BDA The Association of UK Dietitians

ONE BLUE DOT®

Frequently asked questions

Frequently Asked Questions

The One Blue Dot reference guide was compiled over many months and aimed to cover the broad range of issues associated with environmentally sustainable diets. It's such a huge topic however that we expect reading the documents will prompt many new questions from dietitians and other nutrition experts. This document starts to collate some of these and will be added to as the discussions continue. See the original reference guide at bda.uk.com/onebluedot

Contents

What about alternative sources of animal protein such as insects?

The practice of eating insects is known as entomophagy and has been a key part of diets in some cultures for many thousands of years. More recently, insects have been viewed as potential sustainable source of animal protein for the population at large. Insects are cheap, plentiful, thrive in a wide range of climates and use much less water, feed and space to farm than traditional sources of meat. Overall, they emit far less greenhouse gases per kg of protein produced than meat. Currently, the majority of insects production for food is for feed for other animals, in particular aquaculture, but also pork and pet foods.

However, further research is needed regarding the allergy risk, safety and wider nutritional benefit (beyond protein) of products such as insect flours. There are also significant challenges overcoming public opposition to the consumption of insects. Other, plant based, sources of protein have similar low environmental impacts without these concerns, and overall protein intake is not an area of particular concern in the UK.

Dietitian Claire Chaudhry has written a comprehensive article on the role of insects in nutrition for NHD magazine. The FAO has an ongoing project looking at insects for food and feed and have produced a report on The Contribution of Insects to Food Security, Livelihoods and the Environment.

What about the environmental sustainability of plant-based dairy alternatives?

Plant based drinks can be a swap for most consumers and the majority of non-organic variants are calcium fortified with a similar content and bioavailability to dairy milk[1,2].

Additionally, some plant-based drinks are also fortified with vitamins B2, B12 and D[3] and a few are now also fortified with iodine[4]. As well as considering greenhouse gas (GHG) emissions, it is important to also take note of other environmental factors such as land and water use which could mitigate any benefits of a lower GHG emission value from plant based dairy alternatives. This is highly dependent on country of origin and farming practices.

Soya dairy alternatives (tofu and soya drinks) are significantly more sustainable compared to dairy (cheese and milk) across all measures: GHG emission, land use and water use[5].

Data on plant-based drinks other than soya is unfortunately limited. However, the data that does exist indicates that GHG emission levels will be similar to soya and therefore significantly lower than dairy milk.[6] However, production of rice and nuts cab be extremely water intensive and could mitigate the benefits of a lower GHG emission level[7]. It is important to remember, that it will not mitigate the other environmental benefits for biodiversity, ecosystem stability, soil pollution, deforestation and land use.

Although GHG emissions are impressively lower for almond drinks, water use may be significantly higher (21 times higher) for drinks using Californian almonds compared to dairy milk. The high water use relates to the cultivation of nuts and not to almond drink production per se. Water use for nut cultivation is extremely variable depending on country of origin with significant disparities between almonds grown in California and those grown in the Mediterranean. This large variance can also be seen in figure 4.4 and table 4.5 in the reference guide which demonstrates water use for nut cultivation to range anywhere from 0 (where rainwater only is used) to 500,000 litres per 100g protein produced. In the overall scheme of things, it is safe to assume that almond drinks have an overall lower environmental impact compared to dairy milk. Additionally, there are plenty of other plant-based drinks which have less uncertainty around their environmental foot prints such as soya and oat drinks.

For oat drinks, one leading manufacturer has extensively investigated a multitude of environmental impacts of oat drink and dairy milk production[8]. Interestingly, differences in water use and fresh water contamination exist between the fresh and long-life oat drink, however, overall oat drink production is more sustainable than dairy for the majority of measures including GHG emissions, land use, soil acidification etc.

Considering the full range of environmental impacts (GHG emissions, land use, water use, pollution, deforestation and soil degradation etc.) plant-based foods are significantly more environmentally sustainable than animal foods.

What are the environmental considerations of mycoprotein-based meat alternatives (Quorn™)?

