



Section 1: Industry Overview



Testing times deepen long term focus on demand creation

Australia's macadamia industry has grown exponentially in its relatively short history to become a world leader in terms of product quality and marketing. Macadamias, which first evolved in the rainforests of Australia's north-east coast 60 million years ago, are now the fourth largest Australian horticultural export and second-biggest nut export.

As a native species, macadamia trees are naturally adapted to the harsh Australian climate, and this trait is proving invaluable as supercharged weather patterns present extreme and rapid climatic variations.

However, it's no secret that 2023 will go down as one of our industry's most challenging seasons. While growers have rebounded from multiple natural disasters in recent years to deliver a quality crop, this was accompanied by the softest farm gate prices in more than a decade, triggered by the convergence of a shifting global production landscape, supply growth in 2022 exceeding all forecasts, and the delayed impact of pandemic-related demand slowdowns across hospitality, travel and ingredient sectors.

While current conditions are challenging, the longer term outlook is brighter. There is enormous headroom to grow demand for Australian macadamias, especially considering only 2% of the world's population is eating the recommended daily intake of nuts. The ingredient market offers substantial opportunities, and with increased macadamia production comes greater surety of long-term supply, so food and beverage manufacturers can feel confident to invest in the development of new products containing macadamias.

Throughout the trials of 2023, these long term opportunities have strengthened the industry's resolve to continue investing in global demand creation. It is one of the beacons that will light the way towards more stable times once again. This commitment has delivered some of the year's milestone events both domestically and in core and emerging markets internationally.

A bold domestic PR campaign involving a tongue-incheek challenge to iconic global brand McDonald's attracted plenty of media attention while raising awareness of Australia as the original home of macadamias. The campaign centrepiece was a billboard positioned outside a McDonald's store in Sydney, claiming that macadamias are the 'Original Macas Down Under for over 60 million years.'

Earlier in the year, the inaugural Australia Nut Forum took place in Japan and South Korea. Co-hosted by the Australian macadamia industry, the trade event welcomed guests from a wide variety of South Korean and Japanese food and trading organisations, introducing them to the Australian nut industry, its production status, all the latest information, and future prospects.

Important connections were forged in India as part of our long-term market development strategy. This dynamic market holds exciting opportunities, especially now that the Australia-India Economic Cooperation and Trade Agreement has entered into force, which will see the tariff on Australian macadamias eliminated by 2028. In October the first ever Australian Macadamia Festival took place in Mumbai, which saw Australian grown macadamias' taste and versatility showcased to chefs, influencers, trading partners and consumers as part of the industry's first major activity in this market.

A major Australian consumer campaign ended the year on a high note. Appearing online, outdoor and in print media, new recipes helped consumers discover a host of new ways to 'Make It Special' with macadamias. Showing how they can elevate any sweet or savoury recipe, meal or occasion, the multi-faceted campaign also featured macadamia grower and Olympic swimming champion Giaan Rooney as a brand ambassador, while esteemed chef Matt Moran hosted a macadamia masterclass for media at his Sydney restaurant. This was our largest domestic campaign to date and helped to drive sales by reinforcing macadamias' position as healthy, delicious and native to Australia.



Australia's macadamia industry in numbers



\$104m

Farm-gate value*

\$2.5m

Annual investment in Marketing

\$5m

Annual investment in Research & Development

\$300m

Export value

48,675t

5-year average in-shell production at 3.5% moisture (52,060 @ 10%)

41,000ha

Under planting (24,600ha bearing)

800

Growers

56%

Production processed and sold as kernel

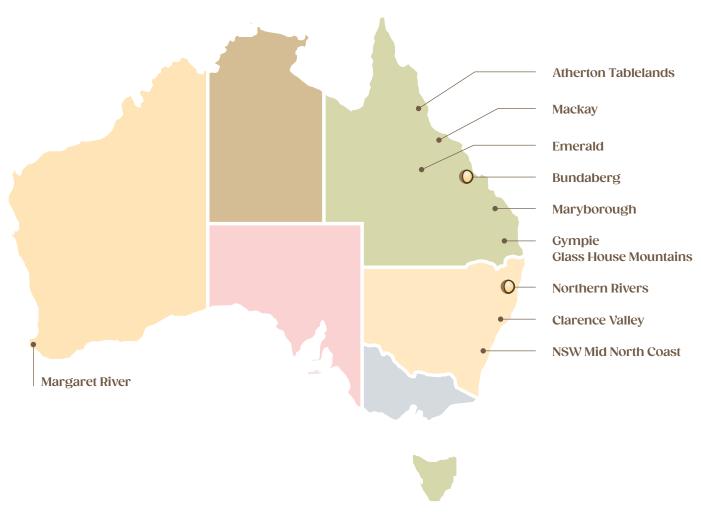
75%

Production exported

^{*}Calculated on the nut-in-shell average price per kg multiplied by the crop volume.

Major Australian growing regions

Macadamias are grown along the eastern coast of Australia from the NSW Mid North Coast in the south to the Atherton Tablelands in the north. Collectively Bundaberg and the Northern Rivers region produce around 80% of the Australian crop.



Production by region data:

Northern Rivers	NSW Mid North Coast / Clarence Valley	South East QLD	Gympie	Bundaberg	QLD Tropical
12,819	1,427	4,737	3,041	25,483	834
27%	3%	10%	6%	53%	2%

Table 1: Australian macadamia production by growing region for 2023 season. Tonnes in shell, 3.5% moisture content. **Source**: Australian Macadamia Handlers Association

Australia is home to approximately 800 macadamia growers and has over 40,000 hectares planted. Australia produced a crop of 48,400 tonnes in-shell at 3.5% moisture content for the 2023 season (March 2022 - February 2023).

2023 was a challenging year for growers and did not unfold as initially anticipated due to lower than expected yields and a softening of the farm gate price. Despite this, the final crop volume was only around 8% lower than the record crop of the previous year, and kernel quality was excellent.

Season, weather conditions and productivity

The macadamia growing season can be broken down into three main periods:

August - September: Flowering begins

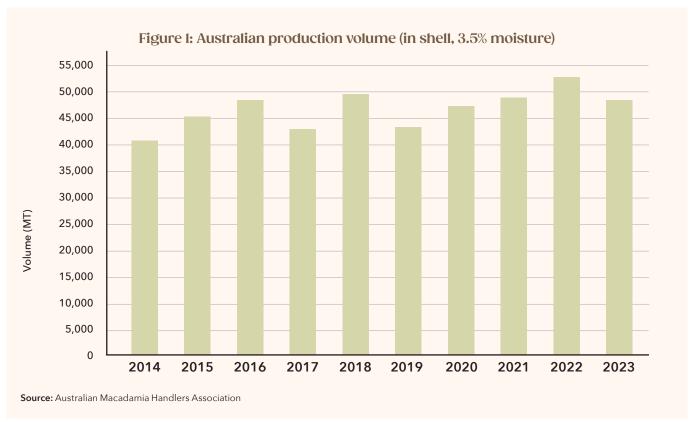
October - January: Nuts begin to form in clusters, their shells harden, and oil rapidly accumulates

February - August: Mature nuts fall to the ground and are harvested with purpose-built harvesting machinery

The 2023 season commenced with excellent soil moisture following 2022's very wet conditions. While this set the scene for a good crop, some regions still experienced wet and overcast conditions and sub-optimal sunlight levels. This triggered a slightly later season with smaller nuts and lower recovery rates, however kernel quality was excellent.

Most growing regions experienced dry conditions throughout 2023, with some regions that were in flood in 2022 drought-declared by the end of 2023. The drier conditions have fortunately limited the impact of pests and diseases that thrive during wetter seasons. Looking forward, August/September 2023 was one of the best flowering seasons on record which lays a strong foundation for the 2024 crop.





Industry insights



Australian macadamia industry value

The Australian macadamia industry achieved a farm-gate value* of \$104M in 2023, continuing a recent downward trend from a high of \$334M in 2020. 75% of the 2023 crop was exported at a value of AUD \$300M.

The Australian macadamia industry experienced unprecedented market conditions in 2023, due primarily to the combination of reduced global demand and a rapidly increasing global supply. It was a very difficult year, with the softest farm gate prices in more than a decade.

 $[\]hbox{``Farm-gate value calculated on the nut-in-shell average price per\,kg multiplied by the crop volume.}$



Australian nut industry

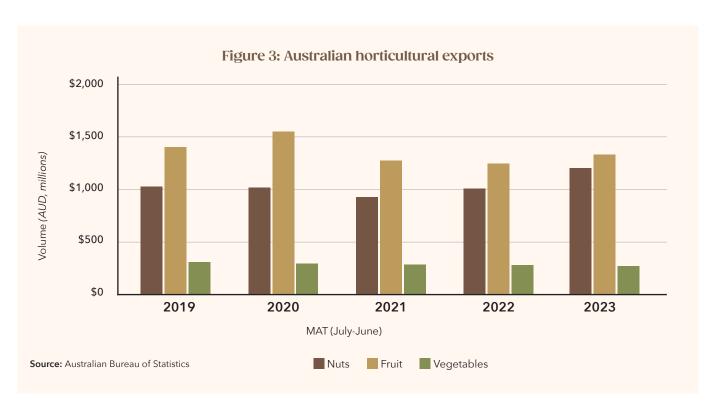
Nuts play a vital role in Australia's horticultural export program, demonstrated by their export value of just over \$1 billion to 12 months to June 2023. Almonds and macadamias represent the vast majority of Australia's nut export value at 93%. Macadamias are Australia's fourth largest horticultural export, with almonds the largest.

