

Mango

Strategic Investment Plan

2022-2026



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EXECUTIVE SUMMARY

The overarching strategic intent of this Strategic Investment Plan (SIP) is to improve grower profitability and productivity by focusing on improved and consistent product quality, accessing new export markets and increasing domestic and international demand.

The mango SIP 2022-2026 provides a roadmap to guide Hort Innovation's investment of mango industry levies and Australian Government contributions, ensuring investment decisions are aligned with industry priorities.

The Australian mango industry situation in 2019/20 is described on **page 4** with further information provided in **Appendix 1**. The production volume of mangoes has increased by 25.9% since 2012/13 to 2019/20 with production value also growing by 26.7%. Australian mangoes are grown mostly in the tropical and subtropical regions of Australia. Queensland and the Northern Territory accounted for 96% of production volume in 2019/20. Smaller volumes are also grown in Western Australia and northern New South Wales.

The strategic intent of the mango SIP provides a summary of how the mango industry will drive change over the life of the SIP which will be achieved by growers having access to best practice management (BMP) tools and resources, new knowledge and technologies to improve consistency of yield and meeting the demands of consumers in both the domestic and key export markets.

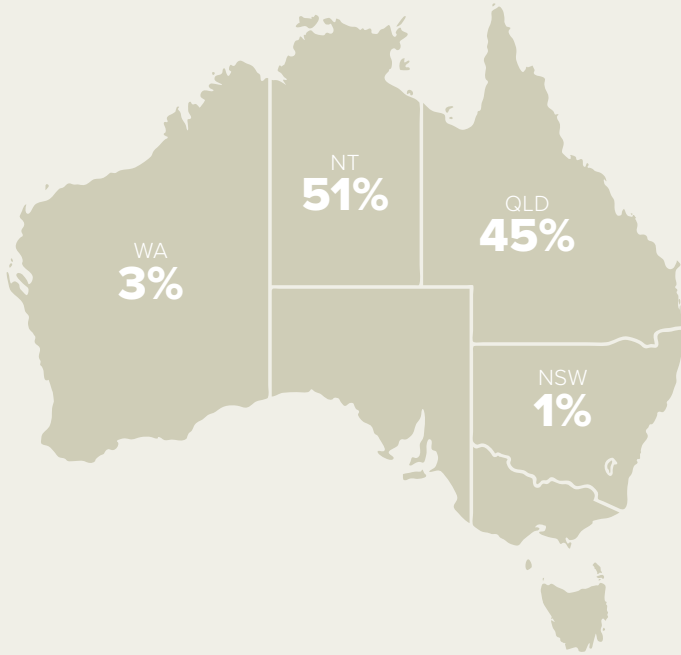
The financial estimates give an indicative overview of the funding availability for the period of FY2022-FY2026. Although a major portion of the mango research and development (R&D) fund is currently allocated to key projects, funds are available for investment over the life of the SIP.

Careful prioritisation of investment needs is required over the next five years if further projects are to be funded.

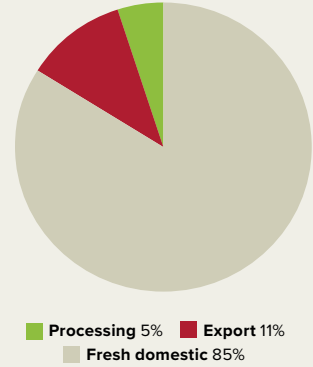
The four outcome areas of this SIP cover significant themes under which programs and investments will be focused. These are listed in priority order for the mango industry. Improving consistency of yield in current varieties as well as improving quality and maintaining yield in variable climates is a priority for the mango research and development (R&D) fund in the next five years, specifically for optimising flowering, fruit set and fruit drop through management practices and new knowledge. Under the outcome of demand creation, improving awareness, consideration and purchase intent is a core focus of the category marketing program, and this will be driven through short and long-term brand building whilst continuing to drive relevant and distinguishable campaigns. Extension and communications of information, particularly relating to these priority areas are key to the industry's success.

The key performance indicators (KPIs) detail how we measure the impact of each strategy, for example, evidence of a trend in increased yields relative to climate variations and variety baselines, new knowledge on productivity in orchard systems, tools and technical support for adoption of BMPs for improved quality and consistency, and positive influence on consumer preference and consideration for Australian mangos.

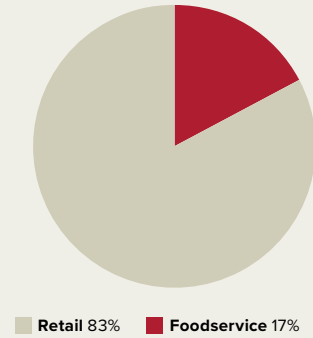
PRODUCTION REGIONS:



EXPORT/FRESH DOMESTIC/ PROCESSING:



DOMESTIC RETAIL VS FOODSERVICE:



PRODUCTION WINDOW:



**July
to
March**

PER CAPITA CONSUMPTION:



2.4 kg

in 2019/20

PRODUCTION VOLUMES:



**72,022
tonnes**

in 2019/20

FARMGATE VALUE OF PRODUCT:



**\$185
million**

in 2019/20

VARIETIES:



**Kensington
Pride**

43% Calypso **25%**

R2E2
19% Honey Gold **8%**

Other* **5%**

* Other varieties include: Keitt, Tommy Atkins, Palmer and Nam Dok Mai

THE MANGO STRATEGIC INVESTMENT PLAN

This SIP is the roadmap that will guide Hort Innovation's oversight and management of the mango industry's investment programs. It lays the foundation for decision-making in investments and represents the balanced interest of the whole industry. The important function of the SIP is to ensure that the investment decisions align with mango industry priorities.

