

Supplementary Material for Mapping Inconsistencies Between Experts' Judgements and Product Description

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Table 1. Sources used for building the TPS.

Source Type	Institute	Speciality
Expert knowledge	Ethical Consumer	An independent non-profit organisation based in the UK, that provides tools and resources about sustainability for consumers.
	Soil Association	A British registered charity that campaigns for healthy agriculture and land use.
	Food and Agriculture Organisation of the United Nations (FAO)	A specialised agency of the UN that leads international efforts to defeat hunger and achieve food security for all.
Market Intelligence Engine	Algopix	Algopix is an Amazon, eBay, and Walmart product market research tool that provides online sellers detailed product data insights to optimise pricing, inventory, and catalogue presentation.
	Google Keyword Planner (GKP)	The Google Ads Keyword Planner tool is a free feature within Google Ads and a useful resource for building strong keyword lists.
Retailer Database and Expert Knowledge	Amazon Climate Pledge	The Amazon Climate Pledge initiative is part of Amazon's commitment to preserving the natural world by providing sustainable shopping options and reducing waste.

0.1 Mapping Process

We decide to create our sustainable product dataset enriched with textual description, leveraging an existing high-quality dataset annotated by experts - ASSET. Acquiring the dataset involved five main operations.

Operation 1: Extracting Food Products from Expert-Validated Dataset. In this process 15917 products from 1194 categories were filtered based on 524 food categories. Only relevant features encompassing unique identifiers were included, specifically Product ID and the European Article Number(EAN) columns. This resulted in 9433 products. The reduction process is illustrated in Figure 1 and explained in the next operations.

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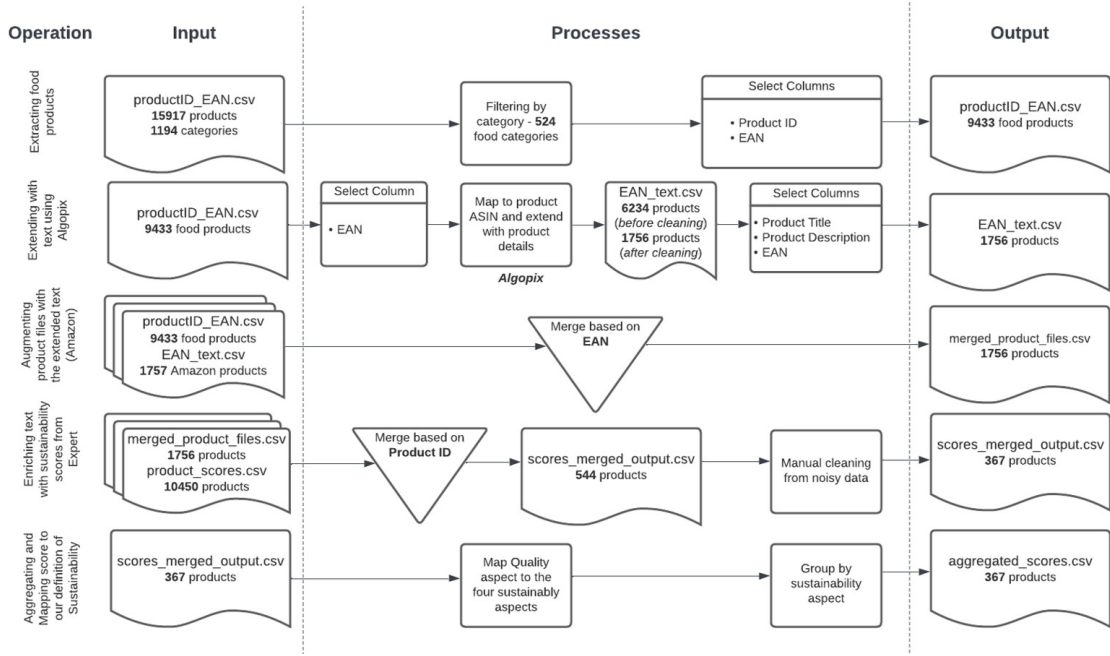


Fig. 1. The details of the five operations involved to acquire the dataset.

