



A world of waste

Analysing an alternative approach to food loss and waste

Farrelly & Mitchell examine the changing tastes and expectations of today's consumer and how they influence M&A.





Preface and acknowledgements

Farrelly & Mitchell is pleased to present A World of Waste, a report which highlights the paradox of food loss and food waste that our society faces today, while millions go to bed hungry every night. Our extensive global advisory experience - particularly in Europe, the Middle East, and Africa- gives us a distinct insight into the problems of food loss in developing regions and food waste in the developed regions of the world.

In compiling this report, we have coupled our decades of hands-on experience working with a range of political organisations and businesses, from large multinationals to SMEs, with expert published sources. And we are happy to now share with you our unique perspectives.

To remain competitive, commercial operations need to remain in sync with both market and regulatory developments. Increased consumer awareness and tightening regulatory environment are trends that the food industry, whether multinational brands or private label, should not ignore. Keeping up enables companies to remain connected with the new consumer; while maintaining wasteful practices may risk previously loyal consumers becoming disenchanted with brands.

As international food and agribusiness specialists, we believe that understanding the economic and environmental ramifications of food security for the industry and the world at large is fundamental in delivering actionable results for our clients. We would like to thank the contributors for their expert input and hope you find it provides useful insights. As always, we welcome your feedback. If you find this report valuable, please consider sharing it with your colleagues and peers.



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The report at a glance



Around one-third of food is wasted globally

One of the biggest paradoxes of our time: while millions struggle to find enough to eat, **millions of tonnes of food is wasted every year.**

Food losses in low-income countries mainly occur at production and handling, while in developed countries it is at the consumer level.

Global food waste could increase to **US \$ 600 billion within a decade** due to a rapidly growing middle-class demographic and increased animal protein consumption.

Even if just a quarter of the food currently lost or wasted globally could be saved, it would be enough to feed 815 million hungry people. To achieve increased efficiency and lower costs, a coherent global process is required that delivers food efficiently around a more circular supply chain.

A drastic increase in future food prices and crop demand and a slow-down of production indicate an urgency to focus on reducing food waste and losses.

Reducing post-harvest losses of perishables in developing countries could reduce substantial amounts of food loss.

Consumer consciousness and awareness towards purchase and consumption could reduce food waste. Education campaigns in developed countries could save substantial food waste.

Improving entire supply-side dynamics in low-income countries and efficient operations of the supply chain at the retailing stage in mid/high-income countries could collectively reduce supply-side losses.

Europe aims to reduce 88 million tonnes of yearly food waste by 50% by 2030.

The UAE aims to reduce/redirect food waste by 75% through recycling strategies by 2040.



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Introduction

This study takes a multinational magnitude of the food loss and phenomenon and its economic and environmental impacts in different continents of the world. Food waste is one of the biggest paradoxes facing society today: globally, one third (1.3 billion tonnes) of food is wasted, while 815 million people – one in nine – go to bed hungry each night. Counteracting food loss is increasingly becoming critical; alleviating growing concerns about food insecurity, undernourishment, and environmental sustainability, in the midst of a significant increase in global food demand over the coming decades.

Over-consumption in developed countries and subsequently, food waste, leads to a global increase in food commodity prices, which mostly affect developing countries. Food losses also mean lost income opportunity for small farmers and even higher proportions of income spent on food commodities by economically vulnerable societies.

This report emphasises the need to reduce food losses and food waste which, in itself, has considerable potential to increase the efficiency of the whole food chain and increase the amount of food available for human consumption globally.



1.3b
tonnes
global food waste



1 in 9
go to bed hungry

By monitoring the food chain and preventing the main causes of food loss at each step, food producers **can save approximately \$120 to \$300 billion** each year. Preventing food loss can create positive environmental knock-on effects by reducing greenhouse gases and burden on finite resources in production, such as fresh water.

The report also discusses the causes of food loss and waste and outlines a prevention mechanism to avoid it in the future. Businesses and governments around the world are becoming increasingly aware of the financial opportunities associated with moving towards a more efficient and transparent circular economy. The report closes with an acknowledgement of the various advances already made to tackle food loss and waste.





Food loss and waste

A definition

While no consensus over a common definition of food loss and food waste currently exists, the Food and Agriculture Organization's (FAO) 2014 definition has been gaining ground

- **Food loss** refers to "... all food produced for human consumption but not eaten by humans and is defined as a decrease in quantity or quality of food...". For example, bananas that fall off a truck that are otherwise fit for consumption.
- **Food waste** is an important component of food loss. It is referred to as "... discarding or an alternative (non-food) use of food that is safe and nutritious for human consumption along the entire food supply chain, from primary production to end household consumer level" or example, -brown-spotted bananas thrown away by a retailer.

Food loss and food waste lead to the decrease of food in subsequent stages of the food supply chain initially intended for human consumption.

Food losses in low-income countries mainly occur at production and handling, while in developed countries it is at the consumer level.



Food loss and waste around the world

Food loss is more prevalent in developing countries and is typically caused by problems in harvesting, storage, packing, transport, infrastructure or market/price mechanisms, as well as institutional and legal frameworks. Food waste is common in industrialised countries and stems from rigid or misunderstood date marking rules (best before, use by, etc.), and improper storage, buying or cooking practices.

The definitions of food waste and loss according to the FAO are illustrated below.

Table 1: FAO definition of Food Loss and Food Waste

Food loss

mainly in developed countries



Caused by inefficiencies in the use and allocation of resources along the food supply chain:

- Poor infrastructure and logistics
- Lack of technology
- Insufficient skills and management capacity
- Poor access to markets
- Natural disasters and climatic conditions
- Negative economic trends

Food waste

mainly in developing countries



Relates to the behaviour of retailers and consumers:

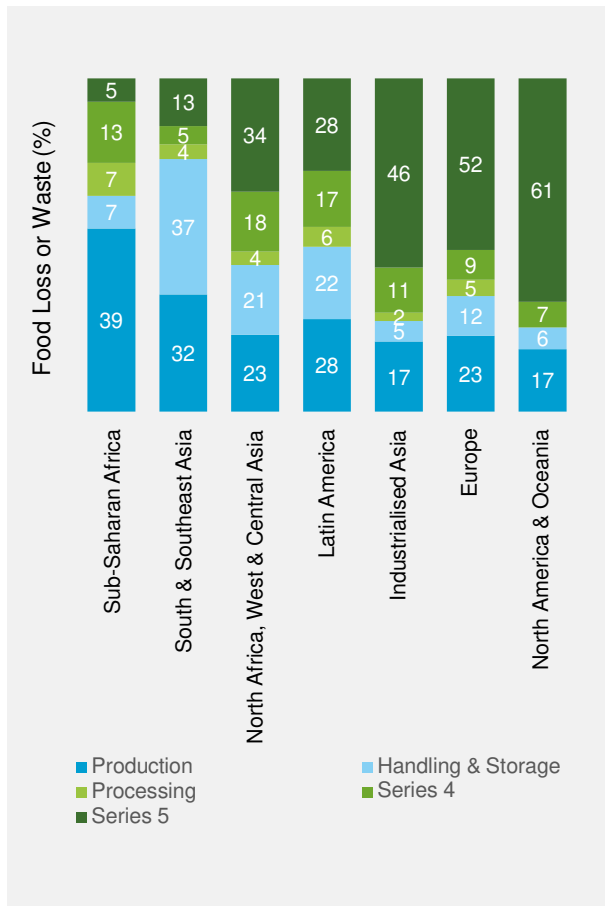
- Surplus food available
- Throwing away food is often cheaper than reusing
- Consumers in industrialised nations can afford to waste food
- Lack of awareness

