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1. Cleaning Process

- Split column (region, type, allergy) columns
- Used conditional formatting to check if there's any duplicates
- Remove duplicates with space (allergy) column
- Used this formula (=IF(COUNTIFS([Food],[@Food])>1, IF([@[Carbon Footprint(kg CO2e)]]= MINIFS([Carbon Footprint(kg CO2e)],[Food],[@Food]), [@Food] & "(Eco-friendly)", [@Food]), [@Food])) because there were duplicates with the same meal name but different categories like different ingredients and so on then made it display eco-friendly next to them.

Food	
Vietnamese cold Spring Roll	
Soya wrap	
Shredded Chicken with Soya Sauce	
Rice Flour Wrap with Tofu And Veggie	
Soya Tikki	
Soya Flour Gobhi Stuffed Paratha	
Saute Tofu	
Soya Flour Cheela	
Tofu Tikka Saute in Green Chutney	
Soya Flour Cheela	

Before

Food	Associativity	Column1
Soya Flour Cheela	1	Soya Flour Cheela (Eco-friendly)
Soya Flour Cheela	1	Soya Flour Cheela

After

Meals	Ingredients
Saute Tofu	Cauliflower-15 gms; Onion-15 gms; Ginger-4 gms; Cumin seeds-4 gms;...
Saute Tofu (Eco-friendly)	carrot-15 gms; CABBAGE-15 gms; Capsicum-15 gms; mushroom-15 gm...
Soya Flour Cheela (Eco-friendly)	Cauliflower-20 gms; carrot-20 gms;Capsicum-20 gms;Black Pepper-4 g...
Soya Flour Cheela	Lettuce Leaf-20 gms; Chicken-70 gms; Tomato-120 gms; Cucumber-62 ...
Chicken Kebab (Eco-friendly)	Soyabean-30 gms; Ginger-15 gms;Garlic-15 gms; Cooking oil-7 gms; Ca...
Jowar Cheela (Eco-friendly)	Rice-250 gms; Mustard oil-15 gms; Onion-77 gms; Capsicum-62 gms; c...
Pasta salad (Eco-friendly)	Soya bean-125 gms;
DHANIYA CHUTNEY (Eco-friendly)	Turmeric powder-15 gms; Cumin seeds-15 gms; Common salt-15 gms; ...
GREEN CHUTNEY (Eco-friendly)	Chicken-300 gms; Sunflower oil-15 gms; Garlic-15 gms; Zucchini-125 g...
Upma (Eco-friendly)	RAJMA-250 gms; CUCUMBER-15 gms; Tomato-15 gms; Chillies-4 gms; ...
Upma	Common salt-15 gms; Coriander leaves-15 gms; Tofu-150 gms; Red chi...
Jowar Cheela	Chicken-60 gms; soya sauce-15 gms; VINEGAR-7 gms; Ginger-15 gms;G...
Pasta Salad	Common salt-15 gms; Ginger-1 slice; Black pepper-7 gms; CURRY LEAV...
Dhaniya Chutney	Onion-120 gms; Ginger-5 gms;Garlic-5 gms; Cooking oil-2 gms; Comm...
Chicken kebab	Common salt-15 gms; Black pepper-15 gms; Cooking oil-30 gms; Onion...
Green Chutney	Common salt-15 gms; Onion-10 gms;Garlic-2 gms; Ginger-7 gms; Tom...
Hung Curd Salad	Cumin seeds-15 gms; Turmeric powder-15 gms; Common salt-15 gms; ...
Paneer Kebab (Eco-friendly)	Papaya-150 gms; ORANGE-90 gms; Almond-4 gms; PUMPKIN SEED-15 ...

- This was how the ingredients column looked at the beginning, before any transformations.

