

7 tips to go green in the processed fruit and vegetables and edible nuts sector

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Becoming greener and having a more climate-positive impact can bring many benefits to exporters of processed fruit and vegetables and edible nuts to Europe, in terms of market access, consumer demand, reputation and sustainable development. If you demonstrate that your products have a positive climate impact, you may have a competitive market advantage. Consumers and other stakeholders are more likely to view a company positively if it is seen to be taking environmental issues seriously. This can help build trust, loyalty and long-term relationships with customers, suppliers and other stakeholders.

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1. Identify specific environmental risks in your sourcing, processing and export

To become more environmentally friendly/aware, you must first identify the specific environmental impact of your company. One of the most common mistakes in this process is to focus only on your processing operations. For a complete environmental assessment in the fruit, vegetable and nut processing sector, you should identify the total environment impact of your supply chain. In practice, this means identifying the impact related to:

- Sourcing of raw materials (agricultural practices)
- Ingredients
- Packaging materials
- Processing operations
- Local and international levels

Environmental impact cannot be generalised for the entire fruit, vegetable and nut processing industry. For example, it is often assumed that along the supply chain in this sector, agriculture contributes the most to greenhouse gas (GHG) emissions. This claim may be relevant for the intensive use of mineral fertilisers, but in many developing countries fruit and nuts are grown almost without any fertilisers or irrigation. Also, some products are sourced from untamed nature where agriculture is not part of the supply chain.

The most important risks in the fruit, vegetable and nut processing industry are high energy consumption, use of water, waste disposal and air pollution, plus possible soil degradation. You should analyse those risk factors separately for sourcing, processing (including packaging) and transport operations.

Agricultural practices

Intensive agricultural operations can harm the environment through fertilisation, irrigation, machinery and plant protection chemicals. In addition to these main factors, organic waste is often burned directly in the fields, polluting the air. This organic waste includes branches cut by pruning, husks from nuts, removed weed or inedible parts of fruits or vegetables.

When assessing environmental risks related to the agricultural practices of your fruit, vegetables or nuts suppliers, you should probably start by estimating the used nitrogen fertilisers. In fruit and vegetable growing, nitrous oxide emitted from synthetic fertilisers is responsible for most of the total agricultural greenhouse gas emissions. However, in the case of organic production where manure is used as the main fertiliser, GHG emissions are much smaller. Along with fertilisers, you should also estimate the emissions from the agricultural machinery used.

As the next step, you can identify water consumption through irrigation practices. Intensive irrigation can lead to water scarcity, putting production at risk. Last, you can estimate the frequency and quantity of pesticide applications. If not used or discarded properly, pesticides easily contaminate the air, soil and water. Also, they can harm biodiversity by killing other animals instead of only pests (bees, birds, worms, etc.).

One example of water scarcity risk is the case of the Iranian production of pistachios. A semi-arid area of Rafsanjan is one of the most important pistachio-producing areas, with over 110 thousand ha of pistachio orchards. More than 95% of water in this region is used to irrigate pistachio orchards. Intensive use of water has led to an increase in well depths. In the last 30 years, the average depth of wells went from 20 m to over 300 m. Today, Rafsanjan faces a severe water scarcity and pistachio production is decreasing.

Energy consumption

Energy is needed to run vehicles and processing equipment, yet energy consumption greatly varies depending on the type of processing methods. In your impact assessment, you should first identify the amount of energy consumed expressed in kWh or in MJ for your operations. It is equally important to identify the share of renewable energy. One of the mistakes people make is to assume that only fossil fuels are polluting and that electricity is 'green' energy. Only electricity produced from renewable sources (water, sun, wind) can be called 'green'.

In this sector, operations requiring a change of temperature are some of the most important energy consumers. Those operations include temperature increase (as in drying, blanching, pasteurisation, cooking) as well as temperature decrease (as in chilling or freezing). See the table below to learn more about energy consumption hotspots per subsector.

Table 1: Energy consumption hotspots in the processed fruit, vegetables and edible nuts industry

Sector	Explanation
Frozen fruit and vegetables	Low (usually -18°C) temperatures must be maintained throughout the entire supply chain, including storage and transport. To freeze 1 kg of fruits or vegetables, 2-3 kWh of energy is usually needed. Initially this may seem like low energy consumption, but frozen products are often kept in deep-freezing warehouses for months before export. Storage time can significantly increase energy consumption.

