Biocyclic Vegan Standard
Biozyklisch-Vegane Richtlinien
Standard Biocyclique Végétalien
Πρότυπο Βιοκυκλικής Φυτοπονίας

Biocyclic Vegan Agriculture – Frequently asked questions

Are fruits and vegetables actually vegan?

This question seems superfluous at first glance, since it is generally assumed that these staple foods are vegan per se because they do not contain any animal ingredients. However, if one looks at the common production of fruits and vegetables, it can be seen that, especially in organic farming, organic inputs of animal origin such as manure and slaughterhouse waste (blood meal, bristle meal, feather meal and horn chips) are often used for fertilisation. The production of fruit and vegetables is therefore often associated with animal suffering, which a vegan human actually wants to avoid.

Closed-loop management

The term "biocyclic" implies that biocyclic vegan agriculture operates as a closed-loop system. Is this really possible without animal husbandry and the use of fertilisers and other inputs of animal origin?

The widespread idea that agriculture does not function without the use of so-called farm animals overlooks the fact that the return of animal excrements to the field in the form of animal manure is associated with high nutrient and energy losses compared to the nutrient and energy levels contained in the amounts of plant material required for raising these animals.
There are actually four levels at which cycles can be closed: operational, local, regional and global levels. Since every form of agricultural production is associated with the removal of biomass from the field, the return routes vary in length depending on the distance of the customer from the production site. Correspondingly narrow or wide are the cycles to close.
At farm level, essential nutrient cycles can already be closed by recycling harvest residues and growing legumes for fertilisation purposes. In this way, for example, the supply of nitrogen and organic matter can be almost completely ensured.
In addition, the use of fully matured plant-based compost and the so-called biocyclic humus soil derived from it by means of a systematic compost management and post-ripening process plays an important role. In addition to the use of the farm's own raw materials waste materials and other plant-based residues from the organic food industry and trade as well as from biogas production on local level can also be integrated into the agricultural nutrient cycle in the sense of the biocyclic idea.
From a regional perspective, so-called absolute grassland sites or extensively grazed grassland can also make an important contribution to the production of plant-based material for the preparation of biocyclic humus soil or for the mulching of crops on other surfaces.
Large quantities of the nutrients metabolized and excreted by humans are transported directly and indirectly into surface waters and ultimately into the oceans. From a global point of view, nutrient cycles can therefore only be closed by including maritime forms of life, such as algae preparations of various kinds as is planned, for example, in biocyclic vegan farms in Cyprus. Seaweed washed up on beaches are to be collected, composted and processed into biocyclic humus soil.

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Closed-loop recycling in the sense of the Biocyclic Vegan Standard is therefore an efficient, resource-saving and holistic approach, which bypasses the much less efficient way of utilizing natural resources such as solar energy, water and minerals indirectly via the detour of animal digestion.

Soil fertility and fertilisation, German Fertiliser Ordinance

Is it possible to maintain soil fertility in the long term without the use of inputs of animal origin?

An increase in natural soil fertility usually goes hand in hand with an increase of the organic matter integrated into the soil as well as good aeration. Every type of tillage leads to an increase in microbial activity, which results in increased degradation of the organic matter. If organic matter is not replaced to the same extent as it is degraded, excessive tillage leads to a loss of organic matter up to the complete loss of natural soil fertility. If animal manure is used, both organic matter and nutrients are supplied to the soil in partially water-soluble form. The water-soluble components of animal excrement can be directly absorbed by the plant together with the water and cause stronger growth due to the nitrogen dissolved in them. This effect is commonly associated with a supposed increase in soil fertility, although it is only indirectly related to soil life itself. Rather, it is an effect caused by the plant's ability to absorb water-soluble salts, contrary to the mechanism of active digestion of organically bound, not water-soluble nutrients commonly required in nature. If, on the other hand, organic matter in the form of plant-based material is supplied to the soil, considerably less water-soluble nutrients are released. Furthermore, if the material contains little nitrogen, the rate of degradation of the organic matter by soil microorganisms may slow, resulting in reduced nutrient release and thus lower plant growth. Animal manure is therefore said to have a higher fertilizing effect than plant materials.

If, however, nitrogen is provided to the soil at the same time as the plant material is supplied, as is the case with the incorporation of legumes, soil life is promoted much more strongly and is enabled to metabolize large amounts of organic matter and to provide the plants with organically bound nutrients. Green manure therefore also leads to lower losses of nutrients due to leaching. The plant mass yield on areas fertilized with legumes therefore shows no loss compared to areas on which animal manure has been applied.

In biocyclic vegan agriculture, in addition to increasing the plant mass yield through legume fertilisation, a long-term increase in soil fertility can be achieved by promoting the production of biocyclic humus soil, which the farm can prepare itself through its own composting process. The higher the amount of biocyclic humus soil supplied to the soil (mainly consisting of stabilized molecular humus structures that cannot or hardly any more be broken down any further), the more carbon can be permanently sequestered in the soil (i.e. for decades) and the greater is the amount of nutrients that can be stored securely against leaching and deterioration, and nevertheless still available to plants.

