealed that every ₤1.00 invested in the campaign resulted in an ₤8.00 savings from the reduction of food waste.

In Israel, the Postharvest Science of Fresh Produce Department at the Volcani Institute has published guidelines for the preservation of fruits and vegetables for private households.[[8]](#footnote-8)

Technological means provide another path towards reducing food waste. In the Netherlands, research was conducted on optimal temperatures for extending the shelf life of various products. By changing the storage temperatures, researchers were able to significantly extend the shelf life of the products.

An additional way to reduce household waste is through taxation. In many countries, what’s known as the “pay as you throw” method has been employed. Countries currently implementing “pay as you throw” include the US, Canada, Austria, Germany, Spain, Japan and others. Through this method, the fee each household pays to the municipality or waste collection agency depends on the amount of unsorted waste it discards. As a result, the “pay as you throw” method encourages both recycling and reduction in food waste, because food accounts for a significant portion of the volume of household waste.

# Food Waste and Rescue in Institutional Consumption

Bold chapter head: **Nearly 1/3 of waste from institutional consumption is rescuable // Approximately 75,000 tons of food could be saved each year, worth NIS 1.2 billion.**

Approximately 20% of the food consumed in Israel is served in institutional catering operations: meals served at factories, workplaces, security forces (Israel Defense Forces [IDF] bases, police stations, prisons), hotels, catering halls, restaurants, schools, hospitals, etc.[[9]](#footnote-9) This sector, in which many diners eat are gathered in one location, has the greatest potential for food rescue.

According to BDO estimates, on an average day in 2018 approximately 2 million people ate one meal outside of the home, equivalent to 670 million meals annually. Approximately 780,000 tons of food is used to prepare these meals.

The value of food used in meals eaten by consumers outside of their homes is estimated to be NIS 14 billion annually, equivalent to approximately 17% of the total expenditure for food in Israel, and approximately 11% of the food consumed in quantitative terms.

The total food wasted in the institutional sector amounts to 230,000 tons annually, representing 30% of institutional food consumption, at a cost of approximately NIS 3.8 billion annually.

Estimated Food Waste in Institutional Consumption

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Relevant population [[10]](#footnote-10)** | **Meals served (yearly)** | **Food consumed (yearly)** | **Annual waste** | **Rate of waste** | **Rescuable waste** |
|  | *1000 people* | *Million meals* | *1000*  *tons* | *1000*  *tons* | *%* | *1000*  *tons* |
| **Events** |  |  |  |  |  |  |
| **Hotels** |  |  |  |  |  |  |
| **Hospitals** |  |  |  |  |  |  |
| **Security forces** |  |  |  |  |  |  |
| **Workplaces** |  |  |  |  |  |  |
| **Educational institutions** |  |  |  |  |  |  |
| **Restaurants** |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |

Approximately one-third of institutional meals wasted are rescuable, meaning that it would be possible to save approximately 75,000 tons of food annually, with a total value of approximately NIS 1.2 billion each year, equivalent to approximately 68 million meals.

Food waste in institutional kitchens is an inevitable part of the economic planning of meals for a large number of patrons in congregant settings, while guaranteeing that the supply and variety meet the requirements of many diverse patrons, and taking into account the inherent elements of uncertainty as well.

In recent years, most institutional kitchens are being operated by external companies with a high level of expertise in the field. Those companies strive for maximal economic efficiency and reduction of waste. Despite this, catering cannot be planned on the basis of averages alone. Rather, it is necessary to provide appropriate supplies of food even for non-average days. Therefore, food preparation must allow for sufficient margins to accommodate the risk of variance, rather than relying solely on statistical averages.

The analysis in the report shows that, as a general rule, a kitchen characterized by a higher level of uncertainty regarding the number of patrons can be expected to produce a higher level of waste. For example, at open IDF bases and workplaces, where there are accessible alternatives, the food waste will be higher than in schools and prisons, where there is less uncertainty about the number of meals to be served.

In addition, the more varied the menu, the greater the amount of waste that can be expected due to the uncertainty regarding which choices patrons will prefer. Accordingly, a higher level of waste can be expected at events and in hotels, where a wide variety of choices is offered, rather than workplaces, IDF bases and police stations.

