TASTE Food: The Automated Scope 3 Tool for Tracking Emissions from Food

A Free Python-based Categorization Tool For Calculating Institutional Indirect Emissions From Purchased Food

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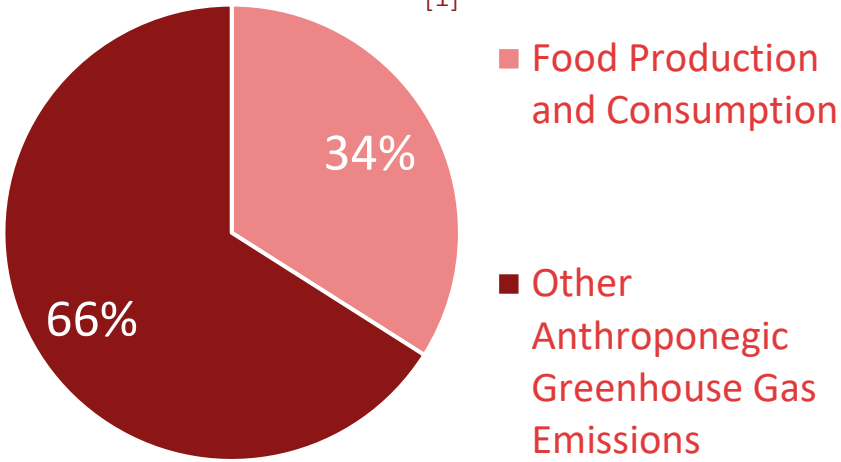
Food is a significant portion of anthropogenic emissions which must measured to be mitigated

Food's impact on 2015 Global Emissions

[1]



