WORLDWIDE fruit

Water Stewardship Case Studies

Peru Case Study 1:

Beta

Photo: supplied by Beta

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BLUE NORTH

THINKING. FUTURE

Report compiled by Carina Wessels

Blue North Sustainability

1. Context

Worldwide Fruit Limited (WFL) are investing in Water Stewardship across their supply base. As part of their commitment, they are presenting a series of Water Stewardship case studies from supplying farms. The aim of these case studies is to raise awareness of the challenges that WFL's growers deal with on a daily basis. Water management challenges and the solutions implemented to overcome them are explored, but we will also see how growers are driving ongoing good management of water resources. Apart from water, case studies will also look at current sustainability strategies implemented and plans for improving sustainability into the future.

This case study presents Beta, who is based in Peru and has been a strategic partner and avocado supplier for WFL for the past 6 years.

beta
complejo agroindustrial

2. Summary

Beta holds a significant position within Peru's agriculture sector, with a focus on the cultivation and export of fresh produce worldwide. Their operations span over 5 000 hectares across three key regions, Piura, Lambayeque (Olmos Project), and Ica, cultivating diverse crops while maintaining rigorous quality standards. Their crop portfolio includes asparagus, blueberries, grapes, avocados, citrus, and pomegranates. In the face of significant water scarcity challenges, particularly in the Olmos Project, Lambayeque Region, as well as the Ica Region, where avocados are a core crop, Beta has displayed dedication to responsible water stewardship. They employ a range of innovative strategies, such as advanced irrigation systems and active engagement in water governance, to ensure efficient water use and contribute to water resource sustainability. Beta's commitment extends beyond water management, as they also prioritise soil health through dedicated programmes, emphasising the importance of moisture retention and efficient nutrient cycling. Integrated Pest Management practices underscore their dedication to environmentally responsible agriculture, with a focus on minimising pesticide use. Biodiversity conservation is a cornerstone of Beta's environmental responsibility. Through assessments, monitoring, and conservation plans, they strive to protect local flora and fauna while actively engaging in projects to restore and enhance biodiversity. Furthermore, Beta is working on a Carbon Footprint Reduction Plan, demonstrating their commitment to reducing their carbon emissions. Beta is setting a compelling example, not only by ensuring the quality of their produce, but also by contributing positively to the environment and the communities they operate in.

3. About Beta

Beta is a prominent player in the Peruvian agriculture sector, specialising in the production and export of fresh produce to global markets. Since their establishment in 1994, Beta has been fostering sustainable practices and contributing to the development of the communities it operates in. With over 5 000 hectares (ha) of land spread across the departments of Piura, Lambayeque and Ica, Beta cultivates a diverse range of crops (Table 1).

As one of the largest fresh produce grower-exporters in South America, Beta has earned a reputation for delivering high-quality products to over 40 export markets. To achieve this, the company maintains 42 farms and nine packhouses (WFL is supplied with avocados from two of these farms and packhouses (Olmos and Chicago)). Care and dedication go into growing and packing their products, ensuring they meet stringent quality standards for global distribution. The company also places great emphasis on creating a positive and fulfilling work environment for their approximately 10 000 employees.

Emphasising their commitment to sustainability and continuous improvement, Beta envisions being recognised as a sustainable and leading company in the agro-industrial sector. With a focus on innovation, research, and ongoing development, Beta strives to remain at the forefront of the industry, contributing positively to both environmental and community well-being.

