



What You Can Say When Marketing Organic



INTRODUCTION

There is a climate emergency, we have ten years to change our behaviour to prevent catastrophic global heating. From taking fewer flights to eating less but better meat, people are increasingly making conscious decisions to reduce their impact on the planet and help build a better future.

Organic can play a leading role. As shoppers seek to be more sustainable in their daily lives, organic is increasingly becoming an easy and natural choice. However, there is more that can be done to help people understand what organic means and empower them to choose organic.

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Cutting through the noise

Confronted with a sea of labels, competing health claims, food scares and conflicting advice, people are confused. Coupled with this confusion is a growing awareness that our choices and behaviour have an impact on the wider world. This presents an opportunity for the organic industry to come together to make our voice heard and communicate the benefits of organic simply and clearly. With this in mind, we have shifted the focus of this booklet to demonstrate how organic can offer solutions in a post COVID-19 world. We have added a section to explain more about how the organic standards help achieve the outcomes that benefit our environment and how organic takes a “whole system” approach.

Organic – the natural way to be more sustainable

Organic farming is a system – governed by legal standards, and regularly and independently inspected – that produces food in ways that benefit people, animals, wildlife, society and the natural world. No other defined system of farming and food production comes close to delivering such a breadth of benefits. With attitudes shifting towards more planet-centric thinking, the time is now for the organic industry to harness this momentum and work together to promote a clear message.

What's inside

This booklet was prepared with reference to the principles of the CAP (Committee of Advertising Practice) Code. It features statements that can be used to communicate about organic in a clear and correct way. It covers the organic principles, and includes sections on sustainability, climate change, animal welfare, soil, wildlife and more. While these statements have been reviewed against the UK Advertising Standard Authority's (ASA) Code, it is important to remember that **CONTEXT IS KEY** when using particular statements, and we would **ALWAYS** advise that you submit your own advertising copy and materials to Copy Advice before using them, as much will depend on the context that a statement appears in.

We hope you find this booklet useful, and, ultimately that it helps us all to promote a strong, clear and positive message about organic.

Clare McDermott

Business Development Director
Soil Association Certification

Advertising Standards Authority & Copy Advice

The Advertising Standards Authority (ASA) is the UK's independent advertising regulator. The ASA makes sure ads across UK media stick to the advertising rules (the Advertising Codes). The Committee of Advertising Practice (CAP) is the sister organisation of the ASA and is responsible for writing the Advertising Codes.

The ASA investigate any complaints made about non-broadcast advertising, once it is established that it falls within the ASA's remit. They also spot-check ads across media to make sure they're sticking to the rules.

To help advertisers get their ads right, CAP provides a range of advice, guidance and training, including a free pre-publication Copy Advice service. Copy Advice are linked to, but independent of the ASA, and always take pains to stress that if they advise that a statement is acceptable, it still may be found to be unacceptable by the ASA. Nevertheless, their view carries some weight with the ASA, and certainly provides a useful guide to advertisers. Copy Advice is an essential service for advertisers, agencies, media owners and media service providers who want to check how their prospective non-broadcast ads or multi-media concepts measure up against the UK Advertising Codes.

The vast majority of advertisers, promoters and direct marketers comply with the Code. Those that do not may be subject to sanctions.

What does the ASA Non-Broadcasting code cover?

The UK Code of Non-Broadcast Advertising and Direct & Promotional Marketing (CAP Code) is the rule book for non-broadcast advertisements, sales promotions and marketing communications. Visit the ASA website (www.asa.org.uk) for a full breakdown of what is included in the Code.

In summary:

The Code applies to: all non-broadcast marketing communications including national and regional print and press ads; advertorials; posters; direct mail; email and text messages; online including banners, pop-ups, own websites and social media.

The code does not apply, amongst other things, to: packaging/on-pack claims; shop windows; point of sale; sponsorship; live telephone calls; fly-posting; private classified ads; statutory/public notices; press releases; political ads; online editorial.

Note: TV & Radio ads are covered by the UK Code of Broadcast Advertising (BCAP Code) and are usually pre-cleared by Clearcast (TV) or Radiocentre (radio). It is important to note that Clearcast approval DOES NOT mean it meets ASA approval.

Misleading Advertising

Is the average consumer to whom the ad is directed likely to be misled into taking a transactional decision which they would not have otherwise taken?

Adverts should not materially mislead, exaggerate the capability or performance of a product or omit material information.

Marketers must hold documentary evidence to prove objective claims (including prices). Significant limitations and qualifications must be stated and should not contradict.

What does not fall within the ASA's remit?

"Puffery"

Obvious exaggerations ("puffery") and claims unlikely to be taken literally are permitted provided they do not materially mislead.

For example:

"The most comfortable beds in the world"
"The happiest place on Earth"
"Red Bull gives you wings"
"Together we can make a world of difference"

Subjective Claims

Subjective claims are generally those which consumers will interpret as an opinion about the product and service, such as "my favourite", or those that refer to aspects of a product or service which are based on personal subjective preference, such as look, taste, or feel.

Note: Marketers should not try to present objective claims as subjective opinions or testimonials in order to make a claim without having the supporting evidence. Examples of this include putting quotation marks round an objective claim, or prefixing a claim with "users thought", or similar. Even if a claim is presented as an opinion, if it is an objective claim it must be supported by evidence which substantiates the claim.

Substantiation

Marketers must hold documentary evidence for claims that consumers are likely to regard as objective. Without adequate substantiation, claims are likely to be misleading. The level of substantiation depends on the claim – the stronger the claim, the more robust the evidence needed.

E.g. "70% of shoppers prefer the taste of organic potatoes" could be substantiated by a market study. "Organic cotton production uses 50% less water" would need robust supporting evidence.

If investigating a claim, the ASA will require the evidence to be submitted, and will call on independent experts when necessary.

YOU CAN'T SAY EVERYTHING THAT IS TRUE!

The rules governing what you can say to sell a product, as administered by the ASA, do not simply rely on a statement being true. For example, while you may make comparisons, you are not allowed to say something that the ASA might feel 'denigrates' other products.

FOOD & ENVIRONMENT RULES

If an ad promotes a particular food product, rather than a farming technique or philosophy, the strict food rules in Section 15 apply.

If an ad makes claims about environmental impact, the Section 11 requirements to hold strong evidence and clearly state the basis of the claims, will apply. For full details on the scope and rules of the code visit: www.asa.org.uk/codes-and-rulings/advertising-codes/non-broadcast-code.html

How to use the statements in this document

1. Once you have decided to use a statement, **you must still check your specific advertisement with Copy Advice**. The context in which the statement is used, and any associated imagery, can alter the meaning of the words, so give as much detail as possible to help Copy Advice make an informed response.
2. You need to hold any evidence that might be required to substantiate the statements you make, when you make them. The digital version of this document is fully referenced and can be found on our website (www.soilassociation.org/whatyoucansay). Many of the claims listed are based on general evidence for organic farming systems. This evidence is unlikely to be representative of a specific product so should be used in a context that does not suggest otherwise (unless additional evidence is found). See page 11 for further details.
3. In order to assist the ASA in assessing a claim, highlight the appropriate information and explain the relevance, if necessary. Given this could be buried within a detailed report, this can save the ASA advisors from having to read pages of irrelevant information in order to verify the claim. Helping them helps you!

Copy Advice can be reached via their website at www.asa.org.uk/advice-and-resources/bespoke-copy-advice.html and proposed statements can be submitted via the website for free advice. Copy Advice always undertake to respond within 24 hours. However, remember that Copy Advice will always qualify their opinion by stressing that it does not bind the ASA itself.

Telling the organic story

Our farming and food production systems have multiple and often 'hidden' problems that need solving. Some argue you can't fix everything all at once, but organic does a pretty good job! The true strength of organic is how it attempts to tackle these multiple problems and reduce any trade-offs – by taking a holistic "whole system" approach.

But this is a complicated concept to get across. We recommend taking a narrative or visual approach to tell this organic 'story'; the way organic standards tackle a wide range of often hidden, interrelating problems in the food system. It is about how simply looking for an organic label can make a very complicated choice, somewhat easier. The claims in this booklet are here, not so much as standalone facts, but to help you to convey this story, or at least a feel for it, using language that has been verified and can be backed up by science.

If you plot sustainability as a flower, where the degree of positive impact on different components of sustainability are shown by the size of the petal, then organic farming has been found to have a more balanced, full flower shape compared to non-organic farming.

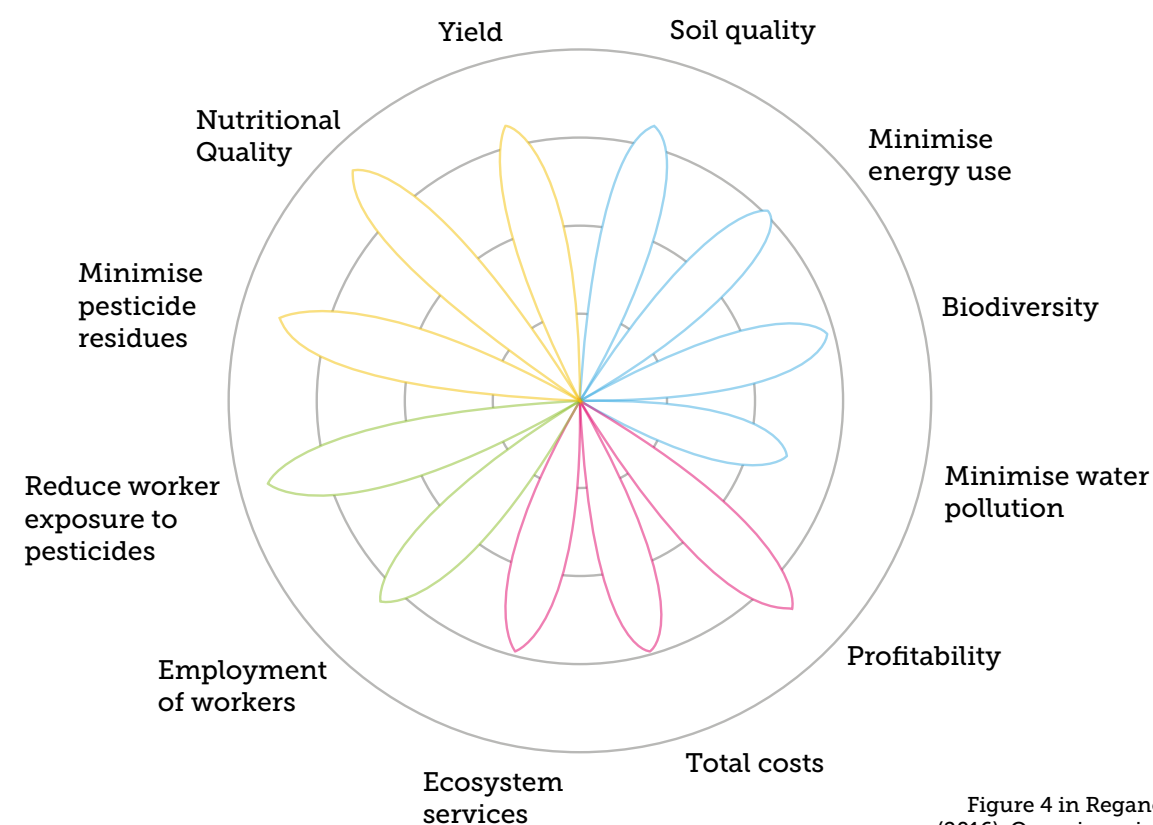


Figure 4 in Reganold, J. P., & Wachter, J. M. (2016). Organic agriculture in the twenty-first century. *Nature Plants*, 2(2), 15221. <https://doi.org/10.1038/nplants.2015.221>

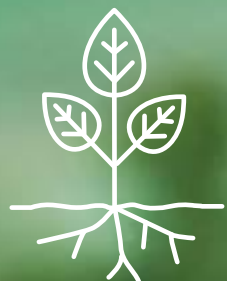
What is organic?

“Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

Definition of Organic Agriculture, IFOAM – Organics International



Organic Agriculture is based on four key principles:



HEALTH

Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.



ECOLOGY

Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.



CARE

Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.



FAIRNESS

Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.



Organic Standards

The Soil Association developed the world's first organic standards in the 1960s. Standards are the rules that define how an organic product must be grown, farmed or made. The principles upon which the Soil Association's organic standards are based are set out below. Organic takes a "whole system" approach to farming and food production – it recognises the close interrelationships between all parts of the production system, from the soil to the food on our fork. This comprehensive set of organic principles guides the Soil Association's work and standards.

PRINCIPLES OF ORGANIC FOOD PRODUCTION

1. To produce food of high quality and in sufficient quantity by the use of processes that do not harm the environment, human health, plant health or animal health and welfare
2. To work within natural systems and cycles at all levels, from the soil to plants and animals
3. To maintain the long-term fertility and biological activity of soils
4. To treat livestock ethically, meeting their species-specific physiological and behavioural needs
5. To respect regional, environmental, climatic and geographic differences and the appropriate practices that have evolved in response to them
6. To maximise the use of renewable resources and recycling
7. To design and manage organic systems which make the best use of natural resources and ecology to prevent the need for external inputs. Where this fails or where external inputs are required, the use of external inputs is limited to organic, natural or naturally-derived substances
8. To limit the use of chemically synthesised inputs to situations where appropriate alternative management practices do not exist, or natural or organic inputs are not available, or where alternative inputs would contribute to unacceptable environmental impacts
9. To exclude the use of soluble mineral fertilisers
10. To foster biodiversity and protect sensitive habitats and landscape features
11. To minimise pollution and waste
12. To use preventative and precautionary measures and risk assessment when appropriate
13. To exclude the use of GMOs and products produced from or by GMOs, with the exception of veterinary medicinal products
14. To sustainably use products from fisheries

Why organic?

In the face of climate change, diet-related ill health and widespread decline in wildlife, the need to change our food system has never been greater. The "whole system" approach used in organic attempts to address issues in a joined-up way. Organic therefore provides solutions to many problems, offering truly sustainable food for a growing population, in a way that works with nature.

Food you can trust

The standards for organic food are laid down in law (and, in places, these are supplemented by the Soil Association's well-evidenced higher standards), so certification is required to grow, process or market organic products, plus all organic farms and companies are inspected at least once a year.

Soil Association Certification certifies over 70% of organic food in the UK and the organic label is the best way of assuring that the food you eat has been produced to a standard you can trust.

Why We Can't Always Say What We'd Like

Wondering why some claims are phrased in a certain way or not quite as strong as you might expect?

Research gaps

In order to make a substantiated claim on the benefits of a farming system, a huge number of studies from different places and for different products are needed. This is especially the case for most things that you want to put a number on, such as percentage greenhouse gas (GHG) emissions. Organic standards are evidence-based and regulated by law, so their rationale has had a lot of scientific scrutiny. But research gaps do remain, especially when it comes to quantifying the impacts of organic systems. Sadly, less than 1% of all annual research funding for farming goes towards looking at organic systems so the claims listed here reflect this.

Research bias

The metrics chosen by scientists also have implications for how the results are interpreted. For example, commonly used methods like Life Cycle Analyses, tend to favour intensive farming methods over organic. This is because such methods can take a narrow perspective on the function of farming systems – such as focussing on yield, without considering non-economic impacts like biodiversity. The starting point for organic is to try and avoid a narrow focus, by taking a holistic, “whole system” approach. A “whole system” approach means attempting to strike a more optimum balance between avoiding or mitigating a wide range of the common negative consequences associated with food production whilst still producing enough


food. Methods that fail to account for the full range of factors that the organic approach considers, or which inconsistently model them, can misrepresent the benefits of organic and result in evidence that is not as strong as might be expected.

Ongoing disputes

An example of this is the ongoing debate about the implications of organic farming for yields, with organic farms sometimes being found to produce lower yields. Lower yields often mean that measured impacts (such as GHG emissions) come out lower per area of farmland, but higher per unit of product. Whilst some argue this counts against organic, others (including the Soil Association) argue this sets up a false dichotomy because it fails to consider the other costs that high yields come with. Not only because it ignores the potential to close the yield gap, but by focusing on a narrow set of metrics (yields and efficiency of input per unit of product) at the expense of other metrics it is short-sighted and fails to evaluate overall sustainability. This yield driven approach has directly and indirectly contributed to waste, overconsumption of unhealthy foods, and has provided economic incentives to convert natural habitat to agriculture. Nonetheless, the ASA emphasise the importance of being sensitive to ongoing scientific disputes. For this reason, when organic farming performs better only in terms of land area comparisons, the claim specifies this.

How to use claims in the context of a specific product

1. Claims based on organic standards are usually applicable to specific products

Claims listed which are based on organic standards are *italicised and in bold and marked with our organic symbol* . These should be applicable to specific products when these products meet the standards that the claim refers to. The evidence basis behind these claims is the standards themselves. It is nonetheless still the responsibility of the advertiser to check that their particular use of such claims meets ASA guidelines.

One thing to be careful of are claims based on standards which relate only to a part of a product cycle, such as on farm. The use of such claims in the context of specific products may well need further qualifying statements to make this clear.

2. General claims about organic farming may not be applicable to specific products

In this booklet a lot of the statements have been purposely worded to say “organic farming is XYZ”. These claims refer to standards for organic farming or the generic impact of organic farming. The latter reflects the findings of robust reviews into the impact of organic farms, usually in comparison to non-organic farms. Where statements reference reviews, we have made every effort to ensure such claims are generic enough to stand up to scrutiny by referring to robust reviews that are as comprehensive as possible. However, review findings reflect average results, and this masks natural variation between findings for different farms and products in different places.

One example is that most research on organic agriculture happens in Europe and North America. This means the statements in this booklet are by default less applicable to crops & ingredients which originate in other continents and climatic zones – such as produce from tropical and arid environments.

With all this in mind, it is your responsibility to consider the way in which you present the information and how it might be interpreted in the context of the products it is being used to advertise.

We therefore suggest you:

- Ensure it is clear to audiences if a claim refers to organic farming systems in general, and on average. This could be through a qualifying statement that accompanies a headline claim
- Alternatively, ensure that the claim you use, and its underlying evidence, is representative of the product advertised. If it is not, more specific evidence may exist which may be more representative of your product(s), so don't be afraid to look for it.

Any claims in this booklet that are specific to organic farming do not relate to other stages in a product's life cycle (such as processing, transport, use, and disposal). If you use these claims, it is also in your interest to be careful not to imply that they relate to the whole supply chain or life cycle of your product(s) unless you hold additional evidence to support this. This is most applicable when making environmental claims, as ASA guidelines state that you must ensure you hold evidence to support any environmental claim you wish to make about the product you are advertising, taking into account its entire life cycle. See sections 11.3 and 11.4 of the code (www.asa.org.uk/advice-online/environmental-claims-general.html). Again, the use of qualifying claims may help in this instance.


3. Comparative claims need to be supported by evidence if audiences can name a competitor

If you are making a comparative statement such as ‘organic XXX has more XXX’ then you need to be careful about using the claim in a context which would lead your audience to interpret the statement as referring to an identifiable competitor. In this instance, ASA guidelines state that comparisons must not mislead the consumer about the product or the competing product, must be about products which meet the same need or are intended for the same purpose, and must be verifiable (see section 3.3 of the code).

1 BETTER FOR THE PLANET

Organic takes a “whole system” approach to farming and food production. This means farming in a way that aims to support our whole food system, from soils and farm animals to the health of people, nature and the planet. Organic farmers are encouraged to “close the loop” on their farms, making use of what’s to hand and limiting the use of imported resources. It’s this respect for the natural world and ability to work with natural relationships and cycles that makes organic farming a solution that is better for the planet.

PLEASE NOTE:

Claims which are based on organic standards are *italicised and in bold and marked with our organic symbol* . These should be applicable to specific products when these products meet the standards that the claim refers to. The evidence basis behind these claims is the standards themselves.

Important:

Those standards that are the Soil Association’s own higher standards clearly say so and must not be used in a context that implies they apply across all organic farming.

Organic farming is a holistic system that works with, rather than against, natural systems





Organic as a sustainable solution

- 🕒 *Organic means working with nature, not against it¹*
 - 🕒 *Organic respects nature²*
 - 🕒 *Organic farmers use nature-based methods³*
 - 🕒 *Organic farmers use natural methods⁴*
 - 🕒 *Organic farmers work within natural systems and cycles at all levels, from the soil to plants and animals⁵*
 - 🕒 *Organic farming is a holistic system that works with, rather than against, natural systems⁶*
 - 🕒 *Organic farming aims to minimise disruption to the natural environment⁷*
 - 🕒 *Organic is rooted within living ecological systems⁸*
 - 🕒 *Organic takes a balanced approach. It is designed to respect nature and to enhance the health of soils, water and air, of plants and animals, and the balance between⁹*
 - 🕒 *Organic is a 'whole system' approach to farming and food production. It recognises the close interrelationships between all parts of the production system, from the soil, to the food on our fork¹⁰*
 - 🕒 *Organic is a 'whole system' approach to farming and food production¹¹*
 - 🕒 *In organic, weeds are controlled, and pest and disease damage is reduced using techniques which are sustainable and promote environmental preservation¹²*
 - 🕒 *Organic farming takes account of local and regional balances and encourages the use of on-site resources¹³*
 - 🕒 *Organic production aims to maintain a healthy living soil, and positive plant and animal health¹⁴*
 - 🕒 Organic farming lowers the risk of environmental pollution and helps reduce greenhouse gas emissions by severely restricting the use of manufactured chemical fertilisers and pesticides.¹⁵ **Instead, organic farmers rely on developing a healthy, fertile soil and growing a mixture of crops^{16 17}**
 - Organic farming drives sustainability in agriculture^{18 19}
 - Organic farming is leading the way on sustainability^{20 21}
 - Organic farming takes a balanced and holistic approach to sustainability²²
 - Organic farming systems don't focus on one sustainability goal over others²³
 - Organic takes a whole system approach to sustainability²⁴
 - Organic food is produced with natural fertilisers,²⁵ usually less energy^{26 27} and more care for animals²⁸
 - Organic farms are more ecologically diverse²⁹
 - Organic farms are more diverse. This helps minimise risk by reducing a farmer's economic dependence on a single crop^{30 31}
 - Organic farming supports smallholder families in low-income countries^{32 33 34}
 - Organic farming supports the livelihoods of smallholder farmers in low income countries^{35 36 37}
- The following need a qualifying statement or context that makes it clear that these refer to organic in comparison with other farming or production methods:**
- 🕒 *Organic is designed to benefit nature³⁸*
 - 🕒 *Organic is designed to benefit insects, wildlife, and soils³⁹*

Organic is a "whole system" approach to farming and food production. It recognises the close interrelationships between all parts of the production system, from the soil, to the food on our fork

Organic farmland stores more carbon – on average 3.5 tonnes extra for every hectare (the size of nearly two football pitches). This is the greenhouse gas equivalent of driving your car around the world almost one and a half times (31,844 miles)