Hort Innovation has led the process for preparing the refresh of the mango SIP, listening and engaging with levy payers and key stakeholders including Industry Representative Bodies (IRBs) and expertise available through advisory mechanisms and delivery partners. The refresh process involved consultation with and input from a wide range of levy payers, objective analysis of performance and learning from the previous SIP, as well as environmental scanning to identify emergent trends and issues that could impact on future industry profitability and sustainability.

Hort Innovation has valued the support, advice, time, and commitment of all stakeholders that contributed to producing this SIP, especially mango growers.

The whole-of-company approach taken by Hort Innovation to produce this SIP has harnessed existing external and internal knowledge, learning, partnerships and relationships. The output is a tailored plan with which the mango industry can be confident of its strategic intent, including visibility on how investment impacts will be identified. Specific investments to address the SIP strategies and align with industry strategic priorities will be outlined in detail via the mango Annual Investment Plan (AIP). The AIP will be published each year over the lifespan of the SIP and detail the investments that will be prioritised based on potential industry impact, as well as the availability of levy funds. Hort Innovation will advise industry stakeholders when the AIP has been published via established communication channels each year. The AIP will be developed with input from the mango Strategic Investment Advisory Panel (SIAP), IRBs and other key stakeholders.

Producers in the mango industry pay levies to the Department of Agriculture, Water and the Environment, which is responsible for the collection, administration and disbursement of levies and charges on behalf of Australian agricultural industries.

Agricultural levies and charges are imposed on primary producers by government at the request of industry to collectively fund R&D, marketing, biosecurity and residue testing programs.

Levy is payable on mangoes that are produced in Australia and either sold by the producer or used by the producer in the production of other goods. The R&D levy rate on mango is set at 0.75 cents per kilogram. The marketing levy is set at 1 cent per kilogram.

Hort Innovation has developed this SIP for the mango industry to strategically invest the collected mango levy funds into the priority areas identified and agreed by the mango industry.

The mango SIP represents the Australian mango industry's collective view of its R&D and marketing needs over the next five years (2022-2026). Learning, achievements and analysis of the previous SIP, consultation with Australian mango levy payers, and synthesis of various strategic documents have been incorporated into the development of this SIP.

Appendix 3 acknowledges the people who were consulted in the preparation and validation of this SIP. Statistics and data within this publication are sourced from the Australian Horticulture Statistic Handbook 2019/20 and other documents unless stated otherwise and are listed in **Appendix 4**. A list of acronyms used within the document is available in **Appendix 5**.

Financial estimates

The annual revenue from levy income and Australian Government contributions for eligible R&D set the overall budget parameters for the mango SIP. Importantly, a portion of these funds are already committed, as the industry has current multi-year projects for R&D and marketing activities. In addition, the levy income from year to year will vary due to changes in seasonal and market conditions.

The indicative financial estimates used for the purposes of developing this SIP are presented in **Table 1** below. These figures are regularly reviewed to reflect the latest information and statistics for the industry and any changes in investment priority. For further details refer to the mango AIP.

TABLE 1. Indicative financial estimates for the mango SIP over the life of the SIP

	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$
R&D					
Balance end FY2021	77,685				
Estimated levy funds (growers)	542,000	575,000	575,000	575,000	575,000
Australian Government contribution	642,015	548,214	549,827	551,242	550,023
Current investments	1,064,000	286,000	170,000	142,000	140,000
New investments	65,000	650,000	770,000	800,000	800,000
Total project investments	1,129,000	936,000	940,000	942,000	940,000
CCR	182,266	151,108	151,754	152,077	151,754
Projected end balance	64,000	79,800	93,600	94,700	96,700
MARKETING					
Balance end FY2021	117,497				
Estimated levy funds (growers)	670,000	770,000	770,000	770,000	770,000
Current investments	550,000	–	–	–	–
New investments	–	590,000	600,000	600,000	600,000
Total project investments	550,000	590,000	600,000	600,000	600,000
CCR	113,450	121,701	123,764	123,764	123,764
Projected end balance	90,500	48,500	57,500	71,500	85,500

Disclaimer: All figures are indicative only and may change depending on actual income and expenditure.

Balance end FY2021 – The closing balance of the fund as at 30 June 2021

Estimated levy funds – Net levy income/revenue that is generated and collected by levy revenue services (LRS)

Australian Government contribution – Amount of contribution from the Australian Government on R&D levy-funded expenditure

Current investments – Current estimated value of contracted projects

New investments – The estimated dollar value that is available for potential new investments for industry subject to industry advice

CCR – Corporate cost recovery: the cost to implement and manage R&D and marketing investment programs for each industry

Projected end balance – Forecast of the anticipated final position of the fund

MANGO INDUSTRY OUTCOMES



The overarching strategic intent of this SIP is to improve grower profitability and productivity by focussing on improved and consistent product quality, accessing new export markets and increasing domestic and international demand.