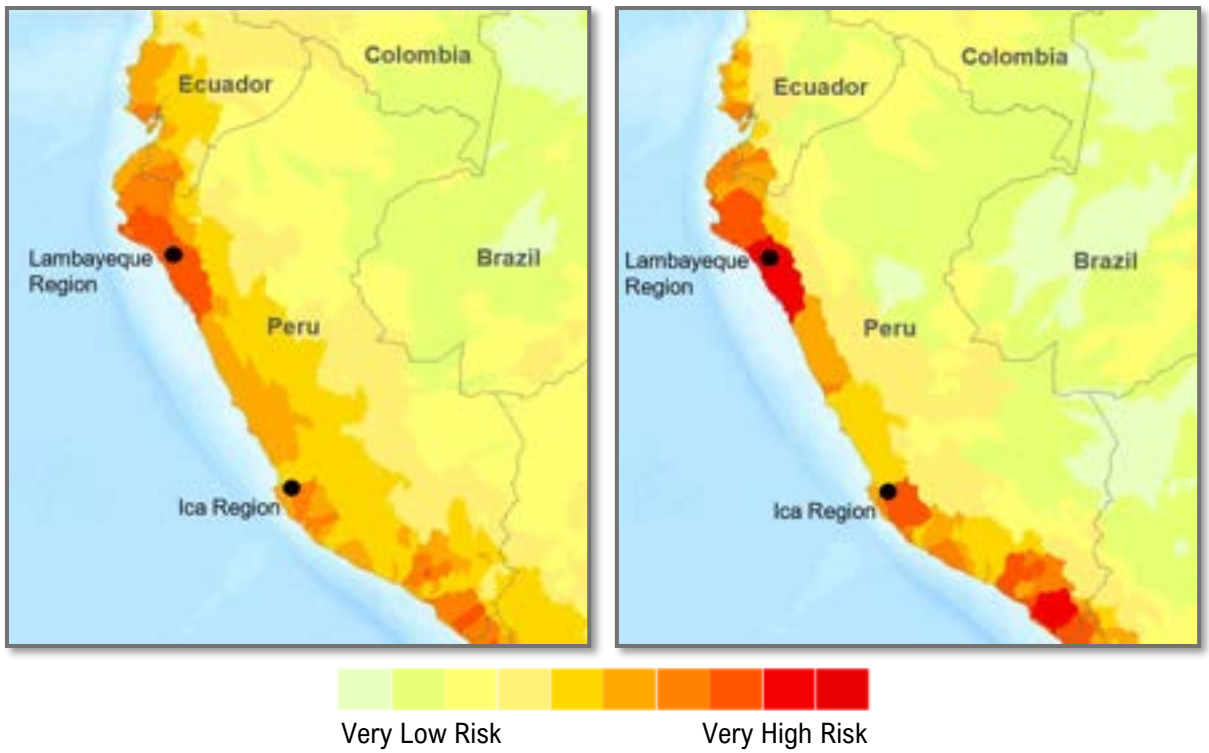
Table 1: The commodities Beta produces, the regions each commodity are grown in, and the number of cultivated hectares Beta produces of each commodity, as well as the average product water footprint of each commodity. All water footprint values are global averages and does not represent Beta's water footprint. All values were obtained from: Mekonnen, M.M. and Hoekstra, A.Y. (2010) The green, blue and grey water footprint of crops and derived crop products, Value of Water Research Report Series No. 47, UNESCO-IHE, Delft, the Netherlands. Water Footprint Network

			Average Product Water Footprint (l/kg or m^3/ton)			
Commodity	**Regions grown**	**Cultivated hectares**	**Green**	**Blue**	**Grey**	**Total**
Asparagus	Lambayeque & Ica	2 500	1 524	119	507	2 150
Avocados	Lambayeque & Ica	650	849	283	849	1981
Blueberries	Lambayeque & Ica	1 000	341	334	170	845
Grapes	Piura & Ica	870	425	97	87	608
Pomegranate	Ica	61	Not available			

The water footprint of a product is the total volume of freshwater (blue, green, and grey) directly and indirectly consumed in the production of a product across its entire supply chain. Blue water footprint refers to the amount of surface water and groundwater required (evaporated or used directly) to produce an item. Green water footprint refers to the amount of rainwater required (evaporated or used directly) to make an item. Grey water footprint refers to the amount of fresh water required to dilute pollutants and make water pure enough to meet water quality standards.

4. WWF Water Risk Filter: water risks for Peru

The Olmos Project, in the Lambayeque Region, as well as the Ica Region, where Beta produces avocados, are particularly at risk, as can be seen in the WWF Water Risk Filter results below.



Physical risk (left) and water scarcity risk (right) results maps of Peru. Beta's avocado growing locations in the Olmos Project, Lambayeque Region, as well as the Ica Region are indicated with black dots. Ninety plus percentage of avocados supplied to WFL are grown in the Olmos Project, in the Lambayeque Region.

The physical risk layer represents both natural and human-induced conditions of river basins. It is based on global data and comprises four risk categories covering different aspects of physical risks: water scarcity, flooding, water quality, and ecosystem services status. Therefore, physical risks consider if water is too little, too much, unfit for use, as well as the ecological health of surrounding ecosystems and associated ecosystem services.

Water scarcity refers to the physical abundance or lack of freshwater resources, which significantly impact business such as production/supply chain disruption, higher operating costs, and growth constraints. Water scarcity is human-driven, and can be aggravated by natural conditions (e.g., aridity, drought periods), and it is generally calculated as a function of the volume of water use/demand relative to the volume of water available in a given area.