Source: FAO (2016)

Food losses in low-income countries mainly occur in the early and middle stages of the food supply chain, as illustrated in figure 1 below, with proportionally less wasted at the consumer level. The trend is reversed in the case of developed countries, where most food is wasted at the consumption level. According to the FAO, food loss in these countries is the result of "inadvertent losses" due to the poor state of their supply chains.



Figure 1: Food loss along the food value chain by region



Source: World Resources Institute (Adapted from FAO) (2015)

Degree of the problem

A third of the world's food is wasted every year, but governments, businesses and individuals across the globe are making efforts to reduce this waste. In the US, the government wants to halve its food waste by 2030 and "create a generation of Americans who are sensitive to food waste". Thanks to positive publicity and growing awareness around food waste; stigma towards less-than-perfect-looking food is fading.

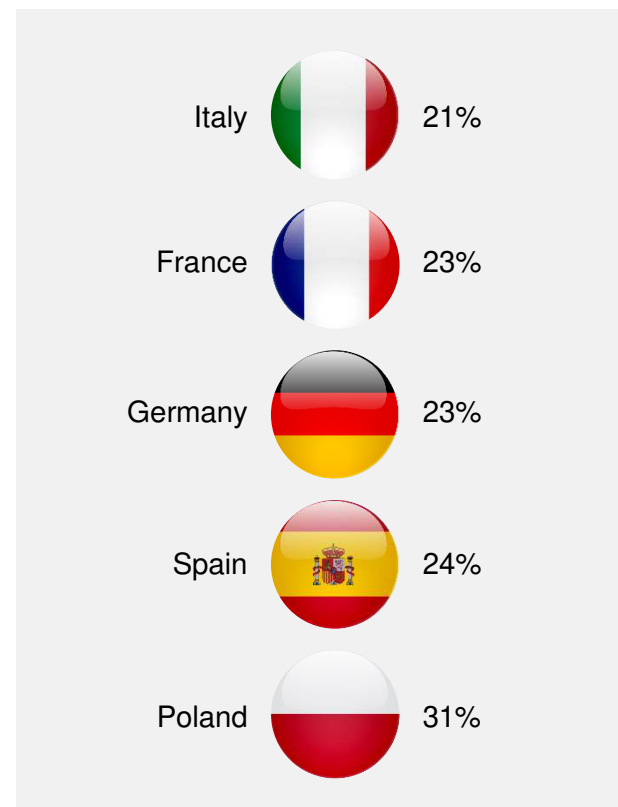
Businesses are rushing in to fill this new market space. In 2014, French grocery brand Intermarché launched an innovative campaign: "An ugly carrot is a beautiful soup". One year later, they released a limited range of cakes and biscuits that would otherwise be discarded.

Around one-third of food is wasted globally.

While Tesco UK admitted to wasting 30,000 tonnes of edible food in 2014, 51% of adults in the US are happy to buy imperfect looking "miss-happened" vegetables. Retailers across the Netherlands and the UK are using apps to sell fresh produce that would otherwise be thrown away. To create a positive perception for themselves in the market, Starbucks USA, M&S UK and Dabbawalas (a lunchbox delivery and return system that delivers hot lunches from homes and restaurants to people at work) in Mumbai, India are donating leftover food to charities.

Consumers across the world have started to question the pack sizes of food products, which contributes to more waste. Around 12% of Brazilian adults struggle to consume a full carton of milk before it goes bad. Around 53% of Chinese adults would prefer smaller pack sizes of sauces and seasonings for home cooking. And a significant proportion of European consumers don't take advantage of special offers as they might have to throw out the extra food, as reflected in figure 2.

Figure 2: European customers who claim not to take advantage of special offers to avoid wasting food



Source: Mintel (2016)



UK-based Snact launched innovative snack products made of unused fruits. The company, founded in 2013, aims to help the UK tackle food waste.

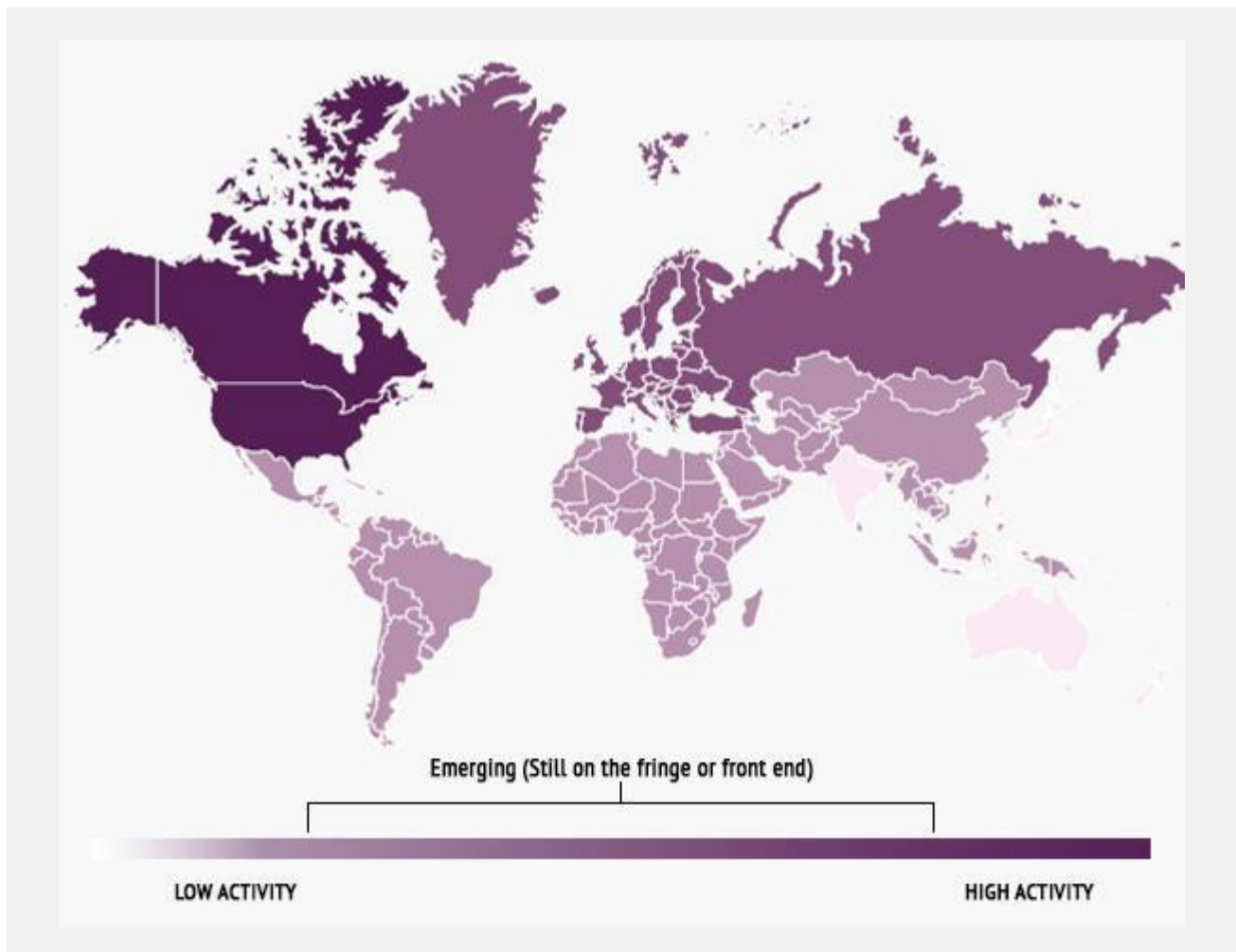
The low or no-waste market trend is gaining traction across the world.