Mycoprotein is produced through fermentation and has a significantly smaller carbon footprint than producing some animal proteins, as well as using 90% less land. It is an example of a more sustainable protein source. At the moment, the only mycoprotein available for sale in the UK is Quorn™.

The Carbon Trust has certified the carbon footprint of Quorn™ mycoprotein since 2012, making it the first meat free protein source to have third party carbon footprint accreditation. Mycoprotein is a high quality, complete protein source which is high in protein, high in fibre and zinc, low in saturated fat and contains no cholesterol. To produce Quorn™ mycoprotein a natural fungus that grows in the soil (a strain of Fusarium) is fermented, which causes it to convert carbohydrate into protein. The solid is then harvested and the result is mycoprotein which is used as an ingredient in all Quorn™ products.

The environmental impact of the final Quorn™ product depends on its format – there are now more than 100 varieties. The most popular, Quorn™ mince, has 90% lower GHG emissions than beef mince and 70% lower than chicken. In addition, the water footprint of Quorn™ mince is up to 10 times smaller than that of beef mince[9].

What are the environmental impacts of soya production as a protein source?

There are concerns that reducing red and processed meat intake and switching to more plant-based forms of protein will lead to unintended environmental damage from crops such as soya beans (known as soy or soybeans in the United States), a popular protein-rich legume.

Soya bean cultivation has doubled in the past twenty years, as producers rush to meet rising demand for animal feed, especially from China. Soya bean production, especially in places such as Brazil (the world's second largest soy producer) can lead to significant deforestation, soil degradation and biodiversity loss. Modern production methods require large amounts of water, involve the usage of insecticides and fertilisers that have an impact on GHG and lead to water and soil pollution[10].

However, most of this soya is not being used for human consumption. Soya beans are processed for two main components – soya meal and soya oil. Around 80% of soya bean weight ends up as the high protein meal, and the vast majority of this ends up as feed for animals in the meat and dairy industries. 18% of the weight of soya bean is processed as oil, the majority of which is used as a biofuel, with some used in cooking oil or in products such as margarine. As a result, around 70-75% of soya bean is used to feed animals and only about 6% for human consumption directly[11].

Given how little soya is consumed directly by humans, reducing meat intake is unlikely to increase production of these alternatives, especially as it takes more than 100g soy protein produce 100g of beef protein.

When consuming soya products directly, it is important for consumers to be aware of country of origin and farming practice of any soya used.

More information:

- Union of Concerned Scientists - Soybeans

What are the environmental impacts of palm oil as a replacement for animal fats?

What is Palm Oil?

Palm oil (made of the flesh of the oil palm tree's fruit) is the highest yielding and least expensive vegetable oil growing in the tropical regions of the planet e.g. South America, Central America, Mexico, the Caribbean, Africa and Southeast Asia[12]. It is semi solid at room temperature, often used for sautéing or frying because it has a high smoke point of 450°F (232°C)

Palm Oil Nutrition per tbsp (13.6 g):
Calories: 120 | Fat: 13.6 grams | Saturated fat: 6.7 grams
Monounsaturated fat: 5 grams | Polyunsaturated fat: 1.3 grams
Vitamin E: 2.17 mg (14% of the RDI)

What foods contain palm oil?
Palm oil is in thousands of products we use every day. Palm oil is in fast and many convenience foods, personal care, cosmetic products, and household cleaner[13]. As a rule of thumb pre-packaged, ready and convenience foods e.g. ready pizza, instant noodles, margarine, chocolate, baked goods such as bread, muffins, biscuits, protein/diet bars, ice cream, nut butters are more likely to contain palm oil.

How does Palm oil affect the environment?
Increasing demand for palm oil has been shown to result in significant deforestation increasing carbon emissions, reducing plant diversity and eliminating animal species including the Sumatran tiger which depend on these tropical forests[12].

How does Palm oil affect my health?
Overall, as a food high in saturated fat, the recommendations from UK government, remain to limit intake to no more than 11% of total energy intake – around 20g per day for a typical woman[14].