Hand Categorization is not effective

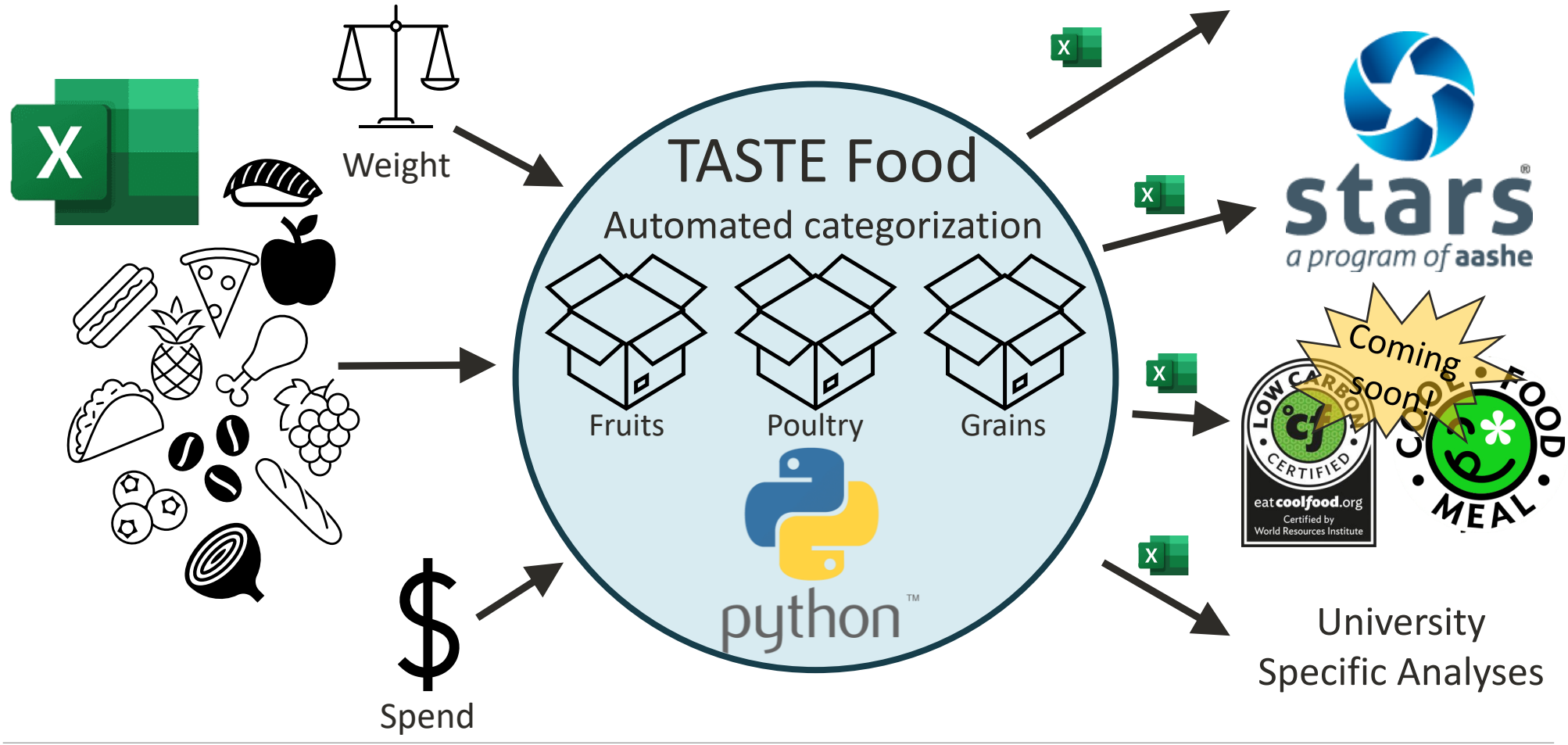
Time Intensive

Error Prone

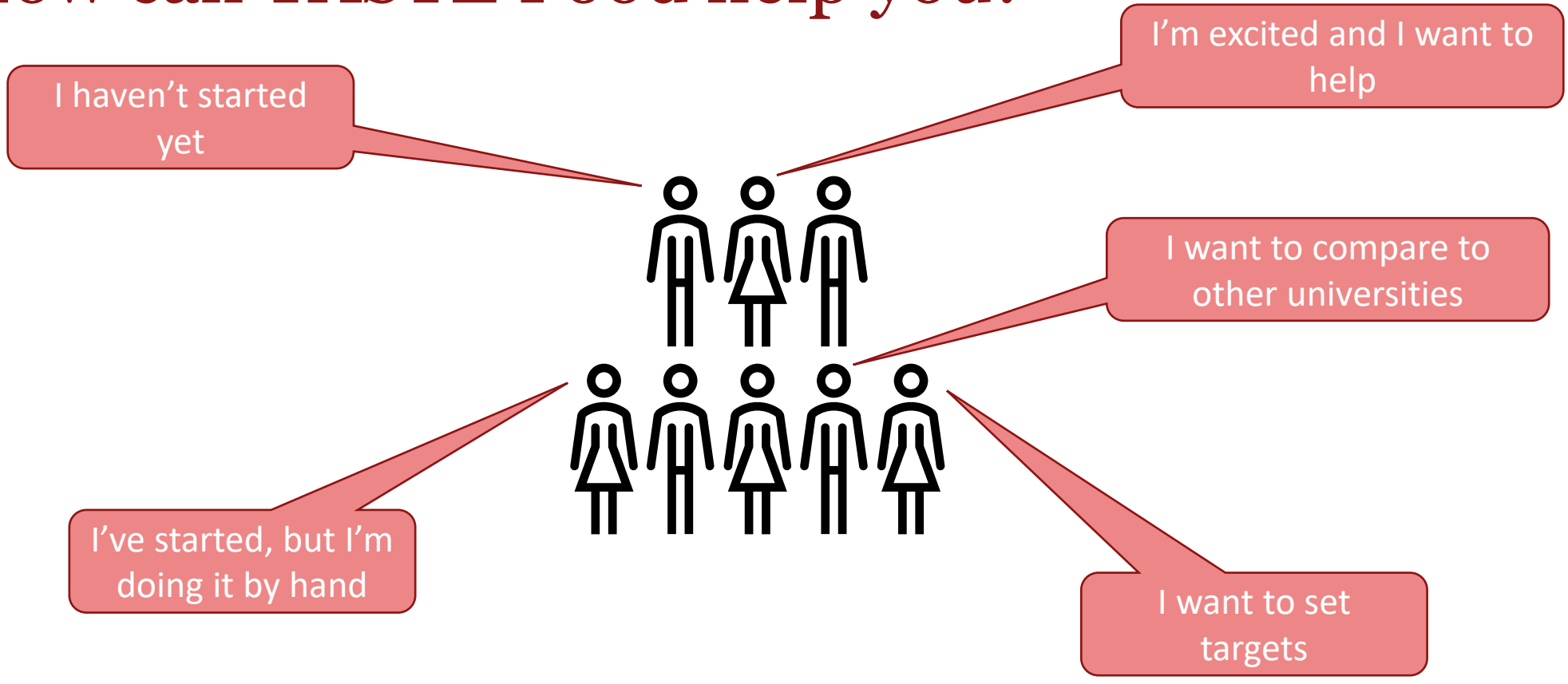
Not Reproducible

[1] Crippa, M., Solazzo, E., Guizzardi, D. *et al.* Food systems are responsible for a third of global anthropogenic GHG emissions. *Nat Food* **2**, 198–209 (2021). https://doi.org/10.1038/s43016-021-00225-9

What does TASTE Food do?

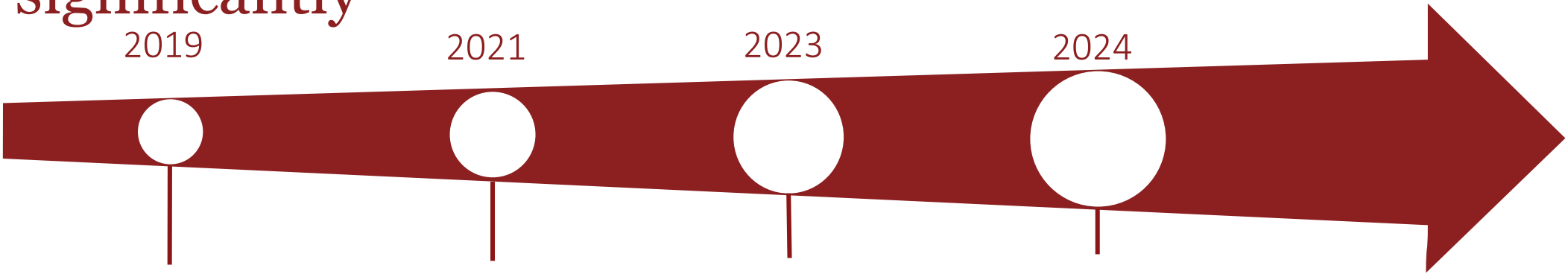


How can TASTE Food help you?



This work was only possible thanks to 8 universities of the SIMAP Nitrogen working group

Started with a few Universities and use has grown significantly



Stanford Dining data set
- 2,802+ metric tons
- 2,732+ unique items
- $10+ million

+7 universities

+9 universities

Total of:
- 52 universities
- 18,130+ metric tons
- 107,549+ unique items
- $124.7+ million

Future

WORLD RESOURCES INSTITUTE

....and more!

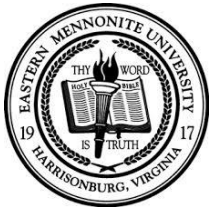
Residential & Dining Enterprises
STANFORD UNIVERSITY
Creating a Culture of Excellence

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

MCURC
THE MENUS OF CHANGE
UNIVERSITY RESEARCH COLLABORATIVE

How did I validate TASTE Food?