Organic farms help combat climate change

LOWER EMISSIONS

- *Organic farmers don't use synthetic fertilisers which come from burning fossil fuels⁴¹*
- *Soil Association organic standards severely restrict the use of peat - an important carbon sink⁴²*
- On average, organic farms use less energy⁴³
- Organic farming tends to reduce energy use⁴⁴ due to the avoidance of synthetic fertilisers⁴⁵
- On average, organic vegetable farms, dairy farms, and mixed farming systems use less energy than their non-organic counterparts⁴⁶
- Soil Association organic standards support the protection of peatlands, which are vital in our fight against climate change⁴⁷

The following statements need to be used along with one of the listed additional qualifying statements:

- Organic farming can help to mitigate climate change^{48 49}
- Organic farming can help to slow down climate change⁵⁰
- Organic farms tend to have lower emissions⁵¹
- Organic fields tend to have lower emissions⁵²

QUALIFYING STATEMENTS:

- If Europe's farmland all followed organic principles, agricultural emissions could drop by 40-50% by 2050, with plenty to feed the growing population healthy diets^{53 54}
- Adopting nature-friendly farming, such as organic, could feed the growing population of Europe healthy diets, maintain key exports, and drop agricultural emissions by 40-50% by 2050^{55 56}
- Adopting nature-friendly farming along with other key changes to our food system could help keep global warming below 2°C⁵⁷

Organic farms sequester more carbon

(see also section 2, Better for Soil)

- Organic farmland stores more carbon – on average 3.5 tonnes extra for every hectare (the size of nearly two football pitches).⁵⁸ This is the greenhouse gas equivalent of driving your car around the world almost one and a half times (31,844 miles)⁵⁹
- Organic farming stores more carbon, on average nearly 2 tonnes more carbon per football pitch area⁶⁰
- Organic soils are around 25% more effective at storing carbon in the long-term⁶¹
- Soil carbon increases on average by 2.2% per year after converting to organic⁶²

Organic farms are more resilient to the effects of climate change

- Organic farms are more resilient to climate change⁶³
- Organic crops perform better during climate extremes⁶⁴
- Organic farms are more resilient to the effects of climate change⁶⁵
- Organic soils store up to twice as much water - this makes them more resilient in a changing climate⁶⁶
- Farming organically can protect against flooding because organic soils store twice as much water⁶⁷
- Organic soils store twice as much water⁶⁸
- Organic soils help protect against flooding⁶⁹
- Organic soils perform better during drought⁷⁰
- Organic soils perform better under extreme weather events^{71 72}

2 BETTER FOR SOIL

Keeping soils fertile and preventing soil erosion is a challenge for all farmers. Instead of using artificial fertilisers, organic farmers look after their soils using manure, compost, 'cover crops' and crop rotations.⁷³ Around the world, we are losing soil much faster than it's formed, alarmingly between 10 and 40 times faster.⁷⁴ One UN official stated that we may have fewer than 60 harvests left.⁷⁵ 95% of our food production relies on soil,⁷⁶ so it has never been more crucial to farm in a way that protects and preserves the soil.

Organic farming is based on nourishing the soil

Why soil matters

- Around 95% of food production relies on soil⁷⁷
- Healthy topsoil is vital to our existence⁷⁸
- Soils are home to a quarter of the Earth's species⁷⁹
- One gram (a quarter of a teaspoon) of soil may harbour up to 10 billion micro-organisms (most of which are still unexplored)^{80 81}
- Healthy soils absorb and store water - with the help of soil organisms, organic matter and good soil management^{82 83}
- Soils store more carbon than the atmosphere, and all of the world's plants and forests combined, which means that soil is one of our most important weapons in the fight against climate change⁸⁴
- A single hectare of soil has the potential to store and filter enough water for 1000 people for 1 year⁸⁵
- UK soils store around 130 trillion litres of water - more than contained in all UK lakes and rivers combined⁸⁶
- 10 billion tonnes of carbon is stored in UK soils⁸⁷
- Soils store 65% of the world's fresh water⁸⁸
- Food security relies on sustainable soils⁸⁹

Soil degradation

- Half of the topsoil on the planet has been lost in the last 150 years⁹⁰
- Globally we lose around 30 football pitches of fertile soil a minute¹⁵³
- One UN official stated that we may have fewer than 60 harvests left⁹¹
- The world loses 24 billion tonnes of soil every year⁹²
- Over the last 40 years, almost a third of the world's arable soils have been lost to erosion or pollution⁹³
- European farmland is being lost at an unsustainable rate⁹⁴
- Every year an area of fertile soil three times the size of Switzerland (12 million hectares) is lost globally⁹⁵
- The UK has lost 84% of its fertile topsoil since 1850, with erosion continuing at 1cm to 3cm a year⁹⁶

- British soils are in crisis⁹⁷
- Soil degradation in England and Wales costs £1.2 billion every year⁹⁸
- It takes 100 years for just 1-2cm of topsoil to form, and soil that is lost to pollution or erosion will need hundreds or even thousands of years to recover on its own⁹⁹
- One inch of soil takes over 500 years to form¹⁰⁰
- We are losing soil 10-40 times faster than it's formed¹⁰¹

Organic is better for soil

- ☞ *Organic farming is based on nourishing the soil*¹⁰²
- ☞ *Organic farming is based on nourishing the plants by building healthy soils*¹⁰³
- ☞ *Organic farming creates a healthy, living soil*^{104 105}
- ☞ *Organic farming builds soil fertility naturally using compost and clover*¹⁰⁶
- ☞ *Natural, sustainable soil fertility is encouraged through composting and crop rotation*¹⁰⁷ with legumes to provide nitrogen, rather than energy-hungry synthetic fertilisers¹⁰⁸
- Healthy soils protect underground water supplies by neutralising or filtering out potential pollutants. Increasing soil organic matter levels (through methods used by organic farmers)¹⁰⁹ can improve this function¹¹⁰

The following statements need to be used along with one or more of the listed additional qualifying statements:

- Organic farming is better for the long-term health of the soil¹¹¹
- Organic farms have healthier soils¹¹²

QUALIFYING STATEMENTS:

- Organic farms have a more diverse range of microbes living in the soil - this helps the crops to grow without artificial fertilisers^{113 114}
- Organic farmers use around 65% more manure and compost - this nourishes the soil and keeps it alive¹¹⁵
- Soil organic matter - the 'living' part of the soil - is higher on organic farms¹¹⁶
- Organic soils have more earthworms¹¹⁷

3 BETTER FOR WILDLIFE



The importance of pollinators

- 76% of globally important commercial crops depend on insect pollination¹¹⁸
- Three quarters of food crops depend on pollinators¹¹⁹
- 1 in 3 mouthfuls of food depends on pollinators¹²⁰
- Without pollinators we wouldn't have potatoes, strawberries, tomatoes, coffee, chocolate or cotton¹²¹
- We get 90% of our Vitamin C, the majority of Vitamin A, folic acid, and lots of important antioxidants from plants that rely on animal pollination¹²²
- The decline of pollinators is a threat to human nutrition¹²³
- Bees are important pollinators but so are flies, beetles, moths, butterflies, wasps, ants, birds, and bats¹²⁴

WHAT DO POLLINATORS DO?

Bees and other insects drink the sweet nectar of flowers. As they move between flowers, they transfer pollen which fertilises the plant, enabling it to produce fruit and seeds.

Wildlife declines

- Over 40% of insect species are declining and a third are endangered¹²⁵
- We are losing insects eight times faster than mammals, birds and reptiles¹²⁶
- The world's insects are being lost at 2.5% a year¹²⁷
- A major global report states that insects could vanish within a century¹²⁸
- Intensive farming is the main cause of insect decline - particularly the heavy use of pesticides¹²⁹
- 41% of Britain's wildlife species have declined since 1970 and more than one in ten are currently facing extinction. Intensive farming practices have been identified as the primary drivers of these declines¹³⁰

Organic is better for wildlife

- Organic farms are havens for wildlife and provide homes for bees, birds and butterflies. On average, plant, insect and bird life is 50% more abundant on organic farms¹³¹
- Organic farms are home to 30% more species of wildlife on average¹³²
- Organic farming is better for bees^{133 134}
- More bees on organic farms^{135 136}
- There are up to 7 times more bees in organic grain fields¹³⁷
- For every 10% increase in bee friendly habitats – like that found on organic farms – bee numbers and diversity increases by over a third¹³⁸
- A small increase in bee-friendly organic habitat would boost bee numbers by a third¹³⁹
- There are more wild bees on organic farms¹⁴⁰
- There are around 75% more wild bees on organic farms¹⁴¹
- Organic farming can improve the numbers of bees found in habitats surrounding the farm¹⁴²
- If pesticides were substituted for more sustainable farming practices (like organic), this could slow or reverse the decline in insects¹⁴³



Organic farms are home to 30% more species of wildlife on average

- Organic farms have around 50% more bees, butterflies and other pollinators¹⁴⁴
- Organic farming is better for pollinating insects¹⁴⁵
- Studies have found more wildflowers on organic farms^{146 147}
- Studies have found that organic farming improves pollination of flowers surrounding the farm^{148 149}

Ecological diversity

- Organic farms are more ecologically diverse^{150 151}
- Organic farms have a more diverse range of microbes living in the soil - this helps the crops to grow without artificial fertilisers^{152 153}

Life below water

- Organic supports cleaner water for wildlife^{154 155 156 157 158}
- Organic farming lowers the risk of pollution in rivers and waterways^{159 160 161 162 163}
- Fertilisers used in farming can create 'ocean dead zones' which deprive life below water of vital oxygen¹⁶⁴
- The main cause of 'ocean dead zones' is nitrogen fertilisers¹⁶⁵
-  Organic standards ban the use of manufactured nitrogen fertilisers¹⁶⁶
-  Manufactured nitrogen fertilisers are banned in organic farming¹⁶⁷

4 BETTER FOR ANIMALS

Animal welfare is one of the most important aspects of organic farming. Organic standards insist that animals are given plenty of space and fresh air,¹⁶⁸ and that they are raised in conditions that suit their natural behaviour.¹⁶⁹ Smaller flocks and herds, and more access to the outdoors means organic animals don't have to be routinely treated with antibiotics and wormers.¹⁷⁰ Mutilations like beak-trimming to prevent the aggressive side effects of stress are also not needed or allowed.¹⁷¹



Organic standards mean that farm animals:

- ☞ **Must have access to pasture (when weather and ground conditions permit) and are truly free-range¹⁷²**
- ☞ **Must have plenty of space (indoors and outdoors)¹⁷³ – which helps to reduce stress and disease¹⁷⁴**
- ☞ **Are fed a diet that is as natural as possible**
- ☞ **Graze and forage naturally on organic pasture (grasses and other crops) where only natural fertilisers are used and pesticides are severely restricted**
- ☞ **Must not routinely be given antibiotics.¹⁷⁵ In 2017 farm animals accounted for around 30% of all antibiotics used in the UK.¹⁷⁶**

Note: at the time of writing in June 2020, these are the most up to date figures, but please check for updated figures if using this stat in the years to come.