Processed juices	Energy is most consumed by vacuum evaporators for the concentration of juices. Also, juices are commonly pasteurised using steam or hot water. However, reducing transport costs can compensate for the energy used for juice concentration. Transporting concentrated juices is more energy-efficient because of the reduced volume.
Canned fruit and vegetables	Heating operations consume the most energy in this sector. Prior to filling, empty cans are commonly sterilised with hot steam. Also, products are often blanched. Last, heat sterilisation is used to sterilise closed cans.
Dried fruit	Energy used in air-drying operations. Hot air is commonly produced by burning gas or sometimes organic materials (such as wood). To increase storage time, fruit can be initially dehydrated to low moisture values (e.g. less than 20%) and rehydrated before packaging and export (e.g. to more than 30%). This rehydration process consumes additional energy.
Edible nuts	Energy used for drying of in-shell nuts before cracking. Also, heat sterilisation is increasingly used. Processing of cashew nuts (in Vietnam, India, Ivory Coast) is one of the most energy-demanding operations, as it additionally requires steaming before cracking. According to a study on energy consumption of small-scale cashew processors in India , the energy required to process 1 tonne of raw cashew nuts to kernels is around 6000 MJ.
Jams	Energy consumed in evaporators for jam cooking. Although this is an energy-intensive process, jams can be stored for a long time without temperature control.

Water consumption and wastewater generation

Water is used for washing raw materials, heating, blanching, pasteurisation, and disinfection of facilities and equipment. Water can also be a part of the final products such as canned fruit and vegetables, table olives or nectars. According to a [2020 study by amfori](#) (PDF), the amount of water consumed in fruit canning is approximately 8,560 L per ton of raw material. The wastewater generated by smaller canning facilities is comparable to that of a population of 20,000, whereas large facilities can generate an amount comparable to a population of 250,000.

The amount of wastewater generated by the fruit, vegetable and nut processing industry is smaller compared to animal food processing and even significantly smaller compared to non-food industries. Still, there are risks connected to waste disposals. For example, wastewater from fruit, vegetable and nut processing companies is often discharged into rivers or seas. This can lower oxygen levels, killing fish and other aquatic animals.

One subsector that generates significant quantities of wastewater is olive oil processing. In a three-phase processing system, olives usually yield 10 to 20% olive oil, 30% olive press cake and 50% of olive mill

wastewater. Wastewater generated by olive mills contains high concentrations of organic compounds (mostly phenols), which can contaminate the soil and water.

A study on [olive mill wastewater treatment](#) suggests that the olive extraction process in Jordan generates around 200 thousand m³ of wastewater annually. Other olive oil processing countries in the Mediterranean region generate even more wastewater (around 30 million m³), making this a serious environmental challenge. Detoxification solutions are usually too expensive for North African processors like Tunisia or Morocco, so it is common to dispose of wastewater into rivers and lakes or use it for farming irrigation.

Solid waste is usually not very large compared to non-food industries and can be used as fuel, animal feed or for composting.

Air pollution

Air pollution in the fruit and vegetable processing industry depends on the type of fuel used to run processing equipment. Fruit drying still uses burning gas or wood to produce heat, even though it generates carbon gas emissions. In the subsector of frozen fruit and vegetables, one major risk is leakage of ammonia gas from refrigeration units. Ammonia is very harmful to the eyes and the respiratory tract, and contaminates the soil and groundwater.

Deforestation

Production processes in the sector of processed fruit and vegetables can affect biodiversity negatively. Intensive agriculture can lead to deforestation or destruction of native biodiversity (as is the case with palm oil production). Overharvesting of wild collected products (e.g. Brazil nuts in Bolivia and Brazil, pine nuts in China) can lead to the collapse of entire ecosystems.

Figure 1: Deforestation of land for palm oil plantation in Indonesia



Source: [Flickr](#) by [glennhurowitz](#), licensed under CC BY-ND 2.0

Packaging

The type of packaging is also part of your environmental impact. The best packaging options are made from renewable materials. If the material used is not renewable, then you should aim for reusable or recyclable materials. However, industrial practices and current packaging solutions are not always sufficient to minimise environmental impact. The most common export packaging solutions in this sector are:

- Lower environmental impact – Jute bags or linen fabric bags (for in-shell nuts), carton boxes (outer layer for dried fruit, frozen products and nut kernels packaging). These materials are renewable.
- Lower-middle environmental impact – Glass bottles (retail packed juices), glass jars (jams). Glass is reusable and recyclable, but is not often used as export packaging.
- Upper-middle environmental impact – Plastic liners (contact material for dried fruit, frozen fruit and vegetables), plastic bags (nuts, frozen products), plastic barrels (olives, olive oil, pickled vegetables). These materials are synthetic but recyclable. However, in many countries the percentage of recycled plastic is still very low and the litter in natural areas/oceans is at a record high.
- Higher environmental impact – Tin and aluminium cans (canned fruit and vegetables), aluminium bags (nuts), bag in a drum (juices and purees). This packaging uses materials that are not renewable, although they are recyclable. Still, there is a big carbon emission difference between producing countries. For example, the production of 1 tonne of aluminium in China on average has 20 tonnes of CO₂e that is almost three times more compared to the aluminium produced in Europe.

Transport

Transport is one of the most important sources of carbon emissions for non-European suppliers of food to Europe. The transport of processed fruit and vegetables from non-European countries can contribute to up to one-third of the total product-related carbon emissions. However, export transport gas emissions are usually out of the control of the processing companies. This is the case because transport is usually sub-contracted and the environmental impact depends on the chosen mode of transport and the shipping company.

2. Turn environmental challenges into opportunities by reducing your environmental impact

After you have identified the highest risks along your supply chain, you should measure your environmental impact. This is measured in specific units, such as the amount of generated waste, used water, and consumed energy or carbon emissions. By measuring the impact you can set the aim of reducing it. After setting your goals and implementing measures, you can communicate them in your reports and your website, and directly to the buyers.

Some possible solutions can be roughly grouped in six broad categories: agricultural practices, water management, energy efficiency, use of renewable energy, use of by-products, and sustainable packaging and transport.

Sustainable agricultural practices

Intensive growing of fruits, vegetables and nuts can be risky for the quality of the soil, water, air and biodiversity. It is therefore very important for each processor to communicate with farmers and to support sustainable agricultural practices. In this way you will ensure a sufficient and long-term supply of raw materials for your own production. The most common ways to preserve soil, water and biodiversity are:

- Consider using new (tested) varieties that are resistant to most common pests and diseases: in this way farmers can reduce production costs, as they will use less pesticides. Also, some cultivars can provide a higher yield without increased water usage.
- Implement integrated pest management – With the use of agricultural forecasting services it is possible to monitor the development of insects and to use insecticides timely and in much smaller quantities.
- Use regenerative agriculture practices – This is the best approach for long-term sustainable agriculture. The most common regenerative agriculture modality is organic agriculture. In addition to having environmental benefits, organic certification also ensures higher prices for farmers and processors. Organic agriculture includes many types of natural and biological pest protection.
- Use fertilisation smartly – Soils can be preserved through the better use of manure, while mineral fertilisers can be precisely applied according to soil analysis.
- Use branches of fruits and nuts cut during pruning for mulching (preservation of soil moisture and protection from weed) and for mixing with soil.
- Save water through good water management practices – Drip irrigation uses significantly less water compared to flood irrigation. Smart irrigation based on sensors that measure soil moisture and specific plant needs can reduce water usage by 50% without affecting the yield. If rainwater is collected and used for irrigation, the water savings can be even higher. Also, many farmers in developing countries use no irrigation at all.
- Enhance biodiversity – Bees (and other insects) can be used for pollination and to increase the yields. Bird columns can be used to increase the number of bird-eating pests. The top priority should be to always insist on deforestation-free products when sourcing your raw materials. Deforestation does not set a good example, as it has been at a record high.

There are many good green practices in developing countries. For example, the [Fruit Fly Control Project in West Africa](#) has managed to decrease mango damage by fruit flies by 57% with a unique surveillance system. This system uses natural parasites (wasps) and predators (ants) that attack fruit flies. Another example is from the Tunisian company [South Organic](#), which uses nets to protect dates from insect damage. This method is popular

and is also used by many organic date producers in other countries.

Water management inside processing facilities

Water use by the fruit and vegetable processing industry is essential for the washing, heating and cooling of food products. The use of water in processing facilities can be reduced through more efficient operations, recycling and re-using wastewater, and opting for alternative water resources. Some ideas for better water usage:

- Installation of low-volume, high-pressure spray cleaning systems.
- Collection of water removed from fruits and vegetables during drying or during juice concentration. Some companies use systems extracting water from fruit drying for nutritional drinks (e.g. prune processors).
- Use of air cooling, instead of water cooling, after blanching.
- Collection and use of water used for washing fruits, vegetables and nuts. This needs a specific installation of the cleaning/filtering equipment.
- Collection of rainwater.