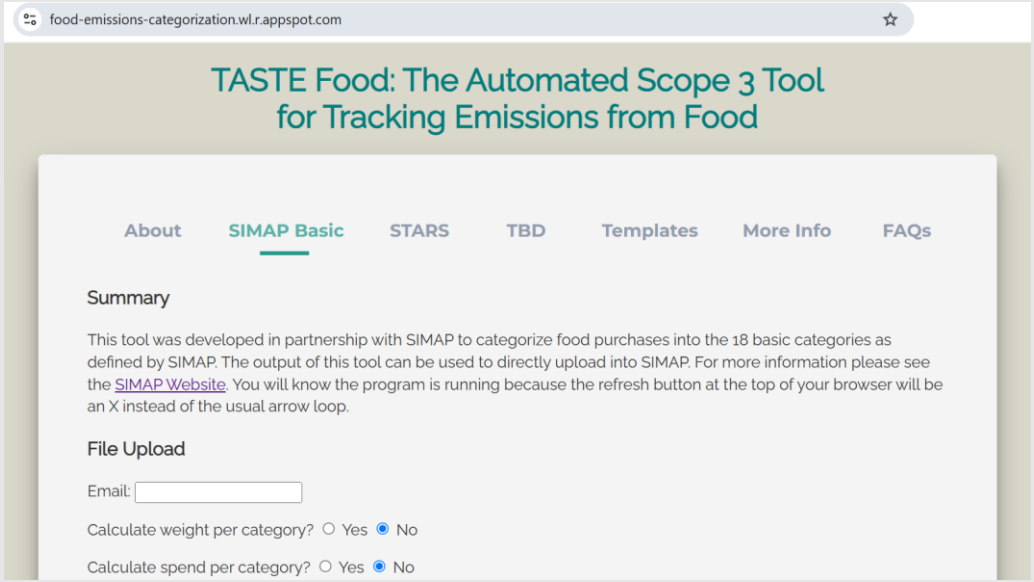
Just a Taste of the Universities that have used TASTE Food



Stanford Case Study

- Excel Input

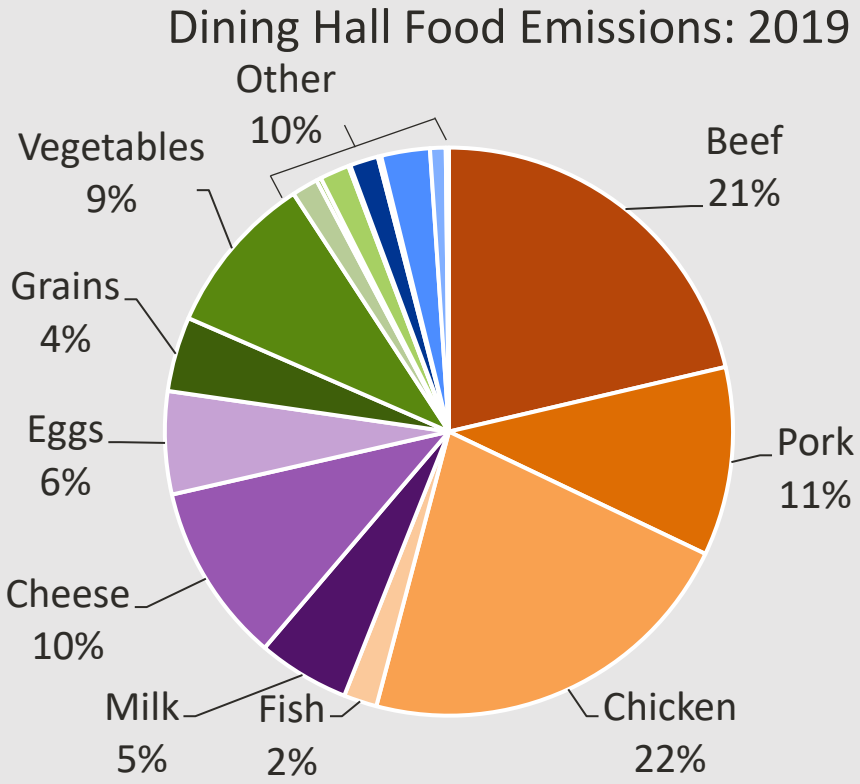
Appetizer Bao Chicken Baked ea	1000	pound
Appetizer Potato SkinBoat Baked Frozen 200ct	357	pound
Appetizer Potato Sliced SkinOnRaw Frozen lb	210	pound
Bagel Assorted Sliced SPI ea	22109.13847	pound
Bagel Blueberry Regular SPB ea	115.787125	pound
Bagel Cheese Sliced SPI ea	67.42613	pound
Bagel Cheese Jalapeno Sliced SPI ea	48	pound
Bagel Everything Sliced SPI ea	1147.251235	pound
Bagel MixedSeeds Sliced SPI ea	12	pound
Bagel Onion Sliced SPI ea	3.24079	pound
Bagel Plain Sliced Frz 72x2.3oz	1467.914945	pound
Bagel Plain Sliced SPI ea	1234.769655	pound



Beef	Pork	Chicken	Fish	Milk	Cheese	Eggs	Grains	Vegetables	Fruits	Potatoes	Beans	Nuts	Liquids	Coffee and tea	Oils	Sugars	Spices

Output and Emissions Calculations

Label	Weight	Unit	Organic	Local	Category 1	Category 2	Category 3
beverage coldbrew starbucks rtd joyride 20lt	1525.857	kilogram	No	No	Liquids	Coffee and tea	
beverage coldbrew starbucks rtd joyride 5gl	342	kilogram	No	No	Liquids	Coffee and tea	
beverage juice applecider100 sparkling 12x25	193.8	kilogram	No	No	Liquids		
biscuit buttermilk baked unsliced frz 120x2.2	3967.734	kilogram	No	No	Milk	Grains	
candy bar chocolatemilk hershey 36x1.55oz	28.16156	kilogram	No	No	Coffee an	Sugars	
condiment pickle relish dill 4x1gl	136.8	kilogram	No	No	Vegetables		
condiment pickle relish dill birite 4x1gl	45.6	kilogram	No	No	Vegetables		
dairy cream manufacturing 40 butterfat 6x0.5	20052.6	kilogram	No	No	Milk		
dairy creamer half half dispenser 3x.75gl	4446	kilogram	No	No	Milk	Oils	Sugars
dairy creamer half half ss glenview 360x10ml	28.9104	kilogram	No	No	Milk	Oils	Sugars
grocery vinegar wine red passover 12x12.7oz	4.524375	kilogram	No	No	Liquids		
juicebase orangeguava frz mm 4x90oz	587.8125	kilogram	No	No	Liquids		
oil blend 75-25canolaolive roseli 4x1gl	15.2	kilogram	No	No	Oils		
salsa chunky medium thick gl	182.4	kilogram	No	No	Vegetables		
soda cocacola classic 24x12oz	1539	kilogram	No	No	Liquids		
syrup agave org gl	629.375	kilogram	Yes	No	Sugars		
syrup maple gradea 4x1gl	273.6	kilogram	No	No	Sugars		



Want to Try It?