- ☞ **Organic farming has high standards of animal welfare¹⁷⁷**
- ☞ **Organic animals are fed a natural, organic and completely GM-free diet¹⁷⁸**
- ☞ **Organic farmers always provide enough light, space and comfort to allow farm animals freedom to move and express their natural behaviours¹⁷⁹**
- ☞ **Organic animals enjoy plenty of fresh air and have space to graze and roam, satisfying their natural instincts¹⁸⁰**
- ☞ **Organic animals are able to satisfy their natural behaviours such as grazing, rooting, dust-bathing and perching. This means there is no need for painful mutilations such as tail-docking or beak trimming¹⁸¹**
- ☞ **Organic systems provide the environments animals need, which means they don't need to undergo painful mutilations¹⁸²**
- ☞ **Organic farmers reduce stress and disease in animals by giving them plenty of space and allowing them to behave naturally in a suitable environment, meaning there is no need for preventative antibiotics. An animal is only treated with medicine if it is sick¹⁸³**
- ☞ **Soil Association standards restrict the use of antibiotics (such as Colistin) that are critically important for human health¹⁸⁴**
- ☞ **Organic farming standards ban the routine use of antibiotics and wormers¹⁸⁵ which helps minimise antimicrobial resistance and protects the effectiveness of these treatments**
- ☞ **Organic standards ban the use of cloning and embryo transfer¹⁸⁶**
- The Soil Association has the highest standards for animal welfare in the UK¹⁸⁷
- Ensuring all animals reared for meat and animal products have a good life is at the heart of Soil Association standards¹⁸⁸

ANTIBIOTICS IN FARMING

The overuse of antibiotics in human and animal medicine is undermining their ability to cure life-threatening infections. The more sparingly we use our antibiotics, the more effective they will remain. Farm animals account for around 30% of all antibiotics used in the UK.¹⁸⁹ In intensive farming systems, to compensate for animals being housed in more crowded conditions where infections spread fast, antibiotics can be used as a preventative measure - before animals show signs of illness - or for group treatments after a disease outbreak which could have been avoided had the animals been kept in better conditions in the first place. Thanks to higher animal welfare standards which reduce the risk of disease, the preventative use of antibiotics is banned in organic farming.

Free-range

- ☑ **Always free-range**¹⁹⁰
- ☑ **Organic animals have a truly free-range life**¹⁹¹
- ☑ **Organic animals must have permanent access to pasture whenever conditions allow**¹⁹²
- ☑ **Animals reared organically are encouraged to forage and graze**¹⁹³
- ☑ **Organic standards insist that animals are given plenty of space and fresh air to thrive and grow – guaranteeing a truly free-range life**¹⁹⁴

Pigs

- ☑ **Pigs raised to organic standards do not have their tails docked (cut short), teeth cut or have painful nose rings fitted. Organic farmers reduce stress by giving pigs plenty of space and the opportunity to express their natural behaviours**¹⁹⁵
- ☑ **Pigs reared in organic systems are weaned much later than standard ones, at 40 days rather than as early as 21 days.**¹⁹⁶ The Soil Association advises its farmers not to wean pigs until they are eight weeks old. This allows the piglets to develop at a natural pace, reducing stress and disease and notably, antibiotic use¹⁹⁷

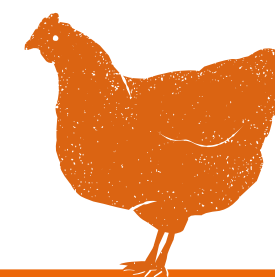
Cows

- ☑ **Organic cows spend as much time outdoors as possible**¹⁹⁸
- ☑ **Cows are fed a grass-rich, GM free diet (minimum 60% grass-based)**¹⁹⁹
- ☑ **'Zero-grazing', where cows are kept indoors and cut grass or other feed, such as cereals and soya is taken to them, is banned by organic standards**²⁰⁰
- ☑ **Calves must be fed natural, organic milk, preferably maternal milk, for a minimum period of 12 weeks**²⁰¹
- ☑ **Soil Association standards state that farmers must have a plan in place for unwanted male dairy calves**²⁰²
- Organic cows eat mainly grass (the organic standard requires 60% forage in the diet), while non-organic cows are generally given more concentrated feed (on average a third more) in order to increase milk production. This means organic dairy has lower (on average 20% lower) but more sustainable, milk yield, which helps to protect the animals' health and welfare²⁰³

Chickens & Eggs

- ☑ **Organic chickens are much more than free-range. They live in smaller flocks, have better access to fresh air and the outdoors and more space in their houses than non-organic chickens**²⁰⁴
- ☑ **Organic chickens are never caged**²⁰⁵
- ☑ **Organic chickens have a third more space indoors than free-range birds**²⁰⁶
- ☑ **Organic poultry must have continuous and easy, daytime access to a diverse outdoor range. Organic farms certified by the Soil Association also have to provide more pop holes (exits from the hen house) than free-range farms do**²⁰⁷, to encourage and promote ranging²⁰⁸
- ☑ **Organic chickens are not allowed to be fed on GM feed (which is common in free-range and non-organic hens)**²⁰⁹
- ☑ **Organic farming encourages poultry/chicken breeds that are slower growing, and more robust.**²¹⁰ **Organic meat chickens live twice as long as most intensively farmed chickens**²¹¹
- ☑ **Organic laying hens are kept in smaller flocks with more space (max 3,000 vs 16,000 in free-range systems)**²¹²
- ☑ **Soil Association certified poultry raised for meat are kept in smaller flocks (max 1,000 birds) and have more space than free-range birds**²¹³
- ☑ **Poultry must be given access to an outdoor range as early as possible**²¹⁴
- ☑ **Chickens must not have their beaks trimmed to try and prevent feather pecking**²¹⁵ and are given plenty of opportunities to express their natural behaviours such as foraging, bathing in the dust outside and pecking at insects and worms on diverse ranges²¹⁶
- ☑ **Organic chicken flocks are eight times smaller than free-range flocks.**²¹⁷ This is important as the health of individual birds is much more easily managed within a smaller flock

The Soil Association have the highest standards for animal welfare in the UK



5 KNOWING WHAT'S IN YOUR FOOD



Soil Association Certification certify over 70% of organic food in the UK

Food you can trust

For a food product to be labelled as organic, every organisation working up and down its supply chain – from farmers and packers to food processors and organic retailers – have to meet organic standards and prove it to an organic certification body. Those who certify with the Soil Association must also meet our additional higher standards – as shown by the Soil Association organic symbol. The Soil Association Certification certify over 70% of organic food in the UK, meaning when you see the organic symbol you can be sure what you eat has been produced to a standard you can trust.

- Food as it should be
- Food you can trust²¹⁸
- Organic: a symbol of trust²¹⁹
- All organic products come from trusted sources²²⁰
- Organic food must be certified by law, so you can be assured that the product and ingredients come from verified sources²²¹
- **Organic products certified and sold in the UK must legally comply with the EU Organic Regulation.**²²² This means certification is required to grow, process and market organic products. All organic farms and food companies are inspected at least once a year²²³
- Soil Association Certification certifies over 70% of organic food in the UK, and all organic farmers and processors are inspected at least once a year. The organic logo can only be used on products that have been certified as organic by an authorised certification body. This ensures that the product fulfils strict conditions on how it was produced, processed and handled at every stage. This means the organic label is the best way of assuring that the food you eat has been produced to a standard you can trust²²⁴
- Wherever you see the organic symbol, you can be sure that the food has been produced to the highest standards
- Organic certification and labelling is agreed nationally and across Europe, and is a guarantee of food quality, independently inspected and certified all over the world
- Choosing organic means that you are supporting farming practices with a more traceable production process and you'll always know what's in your food
- It means higher levels of animal welfare,²²⁵ lower levels of pesticides,²²⁶ no manufactured herbicides or artificial fertilisers,²²⁷ and more environmentally sustainable management of farmland and the natural environment – this means more wildlife!²²⁸

One way to reduce your exposure to pesticides is to eat more organic food



Pesticides

- 🕒 *Organic farmers manage pests using natural methods*²²⁹
- 🕒 *Organic farmers aim to control pests naturally*²³⁰
- 🕒 *No herbicides (weedkillers) such as Glyphosate are allowed in organic farming*²³¹
- 🕒 *Weedkillers can be detected in food including bread.*²³² *Their use is banned in organic farming*²³³
- 🕒 *Choosing organic is an easy way to limit your exposure to pesticides, herbicides (weedkillers)*²³⁴ *and many additives and preservatives*²³⁵
- 🕒 *Organic farmers aim to create a natural balance between plants and animals to prevent pests, so that they don't need to rely on pesticides*²³⁶
- 🕒 *Organic farmers aim to use natural enemies of pests to control their numbers, so they don't need to rely on pesticides*²³⁷
- Around 400 pesticides are used in farming in the UK²³⁸ and pesticides are often present in non-organic food²³⁹
- Many pesticides remain in some of the food we eat, despite washing and cooking²⁴⁰
- In both 2017 and 2018, roughly a quarter of all food items tested by the government contained residues of more than one pesticide. In 2017, this included more than half of rice, a quarter of bread and 40% of fruit and vegetables²⁴¹
- A study of soil in 11 European countries found UK sites had the second highest diversity of pesticide residues²⁴²
- A long-term UK study over two years revealed that 66% of samples taken from seven river catchments contained over ten pesticides²⁴³
- Between 1990 and 2016, the area of UK land treated with pesticides (treated area multiplied by number of applications) increased by almost two-thirds (63%)²⁴⁴
- One way to reduce your exposure to pesticides is to eat more organic food²⁴⁵
- The best way to reduce your exposure to pesticides in food is to buy organic; certified organic food, including fruit and vegetables, processed food and dairy and meat products have overall been found to contain less pesticides²⁴⁶

WHAT ARE PESTICIDES?

'Pesticides' are chemicals designed to kill insects and other pests e.g. insecticides, fungal diseases (fungicides) and weeds (herbicides). The vast majority are used in farming to grow our food, but they are also used in our parks, schools and even our own gardens. On farms they are being used on a wide scale. Farmers have become reliant on them and they've found their way into our food, our soils, our rivers and our wildlife. Recent studies on global insect declines and the biodiversity crisis name direct and indirect impacts of pesticides as key drivers.

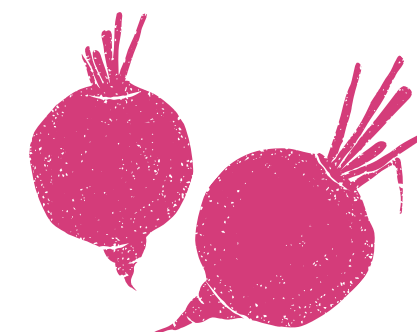
- In the 26 years between 1990 and 2016, the use of Glyphosate on British cereals has increased by well over ten times²⁴⁷

The following statement needs to be used along with one or more of the listed additional qualifying statements:

- 🕒 *Organic farming uses virtually no pesticides*²⁴⁸

QUALIFYING STATEMENTS:

- 🕒 *In organic farming, all weed killers are banned - a very limited number of naturally occurring fungicides and insecticides are permitted and their use is severely restricted*²⁴⁹
- 🕒 *Soil Association organic farmers are able to use a very limited number of naturally-derived pesticides like citronella and clove oil as a last resort, under very restricted circumstances*²⁵⁰



Additives

The use of additives and processing aids is heavily restricted in organic products,²⁵¹ organic products are made with care.²⁵² Only a heavily restricted list of essential additives and processing aids can be used in organic products,²⁵³ and organic processed products are made using processing methods that guarantee the organic integrity and vital qualities of the product are maintained through all stages of manufacturing.²⁵⁴

- 🕒 **Organic standards prohibit the use of toxic substances²⁵⁵**
- 🕒 **Organic standards prohibit the use of toxic ingredients²⁵⁶**
- 🕒 **Organic standards prohibit GM crops and ingredients, hydrogenated fats, and controversial artificial food colours and preservatives²⁵⁷**
- 🕒 **Organic food can only be produced using natural products and substances²⁵⁸**
- 🕒 **GM ingredients, hydrogenated fats and controversial artificial food colours, and preservatives including sodium benzoate, aspartame and food colouring tartrazine are banned under organic standards²⁵⁹**
- 🕒 **Soil Association standards prohibit the use of nanoparticles²⁶⁰**
- 🕒 **Organic food must not be irradiated²⁶¹**
- 🕒 **Organic fruit and vegetables cannot be washed in chlorine²⁶²**
- 🕒 **Only organic wax coatings can be used on organic fruit and vegetables²⁶³**
- 🕒 **Amongst the additives banned by Soil Association standards are hydrogenated fat, aspartame (artificial sweetener) and monosodium glutamate²⁶⁴**
- 🕒 **Any natural flavourings used in Soil Association certified organic food can't be extracted using ingredients from fossil fuels like hexane and acetone²⁶⁵**
- 🕒 **Organic wines are produced in ways that reduce the potential for allergic reactions, by restricting the use of sulphur dioxide (Soil Association standards carry even higher restrictions)²⁶⁶**
- 🕒 **Organic food will only contain added vitamins, minerals, amino acids, micronutrients and trace elements if this is the law²⁶⁷**

GM

Genetically modified, or genetically modified organisms (GM or GMOs)

Organic food systems are opposed to GM, for environmental, health and social reasons. All GM ingredients are therefore banned under organic standards. Whilst GM foods are very limited in the UK (all imports from outside Europe), most non-organic livestock are fed them. As such GM-fed meat, egg and dairy is widespread and unlabelled in supermarkets.