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Do microorganisms, enzymes etc. from the animal digestive system promote soil life and if so, how? Is such an effect, in case it exists, indispensable?
Microorganisms and certain substances from the animal digestive system have no place in the soil at all; just think of antibiotic residues, multi-resistant germs, salmonella or the like., which may be contained in animal manure, but not in plant-based compost. A completely different microfauna can be found in the animal digestive system than in the soil. As soon as animal manure reaches the soil, the animal microfauna dies more or less quickly depending on the temperature and humidity of the excrement or soil. The material is then gradually colonized and converted by organisms living in the soil. This is why it is so important that animal manure is composted before it is applied as fertilizer for plants. The advantage is here that the plant mass, which the animal has eaten, digested and then excreted in the form of manure, is already decomposed and can therefore be more easily broken down by the microorganisms living in the soil. Eventually, it is the nitrogen in animal dung, that is more rapidly available due to its water solubility, that makes manure appear more "vigorous" than compost. The water-soluble nitrogen component is, however, also responsible for the fact that animal manure may endanger the groundwater and can even cause burns on the roots. At the same time, this rapidly available nitrogen also provides the "concentrated feed" for the soil organisms, so that they can better break down the organic matter present in the soil and thus make it available to plants. Similar and better effects, however, can also be obtained without the use of animal manure as soon as there is a sufficient amount of nitrogen, which is ideally achieved by applying green manure with legumes. Even better results can be obtained by using pure biocyclic humus soil, where, owing to the lack of water-soluble nutrients, the plant is forced to activate its natural nutrient absorption mechanism. This leads to a more balanced and impressively intensive growth of the plant, without the symptoms of overfertilization which can often be observed after the use of animal manure, which causes an accumulation of nitrate in the leaves, a higher water content of the cells and thus an increased risk of disease as well as eventually the loss of taste.
What role does the cultivation of legumes play?
Legumes are able to mineralise atmospheric nitrogen with the help of bacteria naturally found in the soil, making it available both to themselves and to other plants. Clover grass, a mixture of different types of clover and grasses, is particularly helpful here. The increased biomass production as well as the strong penetration of the root system into the soil allow a rich soil fermentation. For this reason, also in biocyclic vegan farming, legumes are indispensable in crop rotation; they foster the formation of humus, the development of a vigorous root system, microbial activity in the soil as well as the binding of nitrogen in large quantities that are sufficient even for demanding crops.
What contribution does the use of biocyclic humus soil make?
In biocyclic vegan agriculture, the function of biocyclic humus soil as a nutrient source is of particular importance. It is the mature end product of a composting process that goes beyond the usual composting stages and in which almost all nutrients are bound organically. The term biocyclic humus soil is defined by the following criteria:

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- No further warming-up of the compost when turning,
- the presence of stable nutrient complexes that are no longer leachable,
- low conductivity (preferably drinking water level),
- very high ion exchange capacity, similar to that of organic fertilizers,
- close C/N ratio,
- pollutant content: at least EU organic standard,
- raw materials: of purely plant-based origin; even conventional, as large quantities are required (after successful residue control only),
- absolute root friendliness (also suitable for seedlings),
- high water retention capacity,
- fostering soil life,
- providing high-quality nutrients for the plants, which actively absorb them, and
- reduction of the ecological footprint as no animal manure is used.

Biocyclic humus soil is a comprehensive and balanced long-term reservoir of organically bound nutrients ("nutrient battery"). The fact that almost all nutrients in biocyclic humus soil are present in organically bound clusters and in a non-water-soluble form is of decisive importance for its possible applications. Many years of practical experience have shown that, owing to the stable molecular aggregates contained, no nutrient losses occur due to leaching and that there will be no emissions of environmentally harmful and health-damaging reactive nitrogen compounds. In this respect biocyclic humus soil will be able to make an important contribution to solving the current global nitrogen problem. Especially in view of excessive nitrate levels in ground and surface waters, which lead to eutrophication of surface and marine waters and to pollution of drinking water sources, biocyclic humus soil as an "N-binder" is the ideal nutrient source, particularly in water protection areas.
In practice as well as in initial scientific experiments at the Agricultural University of Athens, it has been shown that, with sufficiently high application rates, the use of biocyclic humus soil can cover all plant needs for macro- and micronutrients as well as phytokinins, natural auxins and other metabolism-promoting natural hormones. The binding of nutrients in non-water-soluble humus complexes prevents overfertilization, even when large amounts are applied. The more humus soil can be applied, the more the natural genetic potential of the crop can be exploited. The results of the scientific experiments show that the use of biocyclic humus soil can lead to yields well above those of conventionally cultivated crops. Since biocyclic humus soil has an obvious (see application examples in Greece) growth-promoting effect on roots and plants that can be analytically proven (phytotoxicity test on biocyclic humus soil: 114%, i. e. the plants on biocyclic humus soil observed in the experiment showed a 14% increase in plant mass compared to the counter test on "normal" soil), the observation of the absence of leachable nutrients in humus soil is at the same time the proof that the plant is capable of absorbing all nutrients also in a non-water-soluble form. This contradicts the current doctrine on fertilizers, which goes back to Carl Sprengel and Justus von Liebig, and whose validity refers to a special case of plant nutrition via nutrient solutions, which is rare or even impossible to find in nature and which must therefore not be generalised, as is still

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the case, however, with regard to plant nutrition in organic farming. At the same time, it corresponds to the observations of the organic pioneer Herwig Pommeresche, who collected evidence that plants can also feed themselves heterotrophically, i.e. that they, through the process of endocytosis, consume and digest large protein molecules as well as living microorganisms via the root hair mucosa. It will be the task of future developments in the field of natural sciences to integrate these natural phenomena, which can be observed everywhere and at any time, into the scientific analysis in order to scientifically accompany new concepts for plant nutrition, as we are already using them to some extent in biocyclic vegan agriculture, and to make the underlying mechanisms of action scientifically comprehensible.