The style of service and payment can also influence the amount of waste. In restaurants, for example, where food is prepared only after it is ordered, less waste is expected than at a buffet where food must be prepared in advance. In situations where the consumer pays only for what is eaten, the amount of waste will be lower than it is in restaurants that charge an all-inclusive price.

The table above presents a summary, in quantitative terms, of the estimated food waste in the institutional sector.

Rate of Food Waste by Category of Institutional Consumption

Rescuable and Non-rescuable waste

**Column captions**, from left to right: Restaurants, Educational institutions, Workplaces, Security forces, Hospitals, Hotels, Events

**Blue**: Rescuable waste; **Red**: Non-rescuable waste

The total amount of food that can be rescued from the institutional sector is valued at approximately NIS 1.2 billion. Approximately half of this amount is from events, from which it is likely possible to rescue approximately 20,000 tons of food, with a monetary value of NIS 0.5 billion, annually. Hotels, IDF bases and workplaces are other important focal points for food rescue, and it is probable that food worth NIS 140-190 million can be rescued annually from each of these sources. The value of rescuable food from restaurants is similar; approximately NIS 120 million, but the broader geographical distribution and the lack of a critical mass in any single location generally reduces the economic feasibility of rescuing food from restaurants.

Annual Summary: Rescuable Food from the Institutional Sector

(NIS millions)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Meals/year | Market size | Total waste in NIS | Rescuable waste in NIS |
|  | **Million meals** | **NIS million** | **NIS million** | **NIS million** |
| Restaurants |  |  |  |  |
| Events |  |  |  |  |
| Workplaces |  |  |  |  |
| Hotels |  |  |  |  |
| Security forces |  |  |  |  |
| Hospitals |  |  |  |  |
| Educational institutions |  |  |  |  |
| Total |  |  |  |  |

The high return on investment for food rescue in the institutional sector is a consequence of the relatively high value of the rescued product, combined with the relatively low logistical costs of collecting food from large kitchens with dense geographic distribution, concentrated in city centers and industrial areas.

# Food Waste and Rescue in the Retail and Distribution Sectors[[11]](#footnote-11)

Bold chapter head: **NIS 4.3 billion worth of food waste in the retail and distribution sector // About half of the rescuable food, by value, is in these sectors**

The volume of food sales in Israel is about NIS 79 billion a year, marketed to consumers in supermarkets, open markets, grocery stores, small retailers and the institutional sector. The total loss in the retail and distribution sectors is about 430,000 tons of food, valued at approximately NIS 4.3 billion, which constitutes about 6% of the retail sales of food. Of this amount, the value of the rescuable food is approximately NIS 3.5billion.

Financial Loss in the Retail and Distribution Sectors

|  |  |  |  |
| --- | --- | --- | --- |
|  | **% Waste** | **Market value** (NIS millions) | **Amount of Waste** (1000 tons) |
| Fresh fruit and vegetables |  |  |  |
| Bread and baked goods |  |  |  |
| Grains & legumes |  |  |  |
| Meat, eggs, & fish |  |  |  |
| Milk & dairy products |  |  |  |
| Frozen & other |  |  |  |
| Total |  |  |  |

\*Numbers are rounded for ease of presentation

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 in the packaging or product, and food damaged in the marketing process. Food manufacturers, distributors, and retailers have a clear economic incentive to minimize food waste by effectively managing the supply chain, maintaining proper storage conditions, and planning inventory.

Nevertheless, surplus food in the retail and distribution sector is inevitable, even with optimal planning of the distribution and marketing systems. This is because retailers are required to ensure a wide, varied and available food supply at all times. Food consumers will not tolerate a shortage of the food items they seek, so the loss potentially caused to retailers because food products are not immediately available is far higher than the cost of offering surpluses. In other words, excess food is an inherent part of the retail sale process.

From an economic perspective, the fact that excess food is discarded rather than rescued represents a market failure, and therefore one of the government's policy challenges is to create a system of incentives that will save these surpluses and transfer them to the needy.

Naturally, the rate of loss is higher for fresh products and short shelf-life products, such as fruits, vegetables, bread and baked goods.

