**Supplementary material 1**

**NANS**

A sample of adults was randomly selected from a database of names and addresses held by Data Ireland (An Post). To recruit respondents for the NANS an introductory letter and information leaflet were posted to each person selected from the database. A second level of recruitment was introduced for underrepresented groups, in particularly those aged 18-35. Referrals from respondents were invited and a second database of names and addresses were assembled. A consent form was signed and the survey commenced once a person agreed to take part. The final response rate for the survey was 60%.

A four-day food diary was used to collect food and beverage intake data. Respondents recorded detailed information regarding the amount and types of foods, beverages and nutritional supplements consumed, the cooking methods used, and brand names of the foods consumed. Data were also collected on the time of each eating or drinking occasion, definition of each eating or drinking occasion (e.g. morning snack, lunch) and the location of the preparation of the meal or snack consumed (e.g. home, takeaway)(39).

**Emission factors**

It was not possible to attain all emission factors specifically for Ireland. Therefore, in total fifty emission factors were adopted from a UK study by Green et al. (22), eight from a US study by Heller et al. (41), and six from an Irish dairy study by Finnegan et al. (43). With the exception of dairy, all emission factors were chosen from Green et al. where possible as they were deemed most appropriate to an Irish context. For certain emission factors this was not feasible as they were not available from Green et al., therefore some emission factors for fruit and vegetables were adopted from Heller et al. However, dairy emission factors were available for Ireland and adopted from Finnegan et al.

Many of the dishes were consumed as composite dishes rather than in isolation. Mixed dishes comprised of combinations of foods, e.g. casseroles, stews, curries with rice, and pasta based dishes. Indeed, when assessing composite dishes it is important to quantify the meat component of the dish (103). This is particularly important when considering GHGE as meat has relatively high emission factors. However, it was not possible to attain the exact composition of each composite dish. Nevertheless, in an Irish study by Cosgrove et al. it was found that the average percentage of meat consumed as part of a composite dish to be 34% across all age groups from a preceding NANS (104). It was therefore deemed appropriate to disaggregate composite dishes as per Baghurst et al. and Hendrie et al.; where mixed dishes were subsequently assumed to comprise 35% meat or fish, 50% starchy food, 5% sauce and 10% oil (105,106). The meat component was assigned to the stated meat type (beef, lamb, pork, chicken or fish) and the starch component assigned to potato, pasta and rice in equal measures. Sensitivity analysis revealed that total dietary emissions would only increase by 3% if the meat components in composite dishes were raised from 35% to 50% (see online ‘Supplementary material 2’).

It was not possible to quantify per participant the exact volume of meat component in the ‘Lamb, pork, and bacon dishes’ food group. To ascribe the appropriate meat quantities from ‘Lamb, pork, and bacon dishes’ the overall mean ratio of lamb, pork and bacon in the food group from NANS was extrapolated and applied to individual consumption (lamb: pork: bacon; 0.03: 0.34: 0.63). Thereafter, the components of ‘Lamb, pork, and bacon dishes’ were disaggregated using the same approach as the other composite dishes with the meat components allocated to their respective grouping. Furthermore, certain food groupings of the NANS had multiple components which could impact the emission factor applied. For instance, the food group ‘Rice & pasta, flours, grains & starches’ was disaggregated into the mean proportion of intake for its individual constituents. This ratio of consumption was used to apply an emission factor to each of the foods within ‘Rice & pasta, flours, grains & starches’. Therefore, a mean emission factor for a whole group could be applied which reflects of the proportion of each of the foods within a food constitute food group.

