‘Why the EU should measure harvest food waste’ – A review of the evidence

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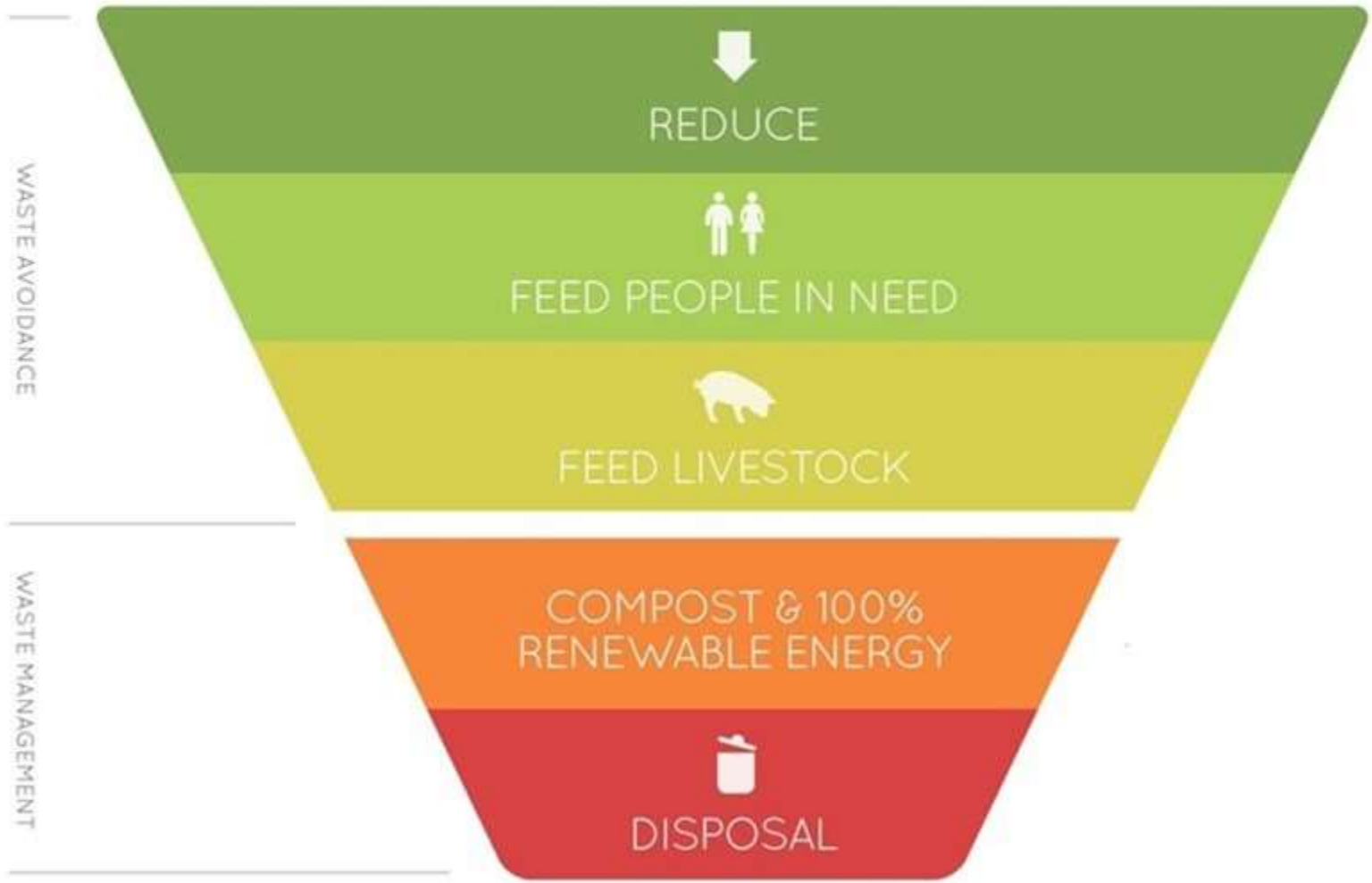
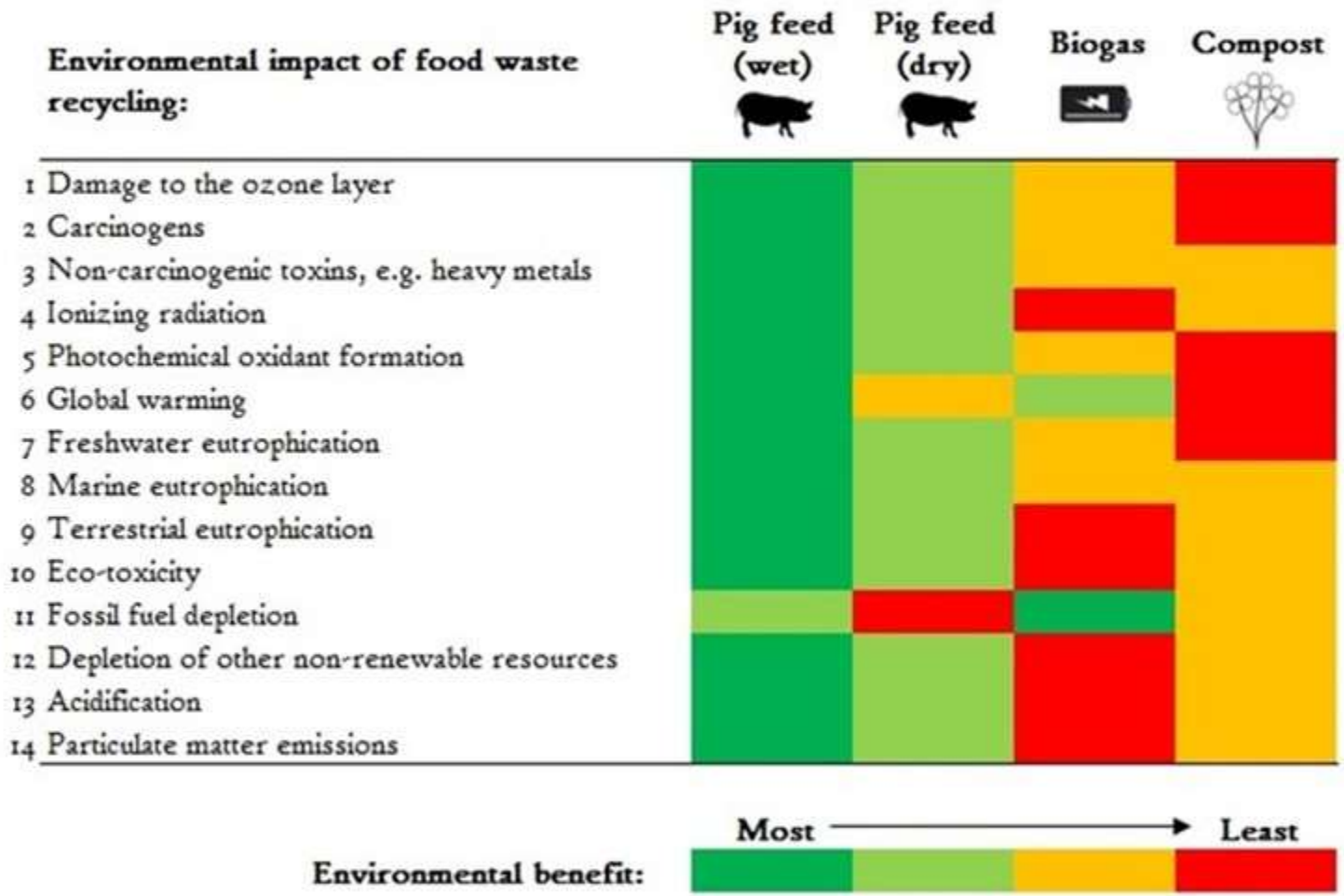
Why the EU should measure harvest food waste:

- Likely occurring on very large scale
- Protect farmers from Unfair Trading Practices
- Potential for very large environmental savings
- Large potential to save farmers time/money
- EU food security

the Food Waste Pyramid




Environmental impact of food waste recycling:
Pig feed (wet)
Pig feed (dry)
Biogas
Compost
1 Damage to the ozone layer
2 Carcinogens
3 Non-carcinogenic toxins, e.g. heavy metals
4 Ionizing radiation
5 Photochemical oxidant formation
6 Global warming
7 Freshwater eutrophication
8 Marine eutrophication
9 Terrestrial eutrophication
10 Eco-toxicity
11 Fossil fuel depletion
12 Depletion of other non-renewable resources
13 Acidification
14 Particulate matter emissions
Most
Least
Environmental benefit:

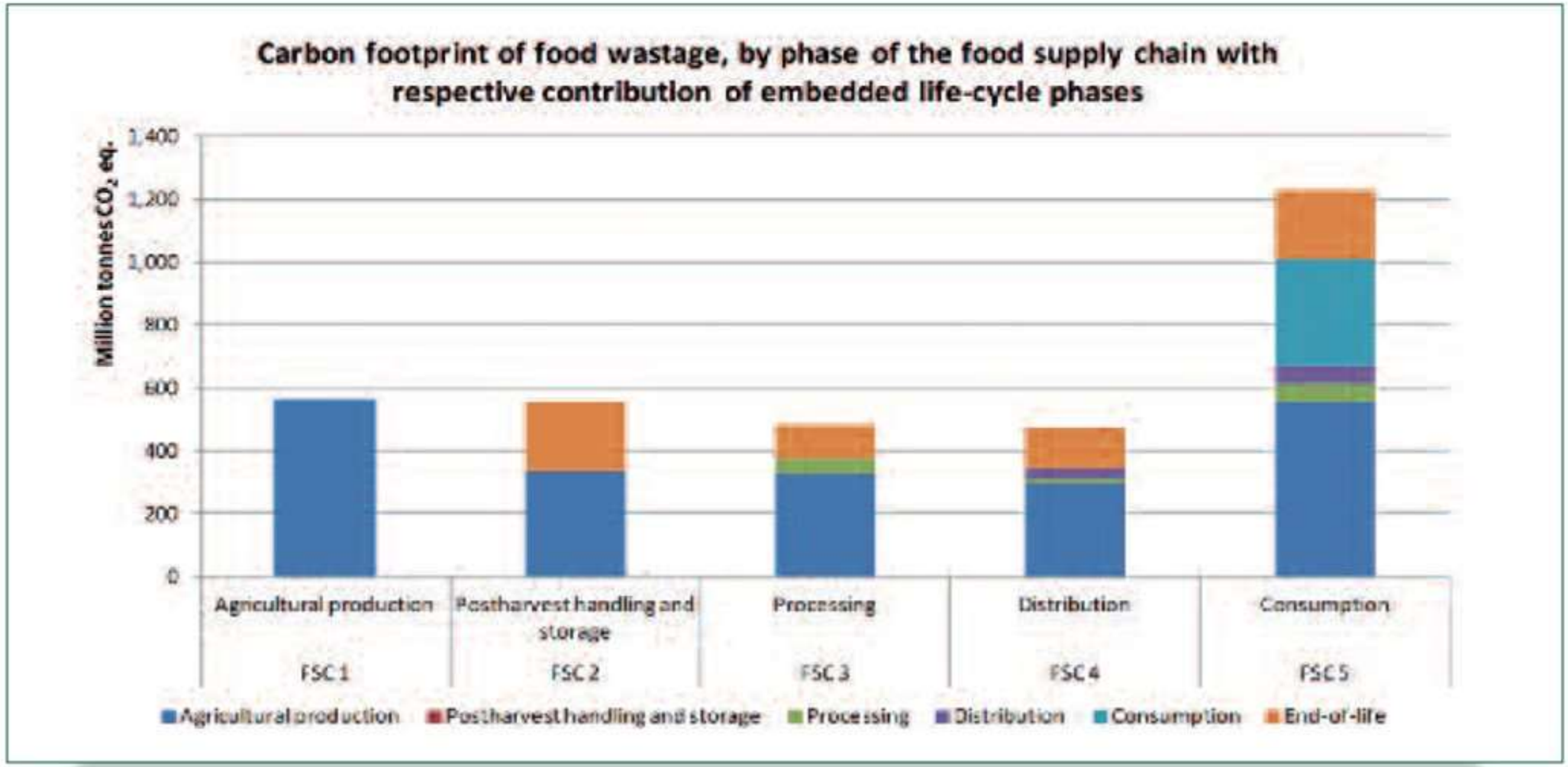
Agriculture accounts for approximately:

- **10% of the EU's total greenhouse gas emissions**
- **44% of total water abstraction**
- **40% of total EU land.**

Huge potential environmental savings of waste reduction! Not scattered across millions of separate consumers – comparatively concentrated.

The FAO estimate that globally the carbon footprint of food waste during agricultural production is higher than for processing & distribution:

Figure 11: Carbon footprint of food wastage, by phase of the food supply chain with respective contribution of embedded life-cycle phases



There were 10,000 pumpkins being wasted on this one small Pick Your Own pumpkin farm!

We spoke with one UK pumpkin farm who claimed to be wasting an average of half a million pumpkins each year.

The farm pictured here was wasting 20 tonnes of parsnips per week because of cosmetic outgrading. They were featured on chef Hugh Fearnley-Whittingstall's TV show *War on Waste*, and were speaking out because they were going out of business as a result of the combination of low prices and the cost of their waste.

Following the show's broadcast, numerous UK supermarkets started stocking more "wonky" produce lines – and we have heard from many farmers that as a result a higher proportion of their crop is being bought. For instance, Tesco report that since launching their "Perfectly Imperfect" line, the proportion of their producer's apples they can take rose from 87% to 97%.

One farmer Feedback interviewed (anonymous for fear of speaking out) said that they waste on average 25% of their carrots. Some carrots are rejected because of rotting or pest damage, but a large amount are simply too small, large, or wonky – these are mainly rejected at packhouse level and returned to the farm.