Global tree nut production

World tree nut production has been trending upwards over the past decade. Total production in the 2022/23 season was 5.3 million metric tonnes. This was in line with the previous season, however, 2% below the record high of 5.4M MT in 2020/21. Between 2013/14 and 2022/23, tree nut production grew at an average rate of approximately 250,600 MT per year.

Almonds and walnuts were the largest crops in 2022/23, accounting for 27% and 22% of the global share, respectively, followed by cashews (20%), pistachios (14%), and hazelnuts (11%).

Source: INC Nuts & Dried Fruits Statistical Yearbook 2022/23





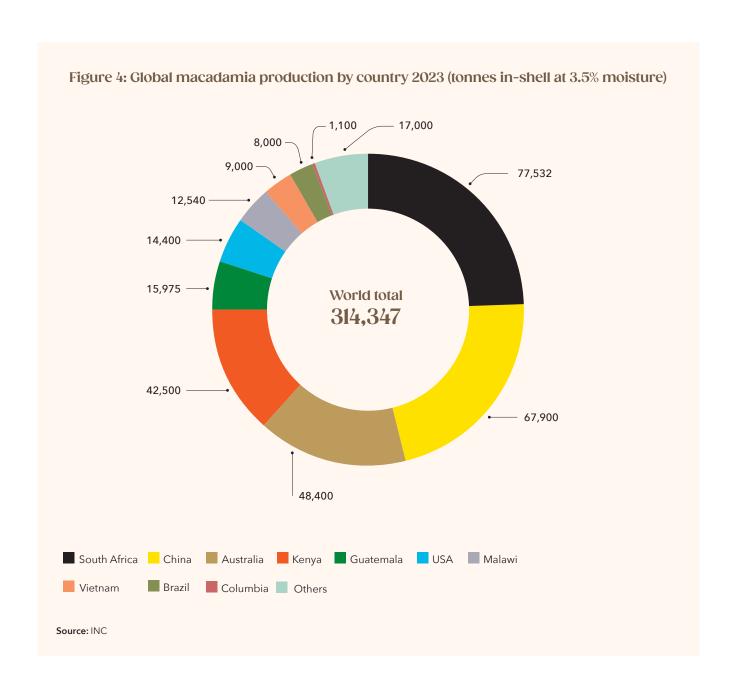
Global macadamia production

Macadamias represent less than 2% of global tree nut production. Global macadamia production is on the rise, with established growing regions continuing to expand their plantings and emerging regions expected to feature significantly in future global production.

In 2021 the World Macadamia Organisation (WMO) was created to stimulate overall demand for macadamias and support their premium position through global industry collaboration.

The WMO's 'Love Macadamia' consumer campaign is building awareness and understanding of macadamias with a focus on the USA, India and China, while its food industry marketing strategy encourages manufacturers to formulate using smaller ingredient styles, especially when supporting a healthy positioning.

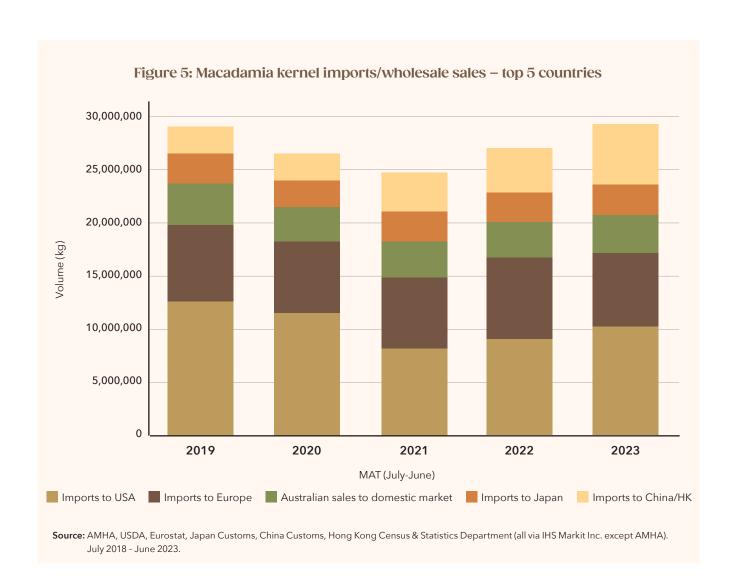
Production of macadamias is currently more evenly distributed than the other major tree nut varieties, with no single producer representing more than 30% of production. However, this has not made the supply of macadamias immune to the effect of major weather events. The world's largest producers are South Africa and Australia, followed by China and Kenya.



Macadamia kernel imports

Global demand for total macadamia kernel imports in the 12 months to June 2023 was up 8% on prior year, driven by strong sales in China and good improvements in USA and Australia. The Japan market remains fairly stable, while Europe experienced a decline.

Demand in the US market, while improving, remains at levels well below pre-Covid years. As the largest global market for macadamia kernel, the slow return to previous demand is driving increased price competition, particularly in the ingredient styles.



How macadamias meet today's consumer preferences

In an era where consumers are increasingly discerning about their food choices, factors such as functional health benefits, origin, sustainability credentials, versatility and of course taste weigh heavily on their decisions. Consumers love macadamias and recognise they're a premium plant-based product that is healthy, indulgent, tasty and versatile, with a unique ability to elevate any meal or product they're added to. Our Australian provenance story adds a powerful layer to our messaging, especially considering 82% of consumers say origin is important to them when purchasing macadamia nuts².



OVER 50% of consumers no.

of consumers nominated
Australia as one of their top 3
preferred macadamia origins.

Australia is viewed very favourably by consumers for its unique and diverse environment, stringent quality standards, healthy lifestyle and people who want to connect with and support one another.

Sources: Australian Macadamias qualitative consumer insights positioning research, FiftyFive5 research agency, June 2022 Discover Macadamias quantitative consumer insights research, Kantar research agency, December 2020





Leveraging the future: How macadamias align with emerging food trends

In 2023, the Australian macadamia industry released the findings from its latest macro food and beverage trends research. Conducted in conjunction with a panel of key opinion leaders from the international food industry, the research revealed 8 emerging macro trends that our experts predict will shape the world of food in the coming years, with all of them offering up opportunities for macadamias to play a role.



Multi-dimensional health

Health has been on consumers' radars for many years now, but the specifics of how it is driving their behaviour continue to evolve. This trend is predicted to see health reach new heights, as its meaning continues to manifest across markets and consumer knowledge keeps expanding.

MACADAMIA OPPORTUNITY:

Australian macadamias offer a host of powerful functional health benefits that can support both inner and outer health.



Rediscovering local

The pandemic and its supply chain issues forced us all to look inwards and rediscover what's in our own backyard. Consumers have amassed a new appreciation of what's available to them locally and this is being amplified by mainstream and social media.

MACADAMIA OPPORTUNITY:

Australian macadamias have a powerful origin story which can be leveraged on its own or by pairing with other native ingredients.



Conscious consumption

Consumers are showing a growing level of care and consideration for what they're eating and where it has come from. Amid a craving for transparency, provenance is being flagged on menus and on pack.

MACADAMIA OPPORTUNITY:

The story of how Australian macadamias are grown and (minimally) processed holds appeal for consumers.



With living costs surging, consumers are returning to their kitchens to create their own delicious and nourishing food.

MACADAMIA OPPORTUNITY:

Sharing simple but interesting ways to use Australian grown macadamias helps empower consumers in their



Focus on the climate crisis is intensifying and people are considering their individual impact more than ever and striving to eat more sustainably.

MACADAMIA OPPORTUNITY:

Australian grown macadamias are a versatile plantbased ingredient produced by an industry with a deep commitment to sustainable production and waste minimisation.



Technology has dramatically changed the way consumers see and access food, opening up unlimited, border-agnostic possibilities and creating a legion of new food influencers.

MACADAMIA OPPORTUNITY:

Influencer marketing has proven to be a powerful marketing tool in key and emerging markets, helping to amplify the benefits of macadamias and showing how they can be part of fast-moving food trends.



Future-proofed foods

Increasing macro-pressures, especially economic, are impacting food availability, and forcing consumers to rethink how they access and use the foods available to them. There's an emphasis on ingredients which can be used in multiple ways to make many different things, and ensuring you always have options.

MACADAMIA OPPORTUNITY:

Macadamias are a great example of an adaptive ingredient that can enhance a broad range of recipes and product formulations.



Complexity is being replaced by clarity as consumers reevaluate what is most important and seek a less 'noisy' life, and cleaner, simpler food.

MACADAMIA OPPORTUNITY:

The minimal processing and stringent food safety standards that Australian grown macadamias are subject to align with this emerging consumer need.

Health and macadamias

Consumers are more interested in health and wellbeing than ever, with most identifying eating well as one of the keys to optimising wellbeing.²⁰

The growing interest in understanding the specific functional benefits of foods is being accompanied by an appetite amongst consumers to pay more for products and ingredients which offer the benefits they are seeking.²¹ The body of evidence to support the role of nuts in living a long, healthy and happy life has grown substantially in recent years.