Figure 3: UK's Snact produces fruit snacks out of healthy fruits that would be otherwise discarded based on appearance



Source: Snact website

Figure 4: Where are the opportunities for waste not?



Source: Mintel (2016)



Even if just a quarter of the food currently lost or wasted globally could be saved, it would be enough to feed 815 million hungry people in the world.

Wasted food is a lost opportunity to feed the hungry

Hunger and malnutrition undermine all other humanitarian and development goals. Hunger also reduces the economic value of an individual quite detrimentally. According to the Food and Agricultural Organization (FAO), “Every child whose physical and mental development is stunted by hunger and malnutrition stands to lose more than 10% in lifetime earnings”. Malnutrition is also the single largest contributor to disease in the world. The cost of undernutrition to the global economy could easily account for about 5% of the global GDP - US\$3.5 trillion, or US\$500 per person; equivalent to the entire GDP of Germany.

Therefore, food waste presents a paradox to the current generation: while millions struggle to have enough to eat, millions of tonnes of food is wasted every year.



The biggest paradoxes of our time: while millions struggle to find enough to eat, millions of tonnes of food is wasted every year.

Economic and environmental impacts of global food waste

Food waste and losses present immense burdens on the global economy and environment.

Economic impact

While both developed and developing countries produce the same amount of food at respectively 670 and 630 million tonnes, the economic costs of production is very different at US\$ 680 billion in industrialised countries and US\$ 310 billion in developing countries. However, on a per capita basis, much more food is wasted in industrialised, advanced countries than in developing countries. A report entitled “Save Food” by the FAO estimates that the current per capita food waste by consumers in Europe and North America is 95-115 kg per year, while this figure in Sub-Saharan Africa and South/Southeast Asia is only 6-11 kg per year. The losses are not limited to food, but they have a domino effect and are a considerable burden on the economy.

Here is an example from the US to illustrate. The FAO estimates that avoidable food waste in the US alone exceeds a staggering 55 million tonnes per year; about 29% of the total annual production. However, the US agricultural sector, when producing food and getting it from farm to fork eats up 10% of the national energy budget, consumes 50% of US land and swallows a colossal 80% of US freshwater consumption. The sheer amount of resources employed in this process is gigantic and any wastage has a profound impact on both the environment and the economy. Yet, more than a third of the food produced in the US goes uneaten.

Similar trends can be observed around the world. Households in the UK waste 8.3 million tonnes of food and drink each year, valued at US\$18.6 billion at a minimum, and are responsible for about 3% of the UK’s domestic greenhouse gas emissions.



The Ministry of Agriculture, Forestry and Fisheries in Japan has similar estimates, where about 23 million tonnes of food was wasted in 2007, worth the equivalent of US \$110 billion, at an average of US \$4,800 a tonne.

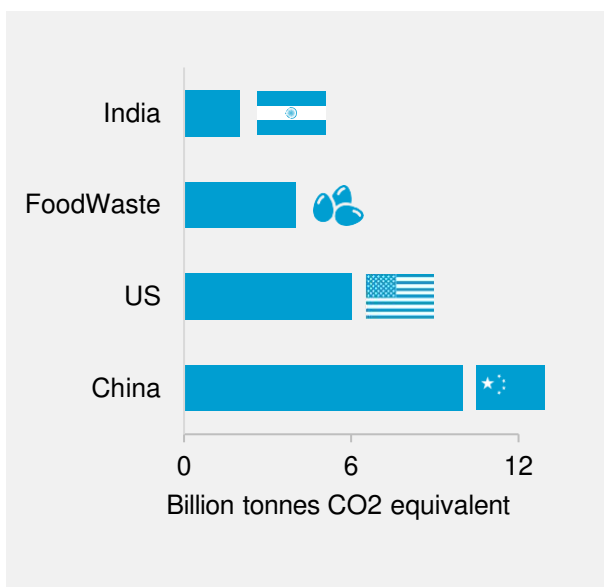
On a global level, a report produced by the Waste & Resources Action Programme (WRAP) in the UK estimates that global food waste could increase to US \$600 billion within a decade due to a rapidly growing middle-class demographic and increased animal protein consumption.

Environmental impact

Global food waste is the third largest CO2 emitter after that of the US and China. Figure 5 shows the greenhouse emissions caused by wasted food globally.

Global food waste could increase to US \$600 billion within a decade due to a rapidly growing middle-class demographic and increased animal protein consumption globally.

Figure 5: Greenhouse emissions caused by wasted food globally



Source: FAO (2013)

To put this into perspective, Tristram Stuart estimates in his book *Uncovering the Global Food Scandal* that water lost globally due to food waste would "be enough for the domestic needs at 200 litres per person per day of 9 billion people."

A challenge: unsustainable supply chains.

Alongside the food waste challenge, global consumer trends are changing and this straining supply chain sustainability. For example, the average person in China consumes 57kg of meat per annum -an increase of 25% over the previous decade -with an expected increase of an additional 50% over the next decade. This is predicted to have a knock-on effect on demand for cattle feed (grain) to the tune of 94 million tonnes per annum, in addition to the current requirement of 650 million tonnes per annum. As a society, we are heading for unsustainable supply chains; where food losses inhibit the supply of food while demand keeps increasing.