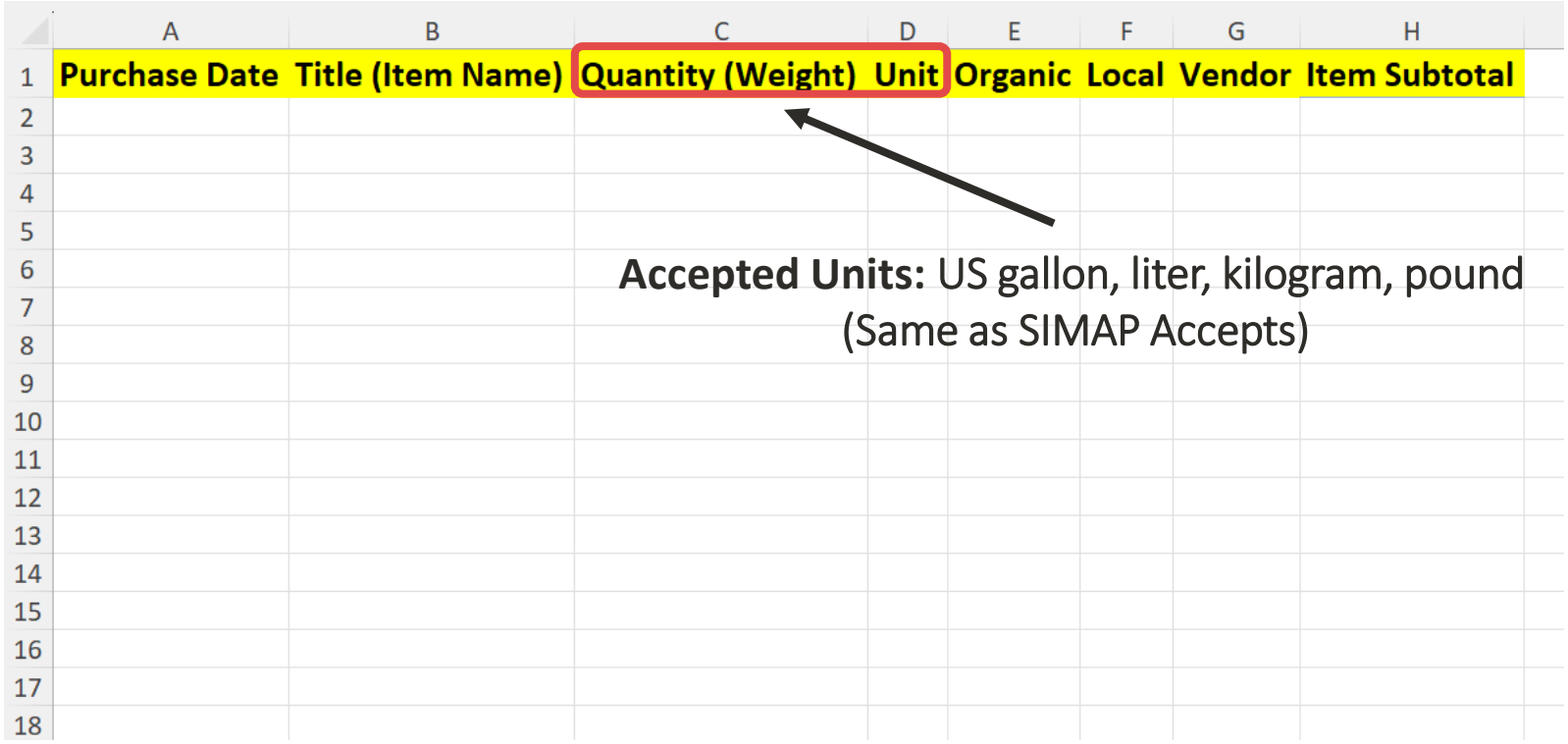
Link to TASTE Food

Want to Help?

https://bit.ly/TASTE_Food_Help

Backup Slides

Inputs: Simple Excel, the only required column for categorization is Title (Item Name)



Categorized Data Sheet – Ready for SIMAP upload

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Start date**	**End date**	**Label**	**Weight**	**Unit**	**Organic**	**Local**	**Category 1**	**Category 2**	**Category 3**	**Vendor**	**Dollars**	
2			salmon fzn coho filet skin on	1170.27	kilogram	No	No	Fish			sea2table		
4			chicken tender fritter	6803.88	kilogram	No	No	Chicken			good source		
5			ice cream walrus assorted flavors	2872.8	kilogram	No	No	Milk			walrus ice cream		
6			cheese mozzarella shred feather low-mois	2349.61	kilogram	No	No	Cheese			us foods		
7			beef ground 81 19 ref	2881.91	kilogram	No	No	Beef			us foods		
8			egg liquid whole pasteurized bag ref	5170.95	kilogram	No	No	Eggs			us foods		
9			beef shaved korean bbq ckd fzn	750.06	kilogram	No	No	Beef			us foods		
10			chips corn frito scoops	3154.01	kilogram	No	No	Grains			frito lay		
11			blueberries	629.85	kilogram	No	No	Fruits			fresh point produce		
12			potatoes french fries curly seasoned fzn	3864.6	kilogram	No	No	Potatoes			us foods		
13			pork carnitas	1651.57	kilogram	No	No	Pork			national food group (csv)		
14			fresh crownless pineapple	2447.12	kilogram	No	No	Fruits			fresh point produce		
15			chicken chunk breaded fritter	2902.99	kilogram	No	No	Chicken	Grains		good source		
16			snack popcorn white cheddar frito lay	407.19	kilogram	No	No	Potatoes			frito lay		
17			fresh honeydew	1938	kilogram	No	No	Fruits			fresh point produce		
56			pizza mini pepperoni mama rosa 4 25 oz	638	kilogram	No	No	Pork	Cheese	Grains	core mark		