**Percentage of Waste in the Retail and Distribution Sectors, for Selected Food Items**

**Column captions**, from left to right: Tomatoes, Peppers, Bread & baked goods, Cucumbers, Bananas, Apples, Potatoes, Meat, eggs, & fish, Grains & legumes, Milk & dairy products, Frozen

Compared to international data, Israel’s rate of waste in the retail and distribution sector is similar to the accepted level in the developed world, despite the potential for higher losses because of Israel’s warmer climate. This is evidence that the retail and distribution sector in Israel manage their inventories according to a relatively high standard. The percentage of food waste in developing countries is higher, primarily due to the poor conditions during distribution, storage and marketing.

International Comparison: Rate of Waste in the Retail and Distribution Sectors

Source: FAO data, processed by BDO

**Column captions**, from left to right: Africa; North Africa & western Asia; South America; Southeast Asia; North America; Israel; Europe; Japan, China & South Korea

Food marketers’ investment in establishing advanced logistical centers, online inventory and demand management systems, and keeping an unbroken cold chain have contributed to reducing the volume of loss in the retail and distribution sectors.

Simultaneously, changes in consumer preferences have increased the volume of food purchased from the large retail chains, and the transition from open markets to indoor, air-conditioned retails and distribution channels also has contributed to a reduce in waste. Moreover, research shows that the transition to large stores with a high volume of activity also contributes to waste reduction. Even more recently, there is nascent trend towards purchasing food on the internet. The development of direct purchase channels, in which food is transported directly to the end customer from a dedicated e-fulfillment center, bypassing the retail branch, may provide an additional contribution to a reduction in food waste levels in the future.

Consumers Transition to Purchasing to Stores with Lower Percentages of Waste

Very low rate of waste

Low rate of waste

Higher rate of waste

Source: CBS, analyzed by BDO

**Blue**: Supermarkets **Red**: Grocery stores **Green**: Open markets **Purple**: Other stores (vegetable stores, butcher shops, specialty shops and stalls)

Waste in the retail and distribution sectors has the highest economic value because it includes the entire previous investment in growth, manufacturing, packaging and transportation. It is food that is ready for marketing and consumption that is lost before reaching the end consumer. In addition, due to the characteristics of waste at this stage, the vast majority of the food at this stage is rescuable, whose loss can be prevented. As a result, these sectors constitute about 50% of the potential for rescue in monetary value, about NIS 3.5 billion, out of total potential for rescue worth NIS 7 billion to the economy.

Food waste in the retail and distribution sectors stems from three main factors:

1. **Short expiry dates**

Food products by nature have limited shelf lives and, therefore, it is inevitable that some products will reach their expiration date before being 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 creating incentives that will facilitate inventory management to ensure that short-dated food is distributed to the needy before it reaches its expiry date. Such inventory management is workable, now that it is possible to estimate statistically the amount likely to be consumed, compare it to current inventory, and donate any surplus at an earlier stage, and certainly before the food reaches its expiry date. In addition, a review of food expiration classification policy is required.

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

Aesthetic defects damage the market value of food products, but in most cases does not represent an impairment of the nutritional value of such products. Loss of this food reflects a market failure since the defective food products maintain full nutritional value for the needy, despite its low market price. Some retailers handle this problem, for example, by selling products that have aesthetically defective packaging at a reduced price.

3. **Damaged food**

Food damaged during logistical processes is a relatively minor cause of food waste. Damage can be caused at various stages in the retail and distribution process. Damaged food includes broken eggs, spilled products, fallen or damaged fruits and vegetables, remains in butcher shops and delis, etc. This food is not rescuable, but the amount is relatively small, because maximal efforts are being made to reduce damage and waste.

**Rescue operations in the retail and distribution sector**

Retailers and food manufacturers are working to reduce loss and rescue food due to economic considerations. Surplus food can be donated in several ways:

* Selling of surpluses at reduced prices – when there are products that have short expiry dates or are damaged, retailers sometimes offer them at a reduced price. Economically, the transfer of these products to the needy reduces the fear of reduced sales.
* Contribution of food – centralized and coordinated on the basis of agreements with food rescue initiatives and/or as a local initiative on the branch level.

Food producers are also involved in food rescue: some food manufacturers contract with NPOs and donate food with short expiry dates or production surpluses. In addition, products with defective packaging or an aesthetic defect in the product are sold in various secondary markets, if the flaws are detected in the factory, and the food is still safe and fit for human consumption.

# Food Rescue: Feasibility to the National Economy

Bold chapter head: **NIS 4 billion potential profit for the national economy from food rescue // Rescuing 20% of the food waste could close the food insecurity gap in Israel**

The rescue of 450,000 tons of food annually, constituting 20% of all food waste in Israel, would fully bridge the food consumption gap between the normative expenditure of the general population and those suffering from food insecurity.