Industry outcomes

Outcome statements as identified and prioritised by the mango industry have been prepared under four key outcome areas: demand creation; industry supply, productivity and sustainability; extension and capability; and business insights.

OUTCOME 1: Demand creation

Contribute to improving consumer knowledge, attitudes and purchase intent to drive volume growth.

Demand creation will support industry to develop existing and future domestic and international markets. This will contribute to improved consumer knowledge and attitudes, in addition to encouraging purchase intent to drive category volume growth.

The strategic intent of this outcome is to maintain and strengthen consumer demand as the foundation for sustainable expansion of production and consumption in domestic markets. It means the industry is investing to:

- Broaden consumer awareness so that mango is more top of mind and purchased more frequently
- Build a strong brand for 'Australian Mangoes' by improving awareness, consideration, attitudes and knowledge
- Support product positioning with consistent quality through best practice industry production
- Develop strong relationships across the supply chain with a shared goal to grow the category
- Raise awareness of opportunities and pathways for businesses to be involved in meeting demand in new export markets.

OUTCOME 2: Industry supply, productivity and sustainability

Improve industry productivity (inputs/outputs) to maintain local and international competitiveness, while maintaining viability and sustainability of supply.

Supply and productivity will be supported through improvements to production efficiencies which will drive profitability outcomes, while ensuring long-term sustainability outcomes.

The strategic intent of this outcome is to accelerate the application of production practices that optimise returns and reduce risk to growers. Achieving the outcome will involve:

- Investigating opportunities to improve yield and consistency of yield, focusing on flowering, fruit set and fruit drop in current Australian mango varieties
- The development of management strategies for maintaining yield and quality in variable climates
- Advances in technology, productivity, biosecurity and pollination through a proactive and prepared industry
- Proactively monitoring potential crop protection regulatory threats and having access to a broader suite of effective, socially acceptable and environmentally sound crop protection solutions.

OUTCOME 3: Extension and capability

Building capability and innovative culture.

Building capability and an innovative culture will support industry cohesion and increase knowledge, attitudes, skills and aspirations (KASA) to use the investment outputs across the supply and demand initiatives to better manage risk and create positive change.

The strategic intent of this outcome is to manage knowledge, relationships, systems and processes required to communicate effectively with internal and external stakeholders. Achieving the outcome will involve:

- Continuous change in KASA and practices for grower/industry profitability and sustainability through development and use of better practices and innovation
- Growers, value chain, media and governments being well informed on industry initiatives and achievements as a vital part of regional communities and networks
- Improved networks and cross-industry collaboration to increase on-farm use of R&D outputs and to build a stronger more resilient industry
- Proactive strategic and evidence-based decision-making in businesses and for industry on investment, priorities and risk management.

OUTCOME 4: Business insights

Measure industry supply (production) and demand (consumer behaviour) data and insights to inform decision-making.

Business insights will support the industry to remain aware of market and industry trends to drive informed decision-making.

The strategic intent of this outcome is to deliver data and insights which is foundational to achieving success in the other three outcome areas of demand creation; supply, productivity sustainability; and extension and capability.

Achieving the outcome will involve reliable baseline data and analysis to provide insights and understand current and emerging trends. Key investments will support the provision of consumer knowledge and tracking, production statistics and forecasting to enable better decision-making process by industry and individual businesses.

These investments underpin and are complementary to delivery of the other outcome areas.

“
The important function of the SIP is to ensure that the investment decisions align with mango industry priorities.”



MANGO INDUSTRY STRATEGIES

Strategies to address industry investment priorities

The strategies and identified impacts for each of the key outcome areas are described in the tables below. The highest priority investments lay the foundation for the SIP, and its implementation will require a balanced approach to ensure the industry has a high likelihood of success over the short term (0-3 years), medium term (3-5 years) and long term (5-10 years).

The ability to deliver on these strategies (and subsequent investments) will be determined by the ability of the statutory levy to provide adequate or sufficient resources. Further resources and efficiencies may become available through alternative funding sources such as Hort Frontiers strategic partnership initiative, external grants and/or cross-industry initiatives.

OUTCOME 1: Demand creation
Demand creation supports the Australian mango industry to develop existing and future domestic and international markets.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Increase domestic consumer demand for Australian mangoes through improving overall product and varietal knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Increased consumer demand for Australian mangoes Positive influence on consumer preference, knowledge, attitudes, and purchase intent
2. Increase international consumer awareness and preference for fresh, quality Australian mangoes through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Increased consumer demand for Australian mangoes
3. Prepare and adopt an updated export strategy to expand exports to high value markets	<ul style="list-style-type: none"> Industry agreement and support for the implementation of an export plan
4. Engage retailers in joint business planning and provide in-season information for mango supply	<ul style="list-style-type: none"> Across-supply-chain understanding of the varieties, optimal handling and display, and confidence in volume and quantity information for mango supply