Reducing food waste could save between \$120 and \$300 billion a year and limit some of the environmental stress caused by the food production system. With growing global demand for food; any supply chain with avoidable waste can be classified as inefficient. Harnessing real-time information about supply chain activities will not only reduce avoidable waste but further reduce food security challenges by finding alternative uses for food commodities, while also easing price shocks and reducing surplus food stocks that are bound to be wasted.

Historically, businesses have operated within a linear economy; one that has enabled holistic supply chains to operate on a make-buy-waste basis, without any need to consider the effects this has on ethics or society at large. But to achieve increased efficiency and lower costs, a coherent global process is required that delivers food efficiently around a more circular supply chain; where waste or end product of one value chain acts as an input into a new value chain to extract maximum value out of each resource.



To achieve increased efficiency and lower costs, a coherent global process is required that delivers food efficiently around a more circular supply chain.

Getting more from less: a different approach

Over the past few decades, significant focus and resources have been allocated to increase food production with a limited appreciation for food loss. For example, 95% of the research investments during the past three decades were reported to have focused on increasing productivity, and only 5% directed towards reducing food loss.

According to the FAO, global food industry dynamics are expected to change drastically in the future if current trends and behaviours are left unchanged; food prices, as well as demand for crops, calories and water, will reflect the change. Figure 6 highlights this.

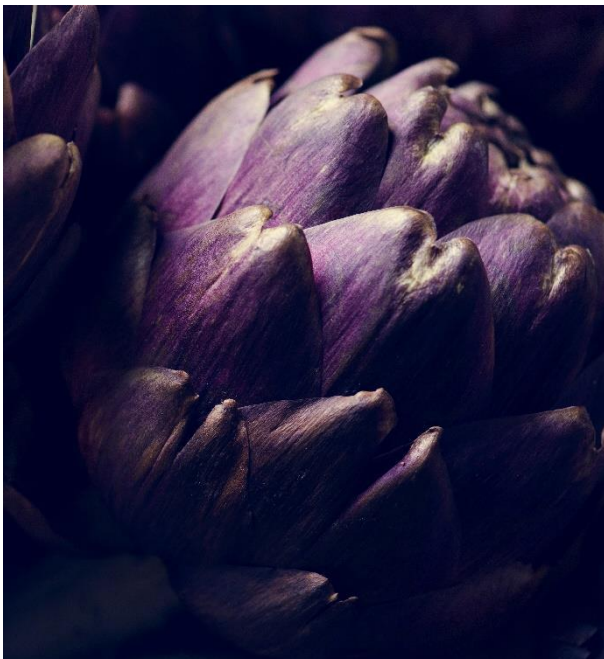


Figure 6: Outlook of global food industry



However, agricultural production is expected to slow by 1.7% per year between 2010 and 2020. Future food shortages is arguably the most urgent issue facing the planet, which, if left to its own devices, may worsen with rising population and could lead to geopolitical tensions.

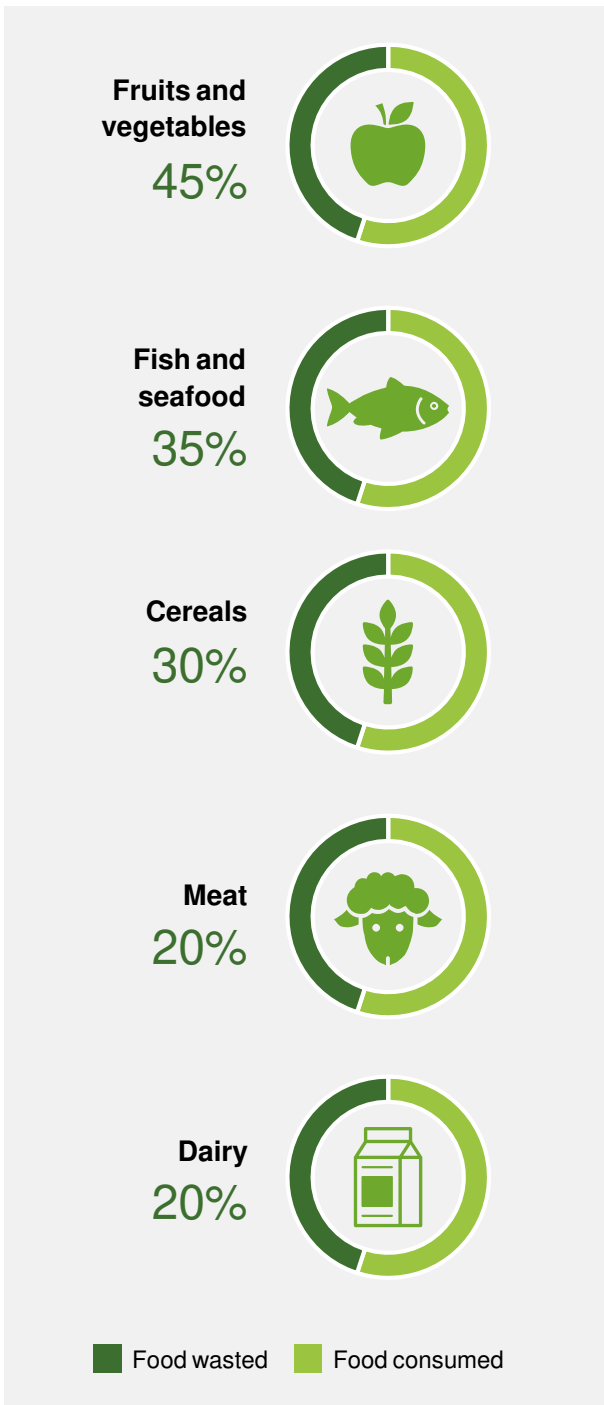
Supply chains are multi-faceted, interdisciplinary, complex and multi-layered systems which are becoming increasingly complex in our globalised economic system. Considering the challenges posed by climate change and limited land and water resources, food security cannot be achieved solely through increases in agricultural productivity. Measures to reduce food losses and food waste along the farm-to-consumer chain, and making the food value chains efficient should be where the focus lies.

Perishables undergo the greatest proportion of post-harvest loss in developing countries. These losses include about 45% of all fruit and vegetables, 35% of fish and seafood, 30% of cereals, 20% of dairy products and 20% of meat, as depicted in figure 7.



Reducing post-harvest losses of perishables in developing countries could reduce substantial amounts of food loss.