5. The current water situation in Peru and in Beta's avocado growing regions

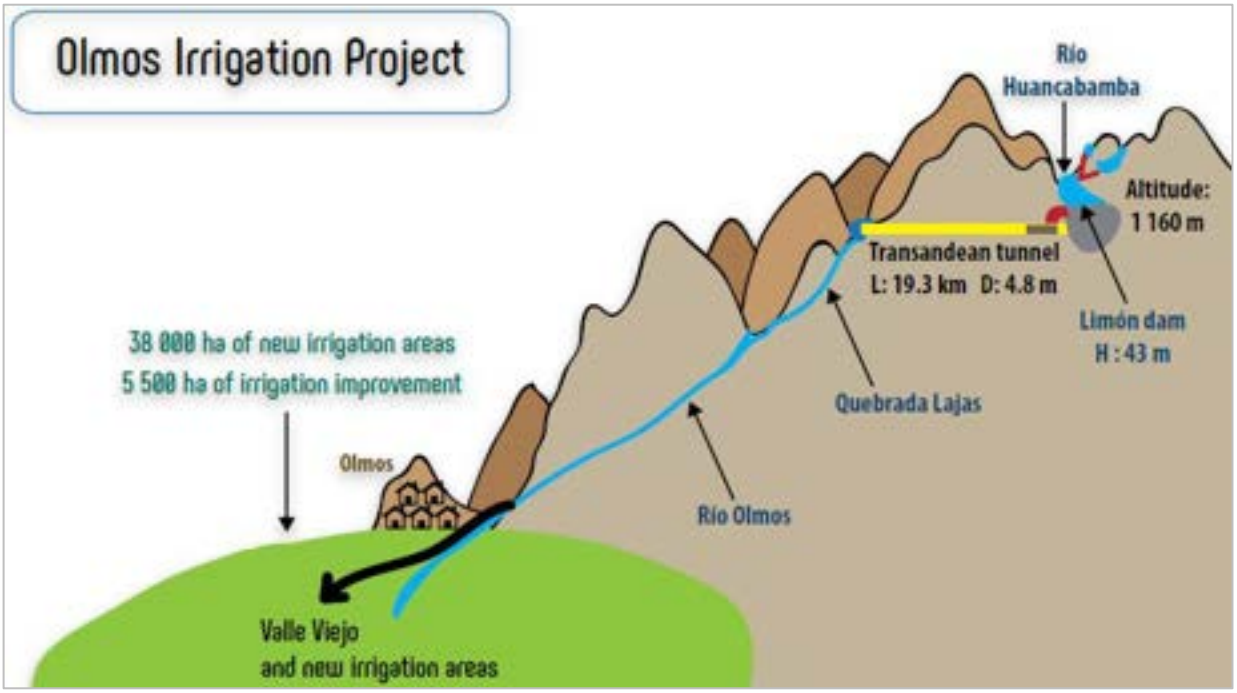
Peru possesses abundant water resources, boasting 106 river basins and an average annual rainfall of 1 738 mm. Nevertheless, a stark contrast exists in the dry Pacific basin, where most of the nation's agriculture occurs, facing a significant lack of precipitation. This situation has worsened over the years, with water scarcity intensifying due to climate change and diminishing glacial ice. Despite housing 70% of the world's tropical glaciers, Peru has witnessed a 43% reduction in glacial coverage since 1970. This deglaciation process, along with rising temperatures, has increased the risk of floods. Predictions indicate a potential 20% decrease in rainfall in the Andes by 2030, exacerbating water shortages. Rising temperatures also heighten evapotranspiration in coastal regions, diminishing surface water and groundwater. A 2019 World Bank report evaluating drought risk in Peru concluded that current strategies to manage drought – dams, reservoirs, and storage under the capital city (Lima) – will be inadequate by as early as 2030.

In early March 2023, a "coastal El Niño" started near Peru with sea-surface temperatures rising to more than 2.3°C above normal, twice as much as in other parts of the Pacific. It coincided with the first cyclone in 40 years, Cyclone Yaku. These phenomena brought with it heavy rains and floods in the north of the country, with the greatest impact in Tumbes, Lambayeque, and Piura. In July 2023, the World Meteorological Organisation announced the onset of a global El Niño for the first time in seven years, a warming in the Pacific that affects global weather. El Niño typically brings increased heatwaves, droughts, wildfires, and floods to different regions. In Peru and Ecuador, El Niño brings heavy rains and flooding.