With the low-fat diet movement now a thing of the past and plant-based eating on the rise, nuts have become one of the most relevant foods for today's consumer - and macadamias are no exception. Enjoyed as a snack, as part of a main meal or applied as oil to the skin, macadamias offer a host of essential nutrients. They're also ideal as part of a Mediterranean or low FODMAP diet, as well as keto, paleo and vegan eating. Macadamias are the richest source of healthy monounsaturated fats of all tree nuts and are abundant in phytochemicals that support a healthy heart and brain as well as protein and fibre.

Heart health

Research shows that many consumers seek out foods that are rich in healthy fats in order to support heart health.²⁰ In 2019, a systematic literature review around nuts and heart health⁸ showed that eating nuts, including macadamias, every day is associated with improvements in several aspects of heart health.

- Macadamias and healthy cholesterol: Regular consumption of nuts like macadamias has been shown to improve the ratio of 'good' (HDL) and 'bad' (LDL) cholesterol. Macadamia nuts are a rich source of phytosterols natural, cholesterol-like substances found in many plant foods. Plant sterols can reduce cholesterol levels by being absorbed instead of some of the 'bad' (LDL) cholesterol, which results in reductions in blood cholesterol levels.⁹
- Macadamias and blood pressure: Macadamias contain the amino acid arginine, which acts as a precursor to the chemical messenger nitric oxide that causes blood vessels to dilate and remain elastic. This can reduce blood pressure among other benefits.¹⁰

Healthy weight

Eating a handful of macadamias every day can play a role in helping maintain a healthy body weight. They satisfy hunger and make us feel fuller for longer. While many people used to think the high fat content of nuts would lead to weight gain, we now know this is not the case. The PREDIMED Trial found eating nuts as part of a balanced diet resulted in a reduction in participants' waist circumferences.¹¹

In 2023, new research findings were released confirming that macadamia consumption does not lead to weight gain and may have other positive benefits on cardiometabolic risk factors for overweight and obese adults. Known as the MAC (Macadamia Nut Effects on Adiposity and Cardiovascular Risk Factors) study and published in The Journal of Nutritional Science²², it was a randomised crossover trial conducted by researchers from Loma Linda University in the USA. It analysed how macadamia consumption affects body weight, waist circumference and other cardiometabolic risk factors. The results showed that consumption of macadamias did not lead to changes in waist circumference, body mass or percentage of body fat.





Brain and mental health

Today's consumers place high value on foods that can support their brain health to help with overall mood and wellbeing.²⁰ The copper, magnesium and manganese in macadamias help maintain healthy neurotransmitters in the brain, while their palmitoleic acid forms an important component of the myelin sheath that insulates and protects nerve cells to allow electrical impulses to transmit efficiently around the whole body, including in the brain.¹² Macadamias contain vitamin B1 (thiamine) that is essential for the proper functioning of your nervous system. Having a healthy heart is linked to brain health¹⁴ and so the monounsaturated fats, vitamin E, antioxidants and other compounds in macadamias that are good for our heart will support our brain function too. Macadamias contain oleic acid (omega 9) which helps keep blood pressure low, reducing the risk of stroke. A recent research trial showed that people who ate nuts regularly had a lower risk of depression.¹⁸



Diabetes management and prevention

Macadamias are an ideal food for those with diabetes or raised blood glucose levels. Eaten on their own, they are a low-GI snack packed with healthy monounsaturated fats. They're also a perfect companion food to help lower the GI of carbohydrate-containing meals and snacks.¹³

- Good for blood sugar levels: containing only small amounts of carbohydrate, macadamias have a positive influence on blood glucose levels. The fat, protein and fibre they contain also helps lower the GI of a meal or snack that contains carbohydrates by slowing the digestion and therefore the release of glucose from carbohydrate-containing foods.¹³
- A diabetes-friendly choice: Nuts like macadamias also contain nutrients, fat, fibre and polyphenols that can help improve insulin function, meaning blood glucose levels don't rise as much after eating.
- Diabetes prevention: Eating nuts like macadamias can help with the prevention of type 2 diabetes. An analysis of multiple studies found eating 30g of nuts four times a week reduced the risk of developing type 2 diabetes by 13%.^{15,16,17}

Gut health

One of the top benefits consumers are now seeking from the food they choose is gut support to help with overall mood and wellbeing, and fibre to support digestion.²⁰ Just one handful of macadamia nuts contains 2g of dietary fibre, similar to a slice of wholemeal bread. Dietary fibre is important for bowel regularity. Nuts like macadamias also contain prebiotic fibre. This is fibre that is a fermentable food for your gut's natural bacteria and fungi (called microflora). When this prebiotic fibre is fermented by gut bacteria, short chain fatty acid gases are produced that are beneficial to the lining of the gut. This activity plays a role in the production of the 'happy hormone' serotonin as well as influencing hormones that affect weight management, appetite, blood sugar levels and the immune system. So by eating prebiotic fibre you are stimulating a healthy colony of gut bacteria to benefit your overall health.

HEALTH AND WELLBEING REFERENCE LIST

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Sustainability improvements shaping the future of Australian macadamia production

Innovative thinking and a collaborative spirit are the driving forces behind the Australian macadamia industry's desire to achieve consistent high-quality yields, and long-term sustainability.

And with the call for sustainable production growing louder every year, the responsibility to produce the world's best macadamias as eco-sensitively as possible is felt and shared by everyone from the largest operators in the processing sector right through to new growers navigating their first season.

"Australian macadamia growers are deeply committed to sustainable production and believe the actions they take on-farm today must benefit the environment and people in the future."

A deep commitment to sustainable farming

Australia is recognised internationally as a clean, green and reliable food producer. Australian macadamia growers are deeply committed to sustainable production and believe the actions they take on-farm today must benefit the environment and people in the future.

Feeling a true affinity for the land on which they farm, Australian macadamia growers take great care to develop and implement ecologically sensitive techniques to protect the natural environment. Our industry invests millions of dollars in research every year to ensure our practices are the world's best and that the natural resources on which our industry relies to grow this delicious wholefood are managed as efficiently as possible.

More Australian growers than ever are now actively monitoring and measuring their operation's sustainability practices, delivering the data and transparency that today's market demands.



Working with nature from the ground up

As growing and orchard management practices become more advanced, so too does understanding of the environment and how it is changing. Macadamia growers remain committed to conserving the natural resources on which their product relies, and now more than ever, are prioritising the protection of the water, soil, air, native vegetation and wildlife.

While growers have been challenged by a year of variable weather, soft farm-gate prices and rising input costs, it has fuelled a renewed focus on working with nature to consolidate orchard fundamentals.

- Soil health: By increasing soil carbon, mulch and organic matter on the ground to replicate a rainforest floor environment, growers are nurturing soils that take up and conserve water and creating a more resilient orchard floor that can stop evaporation and mediate soil temperature.
- Biodiversity: Planting grasses, brassicas and legumes between and around the macadamia trees increases the orchard's biodiversity, creating a harbour and food source for beneficial insects that provide a natural means of pest control, while encouraging natural pollinators.
- Canopy management: Sunlight is a natural enabler of a
 healthy crop and helps to maintain a balanced orchard
 ecosystem and growers are proactively managing the
 structure of their trees to increase the amount of light in
 the orchard.
- Great Barrier Reef protection: Growers in Queensland have made significant on-farm investments to enhance water quality as a Great Barrier Reef protection measure. 2023 saw regulations tighten further and this has seen many growers further embrace the use of natural orchard management practices, and improvements in vegetation around riparian zones.

Macadamia trees are largely grown in the locations where they naturally evolved more than 60 million years ago, meaning it is a crop that has naturally adapted to its environment. This natural advantage and inherent resilience coupled with the ongoing improvements growers are making will ensure the industry can continue to produce a high quality, consistent crop, particularly with the emerging El Niño weather pattern predicted to continue throughout 2024.



Answering the call for sustainable ingredients

The era of meeting demand at any cost is well and truly gone as businesses, governments and consumers across the globe grapple with the environmental impacts of their choices large and small.

In its 2023 Outlook on Sustainability¹, Mintel says rising CO2 emissions and coal consumption as well as the financial and humanitarian fallout of extreme weather events has delivered a reckoning for consumers, with more than 50% now saying their country is suffering climate change. As a result, sustainability is no longer a "premium, nice-to-have" for consumers; rather it's a very real issue that's "impacting their health and wallets."

Concerns over the environmental impacts of meat and dairy production are driving increased interest in plant-based alternatives and between 2021 and 2023, the proportion of consumers globally who reduced or limited the amount of meat and poultry they ate increased from 25% to 28% while for dairy products the proportion grew from 14% to 17%¹.

Manufacturers already understand the taste, texture, health, luxury and plant-based cues macadamias can add to products. Macadamias grown in Australia deliver powerful, research-backed sustainability credentials too, from water use efficiency and carbon sequestration to minimisation of carbon outputs, recycling of by-products and world's best biological control.



A framework for the future

In the globalised supply chain, consumers are showing an increasing interest in understanding more about where their food comes from and how products are produced. Similarly, supply chain companies and their shareholders, markets and investors are seeking evidence of high standards of product safety, workplace ethics and environmental care.

Hort Innovation has released the Australian-grown Horticulture Sustainability Framework, a guide for understanding and measuring the many elements of sustainability of Australian-grown horticultural production and setting goals for the future. The Australian macadamia industry has started using this to develop its own industry approach.