Is biocyclic vegan agriculture also suitable for arable farming, e.g. for the cultivation of cereals?

Yes, biocyclic vegan agriculture is very suitable for arable farming, provided that the humus content of the soil is permanently increased. This is achieved by green manuring and the targeted use of substrate compost and biocyclic humus soil. In addition, legumes ensure the build-up of organic matter and a sufficient supply of nitrogen. However, the mistake must not be made that the plants to be used for green manuring are allowed to completely ripen and are harvested before being incorporated into the soil. The vegetation used for green manuring must be available as a whole for fertilisation. If legumes are incorporated during the flowering period shortly before the beginning of fructification, enormous amounts of nitrogen are made available to the subsequent crop. If sufficient humus build-up has taken place in the soil beforehand (e. g. by applying mature and crumb-stabilised compost, containing stable nutrient components, or even biocyclic humus soil), the large amount of nutrients released from the incorporation of foliage and roots of the green manure plants can be absorbed by the soil without leaching losses and can be transformed into nutrient-rich humus. Green manure plants can be integrated into the crop rotation as catch crop, nurse crop, mixed seed or as single fruit. The yield level of biocyclic-vegan cereal crops can be sustainably improved through the systematic use of green manure plants in conjunction with other measures that promote humus build-up in the soil, as well as through the administration of leaf fertilisers such as algae or nutrient-containing lactic acid preparations; the yield level can actually be increased beyond the quantities which are currently usual in organic farming. Mixed crop systems are of particular importance. Other characteristics of biocyclic vegan agriculture include extensive crop rotation (to ensure a stable soil life), a diverse ecosystem, the simultaneous cultivation of different crops that mutually support each other as well as nurse crops to cover the soil and promote biodiversity.

Is a widespread use of humus soil realistic? And how does biocyclic vegan agriculture envisage obtaining the large quantities of compost needed to produce biocyclic humus soil? Is it necessary, at least in the early stages, to use plant-based raw material from conventional agriculture?

Especially in the early days, it may be necessary to use plant-based raw material from conventional agriculture because of the large quantities of biocyclic humus soil required. However, this may only be done under the strict condition that this plant material is toxicologically tested and that the relevant requirements of the Biocyclic Vegan Standard are fulfilled.

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Is it correct that only soils with an insufficient humus content can be considered for humus enrichment, since in soils with a balanced humus content a supplemental humus supply will lead to permanent degradation towards a state of equilibrium?
No, this is not the case. There is no "too much" of humus, however there is a "too little". Humus can appear in very different forms. We have to distinguish between easily mineralisable and stable forms of humus. In the case of easily mineralisable humus forms, it depends on climate, vegetation and the type of soil tillage how quickly the humus is broken down. Depending on the cultivation method, this degradation can lead to considerable losses or even the complete disappearance of humus. With sufficient amounts of organic matter, over time a certain part of the existing humus is microbially converted into stable humus structures. These kinds of permanent humus can neither be destroyed by extreme weather events (as a result of climate change) nor by intensive soil tillage. Only the plant itself, through the activation of natural absorption mechanisms, is able to break down the nutrients contained in the stabilized humus complexes and to incorporate them into its own plant mass. Given a sufficient and balanced supply of organic matter, humus can be built up despite continuous cultivation activities, as we are talking here about a cumulative process. Examples in nature where humus accumulation has occurred in the form of stable humus compounds are the humus rich tundra and taiga landscapes of the far north and, from prehistoric times, the black earth soils of Romania.
Does the German Fertilizer Ordinance represent an obstacle to traditional organic farming in general and to biocyclic vegan farming in particular? And if so, in what respect?
The three-year nitrogen upper limit of 510 kg/ha for compost could be limiting, since the application of large quantities of biocyclic humus soil is essential for biocyclic vegan agriculture. Here it is decisive how biocyclic humus soil is defined and whether humus substrates fall under the provisions of the fertilizer ordinance for composts. One of the most important properties of biocyclic humus soil is that it has virtually no water-soluble nutrient compounds, especially nitrogen compounds. For this reason, for future amendments to the Fertilizer Ordinance and, consequently, to the Compost Ordinance the legislator should include an exception for biocyclic humus soil of, as organic matter in the form of humus soil does not present a risk of leaching and therefore does not pose a threat to groundwater.
The German Fertilizer Ordinance stipulates that fermentation residues from biogas plants must be included in the calculation of the upper nitrogen limit (170 kg/ha). Is the conversion of fermentation residues into biocyclic humus soil a possibility to "escape" this regulation?
Of course, fermentation residues can also be used as a constituent of compost, which is then refined into biocyclic humus soil.