5.1 Olmos Project, Lambayeque Region

The Lambayeque Region, situated in the north of the country, produces the second most avocados of the major growing regions in Peru. The region went from 2 382 ha of avocado plantations in 2017, to 7 538 ha in 2021. Most avocados are produced in the Olmos area, which was set up in a desert zone with very poor soil and completely virgin in terms of agriculture due to high aridity (20 mm mean annual rainfall). However, climate conditions are highly favourable for growing avocados, with temperatures between 13°C to 34°C. It was thus made possible to harness this high climate potential by the development of a hyper-tech and completely original cropping system, as well as major private investment in largescale water projects.

One such project is the Olmos Irrigation Project which was initiated in 2014 and cost ±£475 million. The project now irrigates 38 000 ha, and 5 500 ha belonging to traditional communities. It is supplied by the abundant runoff from the River Huancabamba. Water is captured from the eastern slope of the Andes mountain range at the Limón dam, it then crosses the Andes via an almost twenty kilometres long tunnel to the western side, emerging at the Palo Verde dam, which is the start point of an underground network supplying the area (image next page). Ninety plus percentage of avocados supplied to WFL are grown in the Olmos Project Region.



The Olmos Irrigation Project, made possible by largescale private investments, supplying water to 38 000 ha of irrigated agricultural areas and 5 500 ha belonging to traditional communities. Source: The Hass Avocado Board, 2019 (www.hassavocadoboard.com).

However, challenges persist in the Olmos zone, notably water availability limitations and the influence of extreme temperatures. Approximately 30% of the surface area remains undeveloped as the water quotas of 10 000 m³/ha allocated by the National Water Authority (ANA) fall short of meeting the demands of the majority of crops in the region The estimated requirement of avocados in the region is 14 000 – 15 000 m³/ha. Producers overcome the short fall by using micro-irrigation systems (minimum of 12 000 m³/ha with the most economic production system) and combining mulching and ground cover techniques to promote deep rooting and soil water retention. The company also owns approximately 800 ha of undeveloped land to supply the planted areas (approximately 1 200 ha) with water. During periods of lower water demand (January to August), water surpluses are stored in large-capacity reservoirs (total capacity of 400 000 m³) and used when water demand is high. Furthermore, there is a lack of understanding regarding the sustainability of the current system.

5.2 Ica Region

With temperate temperatures varying between 15 to 32°C throughout the year, the Ica Region produces the fourth most avocados of the major growing regions in Peru, and went from 3 209 ha in 2017, to 5 428 ha of avocados in 2021. However, WFL do not currently receive avocados from the Ica Region.

In the Ica Region, the Ica River Integrated Basin stands as one of the most crucial water resource systems for the Peruvian economy. Situated in the southwest of the Pacific coast, the basin predominantly caters to agricultural needs, accounting for 90% of total water usage. Despite its significance, the efficient management of water resources has

struggled to keep pace with the region's current economic growth. In response, regional water authorities have concentrated on infrastructure investments to enhance water supply. Nevertheless, groundwater resources continue to be exploited, often at unsustainable rates.

In the Ica Valley, groundwater takes precedence over surface water, particularly for irrigating agro-export crops. The groundwater table has progressively receded from 30 to 180 meters below ground level, with an increasing risk of saline intrusion from the nearby coast. According to ANA, if the depletion of the groundwater table continues at its present rate, the lifespan of current wells in Ica will likely only last between 5 to 11 years.

Photo supplied by Beta

6. Beta's response to the challenges in their avocado growing regions

Beta acknowledges the challenges in their avocado-growing regions and recognises the significance of water resources for sustainable agriculture and food security. They closely monitor weather stations and reports from entities like the National Water Authority (ANA) and National Meteorology and Hydrology Service of Peru (SENAMHI) to assess hydrological basin levels and the effect of El Niño. Fortunately, the availability of water in the Olmos project has not been changed by the presence of the current El Niño, however, it is estimated that the effects thereof will only reach its peak at the end of 2023 or the beginning of 2024. This information informs their annual water consumption plan, supported by tools like capacitance probes for efficient water utilisation. They also adhere to various criteria, including legal compliance for water sources and extraction rates, monitoring of water consumption, and employing best practices in water management. Active participation in water governance, through membership in associations like Pro Olmos, enable them to drive initiatives that enhance water use efficiency.