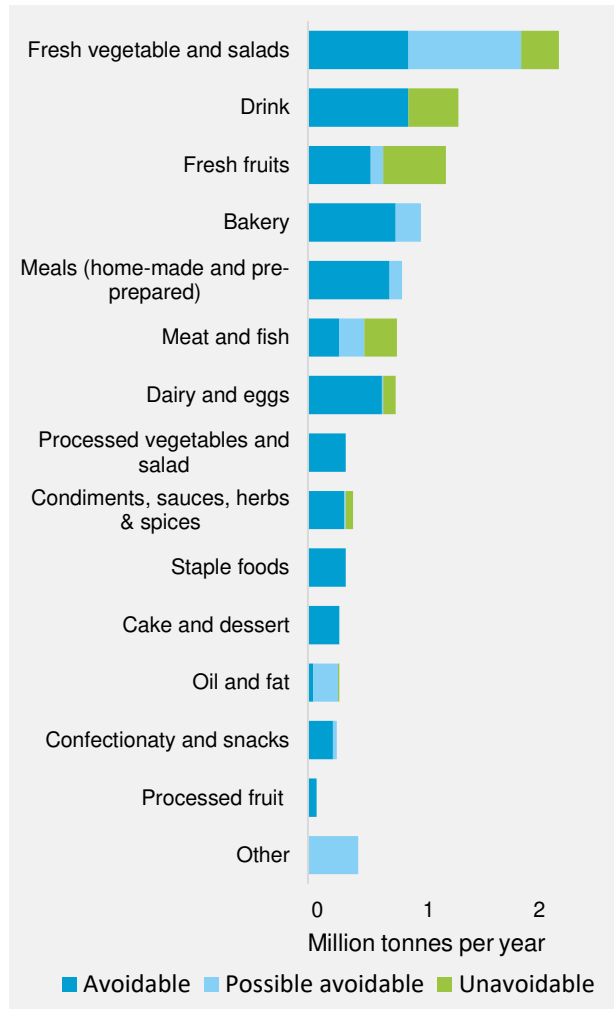
Figure 7: Food waste percentage of different food groups in developing countries



Source: FAO (2013)

However, in industrialised and advanced economies, more than 40% of total food loss happens at the retail or consumer stage of the value chain. Specific components are depicted in figure 8. The figure shows the weight of food and drinks waste in the UK by food group, split by 'avoidability'.

Figure 8: Household food and drink waste in the UK



Source: WEAP (2009)





Financial benefits of reducing food waste

The following three action points could reduce food waste and offer financial and environmental benefits. Among these, consumer education about food losses indicates the highest benefit.

Table 2: Financial and environmental benefits from each tonne of wasted food saved in the US.

Title	Description	Financial benefit (per tonne)	GHGS reduced (thousand tonnes)	Water saved (billion gallons)
Standardized date labeling	Standardizing food label dates, including eliminating visible “sell by” dates, to reduce consumer confusion.	\$4,547	1,593	192
Consumer education campaigns	Conducting large-scale advocacy campaigns to raise awareness and educate consumers about ways to save money and prevent wasted food.	\$4,531	2,336	281
Packaging adjustments	Modifying packaging sizes and designs to optimize consumer consumption and avoid residual container waste.	\$3,443	830	100

Source: ReFed (2015)





Action points: what can be done?

The win-win for all

There is a consensus that reducing food losses is in the best interest of food producers as they will be able to sell more at a lower cost so that their incomes increase. Consumers will benefit from reducing food waste as it saves them money, which they can spend elsewhere, and it lowers the price of the remaining food that is consumed in the market.

Road-blocks in the way of win-win

Reducing post-harvest food losses is a necessary step in sustainably ensuring future global food security. It is also important because post-harvest losses are a major concern in developing countries where the majority of malnourished people live.



Consumer education campaigns in developed countries could save substantial food waste.

Supply-side aspects

The exact causes of food losses vary throughout the world and are very much dependent on the specific conditions on the ground locally. In low-income countries, these causes are mainly connected to financial, managerial and technical limitations in harvesting techniques, storage and cooling facilities in difficult climatic conditions, infrastructure, packaging and marketing systems. However, in medium/high-income countries, the issues mainly relate to consumer behaviour as well as a lack of coordination between different actors in the supply chain.

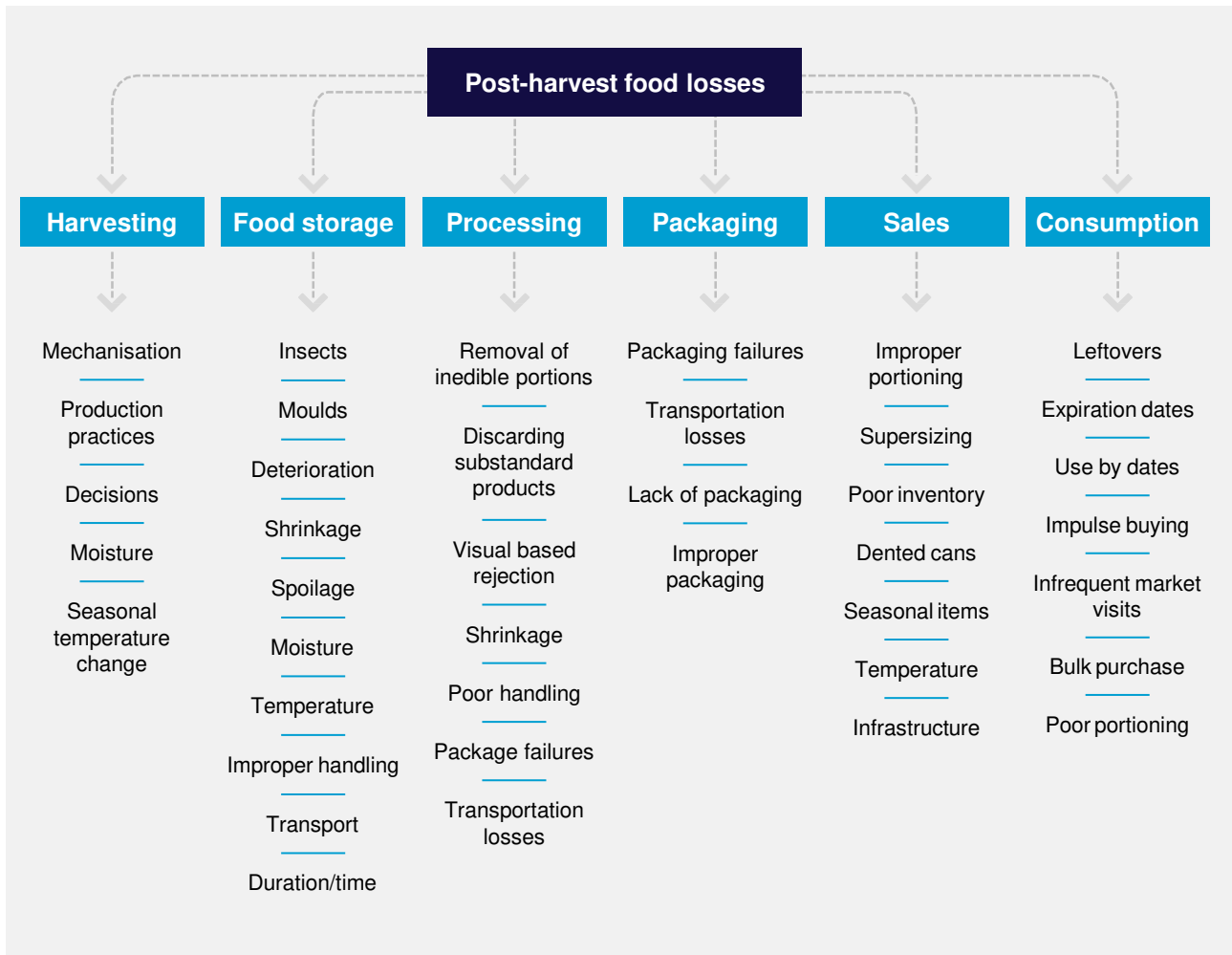
Uneven power relationships allow dominant players (usually large retailers or industrial manufacturers) to bind smaller players with strict contracts within the chain. These contracts can define specific standards, quantities and conditions of delivery which, if unmet, can lead to the rejection of edible products and eventually result in food loss or waste.