This amounts to 1,750 tonnes of their carrots per year wasted on one farm, equal to nearly 22 million portions (of 5 a day recommended for good health). This represents a huge financial loss to the farmer – in resources, labour power and time.

Feedback's Gleaning Network regularly visit farms which have to plough whole fields of their crop back into the field, usually because there is a glut, and the price has crashed so low it is not economical for them to harvest it.

This is often the result of farmers overproducing for fear they will be delisted or fined if they ever undersupply their retail customer. Demand is also unpredictable because of Unfair Trading Practices like last minute order cancellations from retailers chopping and changing between suppliers, and retailers often using cosmetic standards as an excuse for these rejections.

THE TIMES

Farmers get the cauliwobbles

British growers are in despair as tons of cauliflowers go to waste while supermarkets sell imported varieties

Tony Allen-Mills

March 5 2017, 12:01am,
The Sunday Times

Geoffrey Philpott is forced to export his cauliflowers at a loss while supermarkets stock up with Spanish varieties

In 2017, Feedback helped two Kent farmers who were willing to go on record spread word about the food waste they were experiencing.

Farmer Geoff Philpott reported 100,000 cauliflowers going to waste after his buyer dramatically reduced their order at the same time as a big glut occurred – the demand and price crashed. Another farmer, Trevor Bradley, reported wasting 25,000 cauliflowers a week because there was no market for them. Geoff said he was struggling to make ends meet because of the huge financial losses from this waste.

Following the news story, two major retailers immediately began a discount marketing drive on cauliflowers, stocking 720,000 extra cauliflower as a result. Being open about their food waste helped drive positive change:

Tesco to sell more cauliflowers at 79p following bumper crop

22 Mar 2017 | Beth Gault

Print | Email | Share | Comment | Save

Tesco's cauliflower commitment follows concerns by farmers this month that tonnes of the crop would go to waste

Tesco has bought 220,000 extra cauliflowers from suppliers this month in an effort to reduce food waste.

SHARE

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Aldi chops cauliflower prices to 29p following bumper crop

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Aldi has cut the retail price of cauliflower to try and triple consumption of the vegetable and support farmers.

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31 Mar 2017 | Updated: 05 Apr 2017

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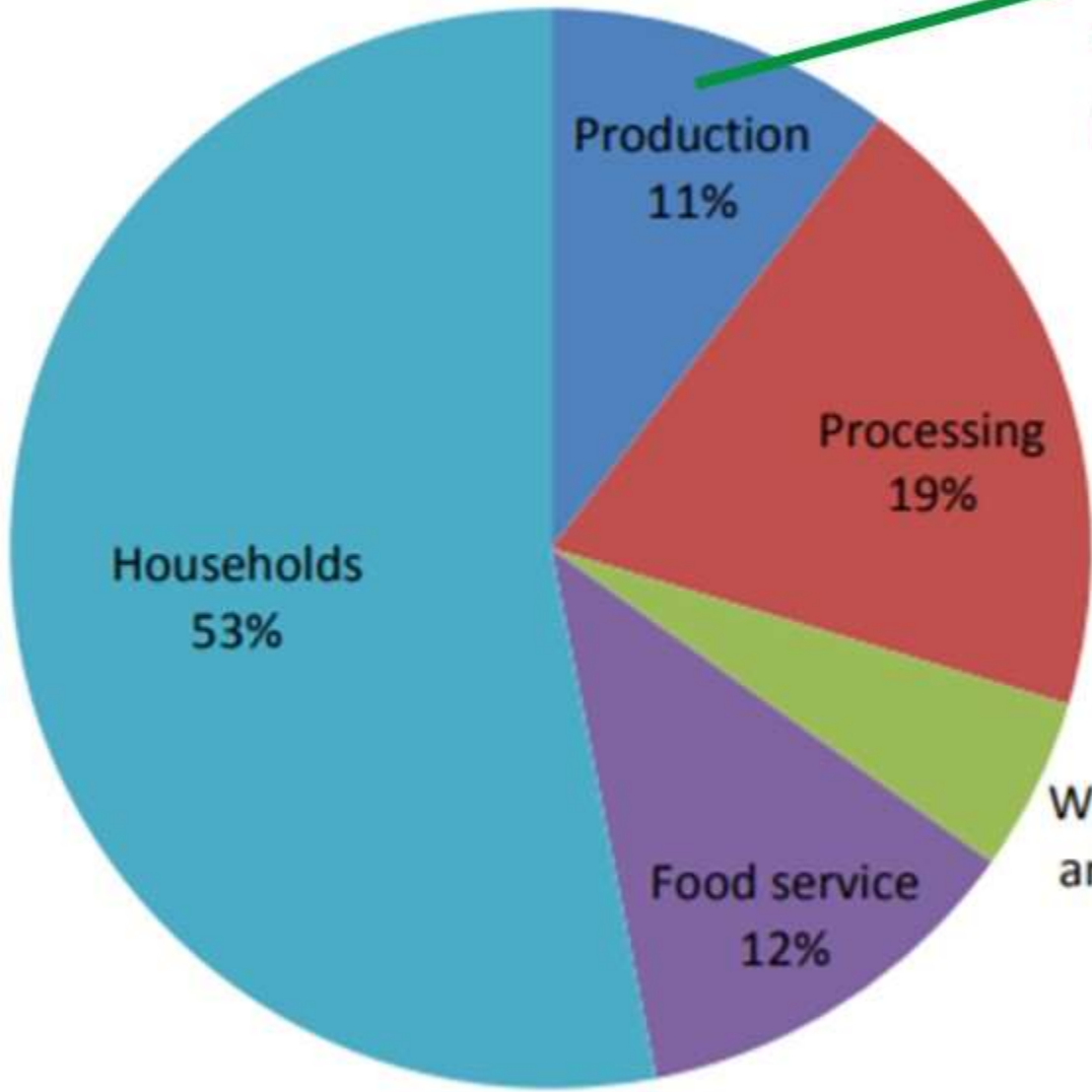
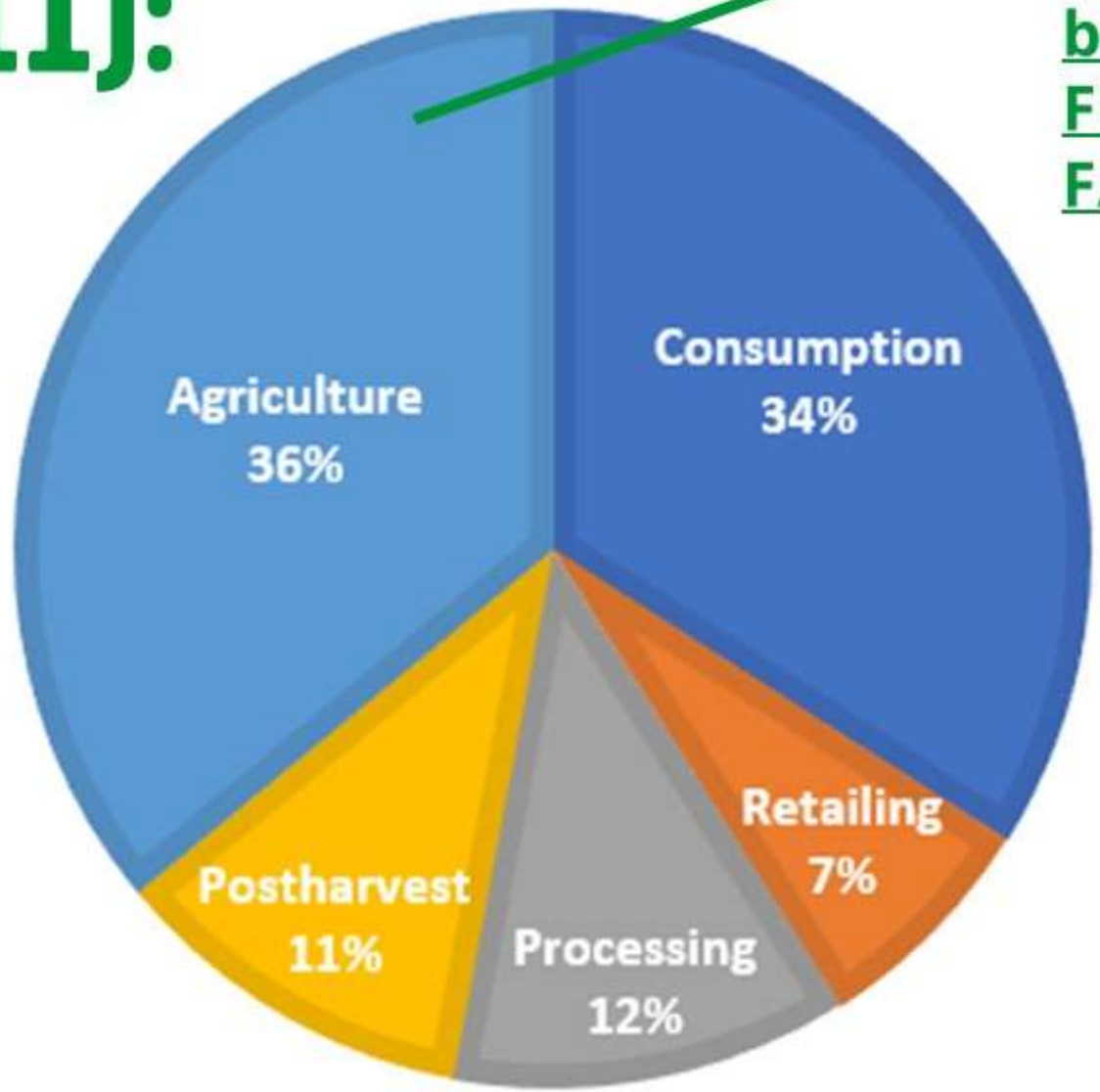
FUSIONS (2016):