Improving energy efficiency

Energy efficiency in freezing and cooling operations can be significantly improved with better refrigerants and cooling systems. For example, the R134a refrigerant with variable frequency drive chillers can reduce electricity consumption by up to 55% compared with a system that uses ammonia. This also leads to a significant reduction of greenhouse gas emissions.

Energy efficiency in the juice industry can also be improved by using enzymes for juice extraction. With the use of enzymes, around 5% less fresh fruit or vegetables is needed to obtain the same amount of juice. This also saves around 3.4 kg CO₂ emissions per ton of concentrated juice. Another energy-saving solution in the juice industry is to use membrane evaporation, which is a more energy-efficient option for water removal than steam-based evaporation methods.

One of the solutions to decrease energy consumption in heating is to use innovative technologies. One such technology is called Pulsed Electric Field (PEF), which uses lower heating temperatures. PEF technology is relatively new but is already being used by the juice industry in several countries. It can be also used in the [drying of fruit](#). The European project [Food Processing in a Box](#) has already supported the development of small-scale juice-processing units with PEF technology. Apart from energy savings, the results showed a preservation of liquids.

The general improvement of energy efficiency in all processing operations is better insulation of walls, roofs, pipes, sterilisation machines, heat exchangers, etc. There is also the reuse of heat streams and energy-efficient power generators, as cheap/old equipment can become very expensive.

Finally, it is important to mention that energy efficiency can be improved by using renewable energy. A common example in fruit and nut drying operations is to use pits from fruit or shells from nuts to heat boilers.

Use of by-products

Different processing operations provide opportunities for a circular economy. Several examples of by-products from the sector are listed below:

- Shells (in the nut processing industry) or pits (in the dried fruit industry) to heat boilers and generate energy for drying;
- Inferior-quality products like animal feed;
- Pits of fruits after peeling for the production of starch or bioethanol;
- Peels of fruits and vegetables before processing for the production of pectin, colorants, fibres, etc.;
- Low-grade nuts for the production of high-quality oil;
- Cashew apples and many other fruits to produce jams, juice or for compost;

- Olive-processing waste to extract polyphenols for the food supplement and cosmetics industries. Same for grape seeds, avocado seeds and other stones/seeds.

Figure 2: Use of shells for heating the boiler in the macadamia processing industry in Kenya



Source: Autentika Global

A good example of environmentally friendly practices is the Kenyan company [Afrimac](#). During macadamia processing, the shells are removed and re-used to heat the boilers. This is illustrative of a circular economy where by-products are used for drying, and is in fact a common practice in the Kenyan macadamia industry. Afrimac additionally introduced the use of solar energy in their processing plants to make them even more sustainable. In fact, 70% of the energy used to run machines comes from the sun. In this way, the company saves 3.3 tonnes of CO2 emissions annually.

Decreasing carbon emissions during transportation

The highest carbon emissions in the fruit and vegetable processing sector is usually related to the transport of fresh products to the processing facilities. In many cases, small trucks (running on diesel fuel) are used to transport products from farms to facilities. The global warming potential of diesel fuel is over 20 times that of CO2. Trucks used for sourcing raw materials are usually operated by aggregators, which cannot be affected by the processors. One option to reduce emissions is to support your suppliers in using biodiesel and renewable diesel.

Carbon emissions are also related to export shipment. Whenever possible, you should choose ocean freight shipping as this is currently the most emissions-friendly mode of transport. Sea freight emits 7g of CO2 per km, which is significantly lower compared to rail (24g), road (137g) or air (654g).

Although sea shipping is subcontracted, it is possible to decrease its environmental impact by choosing a shipping company with a low Carbon Intensity Indicator (CII) rating. According to CII regulations, starting in 2023 each vessel needs a rating of C or higher. Also, you can ask your shipping company to provide the estimated CO2 emission for each shipment, as this can also depend on shipping speed. For example, shortening the shipping time from China to Europe by 2-3 days can reduce carbon emissions by more than 30%.

Tips:

Read the [Energy Efficiency and Cost Savings Guide](#) for the Fruit and Vegetable Processing Industry (PDF) to find energy-saving solutions for your type of processing.

Use the [seexplorer](#) tool (registration required) to search for the best way to save carbon emissions related to your shipment.