OUTCOME 2: Industry supply, productivity and sustainability

The Australian mango industry has increased profitability, efficiency and sustainability through innovative R&D, sustainable BMPs and pollination.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Develop management strategies for maintaining yield and quality in variable climates	<ul style="list-style-type: none"> Industry resilience for maintaining yield in variable climates Prioritisation of opportunities for yield gains
2. Identify and support opportunities to improve yield and consistency of yield, focusing on current and new production	<ul style="list-style-type: none"> Increased grower options for yield gains and global competitiveness Improved yield and consistency in current production systems focussing on flowering, fruit set and fruit drop in current Australian mango varieties Improved productivity with high-density systems
3. Improve on-farm practices and enhance industry biosecurity	<ul style="list-style-type: none"> Increased resilience to exotic biosecurity threats
4. Enhance crop pollination and resilience through improved pollination security	<ul style="list-style-type: none"> Sustainable honey bee health supporting productivity
5. Engage with the methods of developing carbon accounting	<ul style="list-style-type: none"> New knowledge available for mango growers to engage in carbon accounting methods and markets
6. Prioritise the major crop protection gaps through a Strategic Agrichemical Review Process (SARP)*	<ul style="list-style-type: none"> Availability of registered or permitted pesticides that are evaluated for overall suitability against major disease, insect pests and weed threats. The SARP aims to identify potential future solutions where tools are unavailable or unsuitable
7. Provide regulatory support and co-ordination for crop protection regulatory activities with the potential to impact plant protection product access, both in Australia and internationally*	<ul style="list-style-type: none"> Regulatory Risk Assessments have informed proactive strategic priority setting to avoid pest management gaps in the event access or use is negatively impacted
8. Generate residue, efficacy and crop safety data to support applications to the Australian Pesticides and Veterinary Medicines Authority (APVMA) that seeks to gain, maintain or broaden access to priority uses for label registrations and/or minor use permits for crop protection needs*	<ul style="list-style-type: none"> Crop protection solutions meet industry priority needs as identified in the industry SARP or biosecurity plan

OUTCOME 3: Extension and capability

Improved capability and an innovative culture in the Australian mango industry will maximise investments in productivity and demand.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Deliver extension and communication capability to create positive change in the priority areas of high-density production systems, maximising yield, consistent quality and demand creation	<ul style="list-style-type: none"> A progression in KASA and practice for grower profitability and sustainability which supports the adoption of best practices and innovation (e.g., consistent quality)
2. Provide opportunity for engagement between and across mango industry members and relevant stakeholders	<ul style="list-style-type: none"> Improved networks and cross-industry collaboration that increase efficiencies and the use of R&D outputs to build a stronger more resilient industry

OUTCOME 4: Business insights

The Australian mango industry is more profitable through informed decision-making using consumer knowledge and tracking, trade data, benchmarking, production statistics and forecasting, and independent reviews.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Increase industry alignment with quality and brand-positioning opportunities driven by consumer insights*	<ul style="list-style-type: none"> • Provision of business insights to deliver against demand, trade, supply and extension outcomes
2. Use trade data to guide ongoing export development opportunities*	<ul style="list-style-type: none"> • Increased knowledge of potential markets • Positioning of strategic markets
3. Use production forecasts to inform long-term and/or in-season market planning and supply strategies	<ul style="list-style-type: none"> • Increased industry capacity or other stakeholder capacity (e.g., export capacity)
4. Use industry benchmarking activity to measure and track industry productivity and profitability	<ul style="list-style-type: none"> • Increased industry and grower capacity to make informed business decisions • Establishment of profitability and productivity baseline and targets to support continuous improvement • Opportunities for cost reduction

* Foundational investments provide data and information that underpin the delivery of other SIP outcome areas and will be aligned to this strategy. Foundational investment areas include:

- Consumer behavioural data
- Consumer usage and attitudes, and brand health tracking data
- Impact assessments
- Trade data
- Crop protectant data.



“The overarching strategic intent of this SIP is to improve grower profitability and productivity by focusing on improved and consistent product quality, accessing new export markets and increasing domestic and international demand.”



MANGO SIP MONITORING AND EVALUATION

The mango SIP Monitoring and Evaluation (M&E) Framework development has been informed by Hort Innovation’s Organisational Evaluation Framework.

Progress against the SIP will be reported in Hort Innovation publications and through industry communication channels. The SIP outcomes and strategies are used to inform KPIs that in turn drive the investments and individual projects to deliver on the SIP. Projects responsible for delivering the strategy aligned with each KPI will collect the data.

An M&E and reporting framework is shown below. The framework shows what will be measured to demonstrate progress against the SIP and how metrics will be tracked. Reporting on KPIs will be processed through various formal channels to inform industry and government investors of progress, performance, and impact. Data sources to support M&E will be identified and collected as part of the requirements for each levy investment.

Hort Innovation will facilitate the regular review of the SIP to ensure it remains relevant to industry.

Mango SIP Monitoring and Evaluation Framework

The mango SIP M&E Framework is shown below. It includes KPIs and data collection methods both at a macro/industry (trend) level and at more specific SIP strategic level/s.