- 🕒 **No GM crops²⁶⁸**
- 🕒 **No GM ingredients²⁶⁹**
- 🕒 **Non GM²⁷⁰**
- 🕒 **No use of GM²⁷¹**
- 🕒 **GM crops and ingredients are banned in organic standards²⁷²**
- 🕒 **GM animal feed is prohibited under organic standards²⁷³**
- 🕒 **The use of genetically modified organisms is banned under organic standards²⁷⁴**
- 🕒 **To meet organic standards, farmers and processors cannot use GMOs and must show that they are protecting their products from contamination with prohibited products from farm to fork²⁷⁵**
- Most non-organic British chickens, pigs and cows are fed with imported GM crops²⁷⁶

Organic standards prohibit the use of toxic substances



What you feed farm animals and how you treat them affects the quality of the food. The hard work organic farmers put into caring for their animals pays off in the quality of the food they produce, giving real value for money.

Helen Browning, CEO of The Soil Association



Nutritional Differences

Following the three major meta-analyses which looked into the nutritional differences between organic and non-organic crops, meat and dairy, we have worked closely with the team at Newcastle University and have sought legal advice to establish whether it is possible to make advertising claims in relation to the results, which demonstrate significant nutritional differences.

However, whilst organic milk and meat do contain up to 50% more omega 3 fatty acids, these fail to meet the minimum requirements needed to make a nutritional claim for these products, which requires organic milk to not only provide much more omega 3 than non-organic milk, but also to supply 30% of the Required Daily Amount of omega 3, which it does not. For milk, this is due to the lower fat content (around 4% for whole milk). We will continue to work with researchers to ensure we evaluate each study as it is released to establish whether we can make nutritional statements on a product by product basis. We can, however, make the following statements:

- Organic farming affects the quality of the food we eat
- Organic is different
- "What you feed farm animals and how you treat them affects the quality of the food. The hard work organic farmers put into caring for their animals pays off in the quality of the food they produce, giving real value for money."
 - Helen Browning, CEO of The Soil Association
- How we farm affects the quality of the food we eat
- The difference in Omega 3 is because organic animals eat a more natural, grass-based diet containing high levels of clover - clover is used in organic farming to fix nitrogen so that crops and grass grow (instead of manufactured/chemical fertilisers)

REFERENCES

1. The Council of the European Union. Council Regulation (EC) No 834/2007, Article 3. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007R0834&rid=6>: "Organic production shall pursue the following general objectives:
(a) establish a sustainable management system for agriculture that:
(i) respects nature's systems and cycles and sustains and enhances the health of soil, water, plants and animals and the balance between them;
(ii) contributes to a high level of biological diversity;
(iii) makes responsible use of energy and the natural resources, such as water, soil, organic matter and air,"
2. The Council of the European Union. Council Regulation (EC) No 834/2007, Article 3 [as above]
3. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6
4. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6
5. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 1.2
6. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6
7. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.3
8. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.3
9. The Council of the European Union. Council Regulation (EC) No 2018/848 (repealing 834/2007) General principles of EU organic standards, Article 5a "the responsible use of energy and natural resources, such as water, soil, organic matter and air"
10. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 1.2
11. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 1.2
12. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6
13. Soil Association Standards for Farming & Growing v. July 2019. Standard 1.2
14. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 1.2
15. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
16. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 1.2
17. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.5
18. Eyhorn, F., Muller, A., Reganold, J. P. et al. (2019) Sustainability in global agriculture driven by organic farming, Nature Sustainability, Vol 2
19. Arbenz, M., Gould, D. and Stopes, C. (2017) ORGANIC 3.0—the vision of the global organic movement and the need for scientific support, Organic Agriculture, 7, 3
20. Eyhorn, F., Muller, A., Reganold, J. P. et al. (2019) Sustainability in global agriculture driven by organic farming, Nature Sustainability, Vol 2
21. Arbenz, M., Gould, D. and Stopes, C. (2017) ORGANIC 3.0—the vision of the global organic movement and the need for scientific support, Organic Agriculture, 7, 3
22. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
23. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
24. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
25. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.5
26. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.3.3
27. Smith et al. (2015) The energy efficiency of organic agriculture: A review. Renewable Agriculture and Food Systems, 30, 3
"organic farming performs better than conventional for nearly all crop types when energy use is expressed on a unit of area basis. Results are more variable per unit of product due to the lower yield for most organic crops. For livestock, ruminant production systems tend to be more energy efficient under organic management due to the production of forage in grass-clover leys. Conversely, organic poultry tend to perform worse in terms of energy use as a result of higher feed conversion ratios and mortality rates compared to conventional fully housed or free-range systems. With regard to energy sources, there is some evidence that organic farms use more renewable energy and have less of an impact on natural ecosystems. Human energy requirements on organic farms are also higher as a result of greater system diversity and manual weed control. Overall this review has found that most organic farming systems are more energy efficient than their conventional counterparts, although there are some notable exceptions."
28. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 1.2, and 3.5 to 3.17. Also refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
29. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
30. Parrott, N., Olesen, J. E. & Høgh-Jensen, H. (2006) Global Development of Organic Agriculture: Challenges and Prospects, CABI (eds Halberg, N. et al.) 153–179
31. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
"Organic farming can improve food security by diversifying on-farm crop and livestock operations, which diversifies income sources and improves variety in diets"
32. Meinhausen, F., Toralf, R. et al. (2019) Group Certification. Internal Control Systems in Organic Agriculture: Significance, Opportunities and Challenges, the Research Institute of Organic Agriculture (FiBL), part of project "Consolidation of Local Certification Bodies" (ConsCert). Pdf available <https://orgprints.org/35159/7/fibl-2019-ics.pdf> Media release available: https://www.fibl.org/fileadmin/documents/en/news/2019/mr_fibl_ConsCert_ICs_study.pdf
33. Huber, B. et al. (2019) The contribution of organic agriculture in the tropics to sustainable development. Research summary presentation for workshop "The Contribution of Organic Agriculture to the SDGs: Scientific evidence from comparative research", March 2019 https://orgprints.org/34857/23/huber_2019_tropics.pdf
34. Research Institute of Organic Agriculture FiBL (2019) Media Release: The Contribution of Organic Agriculture to the SDGs: Scientific evidence from comparative research. 06.03.2019:
"FiBL research results show that organic farming and other agro-ecological methods can be more economically beneficial for smallholder families in low-income countries than conventional methods, despite lower yields in some cases, as they require less capital and income can be higher in terms of labour input. Hence, organic farming can represent an economic advantage for smallholders in addition to the well-known environmental benefits that this agricultural system brings."
35. Meinhausen, F., Toralf, R. et al. (2019) Group Certification. Internal Control Systems in Organic Agriculture: Significance, Opportunities and Challenges, the Research Institute of Organic Agriculture (FiBL), part of project "Consolidation of Local Certification Bodies" (ConsCert). Pdf available <https://orgprints.org/35159/7/fibl-2019-ics.pdf> Media release available: https://www.fibl.org/fileadmin/documents/en/news/2019/mr_fibl_ConsCert_ICs_study.pdf
36. Huber, B. et al. (2019) The contribution of organic agriculture in the tropics to sustainable development. Research summary presentation for workshop "The Contribution of Organic Agriculture to the SDGs: Scientific evidence from comparative research", March 2019 https://orgprints.org/34857/23/huber_2019_tropics.pdf
37. Research Institute of Organic Agriculture FiBL (2019) Media Release: The Contribution of Organic Agriculture to the SDGs: Scientific evidence from comparative research. 06.03.2019:
"FiBL research results show that organic farming and other agro-ecological methods can be more economically beneficial for smallholder families in low-income countries than conventional methods, despite lower yields in some cases, as they require less capital and income can be higher in terms of labour input. Hence, organic farming can represent an economic advantage for smallholders in addition to the well-known environmental benefits that this agricultural system brings."
38. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 1.2 and 2.3
39. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.3
40. The Council of the European Union. Council Regulation (EC) No 2018/848 (repealing 834/2007) General principles of EU organic standards, Article 5a "the responsible use of energy and natural resources, such as water, soil, organic matter and air"
41. Muller et al. (2016) Organic farming, climate change and beyond. IFOAM EU and FiBL
42. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.5.4
43. Smith et al. (2015) The energy efficiency of organic agriculture: A review. Renewable Agriculture and Food Systems, 30, 3
"organic farming performs better than conventional for nearly all crop types when energy use is expressed on a unit of area basis. Results are more variable per unit of product due to the lower yield for most organic crops. For livestock, ruminant production systems tend to be more energy efficient under organic management due to the production of forage in grass-clover leys. Conversely, organic poultry tend to perform worse in terms of energy use as a result of higher feed conversion ratios and mortality rates compared to conventional fully housed or free-range systems. With regard to energy sources, there is some evidence that organic farms use more renewable energy and have less of an impact on natural ecosystems. Human energy requirements on organic farms are also higher as a result of greater system diversity and manual weed control. Overall this review has found that most organic farming systems are more energy efficient than their conventional counterparts, although there are some notable exceptions."
44. Smith et al. (2015) The energy efficiency of organic agriculture: A review. Renewable Agriculture and Food Systems, 30, 3
45. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
46. Smith et al. (2015) The energy efficiency of organic agriculture: A review. Renewable Agriculture and Food Systems, 30, 3
"organic farming performs better than conventional for nearly all crop types when energy use is expressed on a unit of area basis. Results are more variable per unit of product due to the lower yield for most organic crops. For livestock, ruminant production systems tend to be more energy efficient under organic management due to the production of forage in grass-clover leys. Conversely, organic poultry tend to perform worse in terms of energy use as a result of higher feed conversion ratios and mortality rates compared to conventional fully housed or free-range systems. With regard to energy sources, there is some evidence that organic farms use more renewable energy and have less of an impact on natural ecosystems. Human energy requirements on organic farms are also higher as a result of greater system diversity and manual weed control. Overall this review has found that most organic farming systems are more energy efficient than their conventional counterparts, although there are some notable exceptions."
47. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.5.4
48. Muller et al. (2016) Organic farming, climate change and beyond. IFOAM EU and FiBL
49. Food and Agricultural Organisation of the United Nations (UN FAO) Organic Agriculture and Climate Change, Interdepartmental Working Group on Organic Agriculture, Web page summary <http://www.fao.org/organicag/oa-specialfeatures/oa-climatechange/en/>
"Lower greenhouse gas emissions for crop production and enhanced carbon sequestration, coupled with additional benefits of biodiversity and other environmental services, makes organic agriculture a farming method with many advantages and considerable potential for mitigating and adopting to climate change."
50. Muller et al. (2016) Organic farming, climate change and beyond. IFOAM EU and FiBL. This report calculates that if the EU converted 50% of land to organic farming by 2030, the changes to soil carbon sequestration and the avoidance of mineral fertilizers could reduce or offset greenhouse gas emissions equivalent to about 35% of total agricultural greenhouse gas emissions.