3. Measure the carbon footprint of your production for the whole supply chain

Companies in Europe increasingly use labels related to carbon emissions to promote products as environmentally friendly. Those labels use a variety of terms that can confuse consumers, such as 'carbon neutral', 'zero carbon', 'carbon negative', 'net zero CO2'. Some of those labels are not based on solid scientific environmental footprint methods. When promoting your environmental impact, make sure you are using the

relevant measuring criteria.

GHG emissions are typically measured and reported in a carbon dioxide (CO₂) equivalent. Besides CO₂, there are other common gasses emitted from agricultural production, like nitrogen released from nitrogen fertiliser applications and methane from rice production. Gas emissions are multiplied by their Global Warming Potential (GWP) to convert them to the CO₂ equivalent. The GWP shows that nitrogen has a greater impact on global warming than CO₂ per unit mass.

According to the [European Association of Fruit and Vegetable Processors](#), the average CO₂ emission for processed vegetables is approximately 0.7kg CO₂ emission per kg. This data cannot be generalised, and calculating CO₂ emissions must be done for individual companies and specific products. Still, it is possible to reliably confirm that CO₂ emission in fruit and vegetable processing is significantly lower compared to animal food processing. However, you should not use general industry estimations but make your own calculations.

To lower negative environmental impact, companies in the processed fruit and vegetables and edible nuts sector are advised to calculate the current consumption of resources. After a careful analysis it is important to make a cost-benefit analysis of the options that should lead to a lower impact and to select the most beneficial solutions. Below are some of the most important measurement criteria:

Table 2: Some criteria for assessing the environmental impact of fruit, vegetable and nut processors

Criteria	Type and units	Some points of attention
Mass balance – a difference in the quantity of raw materials (fruit, vegetables or in-shell nuts) and the quantity of final products	Kg	Can by-products/waste be reused (for example, shells or pits for burning or low-grade products like animal feed or for further processing (pastes, oils, etc.)?) Can better equipment produce larger quantities of final product?
Energy consumption	L diesel m ³ natural gas steam kWh	Can energy from fossil fuels be, at least partially, substituted with 'green' energy (solar, biodiesel, wind ...)? Can available energy be used more efficiently (with energy-efficient equipment, better insulation, faster operations, re-use of heat ...)
Water consumption	m ³	Can water be recycled/reused? Can steam and evaporated water from fruit be reused?
Waste	kg	Can waste be recycled? Can the amount of waste be lowered? Can you shorten distance to the point of waste disposal?

Raw materials	Co2 emission per kg produced fruit, vegetables, nuts	Can you make average assessments in communication with your suppliers/farmers?
Ingredients	Co2 emission and production method	Can your ingredients be purchased from nearer? Can ingredients be produced as organic?
Processing aids	Co2 emission and type	Can producers estimate environmental impact to produce the processing aids? (enzymes, stabilisers, absorbents ...)
Packaging materials	Kg, energy consumption CO2 footprint per kg/piece	Can you estimate CO2 emissions to produce one unit of packaging? Can you shorten the distance of purchasing packaging materials? Can you purchase sustainably certified packaging materials? Are packaging materials recyclable or biodegradable? Can pallets be reused or recycled?
Transport	Co2 emission per km Type of fuel used	Can you use sea freight? Can you use a transportation service that measures CO2 emissions and can offer best routes to reduce CO2 footprint?

It is important to estimate the environmental footprint before and after processing: before processing, the environmental footprint relates to agricultural operations, after processing it relates to transport, further processing and retail operations.

Figure 3: Example of the environmental footprint of canned pineapples, for 1000 cans, CO2e/kg



Source: Henry Lamotte Food, adapted by Autentika Global

Henry Lamotte Food advice for SMEs when calculating carbon emissions

1. Try to be as specific as possible. That means gathering primary data that stems from your supply chain. Quality data on scope-3 emissions are valuable to other stakeholders downstream in the value chain, especially retailers who want to communicate their product carbon footprints to their consumers.
2. Be prepared to make compromises. Making use of secondary data whenever it is impossible to gather primary data is legitimate if stated explicitly.

3. Be aware of the shortcomings of the calculations. E.g. lack of (or missing) data, the static nature of a one-time calculation, calculations should always be perceived as estimates only, etc.
4. Work with trusted consulting companies. Get help with the calculation whenever possible. The calculation should conform with a common standard like the GHG Protocol. External expertise is helpful, especially for SMEs where resources are at times limited. If the expertise of the consulting partner is to be trusted, this should also lend more credibility to the calculation. Having a third party verify your calculations would be the icing on the cake.
5. Calculation is only the first step. Adding value to mitigating the effects of the climate crisis begins with knowing our impact on the climate. The goal of calculating our carbon emissions should always be accompanied by measures to reduce them wherever possible, especially within our sphere of influence.