OUTCOME	STRATEGIES	KPIs
Demand creation		
Outcome 1: Demand creation supports the Australian mango industry to develop existing and future domestic and international markets.	1. Increase domestic consumer demand for Australian mangoes through improving overall product and varietal knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Positive influence on consumer preference Use of nutritional information to support consumer demand Positive shifts in brand tracking
	2. Increase international consumer awareness and preference for fresh, quality Australian mangoes through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Positive influence on consumer preference
	3. Prepare and adopt an updated export strategy to expand exports to high value markets	<ul style="list-style-type: none"> Development of an export strategy in collaboration with industry Support for technical access to selected export markets (e.g., case studies) Evidence of improved exporter capability into high-value markets
	4. Engage retailers in joint business planning and provide in-season information for mango supply	<ul style="list-style-type: none"> Retailer feedback on the value of supply forecasts (e.g., case studies)

OUTCOME	STRATEGIES	KPIs
Industry supply, productivity and sustainability		
<p>Outcome 2: The Australian mango industry has increased profitability, efficiency and sustainability through innovative R&D, sustainable BMPs and pollination.</p>	1. Develop management strategies for maintaining yield and quality in variable climates	<ul style="list-style-type: none"> Evidence of increased climate resilience
	2. Identify and support opportunities to improve yield and consistency of yield, focusing on current and new production	<ul style="list-style-type: none"> Distribution of new knowledge for growers on high density and productive orchard systems Knowledge to maximise yield potential and profitability in Australian mango varieties and production systems Development of new molecular, agronomic and data tools to improve on farm productivity
	3. Improve on-farm practices and enhance industry biosecurity	<ul style="list-style-type: none"> Maintenance/tracking of the implementation of an industry biosecurity plan Development of risk analyses of high-priority pests including entry pathways, establishment and spread potential
	4. Enhance crop pollination and resilience through improved pollination security	<ul style="list-style-type: none"> Evidence of sustainable honey bee health through surveillance data
	5. Engage with the methods of developing carbon accounting	<ul style="list-style-type: none"> Grower awareness and interest in participating in carbon markets
	6. Prioritise the major crop protection gaps through a SARP*	<ul style="list-style-type: none"> Coordinated industry priority setting with a clear outlook of gaps and risks in existing pest control options Industry priority needs published and shared with stakeholders, including registrant
	7. Provide regulatory support and co-ordination for crop protection regulatory activities with the potential to impact plant protection product access, both in Australia and internationally*	<ul style="list-style-type: none"> Regulatory Risk Assessments maintained
	8. Generate residue, efficacy and crop safety data to support applications to the APVMA that seeks to gain, maintain or broaden access to priority uses for label registrations and/or minor use permits for crop protection needs*	<ul style="list-style-type: none"> Data to support applications to the APVMA and the establishment of Maximum Residue Limits (MRLs)



OUTCOME	STRATEGIES	KPIs
Extension and capability		
Outcome 3: Improved capability and an innovative culture in the Australian mango industry maximises investments in productivity and demand.	1. Deliver extension and communication capability to create positive change in the priority areas of high-density production systems, maximising yield, consistent quality and demand creation	<ul style="list-style-type: none"> Establishment of a baseline and increased share of industry (volume of mangoes produced (i.e., t/ha) with positive change in KASA in high priority areas Establishment of a baseline and increased share of industry achieving productivity and profitability gains (volume of mangoes produced i.e., t/ha) through the implementation of practices in high priority areas
	2. Provide opportunity for engagement between and across mango industry members and relevant stakeholders	<ul style="list-style-type: none"> Grower satisfaction with growth in cooperation within industry and across industries leading to business and industry innovations (i.e., survey data)
Business insights		
Outcome 4: The Australian mango industry is more profitable through informed decision-making using consumer knowledge and tracking, trade data, benchmarking, production statistics and forecasting and independent reviews.	1. Increase industry alignment with quality and brand-positioning opportunities driven by consumer insights*	<ul style="list-style-type: none"> Provision of business insights to deliver against demand, supply and extension outcomes Delivery of consumer insights strategy Evidence that consumer insights inform strategic market engagement (e.g., case studies) New consumer knowledge available for growers
	2. Use trade data to guide ongoing export development opportunities*	<ul style="list-style-type: none"> Trade data maintained, and data outputs supplied to meet stakeholder needs
	3. Use production forecasts to inform long-term and/or in-season market planning and supply strategies	<ul style="list-style-type: none"> Production forecast available Evidence that production forecasts support growers, supply chain participants and retailers with marketing and production decisions
	4. Use industry benchmarking activity to measure and track industry productivity and profitability	<ul style="list-style-type: none"> Establishment of a baseline, and set targets to drive year-on-year profitability and productivity improvements Data available to support extension activities and individual grower decision-making Evidence of data used to support industry-level decision-making and grower practice change

* Foundational investments provide data and information that underpin the delivery of other SIP outcome areas and will be aligned to this strategy. Foundational investment areas include:

- Consumer behavioural data
- Consumer usage and attitudes, and brand health tracking data
- Impact assessments
- Trade data
- Crop protectant data.

Reporting framework

Hort Innovation will use dynamic reporting aligned to the Organisational Evaluation Framework to report regularly on progress and performance. Reporting will be processed through formal channels to inform industry and government investors.

A review of investment performance against the respective industry outcome and/or strategy-level KPIs for the mango SIP will be completed annually as the primary reporting mechanism. The SIP performance report will provide:

- Evidence of progress towards achieving the industry-specific outcomes and strategies through an assessment of the KPIs identified in the SIP
- Evidence of progress towards cross-industry investment strategies and outcomes. It will involve Hort Innovation's whole-of-horticulture reporting obligations and corporate plan and involve annual reports and Hort Innovation's Annual Operating Plan.