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Is the humus cultivation practiced within the framework of biocyclic vegan agriculture subject to the prohibition periods for the application of compost in autumn and winter regulated by the German Fertilizer Ordinance? If so, how do the farmers concerned deal with this?
The prohibition period introduced by the legislator is extremely sensible against the background of the risk of leaching of organic matter that has not completely decomposed. In the case of composts that have reached the stable humus phase (biocyclic humus soil), such a period would not be necessary. Nevertheless, in view of the danger of soil compaction on damp soils, the field should be driven on as rarely as possible or even not at all, during the winter.
Plant Health
What is the position of biocyclic vegan agriculture with regard to the protection of plants against diseases and pest infestation, seeing that the use of synthetic pesticides is prohibited?
According to the principles of biocyclic vegan agriculture, plant growth and health are causatively influenced by soil life. All measures aimed at promoting plant growth and strengthening the plants' natural defences against degradative organisms, pathogens and parasites must therefore start with the creation of ideal conditions for the development of a diverse and balanced soil life and the greatest possible biodiversity above ground. The occurrence of phytopathological phenomena in the form of diseases or heavy insect infestation primarily demonstrates the need to review and, if necessary, correct the growth conditions of the infested plants. Biocyclic vegan agriculture primarily pursues causative measures which strengthen plant health and at the same time guarantee a natural ecological balance. Interactive plant communities have a positive effect on both the crop and the ecosystem and can promote their self-healing powers. Mixed crop systems also contribute to increasing biodiversity, which is another important aspect, especially in preventive pest control. A species-rich flora and fauna makes a considerable contribution to population control of pests. Phytosanitary effects, involving the significant suppression of numerous soil-borne pathogens, are also supported by wide crop rotations and a wide variety of crops. Finally, biocyclic vegan agriculture uses site-adapted plant varieties, which are selected for their resistance to diseases and pest infestation. Another aspect is the fact that plants, which grow on biocyclic humus soil, are induced to activate the natural absorption mechanisms for non-water-soluble plant nutrients. This leads to a physiologically optimal growth pattern and at the same time to significantly better plant health due to the mobilisation of the plant's own immune system. The cultivated plants are therefore more vital and less susceptible to pests and diseases. If wild and medicinal herbs or components from plants with an increased content of antioxidants (e. g. nettle, comfrey, horsetail, olive leaves) can be added to the maturing substrate during the rotting phase, the plants growing in biocyclic humus soil produced in this way are at the same time particularly beneficial for human health. If direct intervention is necessary, the focus is on auxiliary materials that the operation can produce itself. Only in the event that the preventive and holistic measures taken were unable to prevent the development of a critical situation (disease) for the crop and self-produced preparations are either not available or could not achieve sufficient effect, the use of certain plant treatment agents is permitted in biocyclic vegan agriculture ("Green List"). The plant treatment

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products must have a very specific effect and must not disturb the ecosystem of the cultivated plant as a whole (e. g. species-specific insect traps that protect "beneficial insects"). In the case of repeated and regular outbreaks of certain diseases or epidemics, medium- to long-term measures must be the focus of efforts.
Does biocyclic vegan agriculture use copper ("Bordeaux broth") to combat false mildew in viticulture?
Copper is only used if damage is to be expected despite preventive measures such as the appropriate choice of plant variety as well as soil and vegetation management. In biocyclic vegan agriculture, however, the use is limited to only three kilograms per hectare on a three-year average (other organic farming associations and the EU Organic Farming Ordinance in some cases permit quantities significantly higher than this).
Protection of Human Health
What is the contribution of biocyclic vegan agriculture to the reduction of health risks posed by multi-resistant germs?
Multi-resistant germs are increasingly becoming a serious problem. Particularly in factory farming, broad-spectrum and even reserve antibiotics are regularly administered through the feed, encouraging the formation of multi-resistant germs in the animal body. Therefore, under certain circumstances, the consumption of animal products also favours the formation of multi-resistant germs in the human body. Both antibiotic residues and multi-resistant germs are also frequently found in organic commercial fertilizers made from slaughterhouse waste, such as horn, feather or blood meal pellets. These purchased organic fertilizers are explicitly permitted by the EU Organic Regulation and are frequently used in organic vegetable production due to the fact that they are inexpensive and provide quickly available nitrogen. Recent studies show that antibiotic residues can even be found in plant parts intended for human consumption that have been fertilized with the excrements of animals from intensive livestock farming. Since biocyclic vegan agriculture does not involve commercial animal husbandry and no fertilizers of animal origin are permitted to be used, the consumption of products from biocyclic vegan cultivation drastically reduces the risk of the development of multi-resistant germs. The emergence of multi-resistant germs in soil and plants is practically impossible.
Increased emissions and concentrations of potentially harmful particulate matter (PM10) are also associated with agricultural practices. Is there any contribution that biocyclic vegan agriculture can make to the reduction of these emissions?
Large-scale and excessive fertilization with liquid manure releases a great deal of ammonia, which in the air is converted into ammonium salts known as secondary fine dust. Since no liquid manure is used in biocyclic vegan agriculture, this input path is eliminated.