Tips:

Book demonstration for a [tool to calculate gas emissions for food companies](#) to see the practical applications for your company. This tool, Terrascope, was developed by Olam, the global leading processor of cashew nuts. The same company also developed the sustainable sourcing platform AtSource, which includes an [environmental footprint calculator](#).

Follow the [Agriculture Guidance Protocol](#) to measure specific greenhouse gas emissions for fresh fruit, vegetables and nuts before they reach your processing facility. Along with this global guidance, there is a specific guidance developed for Ethiopia.

Watch [Greenhouse Gas Protocol training](#) free of charge to estimate your company's greenhouse gas emissions.

Use some of the available databases, like [CarbonCloud](#) or [FoodFootprint](#), as a starting point to calculate your environmental impact. At present, the most complete and free-of-charge database containing environmental impact data may be the French [Agribalise database](#). You can also use that database as a basis to estimate the carbon footprint of final products, but agricultural data are limited only to French agriculture. If you want to consider commercial tools, a nice example is [HowGood](#), specifically developed for food companies.

4. Monitor green innovations for inspiration on reducing your environmental impact

There are many emerging technologies that can improve the efficient use of resources in the fruit, vegetable and nut processing industry. Many of them can provide energy and water savings while boosting productivity and water quality. Figure 5 below presents a comparison of different processing technologies based on the work of Italian scientists in the juice processing industry. Some of these innovative technologies are already being used in fruit processing, so you can explore them in detail by contacting the companies that use them.

Figure 4: Energy cost estimations for different technologies without heat recovery, in kJ/kg



Source: [Springer Link](#) (study by Giuseppe Vignali, Mario Gozzi, Massimiliano Pelacci & Roberta Stefanini), graph adapted by Autentika Global

It is important to select green innovations based on real industry experience. For example, it is easy to conclude that non-thermal approaches are most energy-efficient. However, some innovative technologies (like pressure change or pulsed light radiations) are still in the testing phase and not yet used by industrial food processors.

Sometimes energy savings can be achieved with the existing technology but also with equipment adjustments. A good example is the [continuous nut roaster](#), which saves energy up to 4 times compared to other roasters.

Along with improving energy efficiency and water management, many innovations relevant to the sector involve the utilisation of by-products. The range of solutions is wide. Some interesting examples are [new bioplastic packaging material](#) made of olive oil waste and the use of [orange peel in lamp designs](#).

Tips:

Search the Solarimpulse Foundation's [solutions to fight climate change](#) database to find green inspiration relevant for your production. Click on 'Food and Agriculture', then filter results 'by application' according to your interest.

Check the [best practices toolkit](#) of the EU-funded SwitchMed initiative to find innovative solutions for saving water, energy and materials. Under 'sector', select food and beverages, then under 'subsector' select 'Processing and preserving of fruit and vegetables'.

Check the [innovation platform](#) InnoFoodAfrica to cooperate on innovative solutions for green production and processing practices.

5. Comply with the green legislative requirements to be competitive on the European market

Some of the most relevant European laws and legislation related to environmental sustainability are incorporated into the [European Green Deal](#) (EGD). The EGD is a set of policies whose final aim is to lead Europe to climate neutrality by 2050. Climate neutrality means reaching a balance between GHG emissions and removals, which is expected to limit global warming. This state is known as zero emissions and can be reached if global warming is limited to 1.5°C.

The EGD includes legislative changes, with a timetable outlining when they will be enacted. The policies included in the Green Deal are presented in Figure 6 below. The most relevant policies for the fruit, vegetables and nut processing sector are the Farm to Fork Strategy, Biodiversity Strategy and Circular Economy plan. Specific legislations related to those strategies relevant for fruit, vegetable and nut processing and trade are summarised in the sections below.

Figure 5: European Green Deal aspects



Source: IFU Sustainability Report, October 2022

Organic food regulation

One of the most popular ways to go green is to produce and offer organic products. Organic food production is strongly supported by the EGD. One of the aims of the Farm to Fork Strategy is to increase the share of organic agricultural land in Europe to 25% by 2030. The consumption of imported organic food is also increasing.

If you are producing and exporting organic products to Europe, you should be aware of important new rules that may influence your business. The [New EU organic regulation](#) entered into force on 1 January 2022. The implementation of the new regulation can have a significant impact on exporters from non-European countries.