SIP performance reports will also inform the Australian government of progress towards achieving government priorities. In particular, reporting will support Hort Innovation to meet the Performance Principles and requirements contained in the [Deed of Agreement 2020-2030](#).





COLLABORATION AND CROSS-INDUSTRY INVESTMENT

Based on advice from industry throughout the engagement process, Hort Innovation understands that Australian horticulture industries have common issues, and in turn have identified prospective areas for collaboration and cross-industry or regional investment.

These opportunities have been included as strategies across multiple industry SIPs where relevant and required. By delivering targeted multi-industry collaboration in research, development and extension (RD&E), marketing and international trade, Hort Innovation aims to support more effective and efficient outcomes for growers and the wider horticulture sector. This includes driving investment through the Hort Frontiers strategic partnership initiative. Importantly, while this approach acknowledges there is value in solving issues across industries and regions, it does not reduce the importance of industry-specific initiatives.

Cross-industry/regional R&D opportunities identified for the mango industry include:

- Automation/mechanisation
- Remote sensing and forecasting
- Orchard production systems
- Market access/development.

Cross-industry areas of collaboration for demand-driving outcomes provide the opportunity to advance the prosperity of the sector through gaining efficiencies in the delivery of the program and contributing to stronger overall outcomes. By collaborating as one sector to win the hearts and minds of the consumers, in addition to individual demand driving programs, there is the potential to enhance the total category value proposition, contributing to driving returns for Australian growers.

Areas of consideration for collaboration for demand-driving outcomes across the lifespan of the mango SIP 2022-2026 include:

- All-of-horticulture consumer marketing campaigns designed to drive awareness, consideration, and purchase behaviour change

- Communications to bring horticulture to top of mind (saliency) and reposition the benefits they provide to Australian and international consumers
- Retail partnerships to advance total category and shopper demand-driving programs
- A global brand platform to reinforce the unique selling proposition of Australian-grown horticultural produce and drive preference with international consumers.

Strategic science and research focus

The mango SIP takes into consideration the research priorities of various industry stakeholders, including Australian Mango Industry Association (AMIA) and Australian Fresh Produce Alliance (AFPA), and acknowledges the representation of these organisations. In developing the strategies presented within the mango SIP, **Table 2** lists the strategic research areas that were considered.

TABLE 2. Mango research priorities

AMIA priorities	AFPA strategic priority areas
Marketing	Sustainability (climate change, water, packaging and shelf life)
Market access	
Communication	Trade (market access, industry capability development, technical exchange with export markets)
Public affairs	
Biosecurity	Biosecurity (managing pest and disease, integrated pest management (IPM), chemistry)
	Food safety (systems and technology)
	Pollination (bees and flies, alternate pollinators, pollination in production systems)

Collaboration across the agriculture research community is also essential, including with organisations such as the CSIRO, universities, private enterprise and state government agencies. Hort Innovation is a member of the National Horticulture Research Network (NHRN) together with other senior horticultural R&D representatives from state and Australian Government agricultural agencies. The NHRN is responsible for the development and implementation of the broader Horticulture RD&E Strategy under the National Primary Industries RD&E Framework.

During the engagement process, key delivery partners were contacted including lead agencies within the NHRN Framework as well as specific delivery partners for each industry. The lead agencies involved with the mango industry investment program, Department of Agriculture and Fisheries, Queensland (DAFQ), and Northern Territory Department of Industry, Tourism and Trade (DITT), were engaged during the development of this SIP to ensure consideration and strategically aligned priorities for the mango industry. In addition, priorities and opportunities identified within the strategic plans of national and state agencies and research organisations have been considered where applicable.

TABLE 3. Government and key agency priorities

DITT priorities	DAFQ priorities	Rural RD&E for Profit priorities	Australian Government Science and Research priorities
Climate variability and variety/region flower and fruit drop, plant host and pathogen interactions	Orchard intensification	Advanced technology	Food
Integrative effect soil/plant health/climate on fruit quality	IPDM of tropical tree crops	Biosecurity	Soil and water
Postharvest handling	Supply chain management practices to optimise fruit quality	Soil, water and managing natural resources	Advanced manufacturing
Early detection and fast diagnostics of disease and pest threats	Climate change and orchard resilience	Adoption of R&D	Environmental change
IPM – insects			Health

This SIP has been developed alongside the government and key agency priorities listed in **Table 3**, with consideration of issues faced by the mango industry. These strategic areas further emphasise the opportunity and importance of cross-industry and regional collaboration. All the priority areas are of importance to Australian horticulture, and these will play a role in driving the efficiency and effectiveness of investment across the sector.

Annual investment planning

Specific investments to address the SIP strategies and align with industry strategic priorities will be outlined in detail each year via the mango AIP. Investment decisions are guided by the SIP and prioritised based on potential industry impact, as well as the availability of levy funds each year. The AIP will be developed with input from the mango SIAP, which is made up of growers and other industry representatives as well as IRBs and other key stakeholders. Wherever possible, investments will be aligned to form multi-industry projects to increase the efficiency of funding availability. Details of the SIAP can be found on the Hort Innovation website [here](#), and the AIP will be published on the same page each year.

Investment opportunities through Hort Frontiers

Innovation is key to the future success of Australian horticulture. The next evolution of the long-range, higher risk and transformational R&D that has the potential to make a significant impact will be possible through Hort Innovation's Hort Frontiers strategic partnership initiative.