What can we do to help?
The main organisation responsible for certifying sustainable palm oil is Roundtable on Sustainable Palm Oil (RSPO) which aims to promote sustainable growth of palm oil. Although it has made some progress to address the environmental issues, it has been criticised to be insufficient to fully protect the forests and peatlands due to company lack of transparency and use of non-certified oil by RSPO member companies[13].

Whilst there are initiatives to reduce palm oil production and use at manufacturing/retailer level, there are things we could all do as individuals to reduce its use. It seems that whole foods, cooking from scratch, using less pre-packaged foods and reducing reliance on fast foods would be a step in the right direction of reducing Palm oil consumption. Palm oil is the mostly widely used oil in the world and it is unlikely that we can completely replace it with another oil however when buying products containing palm oil we must advocate for reading the label and ensuring palm oil comes from a certified source.

With thanks to Stela Chervenkova RD for this answer

What are the easiest ways of reducing food or food packaging waste?

In the UK, 10 million tonnes of food are wasted every year, with the vast majority being household waste (71%)[15]. This is harmful to the environment as wasted food and drink uses land, water and energy during production and the decomposition of organic matter in landfill releases GHG emissions (methane) into the atmosphere[16]. It also represents wasted money that individuals could be using for something else. UK supermarkets also produce approximately one million tonnes of plastic packaging[17], further contributing to the environmental impact of food and packaging waste.

To help you get started on reducing your food waste and food packaging usage, here are five simple tips:

1) Shop smart
Make sure you plan ahead by making a list before you go food shopping and checking what food you already have at home first. Alternatively, you may wish to shop for food every few days, so that you buy only buy what you need and do not unnecessarily 'bulk' buy.

2) Love your leftovers
Eating your leftovers can save you money and time - and they can be tasty. Try incorporating your leftovers into weekly meals e.g. use leftover bolognaise in chilli, base soups on leftover vegetables, make stock with wilted herbs or create smoothies with old fruit.

3) Learn to preserve
Pickling, drying, canning, fermenting, freezing and curing preserves foods, making them last for longer. Frozen food in particular is as healthy as its fresh counterparts, but keeps better, so if you have access to a freezer, consider choosing that if you find yourself binning fruit and veg. You can use old berries for jams, freeze sauces into ice cube trays or even pickle foods like old onions and cabbages. This doesn't have to be expensive or time consuming.

4) Work wins
Take a packed lunch to work in reusable Tupperware/ glass containers to avoid buying packaged foods. Also try to avoid buying bottled drinks (stick to tap water and use your own bottle) and bring in a reusable coffee cup if you regularly buy take away coffees.

5) To expire or not to expire
Most food that has just passed its expiration date is still safe to eat. The 'sell by' or 'display until' date is for retailers to manage their stock and the best before is a suggested date to indicate when foods are at premium quality. A use-by date on food is about safety. This is the most important date to remember. Foods can be eaten until the use-by date but not after. You will see use-by dates on food that goes off quickly, such as meat products or ready-to-eat salads.

Try to use your own judgement to guide you. If your fruit or veg is still looking good, give it a try. Remember – all your food will last longer if you keep your fridge cold enough and make sure to store it correctly.

Further advice:

- WRAP – Food Waste Reduction
- Love Food Hate Waste
- Let's Get Cooking
- Friends of the Earth – Plastic Waste
- FSA

With thanks to Corrine Toyn RD for this answer.

How sustainable are genetically modified foods?

The public are often concerned about the safety of Genetically Modified (GM) foods (sometimes referred to as Genetically Engineered (GE) foods or Genetically Modified Organisms (GMO)). At the moment, although GM products are permitted in the UK and EU subject to safety assessments, very few are produced or sold within Europe because of consumer opposition.

From an environmental sustainability perspective, GM foods may actually have a positive impact, by reducing the need for insecticides, herbicides and fertilizer, which contribute to GHG emissions. It may also allow hardier crops to grow in areas where normal strains may fail to grow, reducing transport impacts.