TASTE Food is Compatible with Several Reporting Platforms

SIMAP Basic Food

- 18 categories
- Weight-based analysis
- Up to 3 categories per item

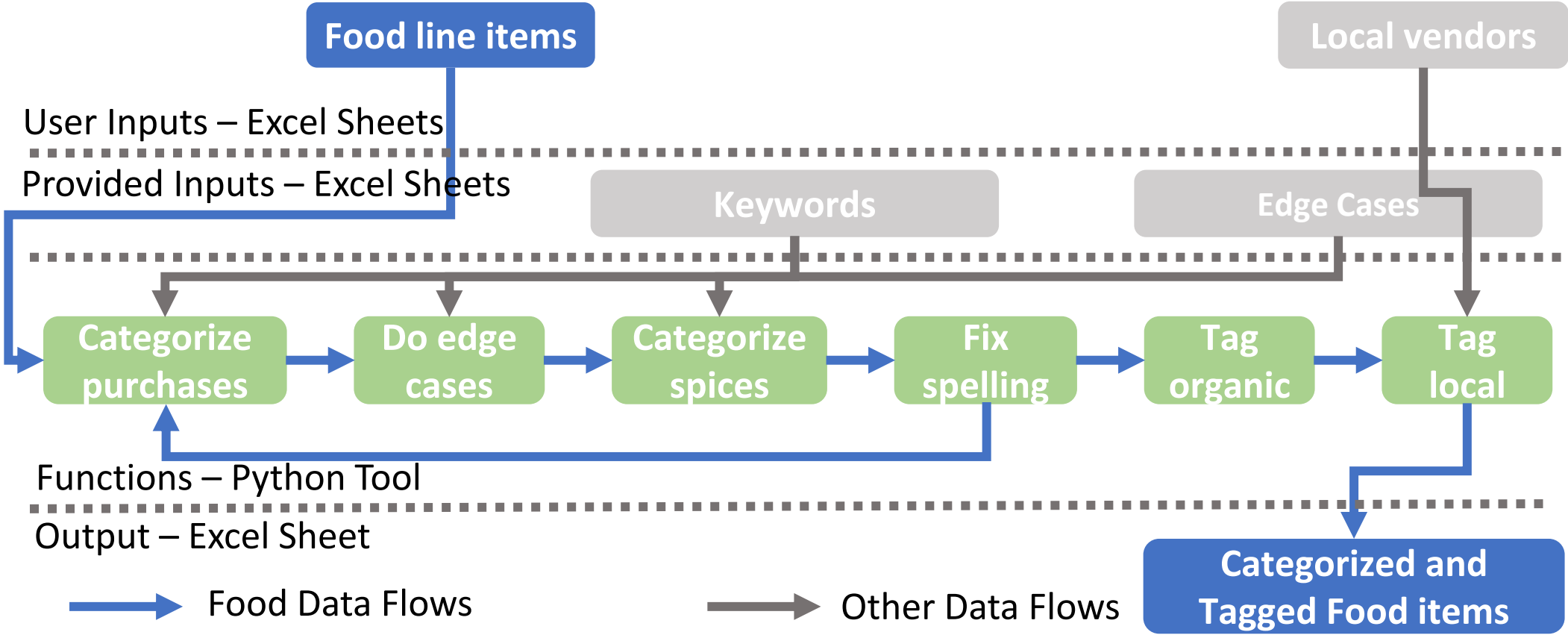
AASHE STARS

- Focus on Plant-based, Organic, and otherwise sustainably sourced foods
- Spend-based analysis

WRI Cool Food Pledge

- 56 categories
- Weight-based analysis
- Up to 3 categories per item

Categorization Methodology



Scope of emissions are defined by level of control entity has on each category

(Direct) Scope 1

- Entity facilities
- Entity vehicles

(Indirect) Scope 2

- Purchased electricity, steam, heating & cooling for own use

(Indirect) Scope 3

Upstream

- Purchased Goods and Services
- Capital Goods
- Fuel and Energy Related Activities
- Transportation and Distribution
- Waste Generated in Operations
- Business Travel
- Employee Commuting
- Leased Assets

Downstream

- Transportation and Distribution
- Processing of Sold Products
- Use of Sold Products
- End-of-life Treatment of Sold Products
- Leased Assets
- Franchises
- Investments

Life Cycle Analyses (LCAs) allow for emissions factors (EFs) for categories of foods

Land Use Change	Farm	Animal Feed	Processing	Transport	Retail	Packaging
Aboveground changes in biomass from deforestation, and belowground changes in soil carbon	Methane emissionsfrom cows, methane from rice, emissions from fertilizers, manure, and farm machinery	On-farm emissions from crop production and its processing into feed for livestock	Emissions from energy use in the process of converting raw agricultural products into final food items	Emissions from energy use in the transport of food items in-country and internationally	Emissions from energy use in refrigeration and other retail processes	Emissions from the production of packaging materials, material transport and end-of-life disposal

$$CO_{2_{item\ purchased}} = kg_{item\ purchased} * emissions\ factor \left[\frac{kg\ CO_2}{kg_{item\ purchased}}\right]$$

$$CO_{2_{item\ purchased}} = \$_{item\ purchased} * emissions\ factor \left[\frac{kg\ CO_2}{\$_{item\ purchased}}\right]$$

- LCA is a process that analyzes emissions associated with a product or process by determining emissions associated with each stage of that product or process during its entire lifetime
- Most EFs are spend-based or weight-based and are available for aggregate food categories such as vegetables, fruits, beef, etc.

