PALM Project
Responsible Agriculture

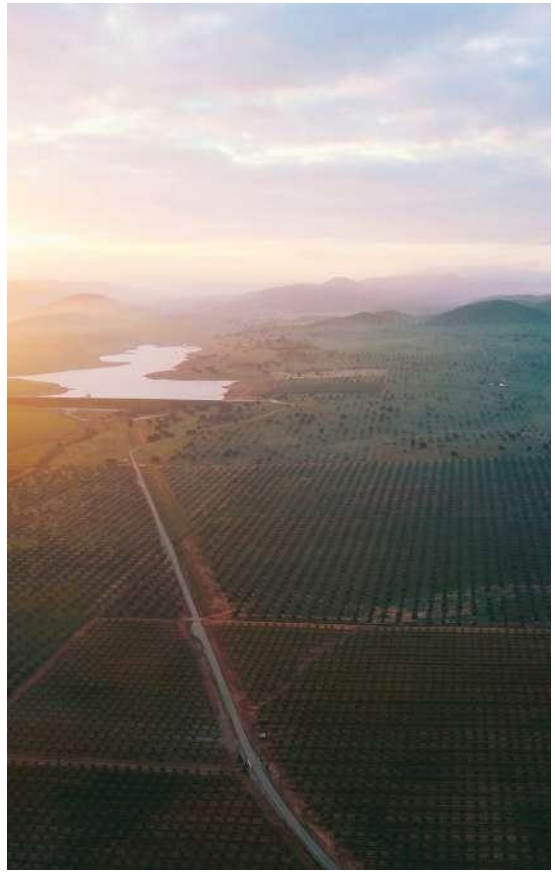
BORGES
AGRICULTURAL & INDUSTRIAL
Nuts

Responsible Agriculture

Years of experience and knowledge of the land have allowed us to create our own view of how we understand and see the future, thus allowing us to apply continuous improvements in our activities **to guarantee the purchase and supply of sustainably produced raw materials**.

One of the main pillars of the Borges Agricultural & Industrial Nuts agricultural project involves the application of **responsible and sustainable criteria in our daily activities**. We therefore add to and take on the goals of the United Nations Food and Agriculture Organization when defining the direction and the challenges the sector should follow:

- Sustainable agriculture must ensure **global food security** and at the same time promote healthy ecosystems and support the **sustainable management of land, water and natural resources**.
- In being sustainable, agriculture must meet the needs of present and future generations of its products and services, while ensuring **profitability, environmental health and social and economic equity**.
- Environmental protection, system resilience and resource efficiency must necessarily be **improved to achieve the global transition to sustainable food and agriculture.**



Borges Agricultural & Industrial Nuts

A comprehensive view of soil, water, and agricultural practices

Soil management and fight against climate change

Read on

Precision farming and water management

Read on

Water footprint

Read on

GLOBAL GAP

Read on

Renewable energies

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Mediterranean varieties

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Biodiversity

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Circular economy

Read on

1/ Soil management and fight against climate change

Soil management

Retaining CO2 in the soil and combating erosion and land degradation **is critical for a sustainable agriculture that aims to preserve a scarce commodity like land for future generations**. At BAIN we work to add to this with different measures that are already common practice in our daily management:

- **Minimum tillage** in all our plantations.
- **Planting cover crops** to increase the content of organic matter in the surface layer of the soil, to favour biodiversity and minimize compacting problems.
- **We provide organic amendments** to increase the organic matter content in the soil, which allow us to improve its structure.
- **We make calcium carbonate amendments** to improve the soil structure and avoid problems associated with acid soils, in order to facilitate water infiltration and to help reduce erosion and efficiencpercolationy in water use.
- We carry out **levelling, water outlets, drainage and cleaning of drains** to direct, channel and collect run-off waters and to minimize erosion and/or asphyxiation problems that can be produced by episodes of rain when the rainfall is greater than the water-saturated soil or soils' infiltration capacity.

Plant cover on farms. Cantillana Farm (Badajoz).

2/ Precision farming and water management

Precision farming can play an important role in the **fight against climate change** insofar as it allows us greater efficiency in the use of resources.

In this sense, we are assessing the best future solution in **remote detection applied to images from satellites and nanosatellites** with high spatial resolution and Unmanned Aerial Vehicles applied to precision agriculture.

The first goal we set ourselves is to calculate the weekly evapotranspiration of each farm, to monitor the water and nutrient status of the soil and the plant and thereby **adapt the watering and fertilisation to the needs of the vegetative cycle at all times**.