Meals	Ingredients.1	Ingredients.2	Ingredients.3	Ingredients.4
Saute Tofu	Cauliflower-15 gms	Onion-15 gms	Ginger-4 gms	Cumin seeds-4 gms
Saute Tofu (Eco-friendly)	carrot-15 gms	CABBAGE-15 gms	Capsicum-15 gms	mushroom-15 gms
Soya Flour Cheela (Eco-friendly)	Cauliflower-20 gms	carrot-20 gms	Capsicum-20 gms	Black Pepper-4 gms
Soya Flour Cheela	Lettuce Leaf-20 gms	Chicken-70 gms	Tomato-120 gms	Cucumber-62 gms
Chicken Kebab (Eco-friendly)	Soyabean-30 gms	Ginger-15 gms	Garlic-15 gms	Cooking oil-7 gms
Jowar Cheela (Eco-friendly)	Rice-250 gms	Mustard oil-15 gms	Onion-77 gms	Capsicum-62 gms
Pasta salad (Eco-friendly)	Soya bean-125 gms		null	null
DHANIYA CHUTNEY (Eco-friendly)	Turmeric powder-15 gms	Cumin seeds-15 gms	Common salt-15 gms	Coriander leaves-15 gms
GREEN CHUTNEY (Eco-friendly)	Chicken-300 gms	Sunflower oil-15 gms	Garlic-15 gms	Zucchini-125 gms
Upma (Eco-friendly)	RAJMA-250 gms	CUCUMBER-15 gms	Tomato-15 gms	Chillies-4 gms
Upma	Common salt-15 gms	Coriander leaves-15 gms	Tofu-150 gms	Red chilli Powder-15 gms
Jowar Cheela	Chicken-60 gms	soya sauce-15 gms	VINEGAR-7 gms	Ginger-15 gms
Pasta Salad	Common salt-15 gms	Ginger-1 slice	Black pepper-7 gms	CURRY LEAVES-5 gms
Dhaniya Chutney	Onion-120 gms	Ginger-5 gms	Garlic-5 gms	Cooking oil-2 gms
Chicken kebab	Common salt-15 gms	Black pepper-15 gms	Cooking oil-30 gms	Onion-100 gms
Green Chutney	Common salt-15 gms	Onion-10 gms	Garlic-2 gms	Ginger-7 gms
Hung Curd Salad	Cumin seeds-15 gms	Turmeric powder-15 gms	Common salt-15 gms	Soya flour-75 gms
Paneer Kebab (Eco-friendly)	Papaya-150 gms	ORANGE-90 gms	Almond-4 gms	PUMPKIN SEED-15 gms

- Split Column using Semicolon (;) to separate each ingredient from its quantity.

Meals	Attribute	Value
Saute Tofu	Ingredients.1	Cauliflower-15 gms
Saute Tofu	Ingredients.2	Onion-15 gms
Saute Tofu	Ingredients.3	Ginger-4 gms
Saute Tofu	Ingredients.4	Cumin seeds-4 gms
Saute Tofu	Ingredients.5	chillies-15 gms
Saute Tofu	Ingredients.6	Coriander leaves-15 gms
Saute Tofu	Ingredients.7	Red chilli Powder-15 gms
Saute Tofu	Ingredients.8	Garam Masala-15 gms
Saute Tofu	Ingredients.9	Common salt-15 gms
Saute Tofu	Ingredients.10	Soya flour-250 gms
Saute Tofu	Ingredients.11	Atta-30 gms
Saute Tofu (Eco-friendly)	Ingredients.1	carrot-15 gms
Saute Tofu (Eco-friendly)	Ingredients.2	CABBAGE-15 gms
Saute Tofu (Eco-friendly)	Ingredients.3	Capsicum-15 gms
Saute Tofu (Eco-friendly)	Ingredients.4	mushroom-15 gms
Saute Tofu (Eco-friendly)	Ingredients.5	Garlic-7 gms
Saute Tofu (Eco-friendly)	Ingredients.6	Ginger-7 gms
Saute Tofu (Eco-friendly)	Ingredients.7	soya sauce-15 gms
Saute Tofu (Eco-friendly)	Ingredients.8	Gingelly oil-7 gms
Saute Tofu (Eco-friendly)	Ingredients.9	Onion-15 gms
Saute Tofu (Eco-friendly)	Ingredients.10	Atta-125 gms

- Unpivot Columns to bring all ingredients into a single column, while repeating the meal name for each ingredient.