Hort Frontiers is a strategic partnership initiative that facilitates collaborative, cross-industry investments focused on the longer term and more complex themes identified as critical for Australian horticulture by 2030. The partnership framework is currently being established and will include a number of key investment themes for potential investment to guide the initiative and drive transformational R&D across horticulture. Key investment themes will include:

- Environmental sustainability (water, soil and climate)
- Pollination
- Green cities
- Biosecurity
- Health, nutrition and food safety
- Advanced production systems
- International markets
- Leadership
- Novel food and alternate uses (waste reduction).

The development of these areas for investment will benefit all of horticulture, with support from partners with aligned priorities to co-invest in deliverables identified that require alternative funds available outside the levy. Hort Frontiers is being developed to align with the Australian-grown Horticulture Sustainability Framework and invest in specific impact areas to drive innovation and sustainability initiative.

The mango industry views a number of these investment areas as opportunities for success into the future, including:

- Climate variability
- Transformational biosecurity
- New crop protection tools
- Intensive production systems
- Genetics of fruit sensory preferences
- Farm automation
- International market development and access
- Leadership.

Partnering with Hort Frontiers on these areas would provide the mango industry with opportunities for access to world-class research, specialised project management teams and large-scale R&D.

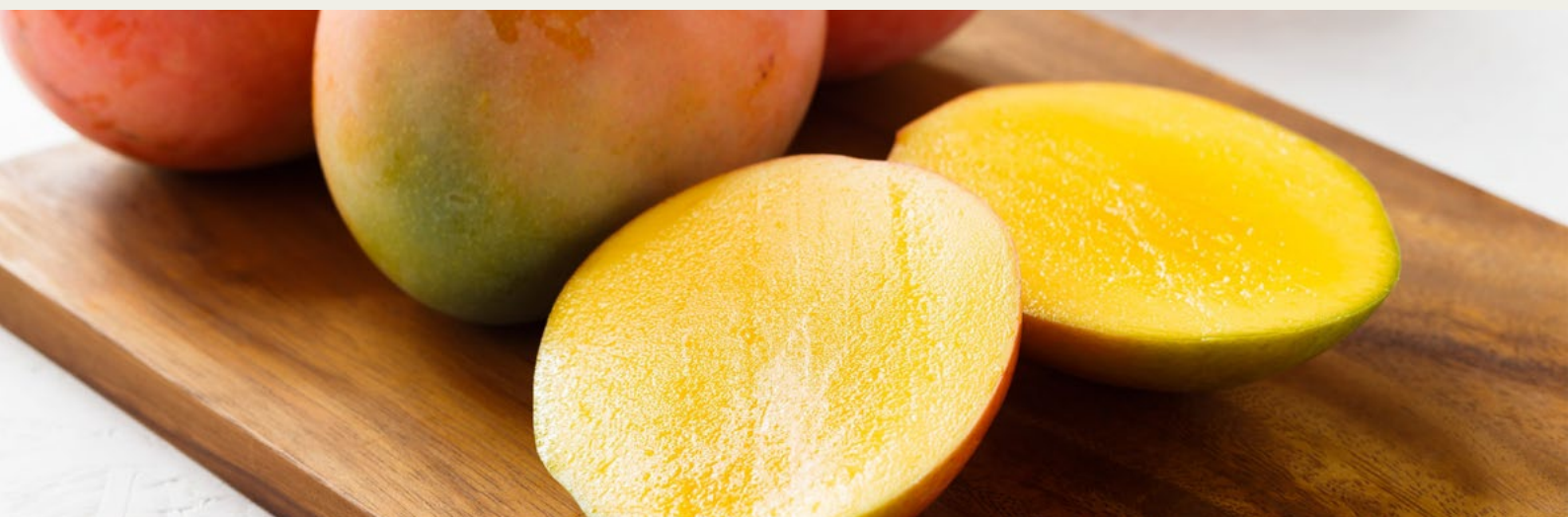


Australian-grown Horticulture Sustainability Framework

Hort Innovation has developed the Australian-grown Horticulture Sustainability Framework, aiming to strengthen the horticulture industry’s sustainability to meet the changing expectations and needs of growers, consumers, the community, investors and governments. The framework applies across the whole of Australian horticulture, including fruits, vegetables, nuts, nursery stock and turf. Through widespread consultation with industry and external groups, proposed sustainability goals and indicators were identified and are detailed within the framework. The framework is aligned to the UN Sustainable Development Goals.

Four key pillars were identified in the framework (*Figure 1*).

FIGURE 1. Four key pillars of the Australian-grown Horticulture Sustainability Framework



The framework should be cross-referenced when undertaking prioritisation of investments. At the time of publication, Hort Innovation is working with industry groups regarding the overall responsibility for the framework, setting and reporting progress against the framework targets and performance measures.

View the Australian-grown Horticulture Sustainability Framework on the Hort Innovation website [here](#).

Table 4 provides examples of mango SIP strategies showing how the industry is already aligning to the framework.