Countries that have an [agreement on trade in organic products](#) with the EU will have to make changes in their organic rules in order to be recognised as compliant with the new European organic regulation.

The new organic regulation is accompanied by more than 20 secondary acts that regulate the production, control and trade of organic products in more detail. Some of the important acts to be aware of are detailed [organic production rules](#), the [list of authorised substances](#) for plant protection and the [rules on documentation requirements](#) for imports.

Main changes implemented by the new organic regulation, relevant for the processed fruit and vegetables sector:

- Compliance with EU organic rules – In the previous organic regulation, the organic standard in your country could be recognised as an equivalent to the standard in Europe but some flexibility was allowed. In the new regulation flexibility is not allowed, and you will have to fully comply with the new rules. If you want to export organic products to Europe, you will have to submit certificates of the [authorised control body](#) starting January 2025.
- New rules for group certification are established – In many developing countries, processors are organising farmers and funding certification for them to facilitate the supply chain. In line with the new regulation, most farmer groups will have to be organised as new legal entities. Also, the rules for group certification are much more detailed in the new regulation. An important cost implication for your business is that a minimum of 2% sampling of products from group members will be obligatory each year.
- A longer [list of authorised substances](#) for use in processing of organic products, such as additives and processing aids.
- Flavourings must be at least 95% natural extracts.
- A list of authorised substances for disinfection and cleaning is expected to be published in 2023.

Sustainability labelling of food products

There are more than 200 environmental labels active in Europe, but not all of them are reliable in measuring environmental impact. Some companies even use non-reliable labels on purpose to give a false impression to consumers about their positive environmental impact. This unethical behaviour is called 'greenwashing'. In order to prevent greenwashing and to harmonise voluntary green claims, the European Commission published [a proposal for a Directive on Green Claims](#) in March 2023.

According to the new proposal, a green claim must be based on recognised scientific evidence, use accurate information, and take into account relevant international standards. Some of the most popular labels are [Eco Score](#) (based on Product Environmental Footprint (PEF) data), [Eco Impact](#) (methodology not published), [Planet Score](#) (a complex algorithm including PEF), [Enviro Score](#) (based on PEF) and [Foundation Earth](#) (based on PEF with some deviations).

The product environmental footprint methodology proposed by the EU is not fully adjusted to food production. In order to make methodology more suitable for food, the European Commission is working on a framework law on 'sustainable food systems' (including sustainability labelling). This piece of legislation is planned for Q3 2023.

To use only credible claims when promoting your company and products, you need to go through the following steps:

1. Create databases to trace greenhouse gasses along the entire supply chain;
2. Identify emission hotspots;
3. Decide on targets you want to reach on identified hotspots;
4. Think about possible solutions for decreasing gas emissions in identified hotspots.

Figure 6: Possible environmental labelling formats



Source: French Ecological Transition Agency (ADEME)

Deforestation-free products

In November 2022, the EU published a legislative proposal for a regulation on [deforestation-free products](#) (PDF). The new regulation will guarantee that cattle, wood, palm oil, soy, cocoa and coffee and their derivatives exported from the EU no longer contribute to deforestation or forest degradation. It asks companies to collect precise geographical information on the land where their sourced commodities were grown so that these commodities can be checked for compliance.

The new regulation is expected to be formally adopted in 2023. Once the regulation is in force, large companies and operators will have 18 months to implement the new rules, and micro and small companies will have 24 months and other specific provisions.

Sustainable Corporate Governance

In 2022, the EU proposed the [Corporate Sustainability Due Diligence Directive](#), aiming to endorse greater corporate responsibility and sustainability standards. The new proposal requires certain large companies to adopt a plan to ensure that their business strategy is compatible with limiting global warming to 1.5°C, in line with the Paris Agreement. Although small companies are not explicitly included in the proposal, the directive states that the due diligence obligation 'will apply to the company's value chains'.

Packaging and the Packaging Waste Directive

In November 2022, the European Commission made a proposal for a [revision of EU legislation on Packaging and Packaging Waste](#). The current directive will be changed to a regulation and set new targets for packaging collection, packaging recycling and packaging waste reduction. The main aim of the directive is that all packaging in the EU 'is reusable or recyclable in an economically viable way by 2030'. This is a practical implication for suppliers from non-European countries, as this aim includes all packaging that enters the EU.