To actively participate in sustainable water resource management activities in the areas where their production sites are located, they have identified the most important stakeholders. These stakeholders include the ANA, Local Water Authority (ALA), water user boards, and communities near their production sites. They keep their stakeholders informed about their water management performance through audits based on Global G.A.P, NURTURE Module (Tesco), GRASP, SPRING, and SMETA standards. Beta specifically obtained SPRING certification in 2022 and will recertify in 2023. SPRING (The Sustainable Program for Irrigation and Groundwater Use) incorporates a wide range of criteria to assess whether sustainable water management is being carried out.

Beta's certifications and social initiatives:

Beta embraces the dynamic nature of agriculture on the Peruvian coast, realising that continuous adaptation to climatic changes is necessary. This drives them to remain at the forefront of crop management and resource development initiatives. In their commitment to water stewardship and environmental sustainability, Beta has implemented, or is in the process of implementing, several water stewardship and other environmental initiatives across their operations. Some of these initiatives are discussed in more detail in the following sections.

6.1 Water consumption

Beta relies primarily on groundwater as the main water supply source for its operations. At their agricultural farms, groundwater is extracted from underground wells, with the exception of the Olmos site (2 000 ha), which receives surface water from the H2Olmos irrigation project. Licenses are in place for the use of both water sources.

To monitor water consumption, hydrometers are installed at the point of extraction and also at water outlets in the fields. The irrigation and hydraulic department conducts direct measurements at each site to collect data accurately.

All farms utilise drip irrigation systems, delivering precise amounts of water to the crops, ensuring optimal efficiency. The quality of water resources is consistently monitored from extraction to distribution in the fields, further promoting responsible water use.

All Beta's farms utilise drip irrigation systems, delivering precise amounts of water to the crops, ensuring optimal efficiency. Photos: supplied by Beta.

For Beta's packhouses, except for their Olmos Packhouse, water is sourced from their own groundwater wells with usage licenses. The Olmos Packhouse relies on surface water provided by the H2Olmos irrigation project.

Beta also have industrial wastewater treatment plants at their city of Ica (Ica Region) and Jayanca (Lambayeque Region) facilities, which allow them to reuse treated industrial wastewater for irrigation. The treated wastewater from the Ica packhouse is incorporated into the irrigation system of Ica farms for fruit crops, while the Jayanca packhouse's treated wastewater is reused for gardens, trees, and the surrounding areas.

Jayanca (Lambayeque Region) water holding reservoirs, irrigation and fertigation system, and Osmosis System. Photo: supplied by Beta.

Litardo Packhouse, Chincha (Ica Region). Photos: supplied by Beta

Panoramic view of the Olmos farm and packhouse (Lambayeque Region). The Olmos site (2 000 ha), receives surface water from the H2Olmos irrigation project. Photo: supplied by Beta.

Beta have a risk analysis in place that identifies potential impacts from water resource extraction to wastewater generation. This action plan encompasses all farms and outlines objectives and compliance goals, detailing measures for sustainable water resource management. Beta conducts regular annual reviews and evaluations of the implemented actions across all farms and packhouses to ensure continuous progress towards responsible water usage.

6.2 Soil moisture and health

Beta values soil as a critical resource susceptible to potential impacts such as erosion, nutrient loss, and compaction. To ensure the sustainable management of this essential resource, Beta has devised a Soil Sustainability Plan which sets forth guidelines to standardise proper soil management practices across all their farms. The plan includes measures to improve soil properties, fertility, water availability, and optimise nutrient cycles and conservation techniques.

Key actions undertaken on Beta's farms include the use of drip irrigation systems, minimising water loss and preventing nutrient leaching into soil. They make use of mulch (leaves and pruning remains) in the avocado orchards to maintain soil moisture, prevent weed growth, and revitalise the soil. Beta's goal is to achieve 100% incorporation of mulch into the soil of all their farms.

In addition, Beta implements ground cover techniques in some of their other crops to improve water retention and soil health, and prevent erosion due to wind and water.

In 2022, Beta conducted soil analyses on all of their farms, enabling the implementation of tailored programs to suit specific soil characteristics. Future endeavours planned up until 2028 include monitoring water infiltration in the soil based on irrigation hours for each farm. Moreover, Beta plans to explore the incorporation of biological microorganisms into the soil to enhance soil activity, fertility, and contribute to effective pest control. Through these proactive measures and ongoing research, Beta ensures the health and sustainability of the soil on their farms.