Table S1. Food intake and GHGE emissions factors of the food groupings of the NANS. Standard errors are represented by numbers surrounded by brackets.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Intake (g/d)** | | | **Energy intake** | **GHGE** |
|  |  | **n = 1500** | **n = 960** | | **MJ** | **(kg CO2eq/ kg)** |
| **Starchy stables** | Rice & pasta, flours, grains & starches | 32.0  ±1.3 | | 31.0  ±1.6 | 0.2  ±0.0 | 2.1a |
|  | White breads & rolls | 50.3  ±1.4 | | 48.2  ±1.67 | 0.5  ±0.0 | 1.7 a |
|  | Wholemeal & brown breads & rolls | 53.1  ±1.4 | | 51.7  ±1.7 | 0.5  ±0.0 | 1.7 a |
|  | "Ready-to-eat" breakfast cereals | 22.6  ±0.8 | | 22.7  ±1.0 | 0.3  ±0.0 | 1.7 a |
|  | Other breakfast cereals (e.g. porridge) | 39.4  ±2.2 | | 40.7  ±2.77 | 0.1  ±0.0 | 0.5 b |
|  | Potatoes (e.g. boiled, mashed, baked) | 75.2  ±1.9 | | 78.0  ±2.5 | 0.2  ±0.0 | 1.5 a |
|  | Processed & homemade potato products | 5.4  ±0.5 | | 5.4  ±0.6 | 0.0  ±0.0 | 2.3 a |
|  | Chipped, fried & roasted potatoes | 39.7  ±1.3 | | 38.5  ±1.5 | 0.3  ±0.0 | 2.3 a |
| **Dairy** | Whole milk | 98.9  ±4.2 | | 95.0  ±5.0 | 0.3  ±0.0 | 2.0 c |
|  | Low fat, skimmed and fortified milks | 94.7  ±3.7 | | 93.8  ±4.6 | 0.2  ±0.0 | 2.0 c |
|  | Other milks (e.g. processed milks) | 16.3  ±1.6 | | 19.4  ±2.3 | 0.0  ±0.0 | 2.0 c |
|  | Creams | 1.2  ±0.1 | | 1.3  ±0.2 | 0.0  ±0.0 | 6.4 c |
|  | Cheeses | 13.6  ±0.5 | | 13.6  ±0.6 | 0.2  ±0.0 | 9.2 c |
|  | Yoghurts | 32.3  ±1.4 | | 33.3  ±1.8 | 0.1  ±0.0 | 2.0 a |
|  | Butter | 3.7  ±0.2 | | 3.7  ±0.3 | 0.1  ±0.0 | 11.9 c |
| **Vegetables** | Green vegetables | 13.9  ±0.6 | | 15.2  ±0.8 | 0.0  ±0.0 | 1.7 b |
|  | Carrots | 13.8  ±0.5 | | 14.2  ±0.6 | 0.0  ±0.0 | 0.5 b |
|  | Salad vegetables (e.g. lettuce) | 20.7  ±0.7 | | 21.0  ±0.9 | 0.0  ±0.0 | 0.7 b |
|  | Other vegetables (e.g. onions) | 26.1  ±0.8 | | 26.0  ±1.0 | 0.1  ±0.0 | 0.4 b |
|  | Tinned or jarred vegetables | 3.0  ±0.3 | | 3.0  ±0.3 | 0.0  ±0.0 | 4.6 a |
| **Fruit** | Bananas | 26.9  ±1.0 | | 26.9  ±1.3 | 0.1  ±0.0 | 1.3 b |
|  | Other fruits ±e.g. apples, pears | 52.0  ±2.0 | | 51.8  ±2.5 | 0.1  ±0.0 | 0.4 b |
|  | Citrus fruit | 15.6  ±1.1 | | 16.9  ±1.5 | 0.0  ±0.0 | 0.5 b |
|  | Tinned fruit | 2.2  ±0.3 | | 2.7  ±0.5 | 0.0  ±0.0 | 1.9 a |
| **Pulses, legumes, nuts** | Vegetable & *pulse dishes* | 19.1  ±1.0 | | 19.0  ±1.4 | 0.1  ±0.0 | 2.0 a |
|  | Peas, beans & lentils | 17.5  ±0.7 | | 16.4  ±0.9 | 0.1  ±0.0 | 1.5 a |
|  | Nuts & seeds, herbs & spices | 2.9  ±0.2 | | 2.8  ±0.3 | 0.1  ±0.0 | 2.1 a |
| **Red meat** | Beef & veal | 18.2  ±0.8 | | 18.3  ±1.0 | 0.2  ±0.0 | 35.4 a |
|  | Lamb | 5.3  ±0.4 | | 5.6  ±0.5 | 0.1  ±0.0 | 32.2 a |
|  | Beef & veal dishes | 33.1  ±1.5 | | 33.2  ±1.8 | 0.2  ±0.0 | 13.8 a |
|  | *Lamb*, pork & bacon dishes | 5.5  ±0.6 | | 6.0  ±0.9 | 0.0  ±0.0 | 9.7 a |
|  | Offal & offal dishes *(ruminant)* | 0.3  ±0.1 | | 0.4  ±0.1 | 0.0  ±0.0 | 9.7 a |
|  | Burgers | 8.3  ±0.6 | | 7.7  ±0.7 | 0.1  ±0.0 | 35.4 a |
| **Pork, poultry, eggs** | Eggs & egg dishes | 16.6  ±0.6 | | 15.9  ±0.7 | 0.1  ±0.0 | 4.7 a |