Improving entire supply side dynamics in low-income countries and efficient operations of supply chain at the retailing stage in mid/high-income countries could collectively reduce supply side losses.





Figure 9: Factors driving food losses in the supply chain flow



Source: FAO (2013)

Consumer side aspects

At the consumer level, three major factors contribute to food waste at home:

1. Poor grocery shopping/meal planning,
2. Food expiring before use and
3. A harmful attitude among those who can afford to throw away food.

For savvy, time-poor consumers, food waste may actually be the result of rational behaviour; the benefits of wasting can outweigh the money spent. To illustrate this, consider the primary aim of the household shopper: to buy food that keeps the whole house happy. If this means variety, they will buy more food than needed, which leads to a lot of waste. But for many, it is a price worth paying if it allows the household to eat and drink what they want when they want.

Consumer consciousness and awareness towards purchase and consumption could reduce food waste. Empirical evidence shows that drivers of consumer food waste, not just in high-income but even in a low-middle income context, include:

-  Stocking too much food
-  Over- or under-cooking
-  Leftover food
-  Decaying of prepared food after long or improper storage



Promising shifts: advances around the world

Consumer consciousness and awareness towards purchase and consumption could reduce food waste.

Policies in Europe

Nearly 88m tonnes of Europe's food is wasted each year. This figure is equivalent to 50% of total food in EU households, supermarkets, restaurants and along the food supply chain - while more than 16 million people in the EU depend on food aid from charities. Unfair trading practices leading to overproduction led by supermarkets are just a small contributor to this problem. Europe is taking corrective measures through specific projects and expos to achieve sustainable food systems.

A 2016 FUSIONS EU study entitled Estimates of European Food Waste Levels estimates that costs associated with food waste in 2012 were around €143 billion. Two-thirds of the costs are linked with food waste from households at about €98 billion.

This is due to:

- Households having more edible food waste than any other sector
- The costs associated with a tonne of food accumulating along the supply chain (e.g. processing, packaging, retailing costs)

Table 3: Estimates of food waste in EU-28 in 2012

Sector	Food waste (million tonnes) with 95% CL*	Food waste (kg per person with 95% CL*	Split of food waste by sector
1. Households	46.5 ± 4.4	92 ± 9	53%
2. Processing	16.9 ± 12.7	33 ± 25	19%
3. Food service	10.5 ± 1.5	21 ± 3	12%
4. Primary production	9.1 ± 1.5	18 ± 3	11%
5. Wholesale and retail	4.6 ± 1.2	9 ± 2	5%
Total food waste	87.6 ± 13.7	173 ± 27	100%

Source: EU FUSIONS report



Attempts to reduce food losses emerged in 2016, with governments' active participation to promote a shift in consumer behaviour. With France enforcing a law that requires supermarkets to donate unsold food to charity and Italy following its path by relaxing regulations for food donation; these last couple of years have witnessed revolutionary change translating to a recovery of 1 million tonnes of wasted food in each country.

A European Parliament report published in July 2016 highlights the proposal to member states to cut unionwide food waste in half by 2030. It also indicates the need to measure progress, the collaboration of member states, food business operators and food retailers.

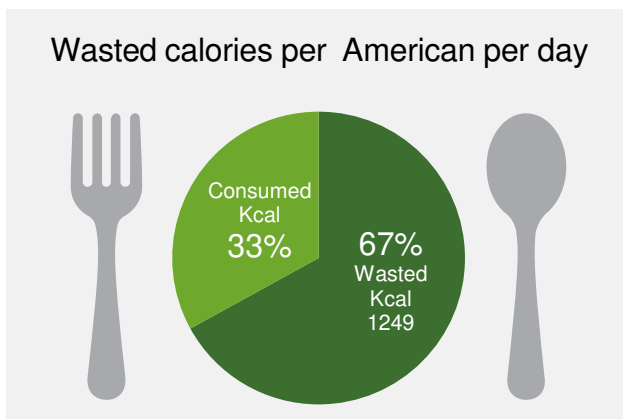
Europe aims to reduce 88 million tonnes of yearly food waste by 50% by 2030.

Policies in the US

A study conducted by the United States Department of Agriculture Economic Research Service (USDA ERS) showed that, in 2010, 31% of the available food supply in the US at retail and consumer levels went uneaten. That amounted to 133 billion pounds of the available 430 billion pounds. The estimated total value of food loss at the retail and consumer levels was \$161.6 billion.

About 32 million tonnes of food loss ends up in municipal landfills, at a cost of about \$1.5 billion a year to local governments. In terms of calories, 1,249 calories is wasted out of 3,796 calories available per American per day, as depicted in figure 10.