6.3 Integrated Pest Management

Beta recognises the significance of Integrated Pest Management (IPM) as a fundamental aspect of their agricultural management. As part of their commitment to responsible practices, Beta has initiated the process of certification with the Rainforest Alliance's IPM & Pesticide Approach. This approach is based on adoption of IPM practices, where pesticides are used only as a last resort and reduction in pesticide use is demonstrated. When pesticides are used, all pesticide management safety measures and occupational health requirements should be implemented. Only registered products can be used, and if pesticides from the risk mitigation list are used, additional risk mitigation measures should be implemented.

Beta also only uses chemical products that align with SENASA (The National Service for Agrifood Health and Quality) regulations and their clients' preferences, but always as a last resort and minimising negative effects on biological controllers.

6.4 Biodiversity conservation

Beta demonstrates a strong commitment to environmental responsibility through its Biodiversity Policy, which includes Biodiversity Conservation Plans across all farms. These plans focus on safeguarding flora and fauna, prioritising native species revegetation, and preserving biodiversity areas.

Beta continuously conducts assessments and monitoring of wild flora and fauna on their farms to maintain an inventory of species diversity and track changes in populations over time. In 2022, biological evaluations were conducted at their Ica, Lambayeque, Chincha, Paracas, and Piura sites. External evaluators performed these assessments and provided a biological evaluation report and a conservation plan. In their 2022 annual sustainability report, Beta included a list of these species that are on the IUCN Red List and national conservation lists, whose habitats are located in areas affected by their operations.

Table 2: Number of species on the IUCN Red List and national conservation lists whose habitats are in areas affected by Beta's operations. Source: Beta 2022 annual sustainability report

	Classification		Number of species in each region							Total
			Jayanca	Olmos I	Olmos II	Piura	Ica	Paracas	Chinca	
Flora	Critically endangered	CR	3	4	4	4	0	0	0	15
	Endangered	EN	0	0	0	0	0	0	1	1
	Vulnerable	VU	3	3	3	3	0	0	0	12
	Near threatened	NT	2	2	2	2	1	0	1	10
	Least concern	LC	0	0	0	0	8	1	23	32
	Total		8	9	9	9	9	1	25	70
Fauna	Critically endangered	CR	0	0	0	0	0	0	0	0
	Endangered	EN	1	1	1	2	0	0	0	5
	Vulnerable	VU	2	2	2	0	0	0	0	6
	Near threatened	NT	2	4	4	2	0	0	0	12
	Least concern	LC	0	8	8	0	23	17	27	83
	Total		5	15	15	4	23	17	27	106

In 2022, Beta initiated a Biological Conservation Project in the Lamabayeque Region for 100 ha of dry forest in the community of San Francisco de Asís through an agreement between themselves, the community, and the NGO Huarango Nature. The project aims to maintain and restore ecosystem services (including water conservation, carbon capture, and pollination). Activities will include improving access, establishing a nursery, collecting seeds of native plants, and monitoring and evaluating existing biodiversity. Currently, baseline data is being processed for the project. Additionally, the process will generate income for the community.

Huarango Nature specialise in the production of native plants for conservation, reforestation, restoration, landscaping and carbon capture projects. Photos: www.huarangonature.org

6.5 Carbon footprint calculations and reduction plan

Beta calculated their organisational carbon footprint for the first time in 2022, resulting in 44 914,56 tCO_2eq for scope 1 and 2 emissions. This calculation was conducted by the company ECOAMET. Since they only obtained their first carbon footprint calculation in 2022, they are currently developing a Carbon Footprint Reduction Plan, and their strategies to reduce their greenhouse gas emissions will be presented in late 2023. Proposed carbon reduction plans and projects include:

- A solid waste audit to propose measures aimed at circular economy.
- Alternatives for disposal of Beta's organic waste such as composting.
- An energy audit to establish measures to reduce electricity consumption.
- Using the Biological Conservation Project (mentioned above) to offset some of Beta's carbon emissions.

7. Conclusion

As a pioneering player in the Peruvian agriculture sector, Beta's proactive measures and ongoing initiatives exemplify their role as a leader in driving positive change in the agroindustrial sector, contributing to a more sustainable future for both their business and the communities they serve.

Beta is committed to complying with good agricultural practices to ensure responsible management of their water and other natural resources. They have implemented a sustainable development policy that is integrated into their practices and programmes. This includes good production practices, circular economy principles, an environmental management system, plans to measure and reduce their carbon footprint, and strategies to conserve biodiversity in external areas. This not only ensures the quality of their produce but also sets a positive example for others in the industry.

Photo supplied by Beta