Another proposal for a revision relates to the [rules on food contact materials](#). A revised regulation is currently scheduled for Q2 2023. New rules are set to improve food safety, ensure citizens' health and reduce the environmental footprint of the sector.

Sustainable use of pesticides

The European Commission has adopted a proposal for a new regulation on the [Sustainable Use of Plant Protection Products](#) (PDF). The Farm to Fork strategy aims to reduce the use and risk of chemical pesticides by 50% by 2030. New measures will ensure the use of Integrated Pest Management. This is an environmentally friendly pest control system that focuses on pest prevention and prioritises alternative pest control methods, with chemical pesticides used only as a last resort.

Tips:

Perform strict and regular controls on pesticide residues for your organic products. Due to a lack of compliance with European organic legislation, there will be increased control of some imported products in 2023. Organically processed fruit, vegetables and edible nuts to be additionally controlled include candied ginger (from China), dates (from Tunisia), hazelnuts (from Turkey), pomegranate juice (from Turkey) and frozen strawberries (from Turkey).

Read the [training materials on the new organic regulation](#) (by Alliance for Product Quality in Africa project) to prepare for the new rules on time.

Read the short guide on [Product Environmental Footprint methods](#) (PDF) to understand the steps you should take to measure your environmental impact and reliably label your products.

Base your sustainability claims on reliable data and approved measuring methods. Do not call your

company 'carbon-neutral' if this isn't based on verifiable data.

Check [Frequently Asked Questions on Organic Rules](#) to understand the specific issues relevant for your production and processing operations.

Read the CBI study about the [EU Green Deal impact](#) on your business.

6. Incorporate green principles in your code of conduct

Developing and noting down your sustainability principles and objectives is important for improving your sustainability performance. To enhance sustainability not only for your company but also for the whole supply chain, you could also set standards for your suppliers and subcontractors. Your Code of Conduct should be based on the specific company characteristics, and can include objectives related to the following aspects:

- Reducing energy use and improving energy efficiency in your processing operations
- Increasing the use of renewable energy sources
- Improving logistics efficiency
- Improving water efficiency
- Using environmental footprint methodology to measure and reduce your environmental impact
- Increasing the use of renewable and recyclable packaging materials
- Reducing waste in processing operations
- Supporting farmers in the implementation of sustainable farming methods
- Protecting/enhancing biodiversity
- Preventing deforestation
- Encouraging the use of sustainable certification schemes along your supply chain (e.g. for farmers, packaging material suppliers and transport companies)

Tips:

Use the OECD-FAO [Guidance for Responsible Agricultural Supply Chains](#) to incorporate green principles into your Code of Conduct. In chapter 2 you will find a template related to environmental protection and the sustainable use of natural resources.

Include aspects of the [ISO 14040 standard](#) in your Code of Conduct.

7. Find funds, investors and partners that can help you become more green

There are many sustainability initiatives and projects where you can find funds or partners for a greener transition. Some of the projects are funded by international and European organisations and implemented internationally, while some projects are focused on specific countries or regions. If you are new to EU-funded projects, a good starting point is to [find partners](#) for your project implementation.

Among the most well-known European funds focused on environmental and climate action is the [LIFE programme](#). It provides grants for environmental projects through yearly calls for proposals. Unlike many programmes that focus on public bodies only, this programme also provides funds to companies from non-European countries. For the food sector, eligible projects are often related to reduction of carbon emissions. To

see project examples, you can use the [advanced search tool](#) and, among the other criteria, select 'food and beverages' under 'Select themes'.

Some environmental funding projects are focused on specific regions only. For example, the UK-funded [ASEAN Low Carbon Energy Programme](#) operates in Indonesia, Malaysia, the Philippines, Thailand and Vietnam. There are many [green partnerships](#) and initiatives between Africa and Europe.

The European Union has established a specific fund for [sustainable organic innovation](#). This project (worth €11 million) will be used to support innovative solutions of small-scale processors, sustainable packaging and supply distribution models. As this project supports the multi-actor approach, it is also open for companies from non-European countries. If you are a processor of fruits, vegetables or nuts, you can apply as a partner for the projects. The deadline for applications is 22 February 2024.

Tips:

Read about EU [funding opportunities](#) related to agriculture and food to explore the possibilities for your green investment plans.

Watch [how to submit a proposal for European projects](#) using the application tool.

Use the [search tool of African Food Changemakers](#) to find funding opportunities in the food and agriculture sector in Africa.

[Autentika Global](#) carried out this study on behalf of CBI.

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