- The use of very **low-flow drip irrigation systems** allows us to supply the water according to the soil's infiltration capacity to avoid problems of water logging and run-off.
- The **amount of water to be supplied with the irrigation is calculated each week** from the forecast evapotranspiration (evaporated water and water transpired by the plants), which are closely linked to the weather forecast (temperature and wind).
- This amount of water is also adjusted with a coefficient that **includes the crop's specific monthly needs**.
- We also use new precision farming technologies in the form of **sensors such as flow meters, humidity probes at different depths** of the soil or suction probes to extract representative samples of the nutrients in solution available for plant absorption.

2/ Precision farming and water management

The use of these new technologies allows us to:

Check effectiveness and efficiency in the fertilisation:

- We must make sure that we provide the nutrients at the right point of the irrigation cycle to prevent the nutrients dissolved in the water from being drawn into the deeper layers of the soil inaccessible to the plant roots.
- We can adjust the amount of nutrients according to the concentration available in the root absorption zone.

Check the efficiency in the use of water

When the humidity probe, at a greater depth, indicates the presence of water, we must adjust the irrigation (shorten the irrigation time or irrigate by pulses) **to avoid water losses** due to percolation and **loss of nutrients due to leaching**.

3/ Water footprint

Sustainable agriculture implies responsible, **integrated management of water resources**, which means that plantation water efficiency is key. Being aware of this resource's direct implication on our activity, we work continuously to improve water efficiency. In this sense, all the almond plantations of the PALM Project have the **latest technology in localized irrigation** and we use very low-flow drips to adjust it to the land's infiltration capacity.

We are active members of the EsAgua platform (www.EsAgua.es) and we have undertaken **to calculate the water footprint of all our plantations**, starting with Finca El Carquí in Guadix (Granada) in 21/22.

4/ GLOBAL GAP

We believe that certifying our activity from sustainability is crucial to give our consumers the guarantees they need.

This is why we are **committed to certifying all our farms as Global GAP**, the international standard that accredits good agricultural practices.

For now, we have already certified El Carquí in Granada, Cantillana, Cuartillo, Casarente and Benavides in Badajoz and Machakos and Palheta in Portugal.

Total hectares of the PALM Project certified with GLOBAL GAP

655.90 hectares certified

72% of the farms (*)

*There are farms in the PALM Project that are still in the growth phase and therefore still unable to be certified, because they do not have production.

Almond tree planting on the Cantillana Farm (Badajoz)

Almond tree planting on the Cantillana Farm (Badajoz)

5/ Renewable energies

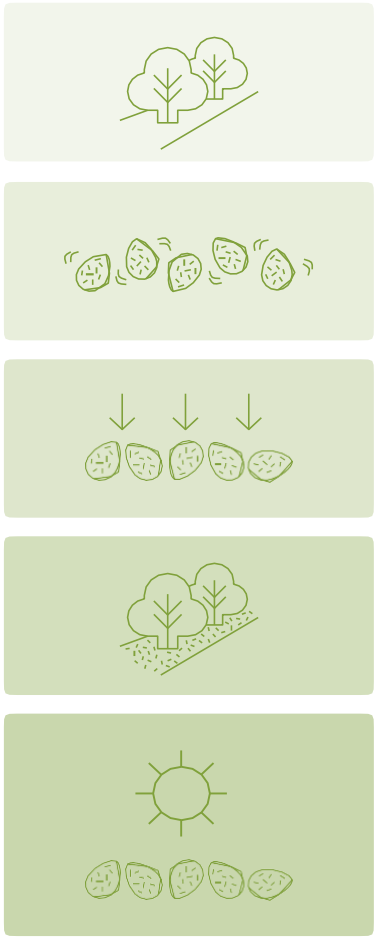
Renewable energy sources help mitigate the impact of agricultural activity on issues such as the pumping of water for irrigation in drying processes.

- In this sense, we are in the process of replacing all the pumping of irrigation water that consume diesel oil or electricity with **photovoltaic pumping**.

- We are currently drying our production of walnuts and pistachios **using biomass** largely from our own farms (walnut shell, almond shell, etc.).

- During the 2019 and 2020 harvest we first confirmed the sun-drying of the almonds: **Sun Dried Almonds**.

Sun-drying almonds



6/ Mediterranean varieties

In order to optimize sustainable production in an efficient way, we have to invest in species and varieties genetically **adapted at the local level**, offering a greater probability of withstanding the extreme droughts and inclement weather caused by global warming.