Very low estimate for agriculture (27 million tonnes)

Data for EU countries

FAO (2011):



Far higher estimate for agriculture – reality could be anywhere between FUSIONS' 11% figure and FAO's 36% figure

Data for Europe including Russia

Science and Technology Options Assessment for the European Parliament apply the FAO methodology to EU-27 countries:

Table 5: Total amount of food waste (in 1000 tons) share of the individual stages of the supply chain across EU-27 in 2006

	Total amount of food waste	Specific amount of food waste	Agricultural production	Postharvest handling and storage	Processing and Packaging	Distribution	Consumption
	1000 tons	kg/capita	Share of the individual stages (%)				
EU-27	138 019.4	279.8	34.2	7.5	12.0	5.1	41.2
Austria	2 197.9	266.3	29.1	7.1	13.5	5.6	44.7
Belgium	3 068.6	291.9	41.1	7.6	10.7	4.5	35.9
Bulgaria	1 452.8	188.2	31.5	8.1	13.6	4.8	42.0
Cyprus	247.4	322.9	45.0	8.3	8.3	4.6	33.8
Czech Republic	1 923.0	187.6	23.4	3.8	16.5	6.3	50.1
Denmark	1 730.6	318.9	36.5	2.9	15.6	5.5	39.5

Very similar figure of 34.2% arrived at as EU average – this would be equal to 47 million tonnes (nearly double FUSIONS estimate)