Some organisations, such as WWF, urge a precautionary approach to GM, in part because of risks of hybridisation of GM strains with wild varieties, or the possibility of invasive or otherwise damaging GM crops and plants replacing wild species with the knock-on impacts to the environment.

- EFSA - GMOs

Are Organic foods better for the environment?

According to EU regulations, to be defined as organic, foods must be grown without the use of man-made fertilizers, pesticides or fungicides. It also involves severe restrictions on the use of animal antibiotics and a ban on the use of genetical modified organisms (GMOs). Organic farmers are expected raise livestock in an open air, free-range environment[18]. Whether organic farming methods are more or less environmentally damaging than conventional farming is a thorny issue, as they have both advantages and disadvantages.

Advantages
The Food and Agriculture Organisation of the United Nations (FAO) outlines a number of environmental benefits to organic farming[19]. Reduced usage of chemical fertilisers and pesticides reduced water pollution, as well as reducing energy, GHG emissions and resource costs associated with the manufacture of those products. Reducing use of pesticides and fungicides can also have a positive impact on biodiversity and long-term soil quality as well as protecting aquatic environments. Practices associated with organic farming, such as crop rotation, can reduce issues of soil erosion. The Soil Association highlight the higher carbon storage potential of organic farming techniques, and also emphasise the resilience of organic systems to climate changes as a result of less reliance on oil-based fertilisers which will not be sustainable in the long term[20].

Disadvantages
It is well established that organic farming is less productive and yields less produce per hectare of land. Research has shown that grass-fed organic livestock take up more land but emit similar levels of GHG, and that organic crop farming, although using less energy, actually emits similar levels of GHG and uses more land[21]. Other research has concluded that more intensive high-yield farming, with appropriate safeguards to reduce the impact of pollution, can have lower GHG emissions, and crucially, use much less land[22]. High land use has a significant environmental impact because land used for farming cannot be used for something else, and taking up more land for farming could lead to increased deforestation or habitat loss.

Organic food is also more expensive to produce, and therefore cost more to purchase, making it a less viable option for more deprived communities and countries. The FAO point out that part of this increased cost is due to the relatively small proportion of farming that is currently organic, meaning the sector does not benefit from economies of scale or the same degree of development and research to reduce costs[23].

Conclusion
It is clear that much more research is needed to properly understand the environmental impact of different farming systems. It remains far from clear that organic farming is necessarily better for the environment, and there may actually be increase costs, especially related to land use.

- European Commission – Organics at a glance

Are the One Blue Dot recommendations applicable to children?

The One Blue Dot toolkit was written with an adult audience in mind, and the specific nutritional requirements and dietary recommendations covered in the documents are based on an adult.

However, we believe the broad advice of the toolkit is suitable for people aged one and up. Reducing red and processed meat consumption, eating from sustainable fish sources, moderating dairy intake are good advice at any age. Avoiding high fat, sugar and salt foods, eating more fruit and veg, drinking more water and less soft drinks would be beneficial to children as much as adults – especially as we know children in the UK consume more free sugar, more soft drinks and less fruit and veg than adults on average.

We also believe that teaching children about healthy and sustainable eating, including where their food comes from, can help create healthier eating habits for life. This could include discussions around how to reduce food and packaging waste, or the role of “seasonal eating”.

We would not recommend coffee as a suitable source of hydration for children due to the high caffeine content.

There are some specific nutritional considerations for children, especially young children, so we would recommend that the advice of a paediatric specialist dietitian in sought before making any significant changes to a child’s diet.

- BDA Food Fact Sheet – Healthy Eating for Children
- First Steps Nutrition Trust – Eating more sustainably in early years
- Sustain – Teaching Food Skills

What’s the most sustainable way to feed infants?