Meals	Value.1	Value.2
Saute Tofu	Cauliflower	15 gms
Saute Tofu	Onion	15 gms
Saute Tofu	Ginger	4 gms
Saute Tofu	Cumin seeds	4 gms
Saute Tofu	chillies	15 gms
Saute Tofu	Coriander leaves	15 gms
Saute Tofu	Red chilli Powder	15 gms
Saute Tofu	Garam Masala	15 gms
Saute Tofu	Common salt	15 gms
Saute Tofu	Soya flour	250 gms
Saute Tofu	Atta	30 gms
Saute Tofu (Eco-friendly)	carrot	15 gms
Saute Tofu (Eco-friendly)	CABBAGE	15 gms
Saute Tofu (Eco-friendly)	Capsicum	15 gms
Saute Tofu (Eco-friendly)	mushroom	15 gms
Saute Tofu (Eco-friendly)	Garlic	7 gms
Saute Tofu (Eco-friendly)	Ginger	7 gms

- Split Column using Hyphen (-) to separate the ingredient name from its quantity.

Meals	Cauliflower	Onion	Ginger	Cumin seeds	
2 Pieces Stuffed idli		null	250 gms	null	15 gms
20% flaxseed flour 80% wheat flour Roti		null	62 gms	null	null
50% Barley Atta & 50% Oats Atta Roti		null		null	null	24 gms
ACHARI TIKKA (PANEER)		null		null	null	null
ALMOND FLOUR CHEELA		null		null	null	7 gms
ALMOND FLOUR ROTI (100% almond flour)		null		null	null	15 gms
ALMOND FLOUR ROTI (20% almond flour + 80% wheat flour)		null		null	null	null
ALMOND FLOUR ROTI (50% almond flour + 50% oats flour)		null		null	null	15 gms
ALMOND MUSHROOM SOUP		null		null	null	null
ALMOND SOUP (WITH ALMOND MILK)		null		null	null	null
APPLE STEW		null	62 gms	null	15 gms
Aam Ras		null	1 gms	null	15 gms
Almond Flour Roti		null		null	null	null
Almond Flour Wrap		null	50 gms	null	15 gms
Almond Soup		null		null	null	null
Almond and Raisins Raita		null		null	null	15 gms
Almond coriander soup		null		null	null	15 gms
Almond roti (50% almond flour and 50% normal atta)		null		null	null	null
Almonds and Walnut Raita		null	125 gms	null	null

- Pivot Column so that each ingredient has its own column, and each meal appears in a single row with all its ingredient quantities.

Meals	Cauliflower	Onion	Ginger	Cumin seeds	
2 Pieces Stuffed idli	0	250 gms	0	15 gms	
20% flaxseed flour 80% wheat flour Roti	0	62 gms	0	0	
50% Barley Atta & 50% Oats Atta Roti	0	0	0	24 gms	
ACHARI TIKKA (PANEER)	0	0	0	0	
ALMOND FLOUR CHEELA	0	0	0	7 gms	
ALMOND FLOUR ROTI (100% almond flour)	0	0	0	15 gms	
ALMOND FLOUR ROTI (20% almond flour + 80% wheat flour)	0	0	0	0	
ALMOND FLOUR ROTI (50% almond flour + 50% oats flour)	0	0	0	15 gms	
ALMOND MUSHROOM SOUP	0	0	0	0	
ALMOND SOUP (WITH ALMOND MILK)	0	0	0	0	
APPLE STEW	0	62 gms	0	15 gms	
Aam Ras	0	1 gms	0	15 gms	
Almond Flour Roti	0	0	0	0	
Almond Flour Wrap	0	50 gms	0	15 gms	
Almond Soup	0	0	0	0	
Almond and Raisins Raita	0	0	0	15 gms	
Almond coriander soup	0	0	0	15 gms	
Almond roti (50% almond flour and 50% normal atta)	0	0	0	0	
Almonds and Walnut Raita	0	125 gms	0	0	

- Replaced Values to change any Null or Error into 0.