The Australian-grown horticulture sustainability framework provides a logical process to measure how Australian horticulture is tracking on key sustainability issues. With this information, Australian horticulture, its industries and businesses can:

- Measure and track the sustainability of their production systems
- Work towards safe, ethical and environmentally sustainable production practices
- Find simplified ways to gather or model data on the sustainability metrics of production systems to meet supply chain needs and reduce burden on individual growers
- Work together on common challenges across the sector
- Target research
- Tell their story of sustainable production
- Protect and grow access to investment and finance
- Strengthen relationships and transparency with stakeholders.

Mapping advances continue to prove invaluable

Significant effort has been invested in macadamia orchard mapping and it has proven to be a vital crisis management tool. Known as 'remote sensing', mapping is an agricultural tool that has been introduced to macadamia growing and it's playing a crucial role in better understanding crop forecasting, orchard health and productivity improvements. It's also an important futureproofing tool, helping to ensure resilience in the event of a biosecurity threat, and identifying and recording the locations of wild macadamia species.

When the 2019/2020 bushfires hit, the fires were mapped and then overlaid with macadamia maps, helping to identify those most at-risk orchards and manage the natural disaster as it unfolded.

In 2022, mapping of storm and flood damage helped to determine the extent of the damage and informed disaster response plans.

In 2023 a new R&D project commenced which is taking mapping to a more granular level . While previous mapping advances have determined the location of macadamia trees at a macro level, helping to identify fire, flood and biosecurity risks, the new project is identifying where specific macadamia varieties are located on a block by block basis. This is helping to determine locations that are vulnerable to particular pest and disease risks, as some cultivars are more susceptible than others.



Using R&D to drive ongoing improvement

Australia's macadamia industry leads the world in terms of on-farm research and development. More than three decades of commitment to R&D has laid the foundation for growers to develop practical solutions that ensure consistent supply of premium quality macadamias.

The industry invests over \$5 million in R&D annually through levy and other industry and research agency investments. Recent years have seen a surge in grower-led innovation as well, with many growers investing in their own trials and implementing innovative new practices on farm as a result. Adoption of new technology, enviro-monitoring and more efficient, targeted and precise irrigation scheduling are paving the way for continued long-term growth in Australian macadamia production.

These important investments will help to improve productivity while aligning with environmental stewardship and sustainable practices.

Several innovation projects were ongoing in 2023, including the Hort Frontiers-funded Tree Intensification initiative that aims to boost crop yield per hectare, advances in pollination, and a 20-year breeding program that is seeing trees bred for better yields, higher pest and disease resistance and more manageable canopies. This year saw greater uptake and planting of these new cultivars which are generally smaller, more efficient and prolific trees that will start to form a good crop 3-4 years after planting, rather than the 5-7 year juvenile phase that is typical of traditional cultivars.

Advances in pollination brought about by improved understanding of its importance and of which insects pollinate most effectively has resulted in cross-pollination becoming a significant consideration when planting new orchards. The Hort Frontiers Pollination Fund covers multiple crops including macadamias, and this has seen many growers adopting pollination services and redesigning their orchard landscapes to create a safe harbour for natural pollinators. Pollination contributes to greater yields and better kernel recovery, again proving that working with nature is often the best strategy.

2023 saw ongoing R&D investment in the following areas:

- Integrated pest management*
- Integrated disease management*
- Industry benchmarking which includes a sustainability pilot*
- Multiple water quality projects including reef certifications and marine estuary health

As mentioned above, a new mapping R&D project commenced in 2023.

*These research projects have been funded by Hort Innovation, using the macadamia research and development levy and contributions from the Australian Government. Hort Innovation is the grower owned, not-for-profit research and development corporation for Australian horticulture.

Serious about food safety and quality

Food safety is a top priority for Australia's macadamia industry. Its approach is underpinned by sophisticated production processes, generations of knowledge about quality on farm and in factory, a commitment to biological pest control, and Australia's reputation as a clean and green environment.

The Australian macadamia industry has rigorous food safety & quality standards, and testing protocols. Good agricultural practice (GAP) on farm underpins a quality and food safety focus that extends throughout the supply chain.

All processors are HACCP certified and most have additional quality management systems, to ensure compliance from orchard to end customer

This year has seen advances made in the traceability space to complement existing food safety practices. Increasingly sophisticated systems are being developed that will trace an Australian grown macadamia's precise origin, ultimately delivering quality improvements throughout the supply chain.

Australia's standing as the producer of premium quality macadamias is validated by the results of the Australian Government's National Residue Survey, a program that screens Australian crops for a range of chemical pesticides and environmental contaminants. In 2023 Australian macadamias achieved 100% compliance in the NRS for the 26th consecutive year - a record unmatched by any other Australian fresh product.

At a glance: the Australian macadamia industry's sustainability and productivity initiatives



Precision agriculture

Mapping tools, weather stations and soil moisture probes are informing orchard operations and helping to improve efficiency of water use on farm.



Integrated orchard management

Integrated management of canopy, orchard floor and drainage.

CANOPY

Light and ventilation in the orchard improves productivity but also supports biodiversity - the beneficial insects and birds that keep pests at bay thrive in these conditions.

ORCHARD FLOOR

Creating organically rich and healthy soil that is cover cropped and adequately moist.

DRAINAGE

Keeping precious soil where it's meant to be and keeping orchards resilient to adverse conditions.



Integrated pest and disease management

Combining a range of strategies including biological controls and cultural farm practices, IPDM continues to be a significant investment for the industry. By creating a pest suppressive landscape and monitoring and understanding pest lifecycles, growers can better discern when intervention is needed.



Biological control and diversity

Collaborative research examining biological control is currently being undertaken by multiple research agencies. This will build on the industry's use of naturally occurring organisms to control pests and disease. Orchards are now boasting more diversity than ever, with many growers establishing inter-rows in their orchards to create habitats for beneficial insects, native bees and other pollinators such as flies and beetles. This is delivering production benefits as well as a more sustainable way of growing.



Improved soil erosion management

Significant work has been undertaken to better mitigate soil erosion using whole farm planning and re-contouring that helps to balance nutrients, prevent nutrient run-off, and monitor and manage water quality. The use of cover crops plays an important role in this area, encouraging beneficial insects while retaining soil and moisture levels.



Revegetation and restoration of riparian zones

Riparian zones are extremely sensitive to any activity occurring in and around them, with careful management required to ensure no adverse impact on the waterways. The industry is restoring these precious zones and planting more vegetation to control erosion and create a naturally pest-suppressive landscape.



Increase in use of both European and native bees

Insect pollination by both managed and naturally occurring bees and other insects are beneficial to the crop.



Increased use of tree shakers

Many bearing orchards in Australia's largest growing region of Bundaberg have now adopted tree shaking technology and uptake is expanding to other regions too. Delivering improved harvest efficiency and quality by providing access to every single nut grown, tree shaking also provides the orchard with the chance to 'reset' by removing nuts that may otherwise support pests and diseases, and physiologically preparing the tree for the next season.



Nothing wasted

100% of the harvested nut is used, with nothing going to waste. The husk is used as mulch and compost and the shell is used for co-generation of electricity in macadamia processing plants. Biochar is the result of burning macadamia shells at a high temperature in a special, low oxygen environment. Used as a soil enhancer, it makes soils more fertile and stores carbon in the soil so it's not released as a greenhouse gas. Biochar production creates oil and gas by-products that can be used as fuel for renewable energy plants.



Breeding programs

Macadamias are part of some long term breeding programs that capitalise on the selection of natural favourable characteristics, not genetic modification. The MCT1 macadamia variety was produced following a long breeding history and testing in multiple regions. It has gone on to become one of the most sought-after varieties in the industry. The levy-funded breeding program has produced four elite varieties which are starting to be planted more widely. It is anticipated these could be game-changing for productivity.

Macadamia Conservation Trust

To secure the industry's future, it's important to preserve the past

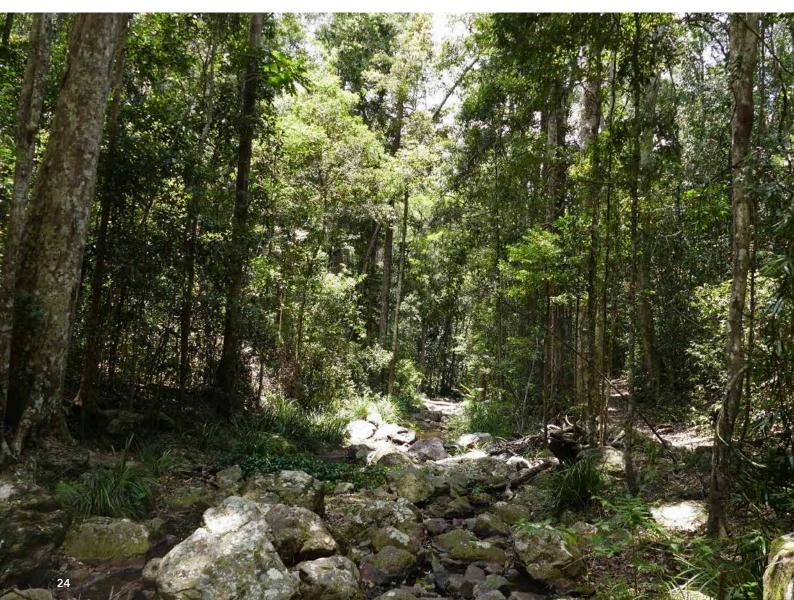
It's a little known fact that macadamias are native to Australia. They originated in the rainforests of the east coast 60 million years ago and Australia is the only country in the world where macadamias grow wild. From South Africa to Hawaii, China to Kenya, every single macadamia tree in the world can be traced back to the wild macadamia trees that still grow in the Australian rainforest.