The best and most sustainable way to feed a baby until around six months of age is breastfeeding. From around six months, parents should then continue to breastfeed, alongside the introduction of suitable complementary foods in the first year, and up to two years of age and beyond. As UNICEF state “Breast milk is a natural and renewable food source that requires no packaging, storage, transportation or fuel, thereby contributing to environmental sustainability.”[24]

If a person is unable or chooses not to breastfeed, they should receive appropriate support and evidence-based advice from all healthcare professionals, including dietitians, to ensure that they use an appropriate first infant milk. All infant milks are required to adhere to specific regulations regarding their constitution, so from a sustainability perspective have a similar environmental impact.

For more information on breastfeeding and complementary feeding, the following links may be helpful.

- UNICEF Baby Friendly Initiative
- BDA Breastfeeding Policy
- BDA Food Fact Sheet – Breastfeeding
- BDA Food Fact Sheet – Complementary Feeding

How important are food miles when considering diet sustainability?

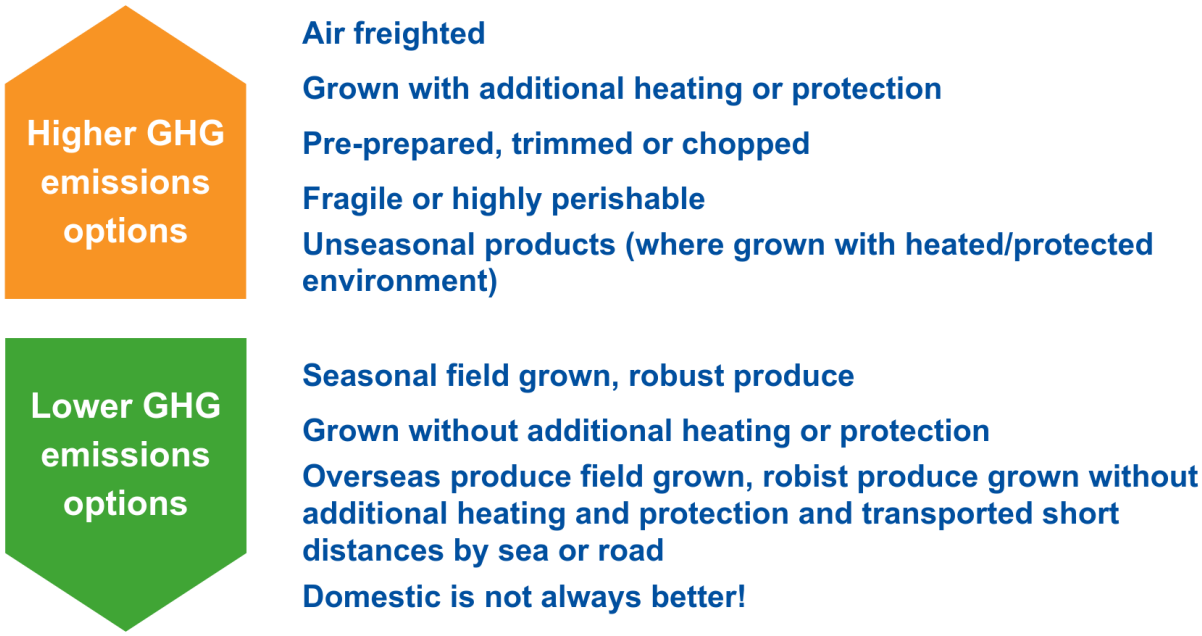
Approximately 50% of the food consumed in the UK is produced abroad[25], and even within the UK the food we eat can come from many hundreds of miles away. The concept of "food miles" is often used to describe this, with the common view being that minimising food miles will have a positive environmental impact. It is true that food transport has a significant environmental impact – a government report in 2005 found that 25% of all miles driven by Heavy Goods Vehicles are to transport food[26].

However, evidence shows that the picture is much more complex. Although transport does have an environmental impact, generally it represents a very small proportion of the total GHG emissions (as little as 11%), with production representing a far bigger proportion[27]. As a consequence, it can actually be less environmentally impactful to import food from where production impacts are much lower. For example, tomatoes grown in the warm climate of Spain have a much lower GHG output, even taking account of transportation, than tomatoes grown in heated greenhouses in the UK[28]. Eating not just locally but *in season* is critical. Fig.1 below highlights the broad hierarchy of different fruit and vegetable types in terms of their impact on GHG emissions.