51. Reviews by Lynch et al., Gomiero et al. and Lampkin report that organic agriculture consistently has lower energy use and greenhouse gas emissions when results are expressed on a per hectare basis:
52. Reviews by Lynch et al., Gomiero et al. and Lampkin report that organic agriculture consistently has lower energy use and greenhouse gas emissions when results are expressed on a per hectare basis:
53. Poux, X., Aubert, P.-M. (2018). An agroecological Europe in 2050: multifunctional agriculture for healthy eating. Findings from the Ten Years For Agroecology (TYFA) modelling exercise, Iddri-AScA, Study N°09/18, Paris, France, 74 p
54. Poux, X., Aubert, P.-M. (2019) Agroecology and carbon neutrality in Europe by 2050: what are the issues? IDDDRI, Issue brief N.05/19
55. Poux, X., Aubert, P.-M. (2018). An agroecological Europe in 2050: multifunctional agriculture for healthy eating. Findings from the Ten Years For Agroecology (TYFA) modelling exercise, Iddri-AScA, Study N°09/18, Paris, France, 74 p
56. Poux, X., Aubert, P.-M. (2019) Agroecology and carbon neutrality in Europe by 2050: what are the issues? IDDDRI, Issue brief N.05/19
57. Poux, X., Aubert, P.-M. (2018). An agroecological Europe in 2050: multifunctional agriculture for healthy eating. Findings from the Ten Years For Agroecology (TYFA) modelling exercise, Iddri-AScA, Study N°09/18, Paris, France, 74 p
58. Gattinger, A., Muller, A., Haeni, M., Skinner, C., Fliessbach, A., Buchmann, N., Niggli, U. (2012). Enhanced top soil carbon stocks under organic farming. Proceedings of the National Academy of Sciences of the United States of America, 109(44), 18226–31. <https://doi.org/10.1073/pnas.1209429109> Comparison calculated using 'The Measure of Things' tool available here.
59. 3.5 tonnes of carbon is equivalent to 31,844 miles in an average passenger car according to the EPA's equivalency calculator. Earth's circumference is 24,901 miles, driving around it one and a half times would be 37,351 miles.
60. Gattinger, A., Muller, A., Haeni, M., Skinner, C., Fliessbach, A., Buchmann, N., Niggli, U. (2012). Enhanced top soil carbon stocks under organic farming. Proceedings of the National Academy of Sciences of the United States of America, 109(44), 18226–31. <https://doi.org/10.1073/pnas.1209429109> 3.5 tonnes more carbon per hectare is 1.87 tonnes more carbon per area of organic farmland the size of a football pitch which is taken as 0.5351 hectares, as listed in 'The Measure of Things' tool available here.
61. Ghabbour, E. A., et al (2017) 'National Comparison of the Total and Sequestered Organic Matter Contents of Conventional and Organic Farm Soils', Advances in Agronomy, 146, 1-35. [twice as spongey related to 44% higher humic acid]
62. Leifeld and Fuhrer (2010). Organic Farming and Soil Carbon Sequestration: What Do We Really Know About the Benefits? AMBIO, 39 (8), p.585-599
63. Muller et al. (2016) Organic farming, climate change and beyond. IFOAM EU and Fibl
64. Muller et al. (2016) Organic farming, climate change and beyond. IFOAM EU and Fibl, p12: "organic farming systems are more resilient to changing weather conditions, such as extreme droughts and extreme rainfall."
65. Seufert, V. and Ramankutty, N. (2017) Many shades of gray—The context-dependent performance of organic agriculture. Science Advances, 3, 3
66. Lotter et al. (2003) The performance of organic and conventional cropping systems in an extreme climate year. American Journal of Alternative Agriculture, 18, 3
67. Muller et al. (2016) Organic farming, climate change and beyond. IFOAM EU and Fibl, p12: Water capture and retention capacity in organically managed soils is up to 100% higher than in conventional soils.
68. Muller et al. (2016) Organic farming, climate change and beyond. IFOAM EU and Fibl, p12: Water capture and retention capacity in organically managed soils is up to 100% higher than in conventional soils.
69. Lotter et al. (2003) The performance of organic and conventional cropping systems in an extreme climate year. American Journal of Alternative Agriculture, 18, 3
70. Lotter et al. (2003) The performance of organic and conventional cropping systems in an extreme climate year. American Journal of Alternative Agriculture, 18, 3
71. Lotter et al. (2003) The performance of organic and conventional cropping systems in an extreme climate year. American Journal of Alternative Agriculture, 18, 3
72. Reganold and Wachter (2016). Organic Agriculture in the Twenty First Century. Nature Plants, 2, 15221
73. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1
74. Pimental (2006) Soil Erosion: A food and environmental threat. Environment, Development and Sustainability, 8 (1), p.119-137. Available here.
75. Maria Helena-Semedo speaking at the World Soil Day Forum (2014) 'Only 60 years of farming left if soil degradation continues', covered by Chris Arsenault, Scientific American, Reuters. Available here. Same estimation by Professor John Crawford, University of Sydney in an interview with TIME magazine (2012) 'What if the world's soil runs out?', World Economic Forum, TIME magazine, Dec 14th 2012. Available here.
76. UN Food and Agriculture Organisation (2015), Healthy soils are the basis for healthy food production
77. UN Food and Agriculture Organisation (2015), Healthy soils are the basis for healthy food production
78. UNFAO (1983) UNFAO Soils Bulletin. Chapter 1: How soil is destroyed; Erosion destroyed civilisations.
79. Natural England, 2015, Summary of Evidence: Soils
80. Torsvik and Øvreås 2012, Microbial diversity and function in soil: from genes to ecosystems, Current Opinion in Microbiology, 5:240–245. Available here
81. Roselló-Mora R, Amann R: The species concept for prokaryotes. FEMS Microbiol Rev 2001, 25:39-67.
82. European Commission, 2012, The State of Soil in Europe, JRC.
83. Palmer, R. and Smith, R, 2013, Soil Use and Management, 29 (4) pp. 567-575
84. Ontl, T. A. & Schulte, L. A. (2012) 'Soil Carbon Storage' Nature Education Knowledge 3(10):35
85. Environmental Audit Committee – Inquiry into Soil Health (2016) Written Submission from the Committee on Climate Change – 14th January 2016
86. Environmental Audit Committee – Inquiry into Soil Health (2016) Written Submission from the Committee on Climate Change – 14th January 2016
87. Environmental Audit Committee – Inquiry into Soil Health (2016) Written Submission from the Committee on Climate Change – 14th January 2016
88. G. Sposito (2013) Green water and global food security. 12, 0 doi: 10.2136/vzj2013.02.0041
89. Amundson, R. et al. (2015) Soil and human security in the 21st century. Science, 348, 6235
90. Pimentel et al. (1995) Environmental and Economic Costs of Soil Erosion and Conservation Benefits, SCIENCE, 267, 5201: 1117-1123. Available here.
91. Maria Helena-Semedo speaking at the World Soil Day Forum (2014) 'Only 60 years of farming left if soil degradation continues', covered by Chris Arsenault, Scientific American, Reuters. Available here. Same estimation by Professor John Crawford, University of Sydney in an interview with TIME magazine (2012) 'What if the world's soil runs out?', World Economic Forum, TIME magazine, Dec 14th 2012. Available here.
92. United Nations Convention to Combat Desertification (2017) Global Land Outlook. Full Report, p52. Available online here.
93. Cameron, D. et al (2015) 'A sustainable model for intensive agriculture' Grantham Centre briefing note, December 2015, University of Sheffield, available online at <http://grantham.sheffield.ac.uk/wp-content/uploads/A4-sustainable-model-intensive-agriculture-spread.pdf>
94. Professor John Crawford, University of Sydney in an interview with TIME magazine (2012) 'What if the world's soil runs out?', World Economic Forum, TIME magazine, Dec 14th 2012. Available here.
95. United Nations Convention to Combat Desertification (2014) Desertification: The Invisible Frontline. Second edition, p2, Available online here. NB. size of Switzerland is 41,280 km2
96. Environmental Audit Committee – Inquiry into Soil Health (2016) Written Submission from the Committee on Climate Change – 14th January 2016
97. Graves et al. (2015) The total cost of soil degradation in England and Wales. Ecological Economics, 119, 399-413.
98. Graves et al. (2015) The total cost of soil degradation in England and Wales. Ecological Economics, 119, 399-413. Available here.
99. Jones, A., et al. (2012) 'The State of Soil in Europe' A contribution of the JRC to the European Environment Agency's Environment State and Outlook Report - SOER 2010, available online at: http://eusoiils.jrc.ec.europa.eu/ESDB_Archive/eusoiils_docs/other/EUR25186.pdf
100. Pimentel et al. (1995) Environmental and Economic Costs of Soil Erosion and Conservation Benefits, SCIENCE, 267, 5201: 1117-1123. Available here.
101. Pimental (2006) Soil Erosion: A food and environmental threat. Environment, Development and Sustainability, 8 (1), p.119-137. Available here.
102. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1
103. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1
104. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1
105. Henneron, L et al. (2015) 'Fourteen years of evidence for positive effects of conservation agriculture and organic farming on soil life', Agronomy for Sustainable Development, 2015, 35:1 169 – 181 doi:10.1007/s13593-014-0215-8. This study found that both conservation and organic systems increased the abundance and biomass of all soil organisms except predaceous nematodes. For example, larger soil organisms increased from 100 to 2,500%, nematodes from 100 to 700%, and microorganisms from 30 to 70%. For more information about how organic agriculture supports healthy soils, see briefing by IFOAM Organics International, 'Organic agriculture and healthy soils', published online at: https://www.ifoam.bio/sites/default/files/2020-04/oa_and_soils_web.pdf (pdf accessed May 2020)
106. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1
107. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1
108. V. Smil (2011). Nitrogen cycle and world food production. World Agriculture 2, 9–13
109. Tuomisto et al. (2012) Does organic farming reduce environmental impacts? A meta analysis of European research. Journal of Environmental Management, 112, December 2012, 309-320
110. Bot, A. and Benites, J. (2005), "The importance of soil organic matter: Key to drought-resistant soil and sustained food production' United Nations Food and Agriculture Organisation, available online at: <http://www.fao.org/docrep/009/a0100e/a0100e.pdf> p38 "soil organic matter enhances biological activity of soil organisms that detoxify and absorb excess nutrients that would otherwise become pollutants to groundwater and surface water supplies."
111. Henneron, L et al. (2015) 'Fourteen years of evidence for positive effects of conservation agriculture and organic farming on soil life', Agronomy for Sustainable Development, 2015, 35:1 169 – 181 doi:10.1007/s13593-014-0215-8
112. Henneron, L et al. (2015) 'Fourteen years of evidence for positive effects of conservation agriculture and organic farming on soil life', Agronomy for Sustainable Development, 2015, 35:1 169 – 181 doi:10.1007/s13593-014-0215-8. This study found that both conservation and organic systems increased the abundance and biomass of all soil organisms except predaceous nematodes. For example, larger soil organisms increased from 100 to 2,500 %, nematodes from 100 to 700%, and microorganisms from 30 to 70%. For more information about how organic agriculture supports healthy soils, see briefing by IFOAM Organics International, 'Organic agriculture and healthy soils', published online at: https://www.ifoam.bio/sites/default/files/2020-04/oa_and_soils_web.pdf (pdf accessed May 2020)
113. Henneron, L et al. (2015) 'Fourteen years of evidence for positive effects of conservation agriculture and organic farming on soil life', Agronomy for Sustainable Development, 2015, 35:1 169 – 181 doi:10.1007/s13593-014-0215-8
114. Lori et al. (2017) Organic farming enhances soil microbial abundance and activity. A meta-analysis and meta-regression. PLoS ONE 12(7):e0180442
115. Tuomisto et al. (2012) Does organic farming reduce environmental impacts? A meta analysis of European research. Journal of Environmental Management, 112, December 2012, 309-320 "The main explanation for higher organic matter contents in organic systems was that organic systems had higher organic matter inputs. In the systems included in this meta-analysis, the organic matter inputs in the form of manure or compost were on average 65% higher on organic farms compared to conventional farms, when calculated as an average of the relative inputs by weight (organic/conventional) in each case."
116. Tuomisto et al. (2012) Does organic farming reduce environmental impacts? A meta analysis of European research. Journal of Environmental Management, 112, December 2012, 309-320
117. Henneron, L et al. (2015) 'Fourteen years of evidence for positive effects of conservation agriculture and organic farming on soil life', Agronomy for Sustainable Development, 2015, 35:1 169 – 181 doi:10.1007/s13593-014-0215-8 "Organic farming improved mainly the bacterial pathway of the soil food web and endogeic and anecic earthworms."
118. Klein et al. (2007), Proc. Biol. Sci. 274, 303. In this review, the authors expanded previous estimates using novel primary data from 200 countries and found that fruit, vegetable or seed production from 87 of the leading global food crops is dependent upon animal pollination, while 28 crops do not rely upon animal pollination.
119. Klein et al. (2007), Proc. Biol. Sci. 274, 303.