Operation 2: Extending with Text from Amazon. The second operation involved the utilisation of Algopix¹, a tool that can retrieve product information from Amazon market using different product unique identifiers. We examined eight Amazon markets available across Europe and English speaking countries, namely: UK, Spain, Italy, Germany, France, USA, Canada, and Australia. Initially, 6234 products were identified which required further cleaning. First, we removed items without titles which reduced the total to 3742 products. We further refined to 2823 after discarding products with missing descriptions². In addition, we rigorously reviewed the EAN value ensuring that it strictly has 13 digits not starting with zero which resulted in 2764 products. Finally, we removed duplicates within products that were retrieved from different Amazon markets (for example identical product records from UK market and Italy market). Removing identical products reduced the number to 1757 unique products.

Operation 3: Augmenting Product Information with Extended Text. In the third operation, product files containing product identifiers (EAN and ASSET identifier) and food category details from ASSET were augmented with the acquired text from Amazon through the EAN. This step was necessary to incorporate Product ID from ASSET, which will facilitate retrieval of sustainability scores.

Operation 4: Enriching Text with Sustainability Scores from Experts. This step involved enriching the previous text-augmented 1756 products with sustainability scores from experts through Product ID. We incorporated representations for 10450 products (including non-food items), 544 of which were identified from our text-augmented products. These

¹algopix.com

²At this stage, the decision has been taken to exclude products that have missing title or description during the cleaning process. The reason is that we have been training AI models and these records cannot be used for text mining as they do not provide example text for the model to learn. These products can be introduced later in the user study to exemplify products that do not have sufficient textual description and thus introduces a knowledge gap.

are the only products that have corresponding sustainability scores from ASSET (ASSET has a total of 15917 products, and a subset of 10450 are annotated with sustainability scores). After manually checking the data, this file required further cleaning to address non-English descriptions and noisy data, resulting in a refined subset of 367 products.

Operation 5: Aggregating and Mapping Sustainability Scores. The final operation was centred on mapping sustainability scores according to our definition of sustainability. Figure 2 provide further details on the quality label mapping process. An essential step to align expert-assigned sustainability scores with our four main sustainability aspects: health, environment, society, and economy. First, we normalised scores values, converting continuous positive and negative expert labels to -1 (yes) or 0 (no) for negative dimension of the aspect and 1 (yes) or 0 (no) for the positive dimension. In addition, the inclusion of quality aspect in the expert data was addressed by mapping it to one of TPS aspects.

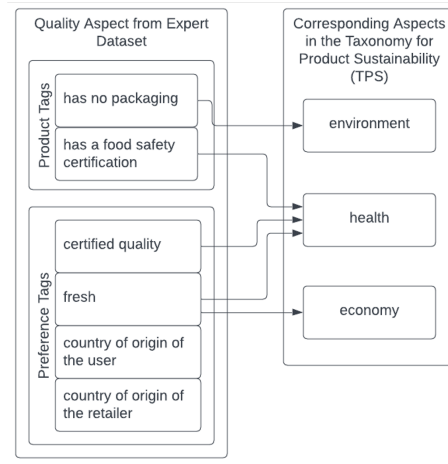


Fig. 2. Mapping quality tags from experts to the four sustainability aspects used in TPS.

Table 2. Examples of keywords and phrases which are represented as terms in TPS.

Aspect	Terms
Health +	organic, certified, vegetarian, no added sugar, bluesign, green seal, without colours, without preservatives, fresh, natural, non-gmo, grass-fed.
Health –	sulphur dioxide, artificial flavours, sweeteners, stabiliser, thickener, gelling agents, other additives.
Health User-Dependant	mustard seeds, peanuts, sesame, nut-free, gluten-free, lactose-free, allergen-free.
Society +	certified, rainforest alliance, kosher, halal, fairtrade, soil association, fair for life, supports a charity, partially owned by farmers, working directly with farmers, made in source country.
Society –	imported, allergens eggs and products thereof, allergens fish and products thereof, fish, contains animal product, egg enriched cages, intransparent company, tests on animals.
Environment +	rainforest alliance, soil association, energy star, marine stewardship certified, has no packaging, natural packaging, no use of chemicals and pesticides, non-gmo, pole and line caught, recycled plastic, reusable bottle.
Environment –	imported, genetically modified seeds and crops, gmo, albacore tuna, plastic packaging, unsustainable cocoa, weak anti deforestation policy, high energy use, palm oil.
Economy +	local, locally caught, local fishmongers, reduce energy use, energy efficiency, value chain footprint, small scale farmers, glass bottle, frequently recycled, fresh made in store.
Economy –	imported, agriculture chemicals.