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In the context of public debates on health hazards caused by excessive nitrate concentrations in drinking water, it is repeatedly pointed out that high nitrate concentrations may be found in vegetables, too. Does this also apply to products from biocyclic vegan cultivation?
It is true that some plant and vegetable species, such as potatoes, cabbage, etc., have a high nitrogen demand Particularly in regions whose soils have a low water retention capacity (e. g. sandy soils), nitrogenous mineral and organic fertilisers are easily washed out and thus significantly pollute groundwater, especially with rainy weather shortly after application. In case of excess nitrogen supply and reduced photosynthesis performance of the plant, e. g. during the cooler seasons or in periods of a heavy cloud cover, plants store nitrogen (which, in the absence of a selection mechanism against water-soluble salts, is compulsorily absorbed with the water) in the leaves in the form of nitrite and nitrate. Mineral fertilisation therefore not only leads to considerable economic losses due to the leaching of fertilizers already administered and their accumulation in groundwater, but also under certain circumstances to dangerous nitrate concentrations in plant parts intended for human consumption, e. g. in the leaves of spinach and other vegetables. This is why the nitrate content of the vegetables used for the production of baby food is constantly monitored and the vegetables are harvested only if the legal limits for baby food are not exceeded. By virtue of the non-use of mineral and organic fertilisers of animal origin in biocyclic vegan cultivation, there is no significant input path for surpluses of reactive nitrogen compounds. Furthermore, the biocyclic humus soil used in biocyclic vegan agriculture offers a remedy in both cases described above. Due to its property that the nutrients it contains, including nitrogen, exist in stable molecule complexes that are not susceptible to leaching and are therefore not released into the groundwater, the problem of nutrient losses is eliminated. Since, in contrast to water-soluble nutrient salts, the plant can selectively absorb non-water-soluble nutrients, nutrient uptake is always tailored to its specific requirements. Therefore, biocyclic humus soil is excellently suited as cultivation soil for sensitive seedlings. A nitrate enrichment in plant tissue due to an excessive supply of nitrogen-containing compounds is practically impossible.
Are bioaerosols, e. g. mould spores, released during the composting of plants and plant residues? How can the concentrations in the breathing air be reduced in order to prevent damage to health?
Increased bioaerosol concentrations are usually detectable in the vicinity of waste treatment plants (especially for organic waste). In composting plants for organic waste these are mainly mould spores, particularly those of Aspergillus fumigatus. The bioaerosol concentration can be significantly reduced by a controlled rotting process (turning of the compost at the ideal time, which depends on several measurable parameters such as temperature, humidity, microbial respiration activity) as well as the permanent covering of the compost heaps (also during turning). In addition, there exist extensive composting methods in which the formation of aerosols can be prevented as far as possible by avoiding the turning process.

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Animal Ethics

In discussions, it is often mentioned that agriculture simply cannot be vegan, because due to the necessary tillage and harvest, even if the effects are minimal, soil organisms and wild animals can be killed. In this context, how is the term "vegan" defined in biocyclic vegan agriculture?
Land cultivation always means an intervention in nature, whether vegan organic, classically organic or conventional. However, by excluding animal husbandry as well as fertilizers and other preparations of animal origin, biocyclic vegan agriculture causes significantly less animal suffering than other forms of agriculture. Wild animals and soil life are promoted more strongly in this cultivation system than in other forms of agriculture by means of a wide variety of crops, mixed crops, structural elements, habitats for beneficial organisms and the development of a healthy soil fermentation process. Nevertheless, damage to soil and other wild animals cannot be completely avoided but is kept to a minimum through minimised tillage as well as gentle harvesting and mowing methods. In particular, the increased use of biocyclic humus soil and the associated minimal tillage effort will lead to a further reduction in interventions that can disturb soil life in the future. However, it is not possible to influence permanent processes in nature that take place without human intervention, such as the death of bacteria and protozoa in the soil. The state described as "healthy soil life" is not static; it is rather a dynamic "fluid equilibrium" in which the "eating and being eaten" of the microbes corresponds to a seemingly stable state of balance.

What is the position of biocyclic vegan agriculture with regard to the use of beneficial insects and repellents in pest control?
Biocyclic vegan agriculture relies on a naturally established equilibrium between the insect populations causing the damages and their antagonists. The prerequisite for this equilibrium is a high level of biodiversity. This is supported by various measures, such as a diverse crop rotation, crop diversity, flowering strips, fallow land and as many wooded structures as possible such as trees and hedges. If a natural balance has not yet been achieved, a short-term restoration can be achieved by the release of "beneficial insects" or the installation of selective insect traps with little effect on the ecosystem. Repellents and passive protective measures with a small but targeted radius of action, which are listed in the "Green List", are also permitted.
What is the position of biocyclic vegan agriculture with regard to beekeeping?
In biocyclic vegan agriculture, the commercial keeping of honey bees as livestock is not permitted. Nevertheless, a non-exploitative accommodation of honey bees is permitted, especially since their pollination services are indispensable for the production of a large number of our crops. The central concern of biocyclic vegan agriculture remains the creation of suitable living conditions for wild bees and other insects, e. g. through the creation of beneficial habitats such as flower strips, nesting aids, hedge structures and a large variety of crops. The protection and promotion of wild bees and other insects is therefore at least as important as the development of new forms to accommodate honey bees.

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Are citrus fruits from biocyclic vegan cultivation treated with shellac?
Citrus fruits from biocyclic vegan agriculture do not come into contact with any peel treatment agents. The fruits are, if at all, washed with water as they come from the field and then dried with air. The use of shellac is excluded in all cases.

Environmental Protection

Climate Protection

What contribution does biocyclic vegan agriculture make to climate protection?
Soils store large amounts of carbon. After the oceans and fossil carriers of energy, soil is the third largest carbon storage on earth. With 4,000 gigatons in fossil deposits and 1,600 gigatons in humus and soil life, the amount of carbon stored in the soil is far greater than the combined amount of carbon in the atmosphere (800 gigatons) and vegetation (600 gigatons). Maintaining this natural sink function is therefore of particular importance for climate protection. Depending on the crop, biocyclic vegan cultivation practice uses very high amounts of biocyclic humus soil for plant nutrition and for the sustainable improvement of natural soil fertility. As 40-60% of humus consists of carbon (C), the increased application of biocyclic humus soil to the arable land can lead to the binding of considerable amounts of carbon in the organic matter of the soil (humus soil as a "CO_2 bunker"). Such an approach, based purely on plant-based raw materials, has the potential to transform arable land into CO_2 sinks (previously only forests, moors, permanent grasslands, savannahs, steppes and oceans were considered as such) and thus make a significant contribution to climate protection. In addition, measures that strengthen the sink function or reduce greenhouse gas emissions generally also have a positive impact on the water balance, soil functions and biodiversity. Animal husbandry is responsible for the emission of significant amounts of CO_2 and CO_2 equivalents like methane and nitrous oxide. These emissions are caused by livestock farming itself and its upstream and downstream activities. This agricultural sector is responsible for about 18% of the anthropogenically caused greenhouse gas emissions worldwide. Since biocyclic vegan agriculture does not practice commercial livestock farming and does not use fertilisers or other inputs of animal origin, direct climate-effecting emissions from livestock farming, such as methane from ruminants (cattle and sheep), are excluded. In addition, indirect climate-damaging emissions resulting from the production of fodder such as soya (thereby causing deforestation of species-rich rainforests) and its import for farm animals kept in Europe do not arise.