120. Buchmann, S. L., and Nabhan, G.P. (1997) *The Forgotten Pollinators* [book], Island Press
121. Wikipedia holds a list of crop plants pollinated by bees: https://en.wikipedia.org/wiki/List_of_crop_plants_pollinated_by_bees. Cocoa plants are pollinated by midges, as described in Young, A. (1994) *The chocolate tree: a natural history of cocoa* [book] Smithsonian Institution Press, Washington DC. Also summarised in this article by Smithsonian Magazine: <https://www.smithsonianmag.com/science-nature/you-wouldnt-have-chocolate-without-invisible-flies-and-extreme-yeast-180954172/>
122. Eilers et al. (2011) Contribution of Pollinator-Mediated Crops to Nutrients in the Human Food Supply, *PLOS One* 6(6): e21363.
123. Eilers et al. (2011) Contribution of Pollinator-Mediated Crops to Nutrients in the Human Food Supply, *PLOS One* 6(6): e21363.
124. Radar et al. (2016) Non-bee insects are important contributors to global crop pollination, *PNAS*, 113, (1), 146-151
125. Sanchez-Bayo and Wyckhuys (2019) Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation*, 232, 8-27
126. Sanchez-Bayo and Wyckhuys (2019) Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation*, 232, 8-27
127. Sanchez-Bayo and Wyckhuys (2019) Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation*, 232, 8-27
128. Sanchez-Bayo and Wyckhuys (2019) Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation*, 232, 8-27
129. Sanchez-Bayo and Wyckhuys (2019) Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation*, 232, 8-27
130. 'State of Nature 2019' The State of Nature partnership, available online from: <https://nbn.org.uk/wp-content/uploads/2019/09/State-of-Nature-2019-UK-full-report.pdf>
131. Bengtsson, J., Ahnström, J., & Weibull, A. C. (2005) The effects of organic agriculture on biodiversity and abundance: A meta-analysis' *Journal of Applied Ecology*, 42(2), 261–269. <http://doi.org/10.1111/j.1365-2664.2005.01005.x>
132. Tuck, S. L., et al (2014) 'Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis', *The Journal of Applied Ecology*, 51(3), 746–755. <http://doi.org/10.1111/1365-2664.12219>
133. Holzschuh A., Steffan-dewenter I., Kleijn D. & Tscharntke T. (2007) Diversity of flower-visiting bees in cereal fields: effects of farming system, landscape composition and regional context. *Journal of Applied Ecology*, 44, 41-49.
134. Tuck, S. L., et al (2014) 'Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis', *The Journal of Applied Ecology*, 51(3), 746–755. <http://doi.org/10.1111/1365-2664.12219>
135. Kennedy et al. (2013) A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. *Ecology Letters*. Vol: 16 pp. 584–599.
136. Tuck, S. L., et al (2014) 'Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis', *The Journal of Applied Ecology*, 51(3), 746–755. <http://doi.org/10.1111/1365-2664.12219>
137. Kennedy et al. (2013) A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. *Ecology Letters*. Vol: 16 pp. 584–599.
138. Kennedy et al. (2013) A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. *Ecology Letters*. Vol: 16 pp. 584–599.
139. Kennedy et al. (2013) A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. *Ecology Letters*. Vol: 16 pp. 584–599.
140. Kennedy et al. (2013) A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. *Ecology Letters*. Vol: 16 pp. 584–599.
141. Kennedy et al. (2013) A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. *Ecology Letters*. Vol: 16 pp. 584–599.
142. Holzschuh et al. 2008, Agricultural landscapes with organic crops support higher pollinator diversity, *OIKOS*, 117, 3, 54-361
143. Tuck et al, (2014) Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis', *Journal of Applied Ecology*
144. Tuck et al, (2014) Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis', *Journal of Applied Ecology*
145. Tuck et al, (2014) Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis', *Journal of Applied Ecology*
146. Batary P, Sutcliffe L, Dormann CF, Tscharntke T (2013) Organic Farming Favours Insect-Pollinated over Non-Insect Pollinated Forbs in Meadows and Wheat Fields. *PLoS ONE* 8(1): e54818.
147. Hardman, C. (2016). 'Delivery of floral resources and pollination services on farmland under three different wildlife-friendly schemes, *Agric. Ecosyst. Environ.*, vol. 220, pp. 142–151, Mar. 2016, doi: 10.1016/j.agee.2016.01.015.
148. Gabriel & Tscharntke (2006) Insect pollinated plants benefit from organic farming, *Agriculture, Ecosystems & Environment*, 118, 1-4, 43-48
149. Batary P, Sutcliffe L, Dormann CF, Tscharntke T (2013) Organic Farming Favours Insect-Pollinated over Non-Insect Pollinated Forbs in Meadows and Wheat Fields. *PLoS ONE* 8(1): e54818.
150. Seufert, V. and Ramankutty, N. (2017) Many shades of gray—The context-dependent performance of organic agriculture. *Science Advances*, 3, 3
151. Scialabba, N. and Muller-Lindenlauf (2010) Organic agriculture and climate change. *Renewable Agriculture and Food Systems*: 25(2); 158–169
152. Henneron, L et al. (2015) 'Fourteen years of evidence for positive effects of conservation agriculture and organic farming on soil life', *Agronomy for Sustainable Development*, 2015, 35:1 169 – 181 doi:10.1007/s13593-014-0215-8
153. Lori et al. (2017) Organic farming enhances soil microbial abundance and activity. A meta-analysis and meta-regression. *PLoS ONE* 12(7):e0180442
154. Soil Association Organic Standards for Farming and Growing, Standard 2.5 and 2.6. Organic standards ban the use of synthetic pesticides and fertilisers commonly used in non-organic farming which are polluting and/or toxic to the environment, wildlife and/or human health. These standards refer to legal requirements of organic farming European law. In addition, leaching of nutrients has been found to be lower in organic systems. A diagram which explains the differing Nitrogen cycles in organic and non-organic farming can be found in Reganold and Wachter (2016). *Organic Agriculture in the Twenty First Century*. *Nature Plants*, 2, 15221, Figure 3
155. Haas, G., Berg, M., Kopke, U. (2002) Nitrate leaching: comparing conventional, integrated and organic agricultural production systems. *Agricultural Effects on Ground and Surface Waters: Research at the Edge of Science and Society*, 131
156. Pandey et al. (2018) Nitrogen balances in organic and conventional arable crop rotations and their relations to nitrogen yield and nitrate leaching losses. *Agriculture, Ecosystems and Environment*, 265, 350-362
157. Sanders, J. and Heß, J. (2019) *Thünen Report 65: Leistungen des ökologischen Landbaus für Umwelt und Gesellschaft, überarbeitete und ergänzte Auflage*. A literature review of 528 studies with 2,816 pair comparisons of organic and conventional temperate farming analysed in terms of mean differences.
158. Cambardella, C. A., Delate, K. and Jaynes, D. B. (2015) 'Water quality in organic systems', *Sustainable Agriculture Research*, 4(3), 60-69 The USDA-ARS Organic Water Quality experiment compared organic and conventional crop rotations and an organic pasture in Midwestern USA and found N losses nearly twice as much from the conventional system.
159. Soil Association Organic Standards for Farming and Growing, Standard 2.5 and 2.6. Organic standards ban the use of synthetic pesticides and fertilisers commonly used in non-organic farming which are polluting and/or toxic to the environment, wildlife and/or human health. These standards refer to legal requirements of organic farming European law.