Table 3. Examples of in-situ learning situation.

Product Title	Product Description	Suggested Prompt
Fazer Geisha Milk with soft hazelnut filling Chocolate 16 Boxes of 225g	Fazer is one of the largest candy makers in Finland. Ingredients: sugar, MILK, cocoa butter, HAZELNUTS (10%), cocoa mass, whole MILK? powder, BUTTERMILK powder, vegetable fat (palm, shea), WHEAT flour, corn starch, emulsifier (lecithin incl. SOYA), salt, flavourings. MAY CONTAIN OTHER NUTS AND ALMONDS. In milk chocolate cocoa solids 30% minimum.	There is an agreement on the negative health effects identified by both experts and the text. This presents an opportunity to highlight and explain harmful ingredients, fostering consumer awareness. An intervention could emphasise key sustainability information from the text, particularly allergen ingredients like wheat, nuts, and soya.
ARGETA Premium Exquisite Supertuna Pate 1330 Grams (95 Grams per jar x 14)	ARGETA Premium Exquisite Super tuna Pate 14 cans of Excellent and Delicious Pate, Natural Aroma Flavour, Preservatives and Gluten Free, Delicacy for gourmets, 1330 Grams (95 Grams per jar x 14) - Argeta.	Both experts and the text agree on the positive dimension of the environment for that product. Highlight facts showing the positive influence on the environment. Additionally, provide extra information about sustainable fishing practices.

Table 4. Examples of confusion and potential risk situation.

Product Title	Product Description	Suggested Prompt
Santa Maria Fajita Seasoning Spice Mix - Mexican Seasoning for Tortilla Fillings, Beef Fajitas, Chicken Fajitas - Fajitas Spices for Meats and Veggies - 0.98 Oz	Our Santa Maria Fajita Seasoning Spice Mix is made to prepare fajitas dish quicker and easier without losing quality and taste. With this seasoning mix, you will prepare your fajitas dish as easy as 1, 2, 3. Simply open the seasoning packet, mix it into the fajitas meat to bring out the delicious taste of your fajita dishes. This seasoning helps bring out the best dish in every meal and the quick and easy solutions to aid cooking and add flavour to your dishes. This seasoning will help you make nutritious, delicious meals. Enjoy your cooking and have a delicious meal with this Fajita Seasoning Spice Mix!	There might be confusion as the product emphasises quick and easy solutions but lacks detailed information about the nutritional aspects. Intervention could provide more health facts about that product from expert knowledge to address potential health risks associated with quick and easy meal solutions.
Heinz - Salsa Soja - Glass bottle 150 ml	Heinz - Salsa Soja - Glass bottle 150 ml	This product is assessed as compliant for the societal aspect by experts but the limited description does not reflect it. Experts may consider inclusion and equitable access for ethnic food, while consumers may not be aware. Nudge with a message explaining that this product caters to a wider spectrum or diversity of world cuisines or diets which aligns with the societal aspect of sustainability.

Table 5. Examples of potential green-washing and unintended decisions situation.