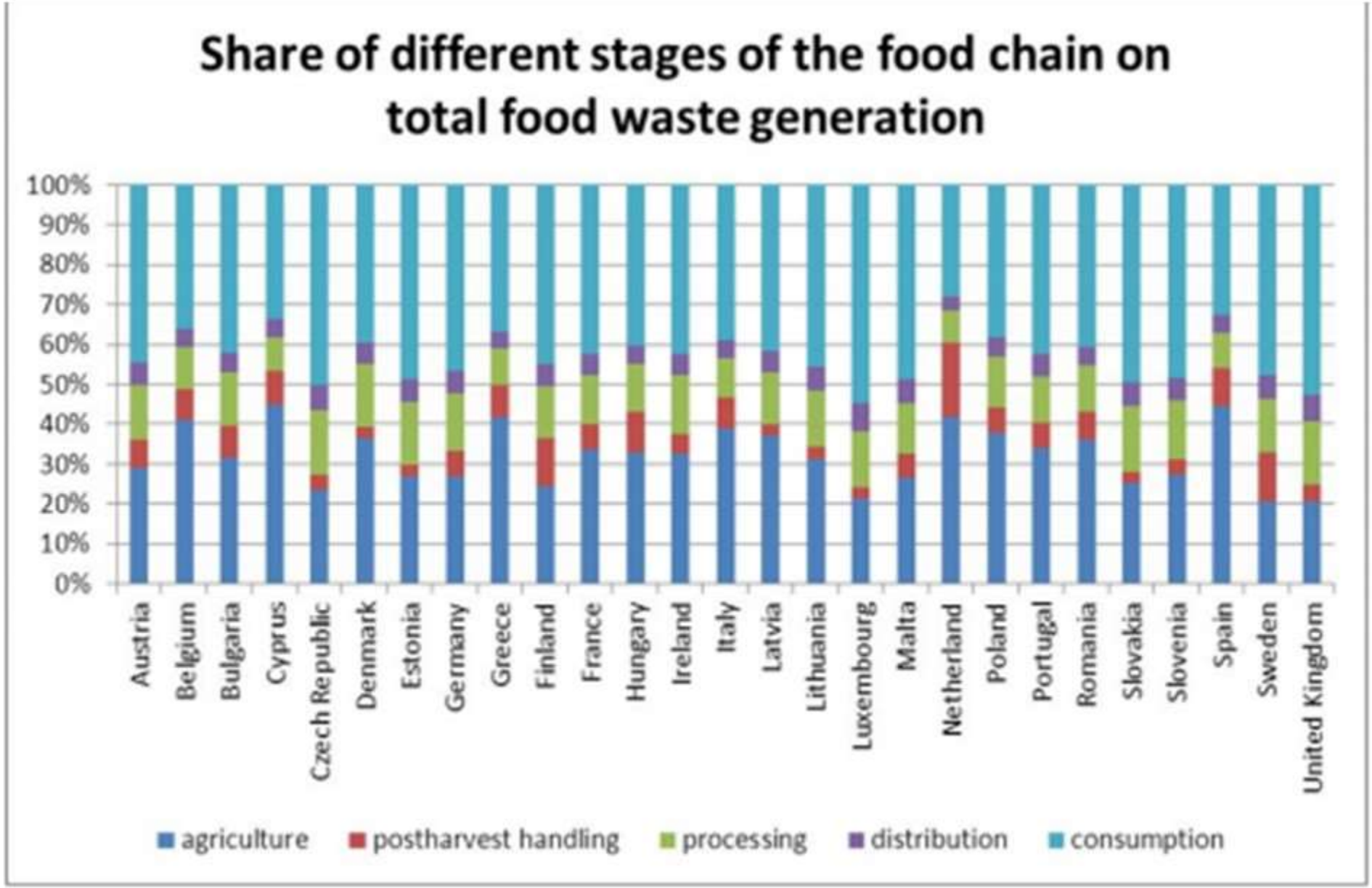


Figure 2: Share of the different stages of the food chain on total food waste generation across EU-27 in 2006 (ITAS-calculations)

With the FAO methodology, EU countries consistently have 20-45% of their food waste occurring at agriculture level

Surprisingly low level of waste in FUSIONS:

F.1 Production

Table 15. Underlying data and calculations for food waste estimations for the production sector.

Country	Food waste (tonnes)	Food amounts produced (tonnes)	Food waste (kg food waste /tonne of food produced)	Reference
Denmark[1]	169 000	22 796 969	7.4	Swedish Board of Agriculture, 2016
Finland[1]	63 000	7 901 090	8.0	Swedish Board of Agriculture, 2016
France	1 990 063	161 552 568	12.3	Redlingshöfer, 2015a
Germany	1 186 244	138 551 300	8.6	Priefer et al, 2013
Italy	1 246 603	71 832 125	17.4	Segrè and Falasconi, 2011
Sweden[1]	111 000	12 632 060	8.8	Swedish Board of Agriculture, 2016
Total	**4 765 910**	**415 266 111**	-	
Average (mean)	-	-	**10.4**	

[1] The figures is calculated from the preliminary report (Swedish Board of Agriculture, 2016), please see the final report for the final data.

Total food amounts produced for countries which have no food waste data available or have food waste data of insufficient quality = 416 197 485 tonnes
Multiply by above average and divided by 1000 (10.4×416 197 485)/1000) leads to
4 329 046 tonnes

Only 1% of total production wasted!

Compare estimate that 1% of total production wasted with FAO (2011) stats, where wastage ranges from 2-20% for different commodity types:

Estimated/assumed waste percentages for each commodity group in each step of the FSC for Europe incl. Russia.

	Agricultural production	Postharvest handling and storage	Processing and packaging	Distribution: Supermarket Retail	Consumption
Cereals	2%	4%	0.5%, 10%	2%	25%
Roots and tubers	20%	9%	15%	7%	17%
Oilseeds and pulses	10%	1%	5%	1%	4%
Fruits and vegetables	20%	5%	2%	10%	19%
Meat	3.1%	0.7%	5%	4%	11%
Fish and seafood	9.4%	0.5%	6%	9%	11%
Milk	3.5%	0.5%	1.2%	0.5%	7%

Within the sources FUSIONS does use as basis of figures, seems to be room for different interpretation of figures.

F.1 Production

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FUSIONS source for Germany was the STOA study mentioned earlier:

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Estonia	302.0	224.6	27.0	2.7	15.8	5.7	48.9
Germany	17 973.4	218.0	26.8	6.6	14.3	5.7	46.6
Greece	4 305.7	387.0	41.7	8.3	9.1	4.3	36.6
Finland	1 200.0	228.3	24.4	11.9	13.3	5.6	44.8

Looking at Table 5 in this study:

26.8% of Germany's 17.97 million tonnes of food waste occurs at agricultural level, making 4.8 million tonnes of food waste.

This is over 4 times higher than the 1.18 million tonnes figure given in the FUSIONS report.

FUSIONS source for Italy is Segrè A., Falasconi L. (2011). Il libro nero dello spreco in Italia: il cibo. (in Italian). Edizioni Ambiente.

(Translates as "residual in the field")

TABELLA 2.1 — **PRODUZIONE AGRICOLA PRODOTTA E RACCOLTA IN ITALIA NEL 2009**

	Produzione totale (t)	Produzione raccolta (t)	Residuo in campo (t)	%
Frutta	62.178.277	61.069.793	1.108.484	1,78
Agrumi	37.849.531	37.095.750	753.781	1,99
Olive*	34.541.779	32.866.405	1.675.374	4,85
Uva**	83.131.047	80.378.729	2.752.318	3,31
Ortaggi pieno campo***	127.936.217	124.416.350	3.519.867	2,75
Ortaggi in serra	15.712.446	13.744.021	1.968.425	12,53
Legumi e patate	20.009.632	18.966.593	1.043.039	5,21
Totale frutta	217.700.634	211.410.677	6.289.957	2,89
Totale ortaggi	163.658.295	157.126.964	6.531.331	3,99
Totale ortofrutta	381.358.929	368.537.641	12.821.288	3,36
Totale cereali	163.795.047	158.915.749	[illegible]	[illegible]
Totale	545.153.976	527.453.390	17.700.586	3,25

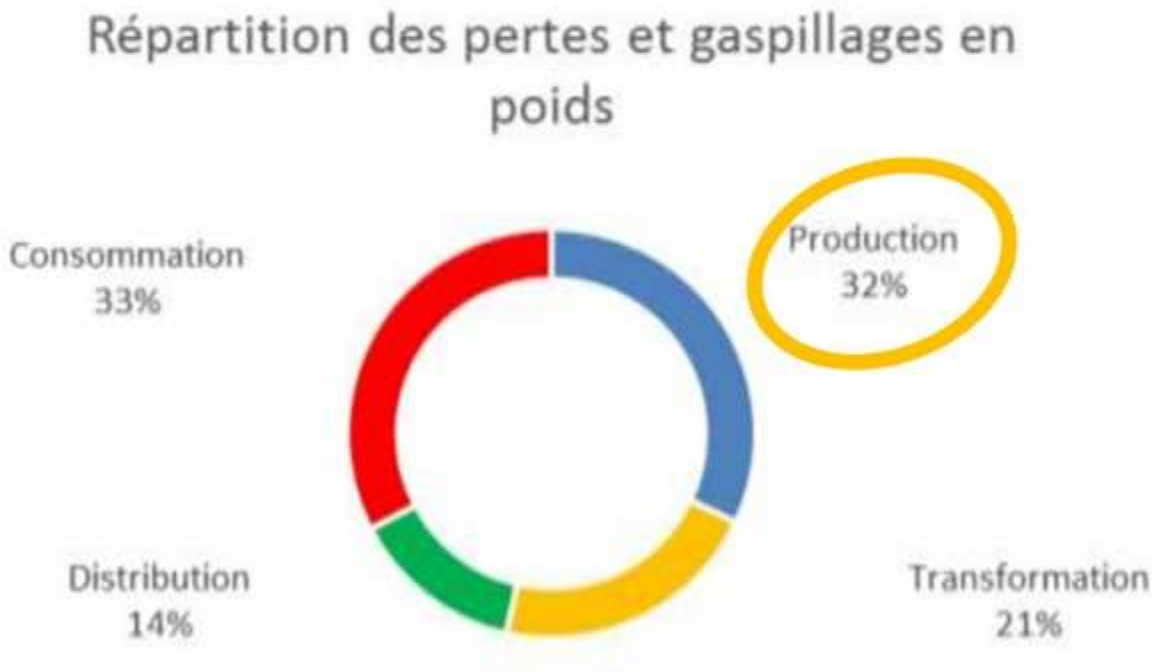
* Comprende olive da tavola e da olio.
** Comprende uva da tavola e da vino.
*** Comprende anche il pomodoro da industria.
Fonte: elaborazione degli autori su dati ISTAT.