According to BDO and Leket Israel estimates, the current rescue multiplier is 3.6, meaning that every shekel (NIS 1.0) spent on food rescue saves food worth NIS 3.6. The more food is rescued, the lower the rescue multiplier is due to the increasing challenge of rescuing larger quantities of food. Therefore, the cost of rescuing NIS 3 billion worth of food would be only NIS 1.2 billion. This is equivalent to the full value of the gap in spending on food consumption by the population suffering from food insecurity in relation to the normative level of consumption.

Without food rescue, it would require an annual cost of NIS 3 billion to fully finance this gap. Therefore, food rescue is clearly preferable to the alternative of attempting to bridge the food insecurity gap by means of allocations, donations, subsidies or support for the needy. Food rescue allows for reaching the same social goal at a significantly lower cost, approximately NIS 1.2 billion annually. Specifically, **food rescue alleviates food insecurity at a 60% cost savings, and also provides significant social and environmental benefits.**

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Percentage of Rescued Food from Food Waste** | **1%** (currently) | **5%** | **10%** | **20%** |
| **Rescued Food (in 1,000 tons)** | 28.0 |  |  |  |
| **Part of Food Rescued from Food Insecurity Gap** | 6% |  |  |  |
| **Value of Rescued Food** | 140 |  |  |  |
| **Cost of Food Rescue** | 30 |  |  |  |
| **Benefit to National Economy (before externalities)** | 110 |  |  |  |
| **Environmental-Social Contribution (FAO)** | 140 |  |  |  |
| Total Value of Food Rescue to National Economy (Million NIS) | 250 |  |  |  |

Source: BDO estimates

The problem of food insecurity is not expressed by the amount of money expended on food purchases; it also affects the types of food consumed. An analysis of average consumption basket expenditures by the portion of the population experiencing food insecurity reveals that **food insecurity is accompanied by low expenditures particularly for fruit, vegetables, meat and fish, which have high nutritional values.**

**Impact of Food** Insecurity on the Food Expenditure Pattern of   
Households Experiencing Severe Food Insecurity

(100% = Diet of the population with normative food expenditures)

Source: BDO analysis and Survey of Household Expenses, CBS

**Blue:** Actual expenditure **Red:** Gap from normative level

**Captions for graph**, from left to right: Bread and pita, Potatoes and sweet potatoes, Milk and dairy products, Fresh vegetables, Fresh fruit, Meat, poultry and fish

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, like potatoes, bread and pita, is lower, from 15% to 25%.

Economic principles dictate that income in goods is an inferior alternative to monetary income , because it deprives those receiving support the freedom to allocate resources according to their full range of needs. Therefore, in principle, the general tendency is to provide monetary support over the direct provision of products. This economic principle is also summarized as, “Subsidize people, not products.” However, **food rescue offers a unique set of circumstances in which there is a clear economic preference for supporting the needy with products over money. This advantage stems from the specific characteristics involved in transforming waste into food (i.e., that every shekel invested in food rescue generates a direct economic value 3.6 higher than the cost)**. Moreover, taking into consideration the FAO’s estimates of external environmental and social impact, the benefit to the economy increases to 7.2 times that of the cost.

In this context, it should be noted that those suffering from food insecurity also suffer from financial insecurity, evident in consumption gaps of other basic necessities (housing, health, education, etc.). It is reasonable to assume that food rescue would enable households to then choose to allocate some of the effective increase in their disposable income to consuming other goods. Socially speaking, these households view 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 to purchase other goods and services.

In September 2015, the US government established a national food waste reduction goal of 50% within 15 years. Analysis of the data in this report shows that rescuing even less than half of the American goal, and contributing it to the approximately 450,000 households suffering from food insecurity in Israel, would provide enough food equivalent to fully cover the gap in their food intake compared to the normative level. **For the national economy, such efforts would generate a value of NIS 1.8 billion annually, bridging the gap between the value of rescued food and food rescue costs**. This is even before considering the added benefits to the national economy from reducing poverty and inequality, and before factoring In the external environmental benefits.