What contribution does biocyclic vegan agriculture make to the conservation of permanent grassland, which is particularly important for climate protection?
The conservation of permanent grassland on carbon-rich soils is particularly important for climate protection. Though at present, the prevailing opinion is that permanent grassland can only be used for grazing to keep it e. g. wood-free or to use it for meat and dairy production. However, grassland can also be mown, and the organic matter can be spread as mulch on a different plot

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following the principle of the "cut and carry method". In addition, the harvested material can also be used for biocyclic vegan composting in order to obtain biocyclic humus soil. By the use of modern pelleting methods, it would be possible to achieve an interregional balance between areas with absolute grassland, where horticulture and arable farming is not possible due to climatic conditions, and areas with intensive agriculture and an increased need for nutrients and organic matter. This would actually happen in a very resource-saving manner, as there will be no water withdrawal from the cultivation region, and the transport emissions can be reduced due to volume reduction). Thus, it would be possible for biocyclic vegan operations to comply with the social mandate given to alpine agriculture, for instance, to help to preserve the traditional cultural landscape. It is also imaginable to have grassland grazed by animals that are not used for commercial purposes or slaughtered.
A comprehensive biocyclic vegan land management would vacate many areas previously used for fodder production, which could either be used again for forestry purposes or used as permanent grassland for biomass production for the fertilisation of intensively cultivated arable and horticultural sites. A drastic reduction in fodder production could thus make an important contribution to protecting climate, land and biodiversity, as a considerable amount of land could be used to produce food for a growing world population in addition to local renaturation measures that might be deemed necessary.

Moor protection: Is biocyclic humus soil suitable as a peat substitute in gardening and landscaping?

Biocyclic humus soil is an excellent cultivation soil for sensitive seedlings, as the plants can selectively absorb non-water-soluble nutrients as they are contained in humus soil. This results in an active nutrient uptake by the plants themselves that is exactly adapted to their needs. Biocyclic humus soil can therefore be used as an alternative to peat.

Can biocyclic vegan agriculture contribute to the renaturation of soils impaired or degraded by the intensive cultivation of oil palms?

During the production of palm oil, 85% of the palm oil fruit remains as biomass. This biomass can be composted either directly or subsequently to an energetic use as a fermentation residue in order to obtain biocyclic humus soil. Through the application of humus soil, areas that have already been degraded can be restored for appropriate agricultural use. At the same time, the significant potential of humus soil can be leveraged to protect the climate, water, soil and biodiversity.

Air Pollution Control

In order not to exceed the permitted national emission levels for ammonia (NH_3) in Europe, these emissions must be reduced, for example by introducing low-emission farming techniques. How can biocyclic vegan farming contribute to emission reduction?

Ammonia emissions are mainly caused by agricultural livestock farming as well as by the storage and spreading of solid and/or liquid manure and fermentation residues from biogas plants. By

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refraining from keeping livestock and using animal fertilizers, biocyclic vegan agriculture makes a significant contribution to reducing ammonia emissions in agriculture.
Ground and Drinking Water Protection
How does biocyclic vegan agriculture contribute to the protection of ground and drinking water?
By not using synthetic mineral fertilizers, chemical-synthetic pesticides and organic fertilizers such as liquid manure and manure, biocyclic-vegan agriculture contributes considerably to the protection of groundwater from nitrate and veterinary drug residues. Biocyclic vegan agriculture also improves the absorption of rainwater by providing a livelier soil life and a better buffer and storage capacity of the soil. In addition, the increased water retention capacity and permanent soil cover, e. g. through the integration of mulch systems, lead to reduced extraction of groundwater for irrigation, which in turn helps to conserve water resources, especially in water-poor areas. Likewise, the use of biocyclic humus soil contributes to the protection of ground and drinking water. According to the latest research carried out by the University of Athens in 2017, the water drained from biocyclic vegan humus soil (i. e. the water that drips out of the material after reaching 100% water saturation) contains only 15 milligrams of total nitrogen per litre and is therefore "cleaner" than drinking water. For comparison: The nitrate limit value of the German Drinking Water Ordinance is 50 milligrams per litre. This figure illustrates one of the most astonishing and at the same time most important properties of biocyclic humus soil, namely the fact that it contains virtually no water-soluble nutrient, especially nitrogen compounds. Humus soil is neither a fertiliser nor compost, but an earth-like material consisting mainly of organic matter, which is exclusively present in highly stable humus complexes, to which all plant nutrients (e. g. 2.8% nitrogen) are bound in considerable quantities in a non-water-soluble form. A leaching of nutrients is therefore practically impossible.
Does the application of the biocyclic vegan guidelines ensure that there are no inputs into groundwater during composting in the open, for example on sandy soils that contain no or too little nitrogen-degrading bacteria?
Compost can be produced anywhere in the world. At the beginning of aerobic decomposition, however, composting should take place on a waterproof base (e. g. concrete slab) in order to prevent leachate formation. Groundwater contamination can be largely avoided by targeted, professional rotting management taking into account the water requirements of the rotting material as well as the regional precipitation levels. During the refinement phase to biocyclic humus soil, which can take several years after composting has been completed up to maturity stage V (according to RAL), leaching, which could endanger the groundwater, is not to be expected. This refinement phase should therefore take place on the farm, for example with the aid of windrows running along the side of the fields.