If you do not have supplier specific emissions factors, you must use industry category emissions factors

- Current SIMAP Food industry emissions factors:

	Beef	Pork	Chicken	Fish	Milk	Cheese	Eggs	Grains	Vegetables	Fruits	Potatoes	Beans	Nuts	Liquids	Coffee and tea	Oils	Sugars	Spices
Emissions Factor (kg CO2/kg food)	41.3	9.8	4.4	5.0	2.2	8.7	3.7	1.5	0.5	0.4	0.4	1.6	4.3	0.5	9.4	3.5	1.6	9.4

- Life cycle analyses exist for some food items within a category and these are aggregated to determine emissions factors for categories of food purchases
- Supplier specific emissions factors can be particularly difficult with food

TASTE Food can process all of these

- The more data you provide, the more TASTE Food can do for you

	A	B	C	D	E	F	G	H	I	H
1	Purchase	Purchas	Title (Ite	Purchas	Quantity	Unit	Organic	Local	Vendor	Item Subt	Item Subtota
2			CHKN, BRST DCD 1/2" FC LS 2/5#						Performance Food	$156,821.22	
3			EGG, BIB 20#						Performance Food	$155,027.95	
4			BF, MFF STK SHVD TFF 2/5#						Performance Food	$154,721.08	
5			CHKN, TNDRS JMB 40#/CS						Performance Food	$138,591.21	
6			CHKN, HRML THGH FBRSD 2/5# AV						Performance Food	$131,173.94	
7			CHKN,TYSN TNDRLN BRD 1.8 OZ 2/5#						Performance Food	$122,130.07	
8			DGH, PIZZA BLL WHT FZ 20/20Z						Performance Food	$84,321.70	
9			CHZ, MOZZ SHRD BACIO 6/5#						Performance Food	$81,051.10	
10			BF, PATTY BRGR 60/2.67Z						Performance Food	$80,268.52	
11			BCN, HRML PRECKD 288SL						Performance Food	$71,974.54	
12			FISH, SALMON SKNLS						Ipswich Shellf	$69,895.05	
13			VEG, BROC FLOR 6/3#						Katsiroubas Brot	$67,969.72	
14			CHKN, BRST NUGG .71 OZ 2/5#						Performance Food	$58,546.11	
15			CHKN, BRST BRD 3Z RND PTTY 2/5#						Performance Food	$56,922.09	
16			SCE, ALFREDO RTU 4/80Z						Performance Food	$55,286.17	

	A	B	G	H
1	Purchase Date	Title (Item	dor	Item Subtotal
2	6/30/2023	EGG, LIQUID W	VIEW FARMS	$21,367.74
3	6/30/2023	CHICKEN, BREA RAW REF CVP J	KENT FARMS	$20,395.21
4	6/30/2023	POTATO, FRENC	OT CLASSIC	$15,852.89
5	6/30/2023	SHORTENING, F STABLE OIL	EST VALUE	$14,367.46
6	6/30/2023	BEEF, PATTY GF	ERINE	$14,296.84
7	6/30/2023	CHICKEN, THIGI	KENT FARMS	$12,151.09
8	6/30/2023	DETERGENT, DI	AB	$11,948.07
9	6/30/2023	CHEESE, MOZZA MILK-PART-SKIN	Y	$10,211.75

TASTE Food: The Automated Scope 3 Tool for Tracking Emissions from Food

About | SIMAP Basic | STARS | TBD | Templates | More Info | FAQs

Summary

This tool was developed in partnership with SIMAP to categorize food purchases into the 18 basic categories as defined by SIMAP. The output of this tool can be used to directly upload into SIMAP. For more information please see the SIMAP Website. You will know the program is running because the refresh button at the top of your browser will be an X instead of the usual arrow loop.

File Upload

Email:

Calculate weight per category? ○ Yes ◉ No

Calculate spend per category? ○ Yes ◉ No

Use Common Abbreviations? ○ Yes ◉ No

Use Advanced Autocorrect? ○ Yes ◉ No

Select these based on the provided data and specifics of your data

Please upload your food file below. Make sure to follow the template provided in the Templates Tab. Choose File No file chosen

Calculate weight per category? ◉ Yes ○ No

	A	B
1	Total weight (kg)	
2	Beef	144.2423
3	Pork	168.8269
4	Chicken	207.6091
5	Fish	27.21552
6	Milk	248.7952
7	Cheese	52.73007
8	Eggs	137.892
9	Grains	460.4866
10	Vegetables	263.9905
11	Fruits	63.95647
12	Potatoes	395.5322
13	Beans	39.9161
14	Nuts	13.60776
15	Liquids	51.2559
16	ffee and t	16.10252
17	Oils	242.9552
18	Sugars	77.19002
19	Spices	32.20503

Weight by Category

	Kilogram
1 US Gallon	3.8
1 Liter	1.0038536
1 Pound	0.453592

Accepted Units: US gallon, liter, kilogram, pound

(Same as SIMAP Accepts)

- If select “Yes”, will include a tab in the output file with the total amount of weight in kilograms categorized to each category
- Weight is split evenly among all categories for an item
- Conversion from liquids to Kilogram is same as SIMAP assumes

Calculate spend per category? ◉ Yes ○ No

	A	B
1		Total spend ($)
2	Beef	1219.3
3	Pork	614.66
4	Chicken	1301.055
5	Fish	187.71
6	Milk	764.385
7	Cheese	434.87
8	Eggs	627.07
9	Grains	1804.24
10	Vegetables	1051.175
11	Fruits	199.69
12	Potatoes	1470.04
13	Beans	105.15
14	Nuts	83.84
15	Liquids	186.625
16	offee and t	281.005
17	Oils	911.26
18	Sugars	429.345
19	Spices	113.09