- Then used Power Pivot to model and merge the data.

- also used Power Query to merge the data.

2. Objectives

- Analyze the average carbon food print of dishes from each country so we can know the highest value and know the country or region and check how to deal with that like how to reduce the carbon food print value or ratio.
- Analyze high protein dishes by checking the average carbon food print of veg and nonveg options.
- High protein dishes but have low carbon.
- Avg carbon food print of food like checking the highest value of carbon at each meal.
- Use the total weight with ingredients to check the categories of food that are the most heavy or costly ingredients.
- Analyze meals that might have zero gluten for breakfast or lunch or even dinner and that gonna fill gabs like safely introduce this data to people with allergies.
- Which region has the highest calorie dishes?
- Which meal type contributes the most to the carbon food print?
- Which food type maximize nutrition and at the same time minimize carbon food print?
- Which meals looks healthy but have a great portion of sugar and fats?
- Do veg meals have less CO2 than nonveg meals?
- Do regions have their own nutrition identity?
- Is breakfast the most balanced meal of the day?
- Which foods have the highest fiber percentage?
- Which food are safe to people with dairy allergy?
- Which meals rely most on dairy ingredients?
- Which ingredients appear most across meals?
- Which meals are most risky for many types of allergies?
- Distribution of meals by Region, Type (Lunch/Dinner), Category (Veg/nonveg), Allergy restrictions.
- Average nutritional values (Calories, Protein, Weight) by meal type and region.
- Meals with highest/lowest calories.
- Comparison of Veg vs nonveg nutrition and which one have the most CO2 effect.
- Unique/rare ingredients.
- Ingredient associations (which ingredients appear together often).
- Which regions favor like what kind of meals?
- Correlation between ingredients and calorie/protein content.
- how many unique ingredients are used in each meal?
- group meals by similarity in nutrition or ingredients.
- Recommendation potential: If someone likes one meal, suggest similar ones based on ingredients/nutrients.
- Balanced diet planning: Identify meals that best fit specific nutritional goals (high protein but low calorie).
- How many meals are there in total, and how are they distributed across different regions?
- What is the distribution of meals by type (Lunch, Dinner, Appetizer)?
- How many meals are Veg vs nonveg?
- What are the most common allergy categories among the meals?
- How does the nutritional profile vary across regions?
- How do vegetarian and non-vegetarian meals compare in terms of energy and protein content?
- Which meal types (Lunch, Dinner, Snack) tend to be highest in calories?

- How do ingredient preferences differ between regions?
- Do Veg meals use a wider variety of ingredients compared to nonveg ones?
- What is the relationship between total meal weight and calorie content?
- Are heavier meals always higher in calories?
- Which ingredients are most correlated with high protein meals?
- What patterns emerge if we cluster meals based on their ingredients?
- Which are the top 10 highest-calorie meals and top 10 lowest-calorie meals?
- Which are the top 10 meals richest in protein?
- Which region has the most diverse meals (by count and ingredient variety)?
- What are the top 5 most popular meal categories overall?
- Which meal has the highest protein-to-calorie ratio?
- Which meal has the lowest fat-to-weight ratio?
- How are calories distributed across all meals (normal, skewed, heavy tailed)?
- What is the distribution of serving sizes across different regions and categories?
- Do South region meals tend to weigh more than North region meals?
- Which meals are the most fiber rich?
- Which meals are lowest in carbohydrates but high in proteins?
- Are veg meals healthier on average (lower calories, higher fiber)?
- Which meals could be considered "balanced" (good ratio of carbs, protein, fat)?
- Which ingredients appear together most frequently?
- Are certain allergens like gluten or dairy more common in specific meal types?
- Which meals contain the largest number of unique ingredients?
- Can we predict the region of a meal based only on its ingredients?
- Can we classify whether a meal is Veg/nonveg using ingredient presence?
- Which nutrients (protein, fat, carbs) contribute most to total calories?
- What hidden clusters exist among meals (healthy, high calorie, light snack, protein rich)?
- What are the "outlier meals" that have unusually high or low nutritional values?