Over millions of years macadamias retreated to favourable niches in the rainforests along the east coast from Gladstone in Queensland to northern New South Wales. But since European settlement, up to 90% of wild macadamias have been lost due to land clearing, with wildfires, grazing, weeds and climate change posing ongoing threats to their survival. There are four wild macadamia species, all of which are now classified as either vulnerable or critically endangered by the Australian government.

Conserving the genetic diversity found among all four endangered wild species plays an important role in securing the future of the macadamia industry. Wild macadamias offer a wealth of genetic diversity and many of the commercially grown macadamia cultivars the industry relies on today are from a very narrow genetic base. The DNA of wild macadamias holds significant untapped potential for development of the macadamia industry world-wide. It could hold the key to breeding commercial macadamia cultivars that are not only more productive, but better adapted to changing weather patterns, and emerging pests and diseases.

As the only home of wild macadamia trees, Australia is the guardian of this diversity. The Australian Macadamia Society (AMS) established the Macadamia Conservation Trust (MCT), a not-for-profit environmental organisation that works with community groups and government to conserve remaining wild macadamia trees in their native habitat for future generations.

Amama Creek on the Walk with Wild Macadamias in the Noosa Hinterland (Image courtesy of Ian McConachie)



"Conserving the genetic diversity found among all four endangered wild species plays an important role in securing the future of the macadamia industry."





Macadamia ternifolia - one of four wild macadamia species (images courtesy of MCT)

Australia now has a National Recovery Plan to guide protection of wild macadamias

2023 delivered a significant milestone in the form of a National Recovery Plan to guide the protection of Australia's precious but endangered wild macadamias.

The National Recovery Plan for Macadamia Species was made jointly by the Federal and Queensland State Governments and legislated in October under the Environment Protection and Biodiversity Conservation Act (https://www.legislation.gov.au/Details/F2023L01376). It outlines the current status of wild macadamias and what Australians need to do to protect this much-loved national icon.

The Plan reviews a decade of conservation activities and finds that three of the four species are still vulnerable to extinction and the Macadamia jansenii species is Critically Endangered (reclassified from Endangered under *Queensland's Nature Conservation Act* on 12 November 2021).

The first Recovery Plan for macadamias, adopted in 2012, was commissioned by Horticulture Australia Limited and the Australian Macadamia Society in recognition of the value of wild macadamias as genetic reservoirs for macadamia farmers both in Australia and internationally. The AMS is the only industry body in Australia to initiate a recovery plan for conservation of the wild species on which its industry is based.

Just as we rely on other countries to safeguard genetic resources for most of the food we eat, Australia has an obligation to look after the genetic resources of our native nut. Protecting wild macadamias and their habitat will conserve high value forests including endangered and critically endangered ecological communities.

The Macadamia Conservation Trust works with partners on the Macadamia Species Recovery Team to coordinate macadamia conservation activities across private, Local and State Government land. The National Recovery Plan for Macadamia Species is the guiding document for macadamia conservation and will be used to get the best possible outcome for Australia's wild macadamias.

Support for the Trust reflects how seriously the industry takes its environmental responsibilities and its passion for conservation, research and education, all of which are vital for the ongoing successful future of the macadamia industry.

Section 2: Marketing Highlights

The Australian Macadamias marketing program reached new heights in 2023. It has a strong domestic presence and with 75% of Australia's crop being exported, significant resources are dedicated to diversifying the market for Australian grown macadamias. The marketing program targets both trade and consumers in several key Asian markets including China, Japan, South Korea and Taiwan. Each of these markets is unique and activity is tailored to account for their differences, particularly in terms of macadamia awareness and the rate of conversion to purchase. The marketing program in 2023 focused on four strategic priorities: strong and unique branding, driving innovation among the food and beverage manufacturing sector, inspiring consumers to eat more macadamias, and developing India as a potential high-growth market. 26

Priority 01

Strong & unique branding

A refreshed look for Australian Macadamias that celebrates Australia as the natural home of macadamias was introduced this year and progressively rolled out across all channels.











Drive innovation among the food and beverage manufacturing sector

Australian Macadamias' trade communications program has continued to connect R&D and marketing professionals with innovation news, consumer research insights, promotion highlights, crop forecasts and health updates.

Telling the story of macadamias as a sought-after ingredient suited to a broad range of manufactured food and beverages, this content is published in five languages and shared with a growing global database of trade EDM subscribers, on the Australian Macadamias trade website and on trade social media channels WeChat and LinkedIn.

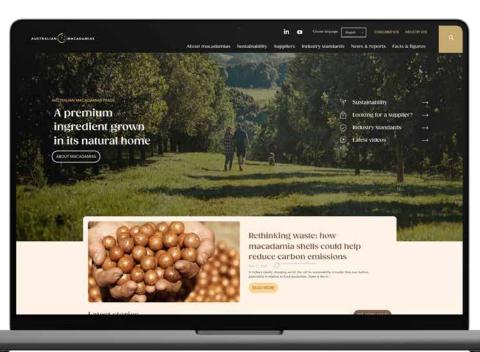
Highlights in 2023 included:

Australia Nut Forum

The first-ever Australia Nut Forum took place in Japan and South Korea in April 2023. These are significant markets as Japan is the biggest kernel export market for Australian macadamias, while South Korea is the fastest growing export market. Co-hosted by Australian Macadamias, the event welcomed guests from a variety of South Korean and Japanese trading organisations, introducing them to the Australian nut industry, its production status, the latest information and examples of how macadamias can be used as an ingredient in manufactured food and beverage products. The forum was held in 3 locations - Seoul, Tokyo and Osaka - and also enabled guests to sample chefprepared macadamia delicacies. The Australian macadamia industry established face-to-face dialogue with decision makers from the food industry in these two important markets. E-recipe books featuring the macadamia dishes served were created and shared with attendees.







Macro trends research

New research exploring emerging macro trends through the lens of global opinion leaders was conducted, with the findings informing key pieces of trade communication:

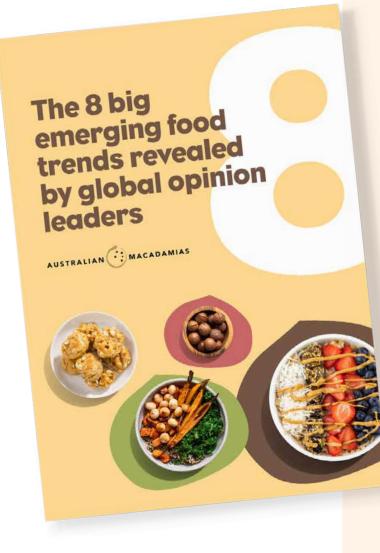
White Paper

The findings were compiled into a new white paper that explored 8 emerging food trends and 5 associated innovation territories for manufacturers using macadamias.

LinkedIn Live

Australian Macadamias' first ever LinkedIn Live online event was called Future-Proofed Food for Health-Forward Consumers. The event took the format of a live conversation and featured author and broadcaster Alice Zaslavsky and macadamia grower and Brookfarm co-founder Pam Brook as panellists. The live event unpacked two key trends that emerged from the research – multi-dimensional health and future-proofed foods, opening up an insightful conversation that targeted food industry decision makers and manufacturers.





Establishment of a trade presence in Taiwan:

For several years Australian Macadamias trade content has been available in English, Japanese, Korean and Simplified Chinese, and in 2023 Traditional Chinese was added as part of the launch of a dedicated trade campaign in Taiwan. This means all news stories are now appearing in Traditional Chinese on the trade website, and the monthly trade EDM is distributed to a growing database of Taiwan's trade and manufacturing contacts.



Priority 03

Inspire consumers to eat more macadamias

Social media and public relations communications showcased the taste, health benefits and versatility of macadamias and their ability to elevate any food or occasion. 2023 also saw a greater emphasis on sharing the story of Australia as the natural home of macadamias with consumer audiences in domestic and international markets. This content was created and shared in a variety of formats, including influencer marketing and PR campaigns, competitions, blog posts and EDMs.



Facebook

With a combined following of more than

202,500

Active in Australia, Japan, Taiwan and South Korea.





Twitter (X)

With a combined following of more than

11.900

Active in Japan and Australia.



Instagram

With a combined following of more than

21,600

Active in Japan, South Korea, Taiwan and Australia.







Weibo, WeChat & RED

With a combined following of more than

119,000

Active in China.



YouTube

More than

26,800 views

Active in Australia and Japan with more than 1,100 subscribers



Pinterest

Achieved

7,300 monthly views

Original Macas PR campaign (Australia)

Not many people know that the macadamia nut originated in Australia more than 60 million years ago, so to help raise awareness of the macadamia's origin, a bold PR campaign was created, featuring a tongue-in-cheek challenge to iconic global brand McDonald's. The campaign centrepiece was a billboard positioned outside a busy McDonald's store in Sydney with the headline "WE'RE THE ORIGINAL MACAS. Down Under for over 60 million years". The initiative attracted the attention of Australian breakfast television program, the Today Show, which broadcast a live interview with Australian macadamia grower, Michael McMahon in front of the billboard. A partnership with Mindy Woods, an indigenous Australian chef and former contestant on hit TV show MasterChef Australia, added another layer to the campaign. To help consumers create their own 'Original Macas' experience at home, she created two native infused recipes - The Original Macas Burger and Mylkshake. The campaign achieved reach of more than 45 million viewing opportunities.