Spend by Category

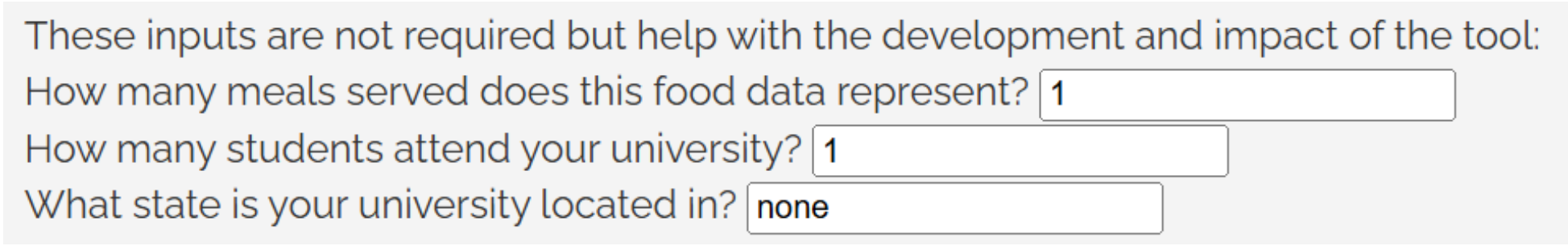
- If select “Yes”, will include a tab in the output file with the total amount of spend categorized to each category
- Spend is split evenly among all categories for an item

Use Common Abbreviations? ◉ Yes ○ No

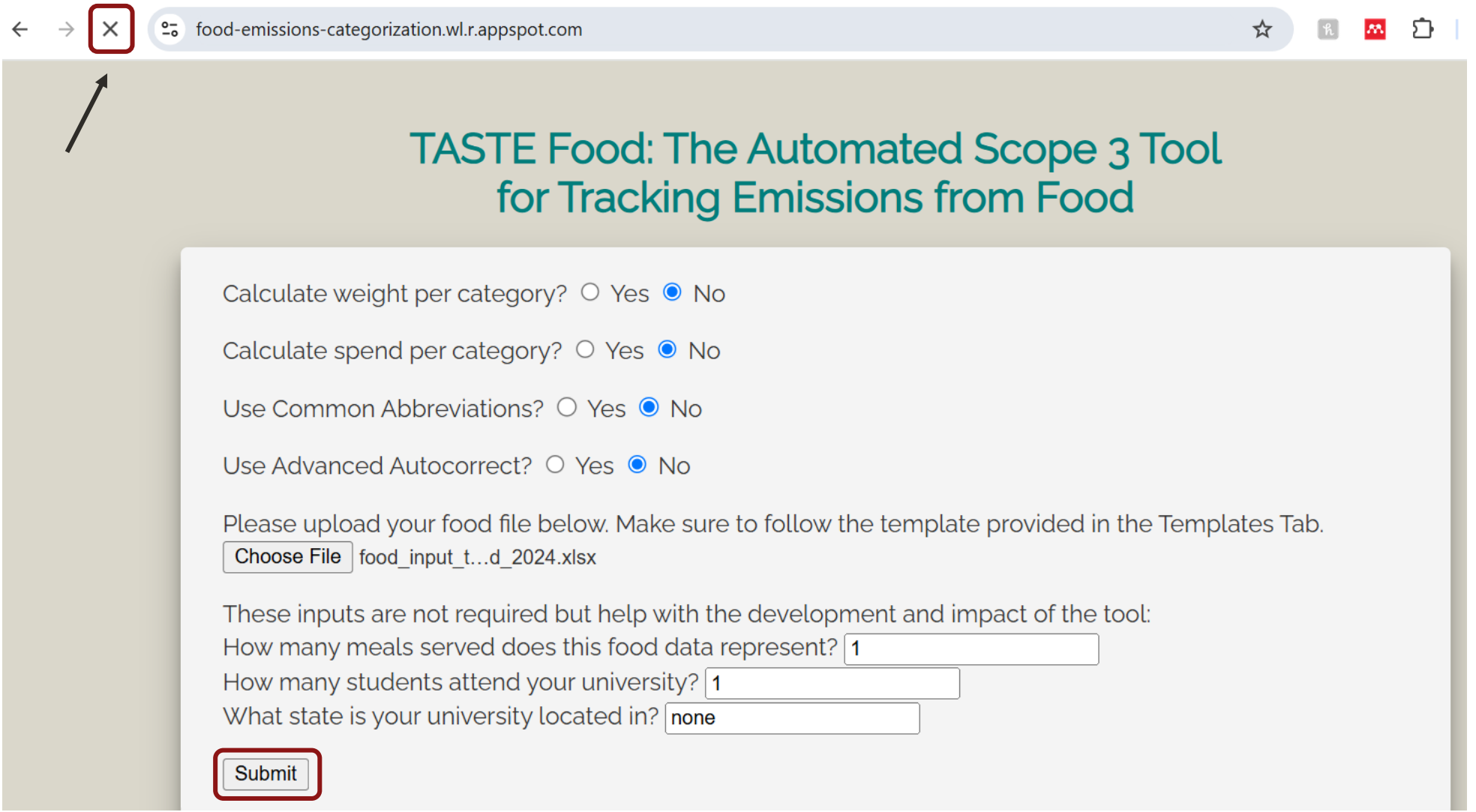
	A	B
1	ow Numbe	ood Name
2	5	chkntysn tndrln brd --> bread 1 8 oz 2 5#
3	7	chz --> cheese mozz --> mozzarella shrd bacio 6 5# chi
4	8	bf --> beef patty brgr --> burger 60 2 67z
5	9	bcn --> bacon hrml preckd 288sl
6	15	pot --> potato ff 5 16" shoestring 6 5#
7	17	bf --> beef fn grnd --> ground 8 10# av grand
8	18	guac --> guacamole wholly 12 16z
9	19	pot --> potato brkfst cbes skin on 6 6#
10	22	bf --> beef eye rnd ch 12 6# av
11	23	frt --> fruit pineapl fresh ct 15# it
12	24	jce --> juice mm appl --> apple 4 90z ice
13	25	bcn --> bacon rnd 2 96ct
14	27	chz --> cheese ched --> cheddar mntjk shrd 4 5# chi
15	29	chz --> cheese mozz --> mozzarella pizz shrd roma 6 5# chi pizza
16	29	chz --> cheese mozz --> mozzarella pizz shrd roma 6 5# chi pizza
17	33	bn --> bean grn --> ground snppd 2 5# snap
18	35	jce --> juice mm oran --> orange 4 90z ice
19	36	topping bcn --> bacon smkd pcs 2 5#
20	37	bf --> beef patty 80 20 slidr 80 2z
21	38	frt --> fruit ban grn --> ground tip prem 40#cs
22	44	tom --> tomato dcd fresh 2 5#
23	46	chz --> cheese american rs 6 5# chi
24	51	bf --> beef top rnd dnud ch 3 18# av dud