|  | Bacon & ham | 21.0  ±0.6 | | 21.5  ±0.8 | 0.2  ±0.0 | 7.9 a |
|  | Pork | 6.2  ±0.4 | | 6.5  ±0.6 | 0.1  ±0.0 | 8.5 a |
|  | Chicken, turkey & game (e.g. pheasant) | 28.3  ±0.9 | | 27.7  ±1.1 | 0.2  ±0.0 | 7.0 a |
|  | Poultry & game dishes | 23.1  ±1.3 | | 20.8  ±1.4 | 0.1  ±0.0 | 3.9 a |
|  | Lamb, *pork & bacon dishes* | 5.5  ±0.6 | | 6.0  ±0.9 | 0.0  ±0.0 | 9.7 a |
|  | Offal & offal dishes *(non-ruminant)* | 0.3  ±0.1 | | 0.4  ±0.1 | 0.0  ±0.0 | 9.7 a |
| **Fish** | Fish & fish products | 24.5  ±0.9 | | 24.3  ±1.1 | 0.2  ±0.0 | 9.4 a |
|  | Fish dishes | 4.3  ±0.5 | | 4.1  ±0.5 | 0.0  ±0.0 | 4.7 a |
| **Processed meat** | Sausages | 9.4  ±0.5 | | 9.3  ±0.5 | 0.1  ±0.0 | 10.1 a |
|  | Meat pies & pastries | 3.7  ±0.4 | | 3.0  ±0.5 | 0.0  ±0.0 | 9.8 a |
|  | Meat products (e.g. processed meats) | 16.3  ±0.7 | | 15.7  ±0.8 | 0.2  ±0.0 | 8.7 a |
| **Savouries** | Savouries ±e.g. pizzas | 28.0  ±1.3 | | 27.5  ±1.7 | 0.3  ±0.0 | 5.6 a |
|  | Savoury snacks | 5.9  ±0.3 | | 5.4  ±0.4 | 0.1  ±0.0 | 4.5 a |
|  | Non-chocolate confectionery | 3.4  ±0.3 | | 3.0  ±0.3 | 0.0  ±0.0 | 1.7 a |
| **High sugar snacks** | Other breads (e.g. scones, croissants) | 12.3  ±0.7 | | 12.4  ±0.8 | 0.2  ±0.0 | 1.7 a |
|  | Biscuits | 12.5  ±0.5 | | 12.6  ±0.6 | 0.2  ±0.0 | 2.4 a |
|  | Cakes, pastries and buns | 17.1  ±0.8 | | 16.9  ±0.97 | 0.3  ±0.0 | 2.6 a |
|  | Ice-creams | 5.8  ±0.4 | | 6.1  ±0.5 | 0.1  ±0.0 | 5.0 a |
|  | Puddings & chilled desserts | 8.3  ±0.5 | | 8.4  ±0.7 | 0.1  ±0.0 | 3.2 a |
|  | Milk puddings (e.g. rice pudding & custards) | 5.5  ±0.6 | | 5.7  ±0.7 | 0.0  ±0.0 | 3.2 a |
|  | Sugars, syrups, preserves & sweeteners | 10.9  ±0.4 | | 10.9  ±0.5 | 0.1  ±0.0 | 3.5 a |
|  | Chocolate confectionery | 9.4  ±0.4 | | 9.1  ±0.5 | 0.2  ±0.0 | 2.9 a |
| **Fats, oils** | Low fat spreads | 3.9  ±0.3 | | 4.1  ±0.3 | 0.1  ±0.0 | 20.9 a |
|  | Other spreading fats | 7.3  ±0.3 | | 6.9  ±0.3 | 0.2  ±0.0 | 20.9 a |
|  | Oils | 0.3  ±0.0 | | 0.4  ±0.0 | 0.0  ±0.0 | 2.7 a |
|  | Hard cooking fats | 0.0  ±0.0 | | 0.0  ±0.0 | 0.0  ±0.0 | 11.9 a |
| **Carbonated beverages** | Carbonated beverages ±non-diet | 71.2  ±3.9 | | 72.4  ±5.1 | 0.1  ±0.0 | 2.0 a |
|  | Diet carbonated beverages | 21.3  ±2.0 | | 20.9  ±2.5 | 0.0  ±0.0 | 2.0 a |
| **Other beverages** | Teas | 445.9  ±10.5 | | 447.8  ±12.7 | 0.0  ±0.0 | 0.0 a |
|  | Coffees | 124.0  ±5.5 | | 118.8  ±6.6 | 0.0  ±0.0 | 0.6 a |
|  | Other beverages (e.g. water) | 527.4  ±15.4 | | 502.7  ±18.3 | 0.0  ±0.0 | 0.3 a |
|  | Squashes, cordials and fruit juice drinks | 10.4  ±1.0 | | 9.9  ±1.2 | 0.0  ±0.0 | 2.4 a |
|  | Fruit juices | 49.5  ±2.6 | | 47.4  ±2.7 | 0.1  ±0.0 | 2.4 a |
| **Alcoholic beverages** | Alcoholic beverages | 300.5  ±14.3 | | 284.2  ±17.1 | 0.5  ±0.0 | 1.5 a |
| **Miscellaneous** | Soups, sauces & miscellaneous foods | 56.6  ±1.8 | | 56.6  ±2.1 | 0.2  ±0.0 | 3.9 a |

**GHGE estimate drawn from: a = Green et al. (2015); b = Heller and Keoleian (2015); c = Finnegan et al., (2015)**