It should be emphasized that the incremental realization of a 50% national food waste reduction goal, over a 15-year period, is not expected to reduce the volume of agricultural production in Israel for local consumption compared to current conditions. Rather it is expected to only slow the growth rate of local food production.

# Food Waste – How Much Food Can be Rescued?

Bold chapter head: **Roughly 50% of lost food is rescuable and can be used to feed disadvantaged populations experiencing food insecurity**.

Approximately 33% of food produced in Israel is lost or wasted during the production, distribution and consumption stages, totaling approximately 2.5 million tons annually. This translates to food waste valued at NIS 19.7 billion, equivalent to 1.5% of the GNP. About half of this waste is considered unfit for human consumption and is therefore not considered potentially rescuable.

In terms of food rescue, the most important component is edible foods (fit for consumption with nutritional and health benefits) that do not reach the consumer. There are various reasons for loss in each of the stages of the food value chain. The common denominator is lack of economic viability for food producers (i.e. farmers, manufacturers, distributors, etc.) to invest additional resources in the more advanced stages of production and distribution.

Reducing food waste, either by prevention or by rescuing surplus, is a primary public objective and a top priority on the international agenda. The estimated amount of food fit for rescue is derived from the value chain model designed specifically for the food industry. Every type of food and its loss, at each stage of the value chain, was analyzed and classified as rescuable or un-rescuable (unfit for consumption).

It is important to note that classification of rescuable foods does not address economic viability of rescue, but rather the feasibility of using wasted food to feed people.

*The value of rescuable food is approximately NIS 7 billion, with the value of the loss increasing at each stage along the length of the value chain, as more resources have been invested in raising, producing, packaging and transporting the food that is then wasted. As can be seen in the following table, most of the value of food waste is concentrated in the retail and distribution sector, because the food lost during these stages is ready for marketing and consumption, meaning that it is being discarded before reaching the final consumer*.

Value of Rescuable Food in the Food Chain

(In NIS millions, rounded for ease of presentation)

|  |  |
| --- | --- |
|  | Value of  Rescuable Food |
| **Agriculture** |  |
| **Sorting & Packaging** |  |
| **Industry** |  |
| **Retail & Distribution** |  |
| **Institutional** |  |
| **Total** |  |

According to our estimate, roughly 50% of food waste is rescuable and can, given economic viability and appropriate resources, be used to feed needy populations suffering from food insecurity.

Estimated Amounts of Rescuable Food in Israel (thousands of tons)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Total Consumption | Total Local Production | Loss | Percentage of Loss | Recoverable Loss[[12]](#footnote-12) |
| Fruit |  |  |  |  |  |
| Vegetables |  |  |  |  |  |
| Potatoes & Starch |  |  |  |  |  |
| Grains & Legumes |  |  |  |  |  |
| Meat, Fish & Eggs |  |  |  |  |  |
| Milk & Dairy |  |  |  |  |  |
| Total |  |  |  |  |  |

Source: BDO estimates

Food waste during household consumption was not classified as rescuable. There are various approaches to the issue of food waste in household consumption. Western culture is based on a notion of consumerism and prosperity, in which consumers extract benefit and enjoyment, not only from food consumption, but also from having a range of selections and even excess. Economically, as long as consumers pay the full amount for purchased products, there is no justification for restricting consumption. The problem is that food production entails the use of natural resources and has an environmental impact, and these external costs are not calculated in the price paid by consumers for food. We did not examine these aspects, however, these circumstances might justify actions to encourage food recovery — perhaps with governmental sponsored public relations campaigns, as has been done in several western countries—to raise public awareness regarding the external impact of producing food that is left unconsumed.

|  |  |
| --- | --- |
| Rescuable Food | Food Waste Unworthy  of Human Consumption |
| * Pre-harvested edible agricultural produce | * Sick livestock or carcasses |
| * Aesthetically flawed agricultural produce | * Diseased food |
| * Agricultural produce not sold in wholesale markets | * Damaged or contaminated food |
| * Unsold food surplus in supermarkets/stores | * Spoiled food |
| * Surplus prepared food from catering, industrial kitchens & restaurants | * Production leftovers (peels, seeds, skin, fat) |
| * Packaged food with damaged packaging or misshaped | * Food already served and left unconsumed |
| * Food nearing its sell-by date that will not be sold |  |

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

Bold chapter head: **Rescuing 450,000 tons of food is necessary to close the Food Security Gap in Israel**

According OECD data that examines the extent of poverty after taxes and allocations (with the poverty line defined as 50% of median disposable income), Israel’s situation has improved in comparison to last year. In the OECD, Israel is the country with the second highest poverty rate, after the United States. Conversely, the National Insurance Institute Poverty Report contends that poverty among Israeli families decreased from 18.5% in 2016 to 18.5% in 2017. This gap is apparently the result of using a different scales for weighing and presenting the benefit of household size.