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Protection of Surface and Marine Waters
What contribution does biocyclic vegan agriculture make to the protection of surface and marine waters?
In biocyclic vegan agriculture, the protection of surface and marine waters is ensured by significantly lower nitrate inputs on the one hand and by refraining from using synthetic chemical pesticides on the other. Furthermore, the absence of livestock eliminates the risk of exposure to residues from veterinary drugs. The use of biocyclic humus soil also has a positive effect on water protection. As a matter of fact, the leaching of nutrients is reduced, which in turn leads to a reduction of the eutrophication of the world's oceans with nutrients from agriculture, a process that has already caused the large-scale collapse of marine ecosystems in many places, e. g. in the Baltic Sea.
Soil Protection
To what extent do compost and biocyclic humus soil contribute to soil protection?
Owing to its physical properties, compost is commonly referred to and used as a "soil improver". The decisive factor for this designation is its ability to contribute to better aeration of the soil, to an increase in water retention capacity and to the acceleration of soil fermentation. Its high proportion of microorganisms of various types also makes a significant contribution to promoting soil life. Compost is therefore generally regarded as an important factor in increasing natural soil fertility, especially on organically managed soils. The increase of the humus content in the soil layer at a depth of 25 cm is achieved by mulching, surface composting and the administration of finished compost or substrate compost of different degrees of maturity. The effect of compost on soil fertility rises as it matures. Biocyclic vegan agriculture goes beyond this by aiming to use as much biocyclic humus soil as possible on the cultivated areas. This humus soil can also be used directly as a plant substrate without adding additional soil. Through the systematic use of large quantities of humus soil derived purely from plant-based composts (preferably in substrate quality), biocyclic vegan agriculture also represents a tool for ending and reversing soil degradation or erosion.
Does biocyclic vegan agriculture counteract the microbial impoverishment of agricultural soils?
Biocyclic humus soil contains a high proportion of microorganisms from various groups. By using compost, the soil fertility is increased and an increase in the humus content is achieved by mulching, surface composting and the application of compost. This, together with gentle soil cultivation, has a positive effect on soil life. A varied crop rotation, incorporating both deep and shallow rooting crops as well as legumes, ensures a good root penetration and aeration of the soil. In addition, mulching supports the formation of humus and thereby the proliferation of beneficial microbes.

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Does biocyclic vegan agriculture contribute to reducing soil acidification?
Yes, by supplying large amounts of organic matter and, in particular, by deploying biocyclic humus soil. Similar to compost, biocyclic humus soil also has a slightly acidic (6.5) up to a virtually neutral pH value (7.5). Measurements of the pH value have shown that the presence of sufficient amounts of organic matter in an acidic environment contributes to an increase in the pH value whereas in an alkaline environment it contributes to a decrease in the pH value of the soil. A gradual soil acidification can thus be effectively counteracted with the aid of biocyclic humus soil and substrate composts.
Protection of Biodiversity
The most frequently reported stresses and threats to the biodiversity of terrestrial ecosystems in Europe stem from unsustainable farming practices, changes on the natural environment and pollution. What contribution can biocyclic vegan agriculture make to preserving and promoting biodiversity?
The overfertilization associated with intensive agriculture, the use of pesticides, monoculture and the absence of green fallow land have brought about a loss of food, habitats and breeding grounds for many animal species. The protection and promotion of biodiversity are fundamental objectives of biocyclic vegan agriculture. Measures to promote biodiversity comprise four levels: (a) Activation of soil life (e. g. through the use of compost and biocyclic humus soil as well as low-impact soil cultivation); (b) Increasing the diversity of species above ground (e. g. through mixed cultivation, wide crop rotation, large crop diversity, beneficial animal habitats such as flower strips or hedge margins, agroforestry or permaculture as well as through targeted measures to improve the composition of wild and medicinal herbs in permanent crops); (c) Promoting biotopes also outside the agriculturally used area (e. g. through buffer and border zones, landscape design measures, etc.); (d) By abandoning livestock farming, deforestation of ecologically very valuable, species-rich rainforest areas, especially in South America, for the cultivation of animal feed used in Europe will no longer be necessary. Instead of growing monoculture feed crops such as maize, wheat or soya, various other types of crops can be cultivated for human consumption. In order to identify the measures to be taken by the operation to promote biodiversity and to illustrate the interconnectedness of the operation with the ecosystem surrounding it, including the question of drift safety at field margins, a biodiversity index for biocyclic vegan operations, the so-called Biocyclic Operation Index (BBI), has been developed. This index, which can vary between 0 and 10, allows to measure the efforts made by farms of different technical orientations and of different regions with regard to its contribution to the promotion of a greater diversity of life on and below the areas, which are managed according to the biocyclic vegan principle, as well as in the adjacent areas, thus making them measurable and objectively comparable. In particular, the BBI has proven in practice to be an important element of agricultural consultancy as well as a tool for raising awareness of ecological issues among producers themselves.