Looking at Table 2.1 in this study 'Agricultural production produced and harvested in Italy in 2009':

It says that 17.7 million tonnes of food is left in the field, or 3.25% of production

This is over 17 times the volume of food waste estimated in the FUSIONS table (although it is also worth noting that overall food production in FUSIONS is also listed as significantly lower), and over twice the estimated percentage of 1.7% wasted

FUSIONS source for France is Redlingshöfer B., 2015a. La méthodologie utilisée dans l'étude INRA pour l'analyse des pertes alimentaires dans les filières. Innovations Agronomiques 48 (2015), 11-22.



Could not find the FUSIONS stated figures in the referenced study.

A more recent French study ADEME (2016), estimates that 32% of France's estimated 10 million tonnes of food waste occurs at primary production level – leading to an estimate of 3.2 million tonnes.

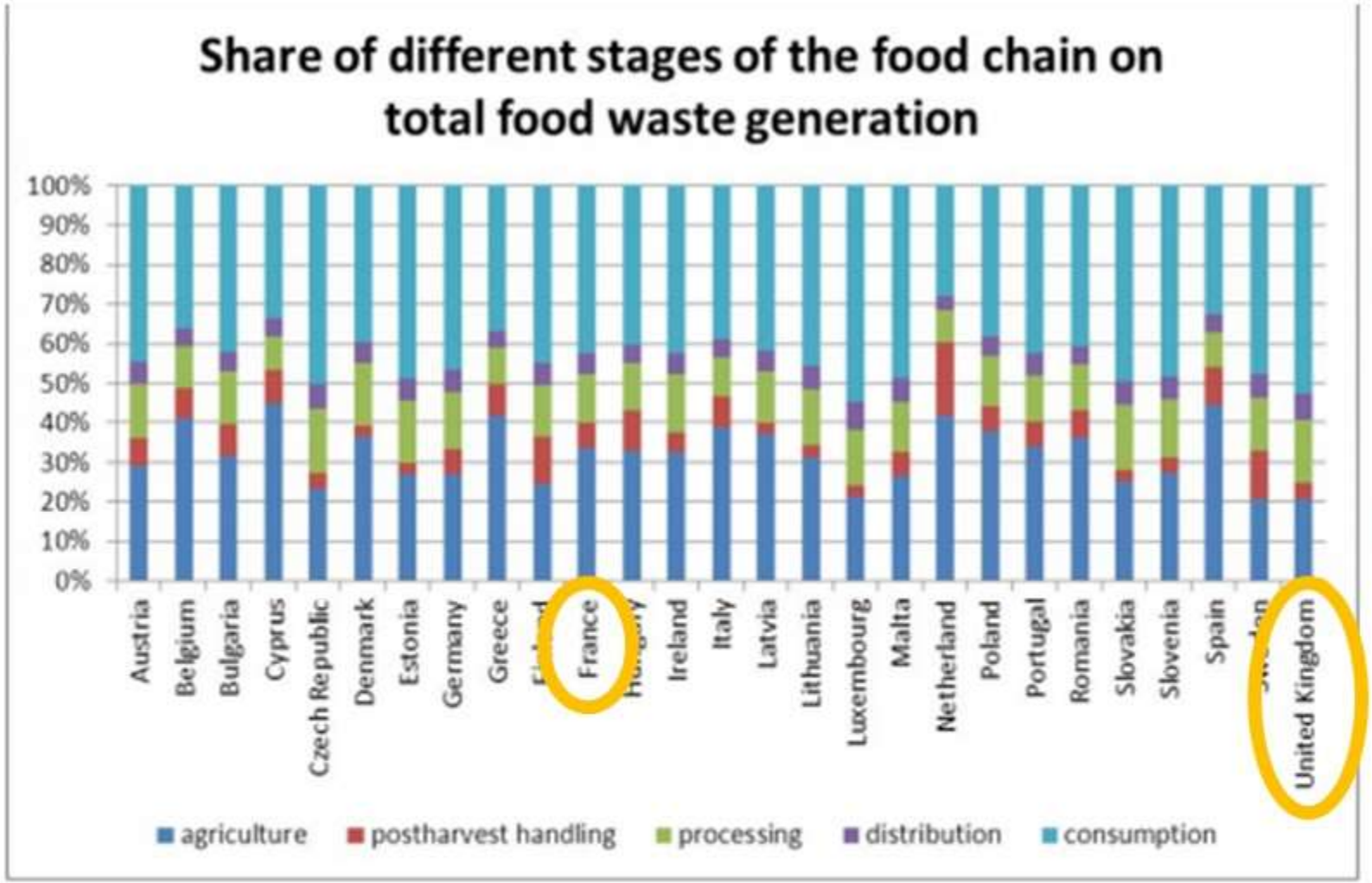


Figure 2: Share of the different stages of the food chain on total food waste generation across EU-27 in 2006 (ITAS-calculations)

- **WRAP's most recent estimate of the UK's primary production food waste is 2.5 million tonnes, which would make it roughly 20% of the UK's total food waste.**
- **Estimates for the UK's primary production food waste at 20% of the total, and France's estimates at 32% of the total are more in line with the FAO's estimates (see left).**

TESCO DATA:

Protein

Bacon

Field Losses	Processing Losses	Retail Waste	Consumer Waste
5%	2%	<1%	14%

Total Production Wasted **21%**

Beef Mince

Field Losses	Processing Losses	Retail Waste	Consumer Waste
2%	2%	<1%	11%

Total Production Wasted **15%**

Chicken Portions

Field Losses	Processing Losses	Retail Waste	Consumer Waste
4%	9%	<1%	14%

Total Production Wasted **27%**

Eggs

Field Losses	Processing Losses	Retail Waste	Consumer Waste
1%	1%	1%	6%

Total Production Wasted **10%**

Ham

Field Losses	Processing Losses	Retail Waste	Consumer Waste
5%	10%	<1%	13%

Total Production Wasted **28%**

Lamb

Field Losses	Processing Losses	Retail Waste	Consumer Waste
7%	13%	1%	5%

Total Production Wasted **26%**

Apples

Field Losses	Processing Losses	Retail Waste	Consumer Waste
11%	2%	<1%	14%

Total Production Wasted **27%**

Bagged Salad

Field Losses	Processing Losses	Retail Waste	Consumer Waste
17%	15%	1%	27%

Total Production Wasted **60%**

Bananas

Field Losses	Processing Losses	Retail Waste	Consumer Waste
2%	7%	1%	8%

Total Production Wasted **19%**

Berries

Field Losses	Processing Losses	Retail Waste	Consumer Waste
15%	7%	1%	11%

Total Production Wasted **33%**

Cucumbers

Field Losses	Processing Losses	Retail Waste	Consumer Waste
1%	5%	<1%	24%

Total Production Wasted **31%**

Grapes

Field Losses	Processing Losses	Retail Waste	Consumer Waste
6%	1%	1%	13%

Total Production Wasted **20%**

Mushrooms

Field Losses	Processing Losses	Retail Waste	Consumer Waste
4%	1%	4%	18%

Total Production Wasted **27%**

Onions

Field Losses	Processing Losses	Retail Waste	Consumer Waste
8%	7%	<1%	15%

Total Production Wasted **31%**

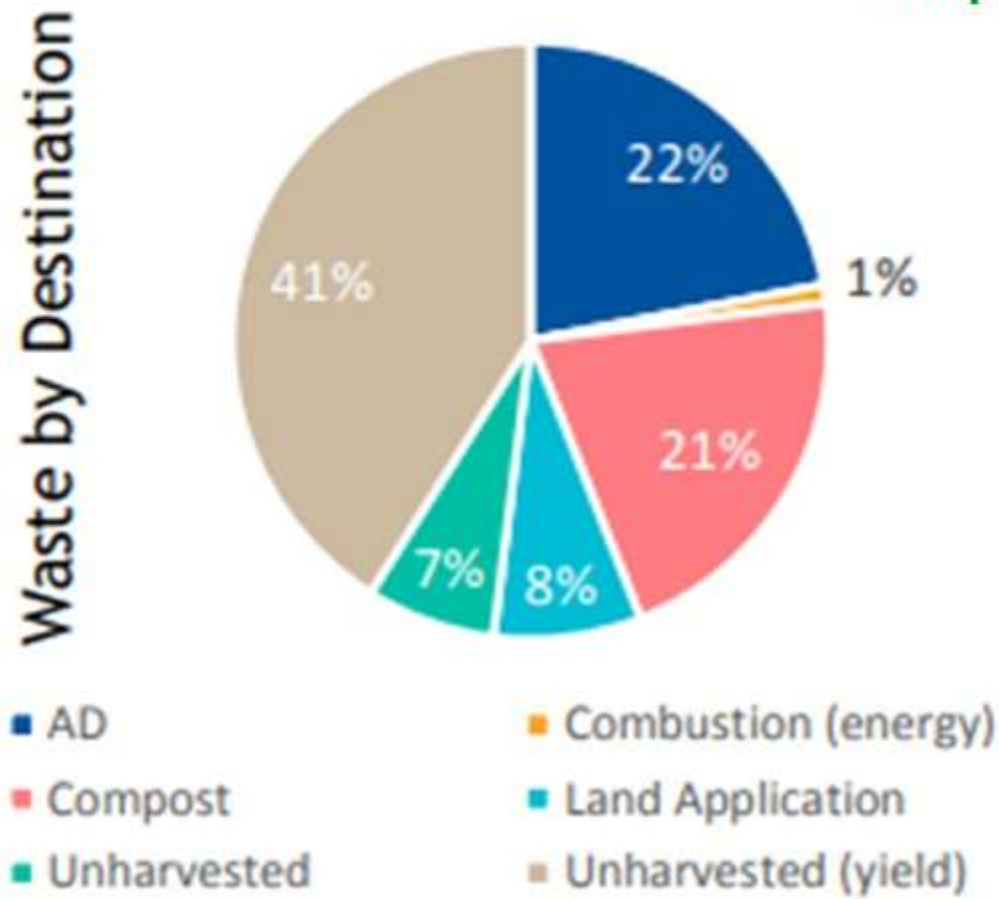
Citrus Fruits

Field Losses	Processing Losses	Retail Waste	Consumer Waste
<1%	3%	1%	17%

Total Production Wasted **22%**

G's FRESH:

One of Europe's largest fruit and vegetable producers – published comprehensive data for first time
Estimate 15% of its total production was lost or wasted (48,730 tonnes over 12 months 2017-18 – about 23,390 tonnes in the field)
Compared to 260,000 tonnes for entire UK retail sector



- In-field food waste accounts for 48% of the total
- Other waste streams are used to produce renewable energy or organic fertiliser that are used on farms to produce food more sustainably

WRAP – UK DATA (2011):

Table E1: Summary of resource maps detailing percentage loss and waste for eleven different fruits and vegetables through the supply chain.

Product	Field loss (Central range)	Grading loss	Storage loss	Packing loss	Retail waste
Strawberry	2-3%	1%	0.5%	2-3%	2-4%
Raspberry	2%	No data	No data	2-3%	2-3%
Lettuce	5-10%	No data	0.5-2%	1%	2%
Tomato	5%	7%	No data	3-5%	2.5-3%
Apple	5-25%	5-25%	3-4%	3-8%	2-3%
Onion	3-5%	9-20%	3-10%	2-3%	0.5-1%
Potato	1-2%	3-13%	3-5%	20-25%	1.5-3%
Broccoli	10%	3%	0%	0%	1.5-3%
Avocado	No data	30%	5%	3%	2.5-5%
Citrus	No data	3%	No data	0.1-0.5%	2-2.5%
Banana	No data	3%	No data	0-3%	2%

NB. For presentational purposes the stages in the supply chain are shown sequentially. In practice, harvested product will either be graded and packed for immediate sale or where appropriate stored and then graded and packed. As a result the data for all stored products cannot be used cumulatively.