How we go to pick up our food has an impact as well. It is estimated that 48% of all vehicle miles and 13% of all GHG emissions relating to food transport come from the car journeys UK consumers take when purchasing food[29].

Some forms of food transport, and in particular air-freighted food, are particularly impactful and should be avoided. In the UK, food transported by air represents less than 1% of "food miles" but 11% of all food transport CO_2 equivalent emissions[30].

Fig.1 Hierarchy of greenhouse gas emissions from fruit and vegetables. Adapted from FCRN 2016[31]. Please note these options are not in order of their impact.



Please contact us if you have any suggestions for additional FAQs

References

[1] Heaney R, Dowell M, Rafferty K et al. Bioavailability of the calcium in fortified soy imitation milk, with some observations on method. Am J Clin Nutr. 2000;71(5):1166-9.
[2] Zhao Y, Martin B, Weaver C. Calcium bioavailability of calcium carbonate fortified soymilk is equivalent to cow's milk in young women. J Nutr.. 2005;135(10):2379-82
[3] Clarkson V. 2018. Fact sheet: the role of plant-based drinks in the British and Irish diet. Alpro Health Professional website. https://www.alpro.com/healthprofessional/uk/updates/2018/01/the-role-of-plantbased-drinks-in-the-british-and-irish-diet
[4] Alpro. Alpro Soya Original chilled. https://www.alpro.com/uk/products/drinks/soya-plain/fresh-original
[5] Ho J, Maradiaga I, Martin J, Nguyen H, Trinh L. Almond milk vs cows milk. Life cycle assessment [Internet]. 2016. Available from https://www.ioes.ucla.edu/wp-content/uploads/cows-vs-almond-milk-1.pdf
[6] Palmer S. Plant proteins. Today's Dietitian, 2017;19(2):26
[7] Hess T, Chatterton A et al. The impact of changing food choices on the blue water scarcity footprint and greenhouse gas emissions of the British diet: the example of potato, pasta and rise. J Clean Prod. 2016; 112(5):4558-68
[8] Florén B, Nilsson K, Wallman M. Oatley drinks environmental footprint internal report [Internet] 2013. [cited 10/18/2018]. Available from https://zaailingen.com/wp-content/bestandedn/oatly.pdf
[9] Quorn Foods. Healthy Planet. [Online] 2019. Available at: https://www.quorn.co.uk/sustainable-nutrition. Accessed on 24/07/2019.
[10] World Wildlife Fund. Soy. [Online] 2019. Available at: https://www.worldwildlife.org/industries/soy Accessed on 24/07/2019
[11] Brack, D, Glover, A and Wellesley L. Agricultural Commodity Supply Chains: Trade, Consumption and Deforestation. [Online] Jan 2016. Chatham House. Available from: https://www.chathamhouse.org/sites/default/files/publications/research/2016-01-28-agricultural-commodities-brack-glover-wellesley.pdf
[12] Vijay V, Pimm SL, Jenkins CN, Smith SJ. The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss. PLoS One. 2016 Jul 27;11(7):e0159668. doi: 10.1371/journal.pone.0159668. eCollection 2016.
[13] May-Toben C, Goodman LK. Donuts, Deodorant, Deforestation: Scoring America's Top Brands on Their Palm Oil Commitments. Cambridge (MA): Union of Concerned Scientists; 2014.
[14] British Dietetic Association. Food Fact Sheet: Fats (Jan 2018) Available at: https://www.bda.uk.com/foodfacts/FatFacts.pdf Accessed on 29/07/2019
[15] WRAP. Estimates of Food Surplus and Waste Arisings in the UK [Internet]. 2017. Available from: http://www.wrap.org.uk/sites/files/wrap/Estimates_%20in_the_UK_Jan17.pdf. Accessed on: 17/4/19.
[16] FCRN Food Source. FCRN Food Source. Chapter 1: An overview of food system challenges [Online]. 2015. Available from: https://foodsource.org.uk/chapters. Accessed on: 17/4/19.
[17] Brown T. Greenpeace. Can we reduce plastic packaging and reduce food waste? 2018 https://www.greenpeace.org.uk/can-reduce-plastic-packaging-reduce-food-waste/. Accessed on: 26/4/19.
[18] European Parliament, The EU's organic food market: facts and rules (infographic) [Online] Apr 2018. Available at@ http://www.europarl.europa.eu/news/en/headlines/society/20180404STO00909/the-eu-s-organic-food-market-facts-and-rules-infographic Accessed on 24/07/2019
[19] Food and Agriculture Organisation (FAO) Organic Agriculture Frequently Asked Questions 6: What are the environmental benefits of organic agriculture? [Online] 2019. Available at: http://www.fao.org/organicag/oa-faq/oa-faq6/en/ Accessed on 24/07/2019
[20] Soil Association. What is Organic farming? [Online] 2019 Available at: https://www.soilassociation.org/organic-living/organic-farming/ Accessed on 24/07/2019
[21] Michael Clark and David Tilman 2017 Environ. Res. Lett. 12 064016 https://doi.org/10.1088/1748-9326/aa6cd5
[22] University of Cambridge. 'High-yield' farming costs the environment less than previously thought. [Online] September 2018. Available at: https://www.cam.ac.uk/research/news/high-yield-farming-costs-the-environment-less-than-previously-thought-and-could-help-spare-habitats Accessed on 24/07/2019
[23] Food and Agriculture Organisation (FAO) Organic Agriculture Frequently Asked Questions 7: Why is organic food more expensive than conventional food? [Online] 2019. Available at: http://www.fao.org/organicag/oa-faq/oa-faq5/en/ Accessed on 24/07/2019
[24] UNICEF. How breastfeeding can build a better world. [Online] July 2016. Available at https://blogs.unicef.org/evidence-for-action/breastfeeding-can-build-better-world/ Accessed on 24/07/2019
[25] Department for Environment, Food and Rural Affairs. National Statistics – Food Statistics in your pocket 2017 – Global and UK supply [Online] October 2018. Available at: https://www.gov.uk/government/publications/food-statistics-pocketbook-2017/food-statistics-in-your-pocket-2017-global-and-uk-supply Accessed on 24/07/2019