Macadamias Make It Special campaign (Australia)

Australian Macadamias' largest ever domestic consumer marketing campaign was executed online, outdoor and in print media reinforcing macadamias' position as healthy, delicious and native to Australia. Created to help drive sales of macadamias across the summer months, new recipes helped consumers discover a host of new ways to 'Make It Special' with macadamias, showing how they can elevate any sweet or savoury recipe, meal or occasion. The multi-faceted campaign also featured macadamia grower and Olympic swimming champion Giaan Rooney as a brand ambassador, while esteemed chef Matt Moran hosted a macadamia masterclass for media at his Sydney restaurant. This campaign helped to drive sales by reinforcing macadamias' position as healthy, delicious and native to Australia

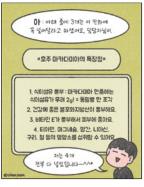


Instatoons and Influencers (South Korea)

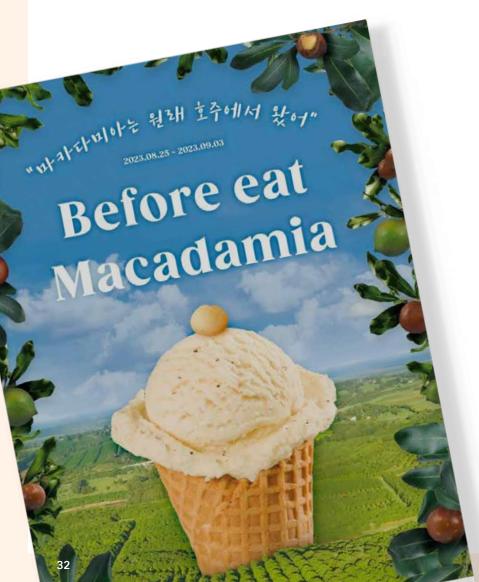
'Instatoons' are a popular trend in the fast-growing export market of South Korea. Blending Instagram with cartoons, they have become an innovative way for a brand to engage its audience. Six Instatoon creators communicated the Australian origin story and versatility of macadamias. Additionally, collaborations with Korean food and lifestyle influencers saw them share recipes and tips with their followers each month, generating awareness beyond Australian Macadamias' existing fan base.











'Before It Melts' brand collaboration (South Korea)

A collaboration with Korean gourmet ice cream store Before It Melts saw the creation of three unique limited edition macadamia ice cream variants: salted macadamia, macadamia basil pesto and macadamia chocolate chip & avocado. The store was decorated with Australian Macadamias branding and imagery, and customers were offered a free macadamia topping and the opportunity to try cracking macadamias when they followed the Australian Macadamias Korean Instagram account, growing the following by almost 1000 people. An Instagram giveaway was also included in the collaboration, with macadamia prizes on offer.

Autumn chocolate macadamia giveaway (Japan)

Japanese consumers are very familiar with macadamias in chocolate confectionery and as the cooler months approached, it was the perfect time to engage Japanese fans on Instagram with the chance to win chocolate coated macadamia products from popular brand Paton's. To be eligible, consumers were required to follow the Japanese Australian Macadamias Instagram account and correctly identify Australia as the origin of macadamias.



Influencer recipe ideas (Japan)

Japanese consumers were introduced to new ways to cook with macadamias thanks to partnerships with three food influencers. Recipes included Spicy Macadamia and Kale Chips, Peach Macadamia and Mozzarella Salad, and Chocolate Chip Macadamia Scones. The influencers' content also included facts about the origin and health benefits of macadamias.





Influencer campaigns and a new Instagram (Taiwan)

2023 saw the launch of an Australian Macadamias Instagram account in Taiwan to reach more consumers in this market. Multiple collaborations with popular food and lifestyle influencers helped educate consumers on the benefits of macadamias and how to cook with them using local ingredients, while helping to grow the Instagram audience. Giveaways were also included in the activity, offering consumers the chance to win macadamia prizes.









Australian Macadamias 'Ripening Adventure' online game (China)

An interactive online game hosted on WeChat was created to educate and entertain Chinese consumers. Featuring a host of macadamia characters and key growing facts, users were invited to complete different levels of the game to compete for the chance to win macadamia prizes. Players were also able to invite their friends to compete in the game with them, broadening the reach of the activity and key messages.

Market development in India as a potential high-growth market

After extensive scoping and research, India was identified as the next high-potential market for Australian macadamias, due to its status as the world's fastest growing economy, the rapid digitisation of its vast population, its consumers' knowledge and love of nuts and positive perceptions of Australia, and the Australia-India Economic Cooperation and Trade Agreement (ECTA) that entered into force in late 2022.

Leveraging these favourable conditions relies on educating Indian trade, consumers, chefs and media about the multi-layered story of Australian grown macadamias, and this sizeable task commenced in 2023, with several key activities:



The inaugural Australian Macadamia Festival (Mumbai)

Supported by the Queensland Government through its Food and Fibre to Market: Industry Partnerships program, the festival was a culinary celebration that immersed Indian media, chefs, food bloggers and social media influencers, as well as trade and supply chain partners, in the Australian origin, taste and versatility of macadamias.

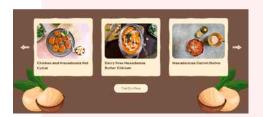
Australian Macadamias trade forum (Mumbai)

Food and ingredient innovation opportunities with macadamias were introduced to representatives from 35 different Indian food manufacturers covering multiple product categories including chocolate and pastry.



Fabelle Chocolates collaboration (New Delhi)

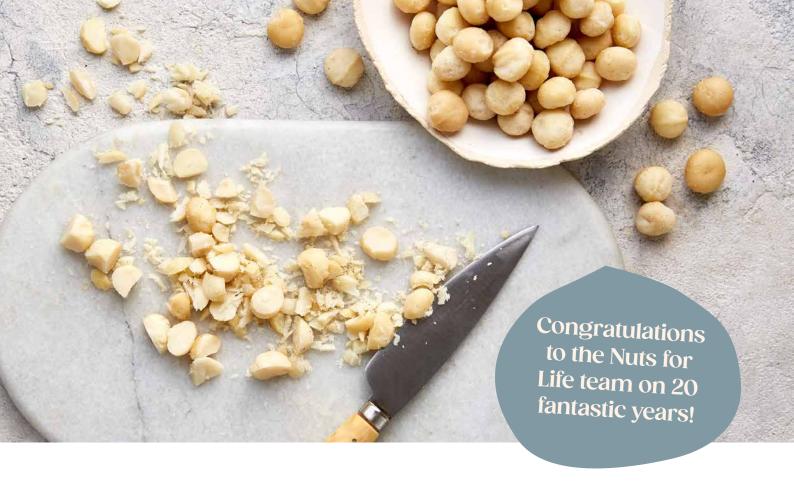
Fabelle One Earth Collection consists of 10 unique truffles, each representing the rich and diverse flavours of nations from across the world. Created by Indian luxury brand Fabelle Exquisite Chocolates by ITC Foods Limited, in collaboration with MasterChef Australia judge Andy Allen, the new collection is a fusion of global flavours and cultures. Fabelle Master Chocolatiers worked closely with Andy to select a hero ingredient from each destination, with the macadamia chosen to represent Australia.



Localised Australian Macadamias consumer website

India's consumers can now easily access information about the origin, health benefits, sustainability credentials and versatility of Australian grown macadamias, as well as localised recipes such as Macadamia Paneer Popcorn, Dairy Free Macadamia Butter Chicken and Roasted Macadamias and Chickpea Chaat.

The activity detailed above was part of the Nut Export Expansion Program facilitated by the Australian Nut Industry Council (ANIC) and funded under Agriculture Trade and Market Access Cooperation program (ATMAC), by the Commonwealth of Australia represented by the Department of Agriculture, Fisheries and Forestry (DAFF).



20th anniversary of Nuts for Life

In 2003, Nuts for Life was established as Australia's voice for the crucial role nuts play in good health and nutrition. In the 20 years since, it has worked closely with health professionals, government, and other bodies to improve the nutritional reputation of nuts.

As a productive, collaborative project that has added significant value to the wider nut industry, Nuts for Life has played a key role in helping drive nut consumption in Australia. Since its inception, the Australian nut consumption value has almost trebled from \$250 million, to nearly \$700 million in 2022. This is a growth rate of over 5% compound per annum - well above the combined population and inflation rates for the 20 years.

Nuts for Life has been instrumental in breaking through consumption barriers and educating Australian health professionals about the vital role daily nut consumption can play in human health. From research reports and recipes to fact sheets and podcast episodes, its impressive body of work has been invaluable in helping to drive consumption of Australian grown macadamias and other nuts.

Nuts for Life is facilitated by the Australian Nut Industry Council (ANIC) in partnership with Australian nut industry members. It is funded by the Hort Frontiers Health, Nutrition and Food Safety fund - part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from the Australian nut industry and contributions from the Australian Government.