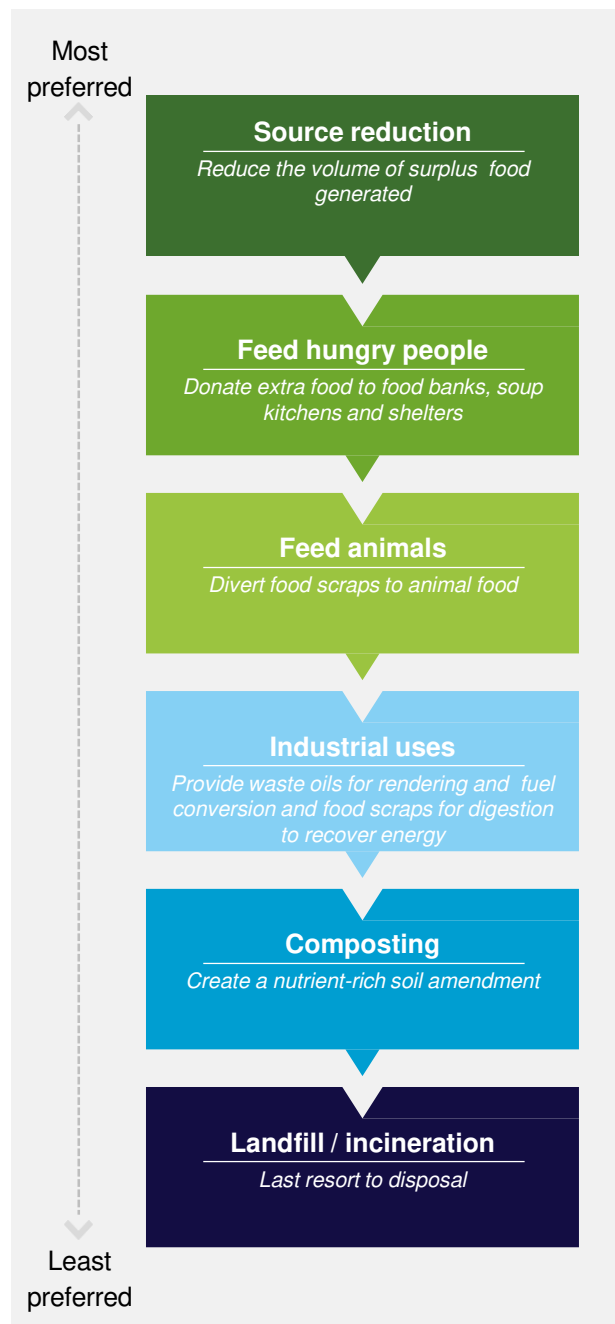
Figure 10: Graphical illustration of the total amount of food loss in the US per day per person



The top three food groups in terms of share of the total value of food loss are meat, poultry, and fish (30%, \$48 billion); vegetables (19%, \$30 billion); and dairy products (17%, \$27 billion).

The US Environmental Protection Agency (EPA) endorses its food recovery hierarchy, where the ideal situation would be to reduce the production of food waste at the source, and the least preferred is incineration that could harm the environment, as reflected in figure 11.

Figure 11: Food waste recovery hierarchy according to the EPA



Source: EPA (Updated)



When food waste is generated, the first preference is to recover wholesome food from all points in the food production, marketing, and consumption chain to feed people who need it. Providing food for livestock, zoo animals, and pets would be the second-best option, followed by recycling food and food waste for industrial purposes. These three options would help conserve resources and reduce food waste disposal costs.

Composting food to improve soil fertility is a relatively low-priority option, and its use is not widespread in the United States. The last resort should be using landfills and incinerators to dispose of food waste because of the negative impacts on the environment. However, these impacts are partly offset if energy is created during incineration and landfilling (e.g., tapping the methane gas).

In the US, the EPA wants to secure action on the 2030 reduction goal by working with leaders in the food system (e.g., private, government, nonprofit) to promote action and bring more successful interventions and tools to advance the sustainable management of food. The EPA is facilitating discussions by co-hosting summits where leaders in various sectors can exchange ideas and identify needed actions, provide leadership and technical assistance, conduct outreach and share information, develop new tools, and celebrate the successes of stakeholders.

Advances in Asia

Food losses in Japan are estimated to be around 6.2 million tonnes a year with almost 55% of it being discarded by the food industry including producers, retailers and restaurants and the rest being household waste.

Food waste prevention was identified as a priority in 2006, and measures were put in place to encourage measurement and reporting by industry, with targets being introduced in 2012. Data suggests food waste arising from industry has reduced by around 14% over a three-year period.

The country aims to half household food waste by 2030 from the fiscal 2000 level. On the industrial food waste front, various plans to improve the sale and distribution of packed food and educating the consumer about expiry dates are under review.

On the industrial food waste front, various plans to improve the sale and distribution of packed food and educating the consumer about expiry dates are under review.

Advances in the MENA region

On average, approximately 210 kilograms of food is discarded by individuals each year in the Middle East and North Africa region which costs over \$60 billion, according to the Food and Agriculture Organization (FAO) of the United Nations. And paradoxically, the MENA region relies on imports for over 50% of its food yet nearly 16 million tonnes of wheat goes to waste every year; an amount that could feed up to 100 million people.

There is a digital-first way of thinking in the Gulf as was reflected in the EcoWaste exhibition in 2015, with future potential to challenge well-established business models highlighted. Opportunities exist to bundle technologies to provide end-to-end services for growers—from selecting crops to optimising planting times, seeding rates, and fertiliser applications. By expanding digital farming to cover broad-acre and horticulture crops, the increase in yields could potentially reach 20 to 30%, providing food for as many as 1 billion additional people in the coming decade.

Tadweer, the centre of waste management in Abu Dhabi, in 2015 announced a 25-year waste management master plan in which the Emirates will be divided into zones with specific recycling centres according to the prevalent type of waste generated in the area. The aim is to redirect 75% of waste from landfills by 2021 through various recycling and re-usage strategies.

The UAE aims to reduce/redirect food waste by 75% through recycling strategies by 2040.



Case study: food waste types in Ireland

In Ireland, there are over one million tonnes of food waste disposed of each year, with around one-third of this coming from households; 1 tonne of food waste at a cost of €400 and €1000 per household per year.

- There are three types of food waste thrown out:
- 60% is Avoidable food waste - plate scrapings, leftovers, and gone off perishables
- 20% is Potentially Avoidable food waste - things like bread crusts, potato skins
- 20% is Unavoidable food waste - general rubbish such as banana skins and chicken bones

Means of prevention

Waste in the global supply chain is unsustainable, but to minimise it to its lowest level, an in-depth, cross supply chain analysis is required. This will deliver decisive insights into waste prevention measures, as outlined in Table 4.



Table 4: Causes of food losses along the food chain and suggested prevention measures

Causes and prevention of food losses and waste	
Cause	Prevention
Production exceeding demand in industrialised countries	Cooperation between farmers (surplus crops of one farm solves shortage of another)
Premature harvesting	Organising small farmers and diversifying their production
High appearance quality standards	Supermarket led consumers surveys and closer sales to consumer (farmers market)
Post-harvest food losses in developing countries	Investment in infrastructure and transportation
Unsafe food is not fit for human consumption	Develop knowledge & capacity of food chains to apply safe food handling practices
"Disposing is cheaper than using or re-using" attitude in industrialised countries	Develop markets for 'sub-standard' products
Lack of processing facilities causes high food losses in developing countries	Develop contract farming linkages between processors and farmer
Large quantities on display and/or inadequate market systems	Marketing cooperatives and improved market facilities
Abundance and consumer attitudes lead to high food waste in industrialised countries	Public awareness

Source: FAO



There are a number of universal mechanisms that different stakeholders can employ to reduce food losses and waste:

Producers

- Harvest all that is grown and at the optimal time
- Invest in better storage technology
- Compost/mulch unavoidable organic waste
- Improve or adapt packaging such as interactive films and resealable packaging
- Apply technologies such as oxygen scavengers, to create modified atmosphere packaging