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The future of agriculture in Germany and worldwide

Assuming that traditional organic farming would be the politically set standard of land management, what added value would biocyclic vegan farming have?

This is a question that, on the one hand, can be answered from an ethical point of view. Biocyclic vegan agriculture and the certification and labelling system related to it would provide end consumers with information enabling them, at the moment of their purchase decisions, to freely choose not to support the exploitation and sometimes agonizing use of animals. So far organically produced vegan products do not show whether their production is eventually related to animal husbandry and the animal suffering associated with it. When it comes to purchasing, it is impossible to tell whether fruit and vegetables have been fertilized with liquid manure, solid manure or fertilisers containing animal body components from slaughtering (e. g. horn chips, bone meal, blood meal and feather meal). Here, biocyclic vegan agriculture offers an alternative and at the same time creates transparency with the help of the biocyclic vegan label.
Furthermore, the use of biocyclic humus soil, which is typical for this form of agriculture, ensures that significant contributions are made to climate, soil, water and biodiversity protection as well as plant health, which have beneficial effects that go even beyond those of traditional organic farming. There is no other organic farming standard where the promotion of biodiversity is as strongly anchored and being applied as consistently (through the Biocyclic Operation Index) as it is in biocyclic vegan agriculture.

What contribution does biocyclic vegan agriculture make to world food security?

According to calculations carried out by the United Nations Environmental Programme (UNEP), the calories lost during the processing into animal food could theoretically feed 3.5 billion people. The conversion rate of plant-based to animal calories per kg is between 2:1 for poultry, 3:1 for pigs, farmed fish, milk and eggs and 7:1 for cattle. Reducing meat, fish, milk and egg consumption therefore has the potential to reduce world hunger by shortening the food chain.
Therefore, from a global point of view, there is no alternative to changing eating habits and reducing livestock if we wish to ensure that the world's growing population can continue to be fed in the future. Here, biocyclic vegan agriculture is supporting the necessary conversion. The strict decision not to keep any livestock or animals for slaughter and not to use any fertilisers of animal origin means that from the outset the focus is on the production of purely plant-based products, which form the prerequisite for a healthy and wholesome diet.
In addition to the inefficient conversion rate of animal calories described above, the cultivation and export of animal feed to and from countries of the global South leads to a poorer supply of the local population in these countries, since there is a competition for land with to local food production, and the cultivation of animal feed requires far more land than the cultivation of food for direct human consumption. In this respect, too, biocyclic vegan agriculture is much more resource-efficient.

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To what extent can biocyclic vegan agriculture support smallholder agriculture in Europe and worldwide?
Agriculture that does not require external inputs, as it functions in a biocyclic manner, provides farmers with maximum self-determination and independence from seed, fertilizer and pesticide manufacturers. For the production of biocyclic humus soil all kinds of vegetable and green waste as well as plant-based organic matter can be used, so that biocyclic vegan agriculture is plausible and feasible in practically any region of the world. Furthermore, biocyclic vegan agriculture can make an important contribution to the development of predominantly smallholder agriculture in so-called developing countries as it provides local farms with methods for establishing a closed-loop economy that is capable of permanently increasing soil fertility through the use of locally available resources, thus also ensuring long-term, sustainable security of yields that are entirely derived from plant-based sources, without the need to become economically dependent on industrial fertilizer and pesticide manufacturers.
Can biocyclic vegan agriculture make a contribution to combating global desertification?
Desertification is caused in particular by overgrazing and the cultivation of monocultures, which leads to exhaustion of soils and destruction of their water storage capacity. Biocyclic humus soil brings this important property back to the soil, and the envisaged diversity of crops, including the presence of bush-like habitats for beneficial insects, prevents soil and ecosystem impoverishment and subsequently desertification. In addition, the use of biocyclic humus soil can contribute to the regeneration of slightly to severely degraded soils.
Other Forms of Sustainable Agriculture
What is the position of biocyclic vegan agriculture regarding permaculture?
Permaculture is the conscious design and maintenance of agriculturally productive ecosystems that possess the diversity, stability and resilience of natural ecosystems. This definition is fully in line with the basic concept and philosophy of biocyclic vegan agriculture. Permaculture includes central aspects of biocyclic vegan agriculture. Therefore, permaculture operations, if they do not keep farmed animals and do not use fertilizers and other preparations of animal origin, can easily be certified as biocyclic vegan. This can then be considered as a form of biocyclic vegan agriculture that is particularly close to nature.
What is the position of biocyclic vegan agriculture regarding agroforestry?
Agroforestry stands for a form of land use in which trees and bushes are cultivated and used on an area in combination with arable crops or grassland. Agroforestry thus makes use of the natural and healthy interactions of different vegetation layers and thus has a high agro-ecological value. In combination, tree, shrub and herb layers create enormous biodiversity and stabilise the entire ecosystem, as it becomes more resilient and resistant to pests, diseases and climatic factors. Agroforestry is thus a special form of mixed cultivation and therefore combines all the benefits of the latter for the plant community to be set up.

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A key feature of biocyclic vegan agriculture is the creation of a natural balance and many different habitats for preventive plant protection, as well as the development of a structurally rich and diverse landscape. Agroforestry, like permaculture, is fully compatible with the principles of biocyclic vegan agriculture. Agroforestry farms, provided they do not keep farmed animals and do not use fertilisers and other preparations of animal origin, can be certified according to the Biocyclic Vegan Standard.