Autocorrected Lines

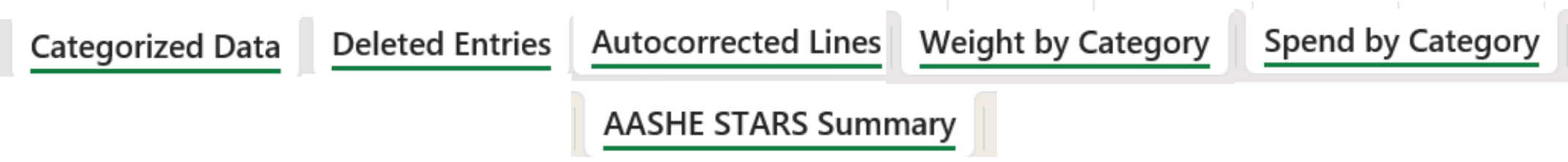
- If you select “Yes”
- Many food purchasing datasets have abbreviations
- Converts the word before --> to the word after -->
- These will show up in the Autocorrected Lines tab for ease of visual verification



- These are not required inputs but if you know and are willing to share this information alongside your data set, it helps me quantify the tool impacts


food-emissions-categorization.wl.r.appspot.com
TASTE Food: The Automated Scope 3 Tool for Tracking Emissions from Food
Calculate weight per category? Yes No
Calculate spend per category? Yes No
Use Common Abbreviations? Yes No
Use Advanced Autocorrect? Yes No
Please upload your food file below. Make sure to follow the template provided in the Templates Tab.
Choose File food_input_t...d_2024.xlsx
These inputs are not required but help with the development and impact of the tool:
How many meals served does this food data represent? 1
How many students attend your university? 1
What state is your university located in? none
Submit

Output – Simple Excel with several sheets



- Output tabs
- Some of these will not appear if you did not select that option and some will be empty depending on your data set

Deleted Items Sheet – Items TASTE Food could not categorize

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	nal Line Nu	Start date	End date	Label	Weight	Unit	Organic	Local	Category 1	Category 2	Category 3	Vendor	Dollars
2	1472			pwdr --> powder bking 6 5#					0	0	0		0
3	1464			pump monin 1ltr plst btl ea					0	0	0		3.75
4	546	fy23	fy23	sausage italian hot vegetarian	50 / 3.5 oz	kg	no	no	0	0	0	vender	243.1515
5	327	fy23	fy23	vive supplement boost immunity	12 / 2 oz	kg	no	no	0	0	0	vender	213.6409
6	316	fy23	fy23	chips tortilla nacho cheese 1 oz	104 / 1 oz	kg	no	no	0	0	0	vender	595.5637
7	73	fy23	fy23	sausage chorizo sub crumble vegan plant	2 / 5 lb	kg	no	no	0	0	0	vender	1959.509
11	1378			linr 24x32 blk 1m					0	0	0		27.18
12	1360			cutlry kit md tkfnap 250 c					0	0	0		30.48
13	1349			pick frills asstd 10 1000					0	0	0		32.88
14	1329			brly prl 25#					0	0	0		38.29
15	1311			tort pln 12" xl gf fz tff 4 10 ct off it					0	0	0		42.72
16	1288			chls dry pslla ngro 5#					0	0	0		49.1

Plant Based – Underlying data for AASHE STARS Reporting

	B	C	D	E	F	G	H	I	J
te	End date	Label	Weight	Unit	Organic	Local	Vendor	Dollars	Plant Based
		salmon fzn coho filet skin on	1170.27	kilogram	No	No	sea2table		No
		shrimp wild gulf p d chem salt free	2041.16	kilogram	No	No	sea2table		No
		chicken tender fritter	6803.88	kilogram	No	No	good source		No
		ice cream walrus assorted flavors	2872.8	kilogram	No	No	walrus ice cream		No
		cheese mozzarella shred feather low mois	2349.61	kilogram	No	No	us foods		No
		beef ground 81 19 ref	2881.91	kilogram	No	No	us foods		No
		egg liquid whole pasteurized bag ref	5170.95	kilogram	No	No	us foods		No
		beef shaved korean bbq ckd fzn	750.06	kilogram	No	No	us foods		No
		chips corn frito scoops	3154.01	kilogram	No	No	frito lay		No
		blueberries	629.85	kilogram	No	No	fresh point produce		Yes
		potatoes french fries curly seasoned fzn	3864.6	kilogram	No	No	us foods		Yes
		pork carnitas	1651.57	kilogram	No	No	national food group		No
		fresh crownless pineapple	2447.12	kilogram	No	No	fresh point produce		Yes
		chicken chunk breaded fritter	2902.99	kilogram	No	No	good source		No
		fresh honeydew	1938	kilogram	No	No	fresh point produce		Yes
		bun hamburger white plain 30 ct	2422.68	kilogram	No	No	sara lee		No
		milk chocolate 1	5586	kilogram	No	No	meadow gold		No

AASHE STARS Summary – Ready for ASHEE STARS Reporting

	A	B	C	D
1	**STARS Summary**			
2	% spend on Plant Based items: 40.24			
3	% spend on Organic items: 0.26			

- These are a lower bound, the tool errs on not tagging things as plant-based when they are than tagging things that aren't plant-based, plant-based
- Not required to upload underlying data to AASHE STARS but can and someone will help verify these