[26] Watkiss P et al. The Validity of Food Miles as an Indicator of Sustainable Development: Final Report. July 2005. Department of Environment, Food and Rural Affairs. pii Available at: http://library.uniteddiversity.coop/Food/DEFRA_Food_Miles_Report.pdf Accessed on 24/07/2019
[27] Webet, CL and Scott Matthews, H. Food-Miles and the Relative Climate Impacts of Food Choices in the United States. Environ. Sci. Technol.200842103508-3513. https://doi.org/10.1021/es702969f
[28] Global Food Security. Your Food is global. [Online] 2019. Available at https://www.foodsecurity.ac.uk/challenge/your-food-is-global/ Accessed on 24/07/2019
[29] Watkiss P et al. The Validity of Food Miles as an Indicator of Sustainable Development: Final Report. July 2005. Department of Environment, Food and Rural Affairs. piii Available at: http://library.uniteddiversity.coop/Food/DEFRA_Food_Miles_Report.pdf Accessed on 24/07/2019
[30] Watkiss P et al. The Validity of Food Miles as an Indicator of Sustainable Development: Final Report. July 2005. Department of Environment, Food and Rural Affairs. pii Available at: http://library.uniteddiversity.coop/Food/DEFRA_Food_Miles_Report.pdf Accessed on 24/07/2019
[31] Garnett, T., Smith, P., Nicholson, W., & Finch, J. (2016). Food systems and greenhouse gas emissions (Foodsource: chapters). Food Climate Research Network, University of Oxford. Available online: https://foodsource.org.uk/sites/default/files/chapters/pdfs/foodsource_chapter_3.pdf

bda.uk.com

Produced by the BDA with project partners
in the science & nutrition team at Alpro.

Published November 2018
For review November 2021