Food Industry

- Allow consumers to customise the amount of food they buy
- Donate unsellable, edible food
- Expand the definition of acceptable food and sell imperfect items at a discount

Policy Makers

- Set binding food wastage reduction goals
- Discourage sending food waste to landfills and enable growers to harvest all they grow
- Fund or create an awareness campaign to reduce food waste

Consumers

- Be aware of the food waste issue and demand more efficient circular food chains
- Don't buy more food than needed by planning meals, creating a detailed shopping list and shopping more frequently, buying less each time
- Store food properly, whether in air-tight containers or in refrigerators
- Understand expiration dates and treat them as a suggestion, not the law
- Accept "Ugly Produce"

Consumers around the world have already developed a distaste for food waste with more and more people cutting down on waste, demanding transparency throughout the production process, and choosing locally produced seasonal food. Food giant Nestlé, in the German newspaper Welt am Sonntag, predicts that eating will carry an ideological charge like belonging to a political party or a football club. There is even a new pathology, "Orthorexia Nervosa": an abnormal urge to eat healthily, correctly and ethically.

Production	Handling & storage	Processing & packaging	Distribution & market	Consumption
Facilitate donation of unmarketable crops	Improve access to low cost handling and storage technologies	Re-engineer manufacturing processes	Facilitate increased donation of unsold products	Facilitate increased donation of unsold goods from foodservice
Improve availability of agricultural services	Improve ethylene and microbial management of food in storage	Improve supply chain management	Change food date and labelling practices	Conduct consumer education campaigns
Improve market access	Introduce low-carbon refrigeration	Improve packaging to keep food fresher for longer	Change in-store promotions	Reduce portion sizes
Improve harvesting techniques	Improve infrastructure		Provide guidance on food storage and preparation to consumers	Ensure home economics is taught in schools, colleges and communities

Source: World Resources Institute



Conclusion

Food loss and food waste is a problem to which we cannot turn a blind eye. With France and Italy already leading the way, regulations will need to tighten globally to curb food losses. It is a terrible thing to throw away food when millions of people go to bed undernourished.

In developing countries, overcoming the infrastructure deficiencies should be considered an opportunity rather than a roadblock. For example, building better road networks and cool-storage facilities should be a priority for both government and private players in the agri-food sector. In developed countries, leaders need to develop transparent circular value chains that create a strong bond with the new “aware” consumer. Low (or zero) waste products could provide another crucial differentiating point between branded and private label offerings to consumers.

Consumers are directly and indirectly responsible for much of the food wasted globally. If they were willing to choose suboptimal food that may look different in terms of shape or colour, food that may be approaching or past its best-before date but is still fine to eat, this waste could be largely avoided.

The work done by the FAO and innovative food projects such as FoodCloud is commendable. However, we still have a long way to go, and each of us can play our part in the process by saying “No” to food waste.

Our senior research team



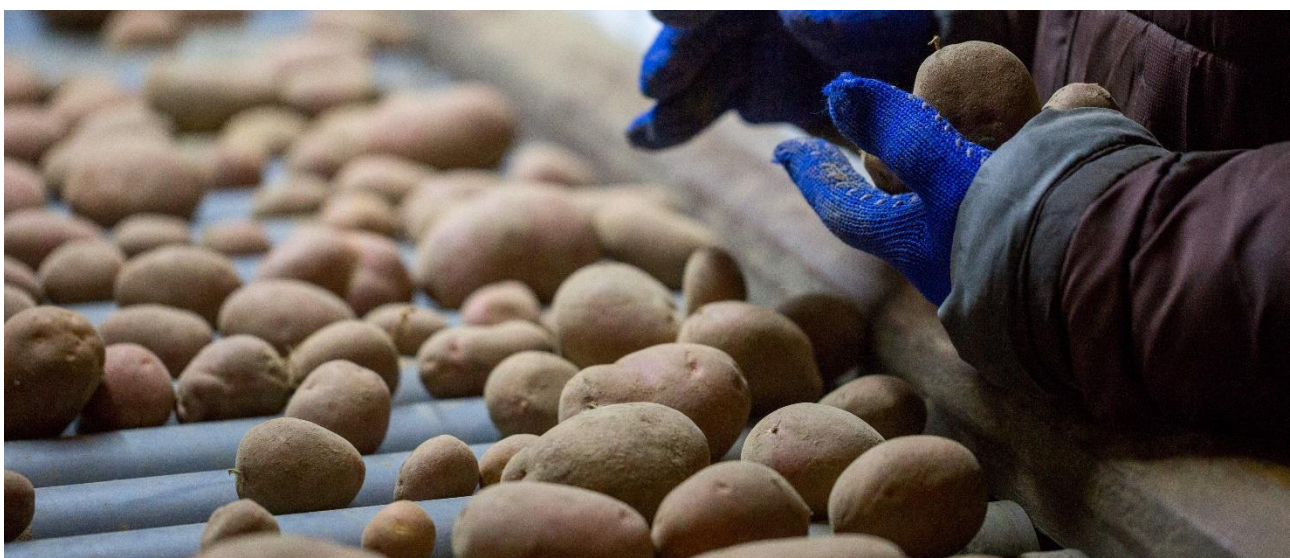
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About us

Farrelly & Mitchell empower some of the world's most ambitious companies and agencies to make the right decisions. With expert insight, local market intelligence and airtight recommendations, we build and implement sustainable strategies that allow our clients to restructure, transform and grow.

We have the hands-on industry experience and expertise, which we combine with local market insight and contacts to help our agribusiness, food and beverage clients to increase profits and improve efficiencies.

What makes us different?

We go above and beyond traditional consultants. As an international management consultancy, we specialise in the global food and agribusiness industry, with a particular focus on the implementation or execution of our recommendations. So we are committed to working with our clients, not just in the development or planning phase of a project, but importantly in its full implementation.

Food an agribusiness specialists

We understand food and agribusiness; we built our experience in this sector, and we employ the best global talent to provide in-depth solutions by addressing real problems sustainably and creating new opportunities for clients.

For the past decade, we have worked with clients across the globe and generated measurable results. We have worked on mandates across every link of the food and agribusiness value chain from large-scale farming operations to food or beverage manufacturing, distribution, retail and hospitality.

Each member of our team of over 200 experienced consultants has worked in industry at an operational and executive level.

We work globally with significant experience in Europe, Middle East and African markets.

Why partner with Farrelly & Mitchell?

Our team has worked at operational and strategic levels all over the European, Middle Eastern, and broader international food, beverage and agribusiness sectors. We have seen projects through from paddock to plate.

We understand the opportunities presented by the growth of the food, beverage and agribusiness sectors, in the Gulf region and across the globe. We work with primary producers, manufacturers, distributors and retailers.

If you are you looking to grow or expand your business, improve efficiency or quality control, or are buying or selling a business, get in touch, and let Farrelly & Mitchell become your project partners.

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