20 years is a milestone worth celebrating, and an opportunity to reflect on some of Nuts for Life's most notable achievements:

- Improved positioning for nuts in public health policy (e.g. Health Star Ratings System, and the Australian Dietary Guidelines)
- The launch of the Healthy Handful logo
- Commissioning PhD and other research projects that have advanced nut nutrition and health science
- Significantly more health professionals now recommending nuts
- Securing a General Level Health Claim for nuts and heart health
- Supporting industry, including through workshops and training
- Engaged in 108 health professional conferences and events, with a reach of almost 80,000 health professionals
- Achieved a social media following of more than 44.000
- Showcased almost 200 nut recipes on its website

Section 3: Statistical Analysis

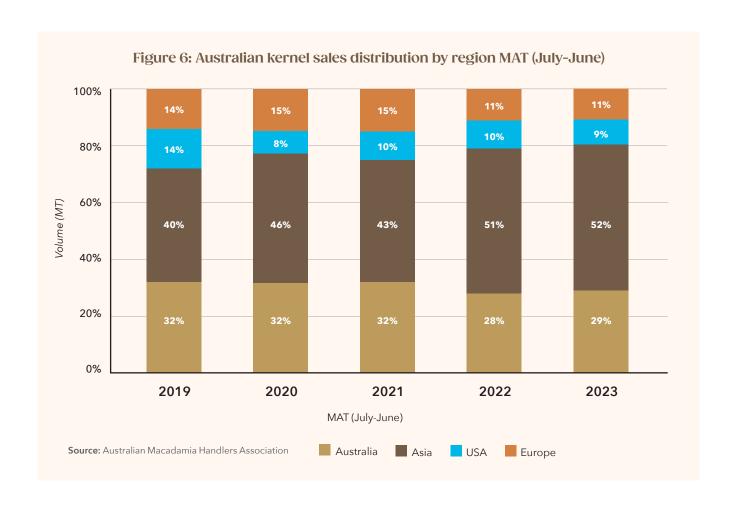


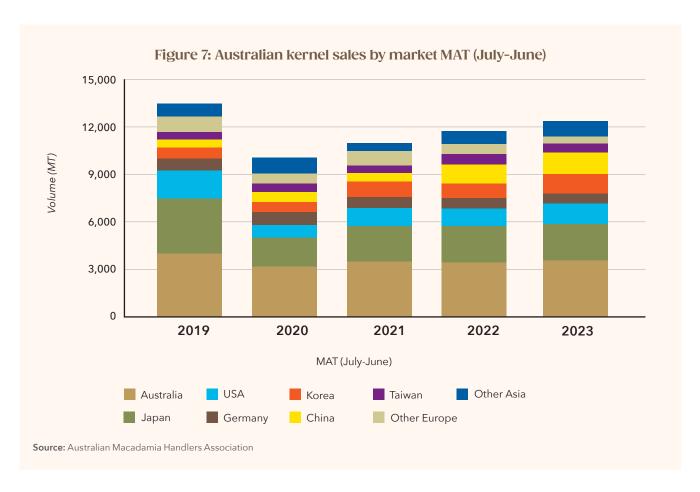
Australian macadamia sales

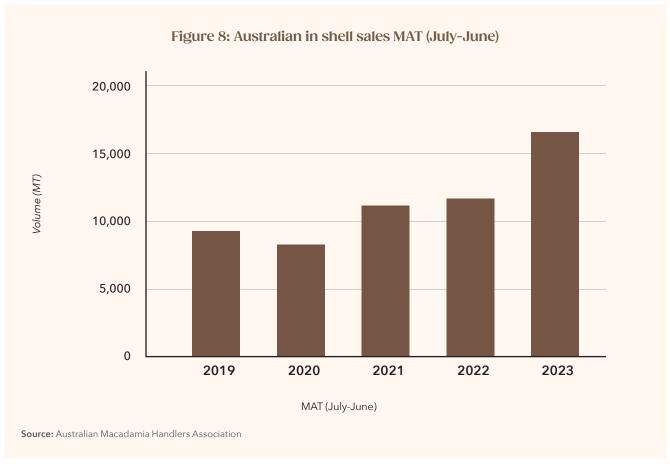
The Australian macadamia industry experienced a difficult 2023 season characterised by lower-than-expected production, increasing global supply driving intensified price pressure in export markets, and a significant change in the sales mix of nut-in-shell and kernel.

In-shell sales to China and Hong Kong were up significantly on last year. This resulted in availability of crop for the kernel market being lower than expected.

Despite these challenges, Australian macadamia kernel sales recorded a 4% increase overall for the MAT period (July to June). The increase was driven by strong kernel sales to South Korea and a major improvement in sales to the USA. China, Other Asia and the domestic market also saw a pleasing increase in sales. Sales to Europe experienced the biggest decrease and the Germany and Taiwan markets softened, while Japan was relatively flat.





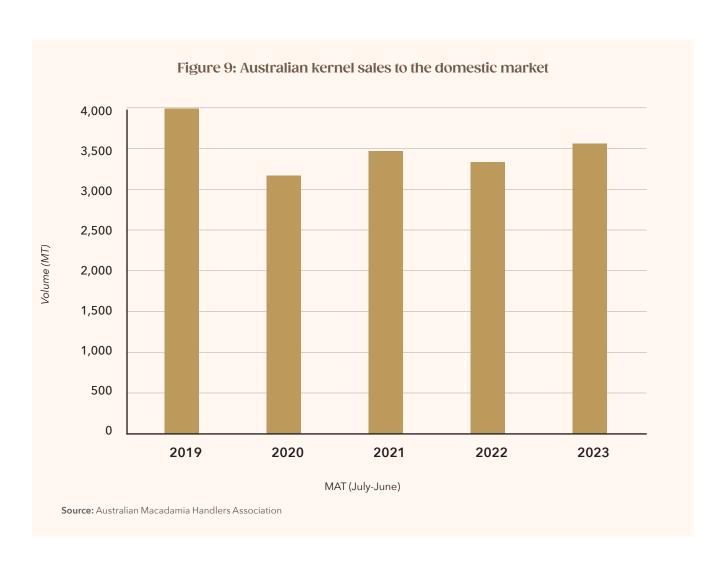




Australia is the second largest consumer of macadamia kernel in the world behind the United States and more than 95% of the kernel consumed in this market is Australian origin.

Industry reported a 6% increase in sales to the domestic market for the 12 months to June 2023, reflecting the season's more competitive pricing. In particular, NielsenIQ Homescan™ reported a strong retail festive season for macadamias. December 2022 and January 2023 performed ahead of the previous year driven by a decrease in average prices per kilogram, which encouraged consumption from more light and medium buyers.

It is interesting to note that while macadamias continue to hold the highest price and significant price differential relative to other tree nuts, NielsenIQ Homescan™ reported an increase in macadamia's volume share of total nuts for the period 52 weeks to 18/06/2023 versus one year ago, with cashews and almonds losing share.

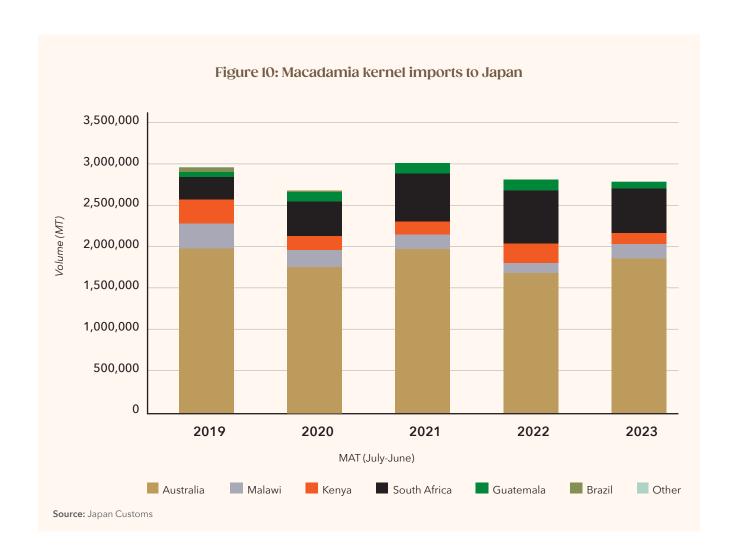




Macadamia imports to Japan were relatively flat in the I2 months to June 2023. Australia continued to be the major supplier with 66% of imports.

There were significant sales movements between origins in the last 12 months with Malawi gaining share at the expense of Kenya, Guatemala and South Africa.

Japan is a well-established market that has traditionally used macadamias primarily as an ingredient (in chocolate confectionery), however in recent years there has been considerable expansion into use in snacking, especially in premium nut mixes. There has also been an increase in use in bakery products such as cookies.