We are focusing on **Mediterranean almond varieties**, to give greater backing to the proximity, with the hard shell and a higher content of unsaturated fats and oleic acid.

- By using **self-fertile varieties** we minimize the problems of pollination if the weather conditions are not favourable for pollinating insects' activity.
- With the late flowering, we try to **minimise the risks** of late freezing during flowering.
- With the **hard shell**, we try to minimise the problems of insects and produce a zero-pesticide waste product, something that we are already able to certify in our almond production.
- With a **higher content of unsaturated fats and oleic acid**, we provide society with an even healthier product.

Zero pesticide waste product

Almond tree planting on the Cantillana Farm (Badajoz)

7/ Biodiversity

The bees, our best ally

We cannot forget this special relationship between our activity and bees (whose **population has decreased by 37% in Europe** in recent years).

Bees and almond trees form a virtuous circle and establish an **almost symbiotic relationship,** since they drag pollen from one flower to another and contribute to increasing the production of almond tree plantations.

The almond tree flower is one of the first flowers of spring and is characterized by a high pollen content, which contributes very significantly to the reproduction and multiplication of the hive.

When we put out the hives, they may contain 35,000 to 40,000 bees and a few days after the almond tree pollination is over, **the hive population can reach the figure of 60,000 bees**.

When we manage to have all the almond tree area of the PALM Project in production, **we will reach a population of almost 180 million bees**.

8/ Circular economy

By-products and waste management

We are very close to closing the circle in our agricultural activity:

- **Pruning remains** are traditionally burned to avoid possible sources of inoculum of pests and diseases. In the last 2 years we have already distributed them through an agreement with the company ENCE, **which will use them for cellulose manufacture**.

- **Fall the leaves in deciduous trees**: they decompose in the soil and are incorporated as organic matter with the labouring.

- **Mowing/Clearing of the plant cover**: the remains decompose in the soil and are incorporated as organic matter.

- **Skin or Mesocarp of dried fruit**: we are already composting the almond skin to put it back into the soil in the form of organic manure.

- The **agrochemical containers** are processed through a specialised waste manager (SIGFITO, etc.) and the waste from the agricultural machinery workshop is also managed through specialised managers.

1,500 tons of almond skin for animal feeding

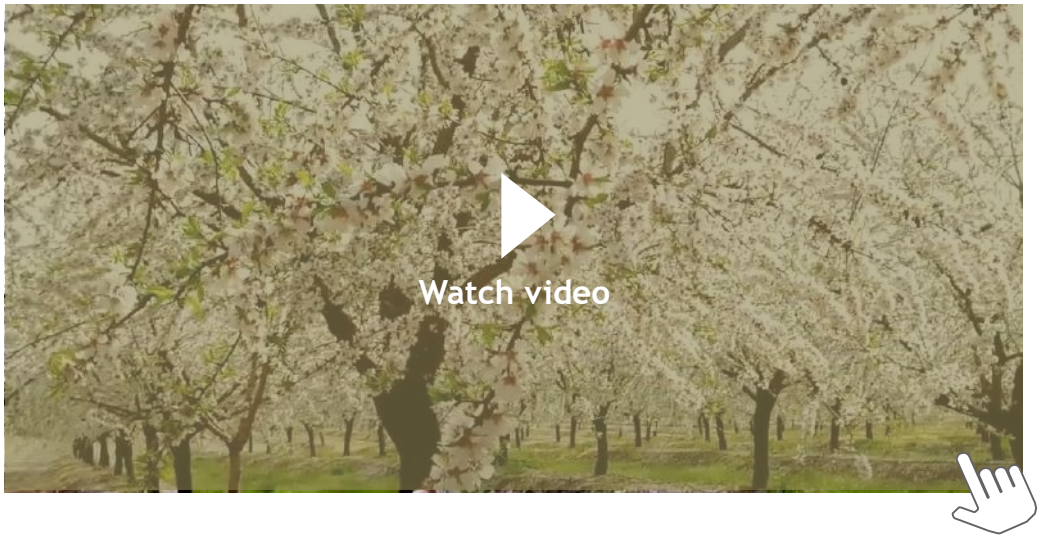
12,000 tons of almond shell for biomass

Composting tests with almond skin

Pruning remains for subsequent manufacture of cellulose

Bee farmers at Machados (Portugal)

PALM Project almond tree blossoming in Extremadura and Portugal, 2021



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