Other produce specific studies from the EU:

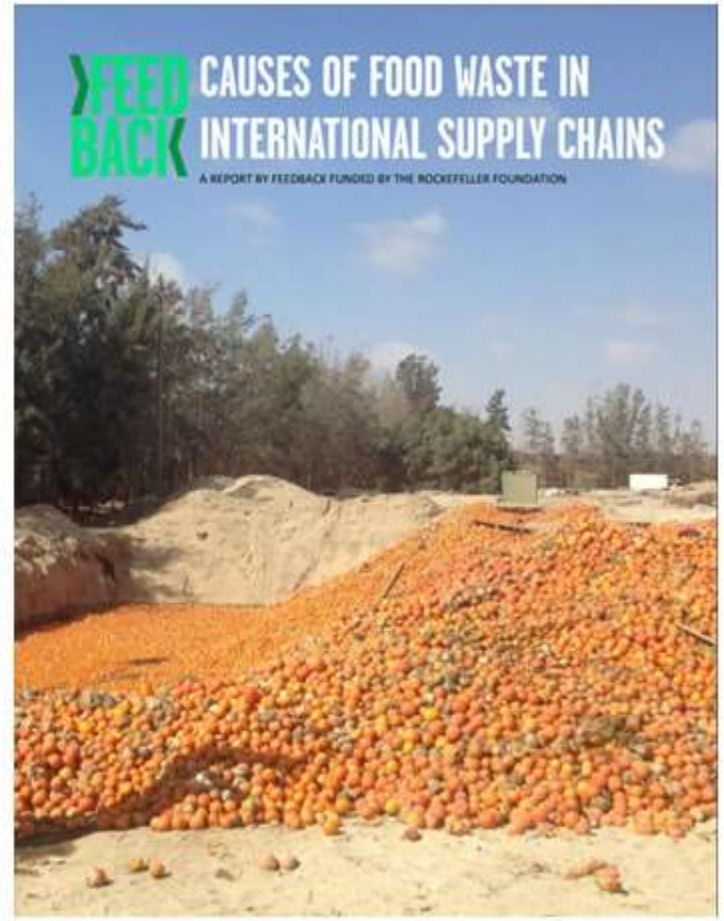
- **Hartikainen et al. (2018) found that 10-26% of fruit and vegetables were wasted at primary production level in a study of Nordic countries.**

- **Hartikainen et al (2017), also studying Nordic countries, studied side flows for various different food types. One of their findings was that "green pea side flow results show that there is a lot of green pea side flow across all countries, ranging from 18% to 21%. The main reasons for side flow was unharvested fields, but also related to the quality of the peas".**

- **Roels (2017) found 449,000 tonnes of food to be wasted on Belgium's farms.**


FEED BACK
FOOD WASTE IN KENYA
UNCOVERING FOOD WASTE IN THE HORTICULTURAL EXPORT SUPPLY CHAIN


FARMERS TALK FOOD WASTE
Supermarkets' role in crop waste on UK farms
FEED BACK


FEED BACK
CAUSES OF FOOD WASTE IN INTERNATIONAL SUPPLY CHAINS
A REPORT BY FEEDBACK FUNDED BY THE ROCKEFELLER FOUNDATION

10-16% FOOD WASTE ON AVERAGE YEARS

The 36 UK farmers who responded to Feedback's survey grew about 2.6 per cent of UK-produced fruit, vegetables and potatoes – based on rough extrapolations from this small sample size, we estimate that 2-4 million people could be fed their 5 a day for a year on fruit and veg wasted on UK farms, equal to more than the population of Birmingham or Manchester.

OVERPRODUCTION, LOW FOOD PRICES AND SUPERMARKETS:

SURVEY RESULT: Of farmers who answered the question 6 in 10 reported that "Farmers overproduce because there is pressure to always meet buyer orders, or risk losing contracts. It is difficult to find outlets for the surplus."

SURVEY RESULT: Of farmers who answered the question 9 in 10 reported that "Overproduction leads to greater price volatility."

SURVEY RESULT: Of farmers who answered the question 4 in 10 reported that "Supermarkets taking over a larger share of the UK retail market from wholesale markets and grocers has led to less outlets for lower grade produce."

SURVEY RESULT: Of farmers who answered the question 8 in 10 reported that "Generally low farm-gate prices increase the risk of it not being cost-effective to harvest produce."

UNFAIR TRADING PRACTICES:

SURVEY RESULT: Of farmers who answered the question 8 in 10 reported that "Retailers chop and change what proportion of their stock they buy from different suppliers in search for cheapest offer, which leads to more unpredictable demand."

SURVEY RESULT: Of farmers who answered the question 8 in 10 reported that "Differences between buyers' forecasts and confirmed orders, like last-minute order cancellations, make it difficult to find alternative buyers for produce before it deteriorates."

SURVEY RESULT: Of farmers who answered the question 7 in 10 did not agree with the statement "Costs incurred from on-farm wastage and returned produce, which arise from order forecasting errors, are compensated by the buyer."

A EUROPEAN PRODUCER, SPEAKING ABOUT UK SUPERMARKETS:

Imagine a supermarket will say it wants 10,000 packets of strawberries. On Monday and Tuesday the food is accepted. On Wednesday the food is rejected. When produce is not selling well – perhaps it's been raining and nobody is buying strawberries – the supermarket rejects the consignment, but there is no difference in the actual strawberries. Believe me, I have seen it happen time and time again...

A Peruvian onion producer noted the same concern:

"If prices are high then the market will take anything. If they are low due to oversupply, then cosmetics are enforced."

A former distribution centre manager confirmed the normality of these problems and listed other ways that his distribution centres reject stock in order to balance budget and space constraints:

> *"If your budget is short then you fill all of your loading spaces with your own stock. You then claim a temperature control issue and the supplier loses out. We would deliberately block loading space to get money back into our budget. You could perhaps save an extra £20,000 by rejecting a load, and this could make all the difference on a tight week."*

A former supermarket stock manager echoed the ways in which supermarkets transfer the cost of waste back onto their suppliers:

> *"You'd think, once the supermarket realised the level of complaints and losses due to returns, they'd do something about the issues. But no, because the complaints credits go back to the suppliers and they bear the brunt of the cost or the loss. So, we the supermarket, do everything wrong, and then we push the costs back and we underreport the waste. It's sickening really."*

COSMETIC SPECS, WEATHER AND IMPORTS:

SURVEY RESULT: Of farmers who answered the question 4 in 10 said that "Retailers use cosmetic standards as an excuse to reject produce when they can get a lower price elsewhere or their demand has fallen."

SURVEY RESULT: Of farmers who answered the question 8 in 10 respondents reported that "Weather produces gluts leading to price collapse' and 'Gluts of imports into the UK sometimes make it difficult to find outlets for produce."

PRESS RELEASE | 19 December 2018

Agreement on unfair trading practices in the food supply chain will protect all EU farmers

European Commission - Press release Brussels, 19 December 2018
The European Parliament, the Council and the Commission reached today a political agreement on a new set of rules that will ensure protection of 100% of EU farmers and of a very large majority of EU agri-food companies against practices contrary...

Refresh

Feedback currently doing research into potential for Unfair Trading Practices regulation to reduce food waste on farms, funded by EU REFRESH.

FEED BACK

If the retailers only knew just how much waste their forecasting was generating, they would surely do something about it.

Supplier reported to Christine Tacon, Groceries Code Adjudicator (The Grocer, 2017a).

Why the EU should measure harvest food waste:

- Likely occurring on very large scale
- Large potential to save farmers time/money
- Protect farmers from Unfair Trading Practices
- Potential for very large environmental savings
- EU food security

‘Why the EU should measure harvest food waste’ – A review of the evidence

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