Product Title	Product Description	Suggested Prompt
Borges Extra Virgin Olive Oil 250ML	Halal, Kosher. Superior category olive oil obtained directly from olives and solely by mechanical means. The olive groves of Catalonia cloak the gentle hills of North Eastern Spain 100 km. inland from Barcelona. Famous since Roman times, this area produces high quality crops of tiny olives, harvested by hand, to produce one of the finest olive oils in the world. Borges olive oils are available in three styles to suit all your cooking needs. 100% Extra Virgin olive oil. The best quality you can buy, use it to add the delicious taste of the Mediterranean to your salads, soups and casseroles. Olive oil. A blend of refined and virgin olive oils especially good for everyday cooking and homemade mayonnaise. Extra mild. For frying, roasting and baking where you require the most delicate flavours.	The product description includes terms like "Halal" and "Kosher" to appeal to specific customers, promoting equitable access and social inclusion. However, the product is imported and may affect local small businesses. To address potential green-washing, show a warning highlighting the possibility and emphasise the breadth of the social aspect in sustainability.
Billington's - Demerara - 500g	Ideal for coffee, biscuits and crumbles. Suitable for vegetarians and vegans. Demerara natural unrefined cane sugar. For many years Billington's has worked closely with local Mauritian growers and producers to create the finest natural cane sugars available.	The intervention for this product relates to potential eco-friendly green-washing. A warning message could state the possibility of green-washing and encourage consumers to consider the breadth of the eco-friendly definition beyond being vegan and vegetarian.

Table 6. Examples of imbalanced information representation situation.

Product Title	Product Description	Suggested Prompt
2 Packs of Halva with Raisin Peanuts of the Best Estonian Dessert	You will get: 2 Bars of Halva with rum and raisins Estonian Dessert. Totally weight is 14 oz or 400 g. (One Bar weight is 7 oz or 200 g). Ingredients: peanuts, glucose syrup, sugar, raisins (4.2%), rum (0.83.5 oz or 100 g of the product contains: energy 1960 kJ / 470 kcal, protein 0.63 oz or 18.1 g, carbohydrates 1.15 oz or 32.8 g, fat 1.044 oz or 29.6 g.	The product description lacks information about nut allergies, which is a health aspect with a negative dimension. An intervention could provide information about allergy ingredients and safety guides by organizations such as FAO.
Lipton Flavoured Fruit Tea - Charming Cassis - Rosehip and Blackcurrant - Premium Pyramid Tea Bags (20 Count Box)	LIPTON Blueberry Muffin Yummy enough to eat. Here's a unique blend of fine superb black tea, indulgently-fruity blueberry taste, and the sweet aroma of warm, oven-fresh muffins. LIPTON Pyramid Tea is handpicked from only the top two leaves and a bud for uncompromising quality. The pyramid long-leaf tea is delicately packaged in unique pyramid-shaped bags that allow the tea room to flow freely with real pieces of fruit, herbs, or spices for a truly authentic tea infusion. LIPTON grows their own best quality tea leaves. They have their own tea estates in India, Kenya, and Tanzania. LIPTON is committed to sourcing all of their tea from sustainably managed farms. LIPTON is proud that their Kericho, Kenya estate has been Rainforest Alliance Certified TM.	The product description predominantly highlights environmentally positive aspects, while experts judge both positive and negative. An intervention could emphasise that although the product has a certificate such as Rainforest Alliance, it also exhibits some negative effects due to being harvested and imported from another country.

Table 7. Examples of potential confirmation bias situation.

Product Title	Product Description	Suggested Prompt
Coco - Organic Coconut Juice with Green Tea & Peach 330ml	Coco - Organic Coconut Juice with Green Tea & Peach 330ml, Naturally Hydrating, Packed With Electrolytes, Full Of Vitamin C & Potassium.	The product description highlights health benefits with terms like <i>organic</i> , <i>naturally hydrating</i> , and <i>full of vitamins C</i> , yet does not refer to other sustainability concerns such as environmental and social impacts. An intervention should emphasise the importance of these health benefits while encouraging consideration of other health-related factors for ethical decision-making. Additionally, consumers need awareness that the product description is limited, excluding references to broader sustainability dimensions, such as environmental, economic, and social impacts, which can be illustrated with examples.
Santa Maria Taco Sauce Tex Mex Hot, 230 g	Tomato puree, tomatoes (36%), onions (19%), hot peppers (6.5%), modified corn starch, vinegar, salt (1.3%), garlic, other spices (cumin, oregano).	The product is presented as vegetarian, potentially creating an impression of environmental friendliness. However, expert assessments reveal adverse effects on health, society, and the environment, which are not adequately addressed in the short product description. An intervention should underscore a comprehensive understanding of sustainability, emphasising the mutual dependence of various aspects crucial for achieving sustainability goals.