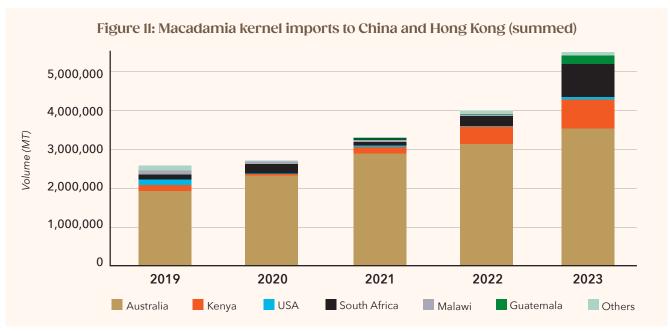


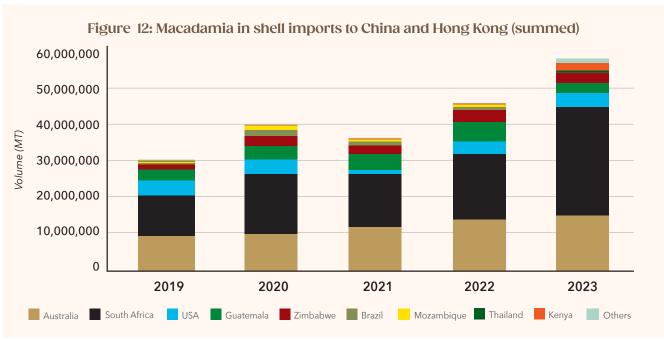
Kernel use in China is still low compared to in-shell, however this segment is experiencing significant growth. Mintel reported a doubling in the launch of new products containing macadamias as an ingredient for the period July 2022 to June 2023 versus prior year.

Despite the increase in domestic production, total macadamia kernel imports to China and Hong Kong continue to grow year on year. Imports for the 12 months to June 2023 were up 40%. Australia remains the major supplier with 65% of imports. All origins are experiencing strong growth, particularly South Africa, Kenya, and Guatemala.

Total macadamia in-shell imports to China and Hong Kong for the period were the highest on record for many years. South Africa's dominance in this market continued to grow and it recorded its highest ever imports, capturing market share of 51%. Kenya, Australia and United States recorded strong growth at the expense of Guatemala, Zimbabwe, Brazil and Mozambique.

Macadamia usage in China is skewed heavily to snack format.





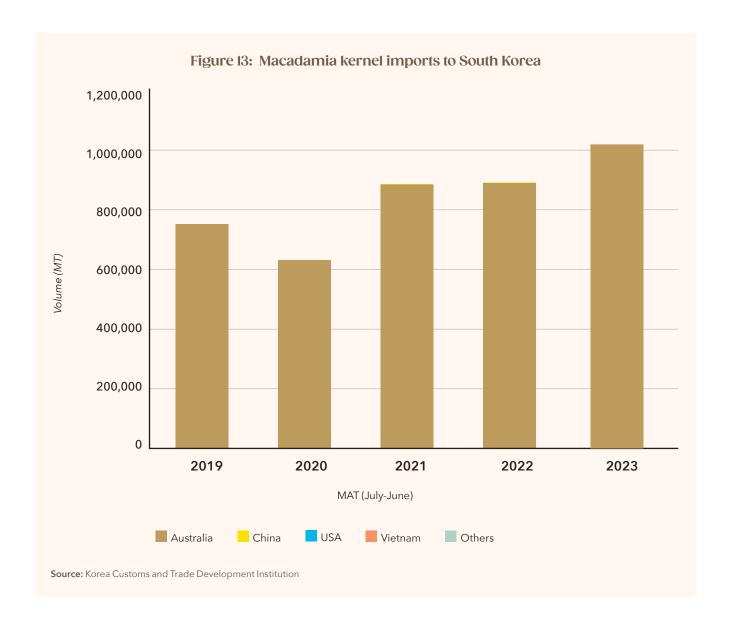
Source: China Customs, Hong Kong Census and Statistics Department



Total macadamia kernel imports to South Korea increased by 33% in the I2 months to June 2023. Australia continued to be the dominant supplier with 99.8% of imports, primarily due to the Korea-Australia Free Trade Agreement (KAFTA).

Macadamia usage in South Korea is primarily in a snack format, often in daily nut mixes, and flavour innovation is growing.

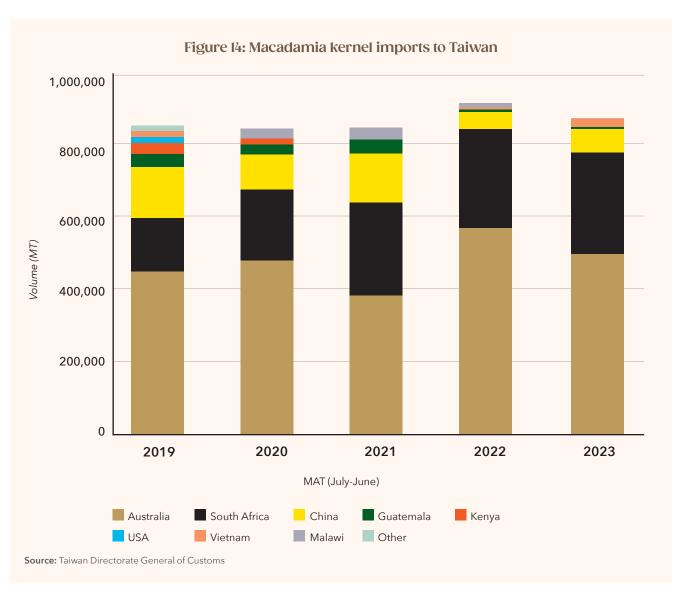
There is considerable scope and expectation of continued growth in this market.





Total macadamia kernel imports to Taiwan fell by 7% in the I2 months to June 2023. Australia continued to be the major supplier with 57% of imports and South Africa held its share of imports at 32%. There was some minor growth in imports experienced by China, Guatemala and Vietnam at the expense of Australia.

Macadamia usage in Taiwan is primarily as an ingredient in nougat and bakery products. Usage in snack is growing in both straight macadamia and mixed nut lines.

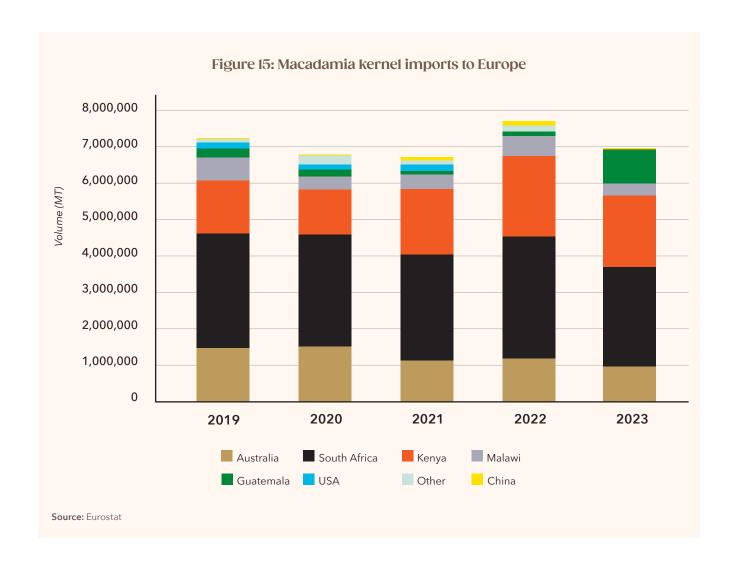




Total macadamia kernel imports to Europe declined by 10% (MAT June 2023) driven by challenging market conditions. Consumption in Europe in recent years has been impacted by high food inflation and increasing consumer price sensitivity, while the retail and manufacturing sectors continue to experience margin and cost pressures.

While Guatemala experienced a significant increase in imports into Europe, imports by all other producing origins decreased. South Africa continued to be the major supplier to this market at 39% of imports. The Australian share of imports dropped one point to 14%.

Macadamia usage in Europe is primarily as a snack product.

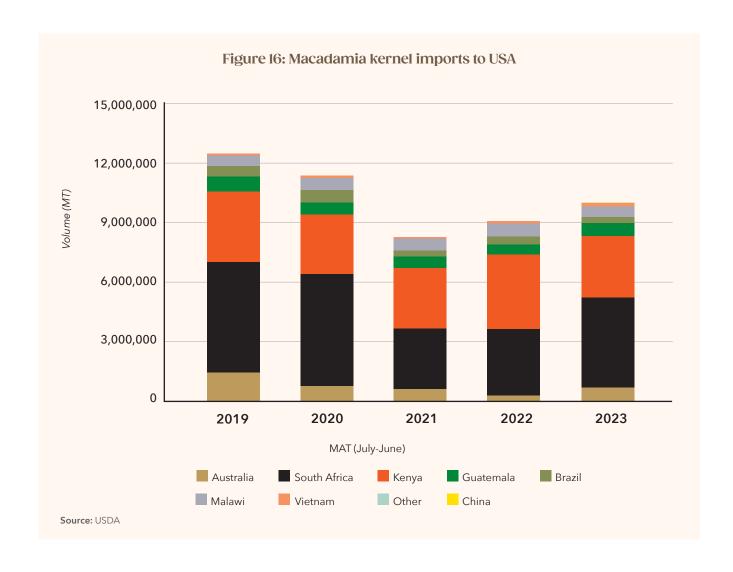




Total macadamia kernel imports to the United States increased by 13% to June 2023, after a marginal uplift the prior year following the difficult Covid years which saw imports plummet.

South Africa and Kenya remain the major suppliers accounting for over 75% of the import volume and holding 45% and 31% share of imports respectively. Imports from Australia doubled but are still significantly below pre-Covid volumes. Guatemala also saw a strong increase in import volumes.

Macadamia usage in the United States is fairly evenly split between snack and ingredient.





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