OECD data shows an improvement in the Gini Index of Inequality last year, even though Israel continues to suffer from a high level of inequality. Israel and Latvia were tied in seventh place for inequality, following Mexico, Chile, Turkey, the US, Ireland and New Zealand. Inequality in distribution of income is one of the greatest challenges facing the Israeli economy, and food insecurity is a consequence of income inequality.

Using the Food Security Index as the basis for comparison, Israel dropped one place because Portugal’s improved score while Israel’s remained almost unchanged. For food consumption as a share of expenditures, Israel moved down two places because of a decrease in food’s share of consumption in Chile and Greece.

**Israe**l**’s Rank in Inequality and Food Security**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Israel | OECD average | Israel’s rank in the OECD |
| Gini Index (inequality) |  |  |  |
| Poverty Rate |  |  |  |
| Food Security Index |  |  |  |
| (%) Food Expenditure to PCE |  |  |  |

\* Israel’s rank among OECD countries.

Source: USDA and Global Food Security Index

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

1. **Food Availability**: Sufficient quantities of food available on a consistent basis;
2. **Food Access**: Sufficient resources to obtain appropriate foods for a nutritious diet;
3. **Food Use**: Adequate water and sanitation; family’s awareness about the proper use of food.

Using these criteria, which are primarily subjective, the NII estimates that approximately 18% of Israel's population suffers from food insecurity; of this number, 8.8% are in severe food insecurity, and an additional 9% in moderate or mild food insecurity.

According to The Economist 2017 Global Food Security Index, Israel is ranked 19th in food insecurity among member states of the OECD. Among OECD countries, Israel is ranked 9th in household expenditure on food.

**Food consumption as a share of household expenditure 2018**

Source: Economist 2018 Global Food Security Index

From top to bottom: Mexico, Turkey, Hungary, Slovakia, Portugal, Poland, Israel, Czech Republic, Greece, Chile, Japan, Italy, New Zealand, OECD average, Spain, France, Belgium, Sweden, Norway, Finland, Holland, Denmark, Germany, Austria, Australia, Ireland, Canada, Switzerland, Great Britain, USA.

**Poverty Rate - International Comparison 2018**

From top to bottom: USA, Israel, Turkey, Mexico, Estonia, Spain, Greece, Korea, Italy, Portugal, Canada, UK, Luxemburg, OECD average, New Zealand, Poland, Hungary, Germany, Ireland, Austria, Belgium, Switzerland, Sweden, Slovenia, Slovakia, France, Holland, Norway, Finland, Czech Republic, Denmark, Iceland.

,

Comparison of inequality and poverty rate data indicates that the US and Israel have similarly high inequality and poverty levels, however food security in the US is paradoxically among the highest in the developed world. It seems that the high US measure of food security, despite high general inequality, is the result of many years of public awareness to the problem of food insecurity, evident in programs like SNAP (food stamps) that ensure adequate food provisions for the needy. Furthermore, the US is a pioneer in supporting food banks’ efforts to recover surplus food and distribute it to underprivileged populations, and is also a world leader in establishing policies to remove obstacles for food waste and reuse.

Despite similar inequality and poverty rates in Israel and the US, food expenses as part of the Personal Consumption Expenditure (PCE) in Israel is among the highest in the world, measured at 17%, 2.5 times the rate in the US. Therefore, a policy of food rescue and distribution to the underprivileged populace 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. In order to examine food rescue effectiveness as a policy measure to increase food security in Israel, the report used the methodology of Chernichovsky and Regev[[13]](#footnote-13) which defines normative food expenditure as a measure of a household’s expenditure basket that remains constant even with an increase in household income.

To examine normative food expenditure,[[14]](#footnote-14) we compared expenditure on food of the lowest percentiles relative to normative levels. Analysis of the data demonstrates that in the two lowest percentiles (in terms of standard per capita consumption), food expenditure was roughly half that of the normative level.