In addition, leaching of nutrients has been found to be lower in organic systems. A diagram which explains the differing Nitrogen cycles in organic and non-organic farming can be found in Reganold and Wachter (2016). *Organic Agriculture in the Twenty First Century*. *Nature Plants*, 2, 15221, Figure 3
160. Haas, G., Berg, M., Kopke, U. (2002) Nitrate leaching: comparing conventional, integrated and organic agricultural production systems. *Agricultural Effects on Ground and Surface Waters: Research at the Edge of Science and Society*, 131
161. Pandey et al. (2018) Nitrogen balances in organic and conventional arable crop rotations and their relations to nitrogen yield and nitrate leaching losses. *Agriculture, Ecosystems and Environment*, 265, 350-362
162. Sanders, J. and Heß, J. (2019) *Thünen Report 65: Leistungen des ökologischen Landbaus für Umwelt und Gesellschaft, überarbeitete und ergänzte Auflage*. A literature review of 528 studies with 2,816 pair comparisons of organic and conventional temperate farming analysed in terms of mean differences.
163. Cambardella, C. A., Delate, K. and Jaynes, D. B. (2015) 'Water quality in organic systems', *Sustainable Agriculture Research*, 4(3), 60-69 The USDA-ARS Organic Water Quality experiment compared organic and conventional crop rotations and an organic pasture in Midwestern USA and found N losses nearly twice as much from the conventional system.
164. Diaz, R. J. and Rosenberg, R. (2008) Spreading Dead Zones and Consequences for Marine Ecosystems, *Science*, 321, 5891
165. Diaz, R. J. and Rosenberg, R. (2008) Spreading Dead Zones and Consequences for Marine Ecosystems, *Science*, 321, 5891
166. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1 The EU regulation 832/2007 Article 12 1 (e) says that 'mineral fertiliser shall not be used'.
167. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.4.1
168. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
169. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6
170. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.4.3
171. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5.3 and 3.5.4
172. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
173. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.8
174. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.10
175. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.4.3
176. Percentage worked out based on the figures from the UK Government's One Health report https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/775075/One_Health_Report_2019_v45.pdf and the UK Veterinary Medicine's Directorate https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/842678/PCDOCS-1705145-v1-UK-VARSS_2018_Report_2019_FINAL_v2.pdf - for further information contact marketing@soilassociation.org
177. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5
178. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.10
179. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.8
180. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6
181. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5.3 and 3.5.4
182. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5.3 and 3.5.4
183. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.4.3
184. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.4
185. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.4.5
186. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.4.10
187. Compassion in World Farming (2012) *Farm Assurance Schemes and Animal Welfare: How the standards compare (Executive Summary)*, available online from: https://www.ciwf.org.uk/media/5231246/standards_analysis_exec_summary.pdf
188. *Farm Animal Welfare in Great Britain: Past, Present & Future*, the Farm Animal Welfare Council, Oct 2009, Part III, "A good life", Pg 16
189. Alliance to Save Our Antibiotics, 'The dangers of antibiotic use', online at: <http://www.saveourantibiotics.org/the-issue/>
190. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6
191. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
192. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
193. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
194. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
195. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5.2
196. Department for Environment, Food and Rural Affairs (2020). *Code of practice for the welfare of pigs*. Page 40. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/869140/code-practice-welfare-pigs.pdf
197. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.10.9 and <http://www.saveourantibiotics.org/media/1768/antibiotic-use-in-the-uk-pig-sector.pdf> for antibiotic use

198. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
199. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.10.4 and 3.10.5
200. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1
201. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.10.9
202. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5.5
203. <https://www.kingshay.com/wp-content/uploads/Dairy-Costings-Focus-Report-2019-WEB-VERSION.pdf> The Kingshay figures suggest non-organic produce 30% milk from forage compared with organic which is 41–47%. Equally concentrate use for non-organic 2683kg/cow compared with 1707 kg to 1890 kg/ per cow for organic (the higher figure was 2019 where there was forage shortage)
204. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12. For comparison with non-organic chickens refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
205. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12.1
206. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12.5. For comparison with non-organic chickens refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
207. For comparison with non-organic chickens refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
208. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12.14
209. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.6.1. For comparison with non-organic chickens refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
210. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.14.3
211. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12.22. For comparison with non-organic chickens refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
212. For comparison with non-organic chickens refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
213. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12.2
214. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12.11
215. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5.4
216. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.5.2
217. Soil Association Organic Standards, Version 18.3, January 2020, Chapter 3.12.2. For comparison with non-organic chickens refer to the Standards Analysis Report 2012 from Compassion in World Farming & OneKind https://www.ciwf.org.uk/media/5231255/standards_analysis_main_report.pdf
218. EU Commission - Organic farming - Consumer Trust https://ec.europa.eu/agriculture/organic/consumer-trust_en
219. EU Commission - Organic farming - Consumer Trust https://ec.europa.eu/agriculture/organic/consumer-trust_en
220. EU Commission - Organic farming - Consumer Trust https://ec.europa.eu/agriculture/organic/consumer-trust_en and also see infographic https://ec.europa.eu/agriculture/organic/sites/orgfarming/files/docs/body/organic-farming-infographic1_en.pdf "Whenever you buy organically certified food, you can be confident that it has been produced in accordance with strict EU environmental and animal welfare rules, and is checked regularly."
221. EU Commission – Organic Farming - organic certification https://ec.europa.eu/agriculture/organic/organic-farming/what-is-organic-farming/organic-certification_en
222. Soil Association Standards for Farming & Growing v. Jan 2020.
223. EU Commission – the organic logo of the EU – what does the logo guarantee? Infographic https://ec.europa.eu/agriculture/organic/sites/orgfarming/files/docs/body/organic-farming-infographic1_en.pdf
224. https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming/organics-glance_en
225. Compassion in World Farming (2012) Farm Assurance Schemes and Animal Welfare: How the standards compare (Executive Summary)', available online from: https://www.ciwf.org.uk/media/5231246/standards_analysis_exec_summary.pdf
226. The Expert Committee On Pesticide Residues in Food (PRiF) Annual Report 2018: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/824814/expert-committee-pesticide-residues-food-annual-report-2018.pdf
227. EU Commission – Organic farming – What is Organic farming? https://ec.europa.eu/agriculture/organic/organic-farming/what-is-organic-farming_en
228. Tuck, S. L., Winqvist, C., Mota, F., Ahnström, J., Turnbull, L. A., & Bengtsson, J. (2014). Land-use intensity and the effects of organic farming on biodiversity: a hierarchical meta-analysis. The Journal of Applied Ecology, 51(3), 746–755. <https://doi.org/10.1111/1365-2664.12219>
229. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6 and 2.6.1
230. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6 and 2.6.1
231. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6.2 and 2.6.3
232. The Expert Committee On Pesticide Residues in Food (PRiF) Annual Report 2018: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/824814/expert-committee-pesticide-residues-food-annual-report-2018.pdf "Glyphosate was sought in all 288 samples of bread and wheat. 25 samples contained glyphosate, all within the MRL"
233. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6
234. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6.2
235. Soil Association Standards for Food & Drink v. Jan 2020. Standards 6.4 and 6.5
236. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6 and 2.6.1
237. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6 and 2.6.1
238. Goulson, D., Thompson, J. & Croombs, A. (2018) 'Rapid rise in the toxic load for bees revealed by analysis of pesticide use in Great Britain', PeerJ 6:e5255 <https://doi.org/10.7717/peerj.5255>
239. Soil Association and PAN UK (2019) The Cocktail Effect: How pesticide mixtures may be harming human health and the environment. Available (pdf) at <https://www.soilassociation.org/media/19535/the-pesticide-cocktail-effect.pdf>
240. Soil Association and PAN UK (2019) The Cocktail Effect: How pesticide mixtures may be harming human health and the environment. Available (pdf) at <https://www.soilassociation.org/media/19535/the-pesticide-cocktail-effect.pdf>
241. The Expert Committee On Pesticide Residues in Food (PRiF) Annual Report 2017 & 2018: <https://www.gov.uk/government/publications/expert-committee-on-pesticide-residues-in-food-prif-annual-report>
242. Silva, V., Mol, H., Zomer, P., Tienstra, M., Ritsema, C. and Geissen, V. (2019). Pesticide residues in European agricultural soils – A hidden reality unfolded. Science of the Total Environment 653: 1532–1545. <https://doi.org/10.1016/j.scitotenv.2018.10.441>
243. Baas J., vijver, M., Rambohul, J., van 't Zelfde, M., Svendsen, C. and Surgeon, D. (2016). Comparison and evaluation of pesticide monitoring programs using a process-based mixture model. Environ. Toxicol. Chem., 35(12), 3113–3123. <https://www.ncbi.nlm.nih.gov/pubmed/27183059>
244. Pesticide Usage Survey Statistics (PUS STATS) are hosted on the website of Fera Science Ltd (Fera) on behalf of the UK government's Department of Environment Food and Rural Affairs (DEFRA) and can be accessed at: <https://secure.fera.defra.gov.uk/pusstats/index.cfm>
245. The Expert Committee On Pesticide Residues in Food (PRiF) Annual Report 2018: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/824814/expert-committee-pesticide-residues-food-annual-report-2018.pdf and EFSA 2015 European Union Report on Pesticide Residues in Food, first published April 2017 <https://www.efsa.europa.eu/en/efsajournal/pub/4791>
246. The Expert Committee On Pesticide Residues in Food (PRiF) Annual Report 2018: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/824814/expert-committee-pesticide-residues-food-annual-report-2018.pdf and EFSA 2015 European Union Report on Pesticide Residues in Food, first published April 2017 <https://www.efsa.europa.eu/en/efsajournal/pub/4791>
247. Calculations: in 1990, area of cereals treated = 161,213 hectares. In 2016 = 1,752,144 ha. (Source: Fera Science Ltd, Pesticide Usage Statistics <https://secure.fera.defra.gov.uk/pusstats/index.cfm>)
248. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6
249. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6.2 and 2.6.3
250. Soil Association Standards for Farming & Growing v. Jan 2020. Standard 2.6.2 and 2.6.3
251. Article 6 of EU Organic Regulation 834/2007
252. Article 6 of EU Organic Regulation 834/2007
253. Article 6 of EU Organic Regulation 834/2007
254. EU Organic Regulation 834/2007
255. The prohibition of toxic substances in organic farming is required under Soil Association Standards for Farming & Growing v. Jan 2020, Standards 1.11.3, 1.13.3, 1.16.2, 1.16.7, 2.6, 3.4.13 (amongst others). The toxicity of pesticides used in non-organic farming is as described in report of Soil Association and PAN UK (2019) The Cocktail Effect: How pesticide mixtures may be harming human health and the environment. Available (pdf) at <https://www.soilassociation.org/media/19535/the-pesticide-cocktail-effect.pdf>
256. The prohibition of toxic substances in organic farming is required under Soil Association Standards for Farming & Growing v. Jan 2020, Standards 1.11.3, 1.13.3, 1.16.2, 1.16.7, 2.6, 3.4.13 (amongst others). The toxicity of pesticides used in non-organic farming is as described in report of Soil Association and PAN UK (2019) The Cocktail Effect: How pesticide mixtures may be harming human health and the environment. Available (pdf) at <https://www.soilassociation.org/media/19535/the-pesticide-cocktail-effect.pdf>; The use of ethylene in food processing is also restricted in Soil Association Standards for Food and Drink v under standard 6.2.1
257. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.4, 6.5, 6.6, 5.11.2, 6.4.2
258. EU Organic Regulation 834/2007
259. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.4, 6.5, 6.6, 5.11.2, 6.4.2
260. Soil Association Standards for Food and Drink v Jan 2020. Standard 5.11.3
261. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.1.5
262. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.2.2
263. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.2.3
264. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.5
265. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.6.5
266. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.9.6
267. Soil Association Standards for Food and Drink v Jan 2020. Standard 6.6.12
268. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2
269. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2 and Standards for Food & Drink v Jan 2020. Standard 5.11.2
270. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2
271. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2
272. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2, Standards for Food & Drink v Jan 2020, Standard 5.11.2, EU Directive 2001/18/EC, Regulation (EC) 1829/2003 or Regulation (EC) 1830/2003 and USDA National Organic Program
273. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2, Standards for Food & Drink v Jan 2020, Standard 5.11.2, EU Directive 2001/18/EC, Regulation (EC) 1829/2003 or Regulation (EC) 1830/2003
274. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2, Standards for Food & Drink v Jan 2020, Standard 5.11.2, EU Directive 2001/18/EC, Regulation (EC) 1829/2003 or Regulation (EC) 1830/2003
275. Soil Association Standards for Farming and Growing v Jan 2020. Standard 1.11.2, Standards for Food & Drink v Jan 2020, Standard 5.11.2, EU Directive 2001/18/EC, Regulation (EC) 1829/2003 or Regulation (EC) 1830/2003
276. Agricultural Biotechnology Council (2015) 'Going Against the Grain', available online from <https://www.nfuonline.com/assets/54301>

Get in touch

Website:

www.soilassociation.org/marketingorganic

Email:

marketingsupport@soilassociation.org

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Contact us:

Soil Association Certification, Spear House,
51 Victoria Street, Bristol, BS1 6AD



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