**Per Capita Food Expenditure in Israel to Normative Expenditure (percentile distribution)**

Source: CBS data for 2017 processed by BDO.

X axis: Household Percentile (Consumption); y Axis: Standard Per Capita Monthly Expenditure

**Yellow**: Normative expenditure; Black: Poly. (trend)

**Red**: Total Fruit & Vegetables; Blue: Total food (excluding fruits and vegetables, or food eaten away from home)

The volume of food required to bridge the gap between actual food consumption of the food insecure population and the normative consumption level (average levels of second-to-fifth percentiles), is valued at approximately NIS 3 billion. The cost of eliminating this food expenditure gap relative to normative levels for the severely nutrition-deprived population (9% of Israeli households) is estimated at NIS 2.2 billion, with an additional NIS 1.0 billion required to assist populations experiencing moderate nutritional insecurity.

Food Expenditure Gap Relative to Normative Consumption Expenditure

for Nutritionally Insecure Populations (in NIS millions)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Value of Food Required to Bridge the Gap for Severe Food Insecurity | Value of Food Required to Bridge the Gap for Moderate Food Insecurity | Total Gap in Food Expenditure |
| Fruit & Vegetables |  |  |  |
| Bread & Grains |  |  |  |
| Meat, Fish & Eggs |  |  |  |
| Milk & Dairy |  |  |  |
| Other Foods |  |  |  |
| Total |  |  |  |

The rescue of 450,000 tons of wasted food each year, constituting 20% of overall food waste in Israel, would enable the closing of the food gap in Israel. Accordingly, an estimated NIS 1.2 billion would enable the rescue of food worth NIS 3 billion, equivalent to the entire gap between the food expenditure of food insecure populations and normative expenditure levels.

1. The value chain model does not include beverages, energy boosters, sugar, honey and candy. [↑](#footnote-ref-1)
2. We are aware such estimates may include deviations or inaccuracies that are inevitable because there is no official data. Additionally, the volume of annual food waste also depends on random variables, such as extreme weather conditions, natural events and pests, deviations in demand, etc. The data presented here is based on an annual analysis and average weather conditions. This data is indicative and intended to serve as the basis for public debate, and for further research and study. [↑](#footnote-ref-2)
3. Dr. Ron Porat, 2015, 2016 [↑](#footnote-ref-3)
4. The estimated food waste from industry does not include food that is recycled, primarily as animal feed. [↑](#footnote-ref-4)
5. Based on food value chain model developed by BDO, using weighted data from the Central Bureau of Statistics for 2018, a national survey of the composition of household garbage conducted by the Ministry of Environmental Protection for 2012-13, and research on household garbage in Israel conducted by Dr. Ofira Ayalon and Efrat Elimelech that was published in 2018, and results of a survey conducted by Geocartography Research Institute in January 2019. [↑](#footnote-ref-5)
6. Household Food Waste survey of 500 households, representative of the Israeli population, conducted by Leket Israel and BDO, with the assistance of Geocartography Research Institute, in January 2019. [↑](#footnote-ref-6)
7. Economist Global Food Security Index, 2018 [↑](#footnote-ref-7)
8. <https://www.moag.gov.il/subject/the_food_we_eat/Storage_Guidelines_For_Fruits_Vegetables/Pages/Storage_Guidelines_consumer.aspx> [↑](#footnote-ref-8)
9. In the model, each of these branches is weighted according to the characteristics of the meal it serves. [↑](#footnote-ref-9)
10. This figure is based on the number of workdays relevant to each category. The estimate also distinguishes between different populations within each category. [↑](#footnote-ref-10)
11. For purposes of analyzing food waste, this report relates to “Retail and Distribution” as a single sector that includes losses incurred from the end of the production stage to the sale to the consumer: any loss of finished products that are ready for marketing by the manufacturers, wholesale loss, returns from retailers to manufacturers and loss in retailers. These constitute the loss in the Retail and Distribution sector. [↑](#footnote-ref-11)
12. Waste of grains and legumes was calculated as a percentage of consumption because the majority of grains are imported to Israel. [↑](#footnote-ref-12)
13. Patterns of Expenditure on Food in Israel, Taub Center, 2014. [↑](#footnote-ref-13)
14. Excluding dining out, alcoholic beverages and carbonated beverages. [↑](#footnote-ref-14)