TABLE 4. Mango SIP strategy examples showing how the industry is already aligning to the Australian-grown Horticulture Sustainability Framework

Strategy	Impact	Sustainability goal
Develop management strategies for maintaining yield and quality in variable climates including optimising fruit set, fruit drop, and fruit manipulation optimised for increased yields	<ul style="list-style-type: none"> Industry resilience for maintaining yield in variable climates Prioritisation of opportunities for yield gains 	Planet & Resources
Increase domestic consumer demand for Australian mango through improving overall product and varietal knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Increased consumer demand for Australian mangoes Positive influence on consumer preference, knowledge, attitudes, and purchase intent 	Nourish & Nurture
Increase international consumer awareness and preference for fresh, quality Australian mango through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Increased consumer demand for Australian mangoes 	Nourish & Nurture
Identify and support opportunities to improve productivity and high-density systems	<ul style="list-style-type: none"> Increased grower options for yield gains and global competitiveness Improved productivity with high-density systems 	Planet & Resources
Enhance crop pollination and resilience through improved pollination security	<ul style="list-style-type: none"> Mango growers can engage in carbon markets 	Planet & Resources



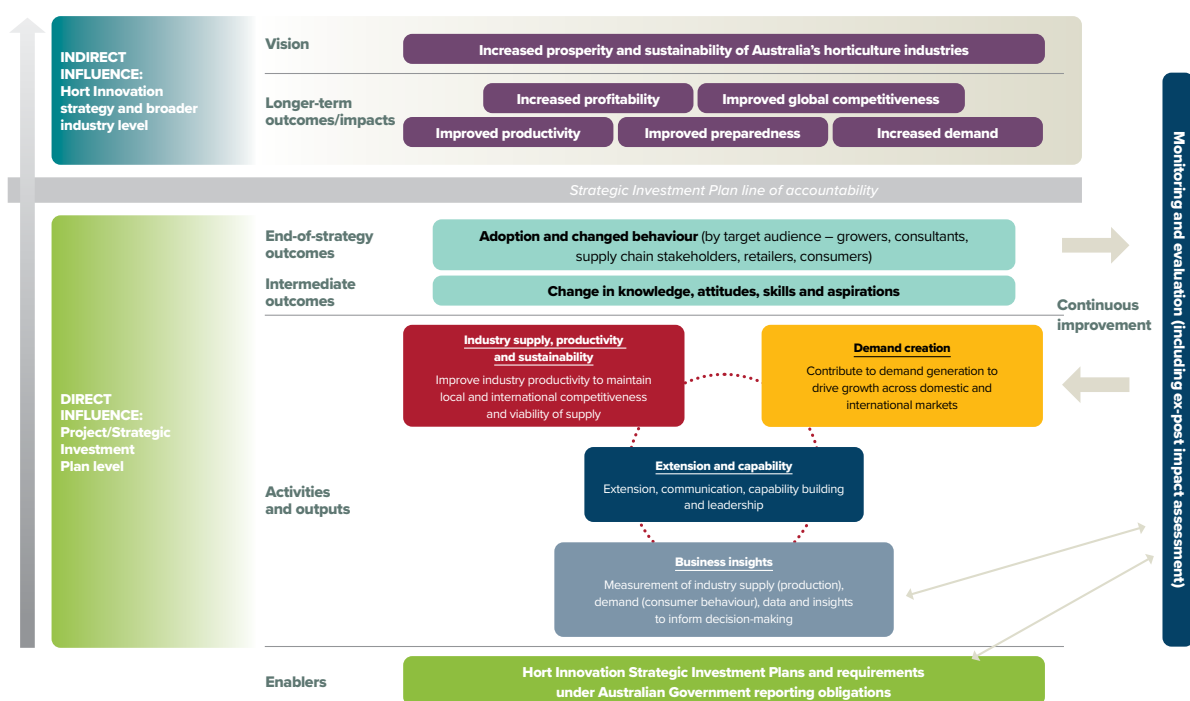
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Strategic Investment Plan logic

The SIP logic (Figure 2) identifies how investment activities and outputs (delivered through each SIP outcome area) will support changes in industry KASA, which drive adoption and behaviour change. Beyond the SIP, investment will contribute to driving longer-term impacts for the sector like increased preparedness, demand, productivity, global competitiveness and profitability. Realising these impacts will support Hort Innovation’s vision of increased prosperity and sustainability of Australia’s horticulture industries.

FIGURE 2. Strategic Investment Plan logic



Aligning to Hort Innovation investment priorities

Hort Innovation is committed to sustainable growth in horticulture, with the overarching aim of increasing the sector’s value to \$20 billion by 2030. We will do this through implementing the SIP and investments against the three core pillars, committed to:

1. Drive knowledge and innovation into horticulture industries
2. Deliver the highest value R&D, marketing and international trade investments across industries now and into the future
3. Enable activities that drive all strategic imperatives.

Hort Innovation is governed by a Deed of Agreement with the Australian Government, which allows for the transfer and

investment of levies and Australian Government contributions. As a Research and Development Corporation (RDC), Hort Innovation is able to leverage industry levy investments in RD&E with Government funds up to a value of 0.5% of the industry’s gross value of production. All investments made by Hort Innovation are thoroughly considered to ensure they contribute to the guiding performance principles:

- Productivity
- Profitability
- Preparedness for future opportunities and challenges
- Competitiveness
- Demand: demonstrates how productivity, preparedness and demand lead to profitability and competitiveness and sustainability.



APPENDICES

APPENDIX 1: Industry context

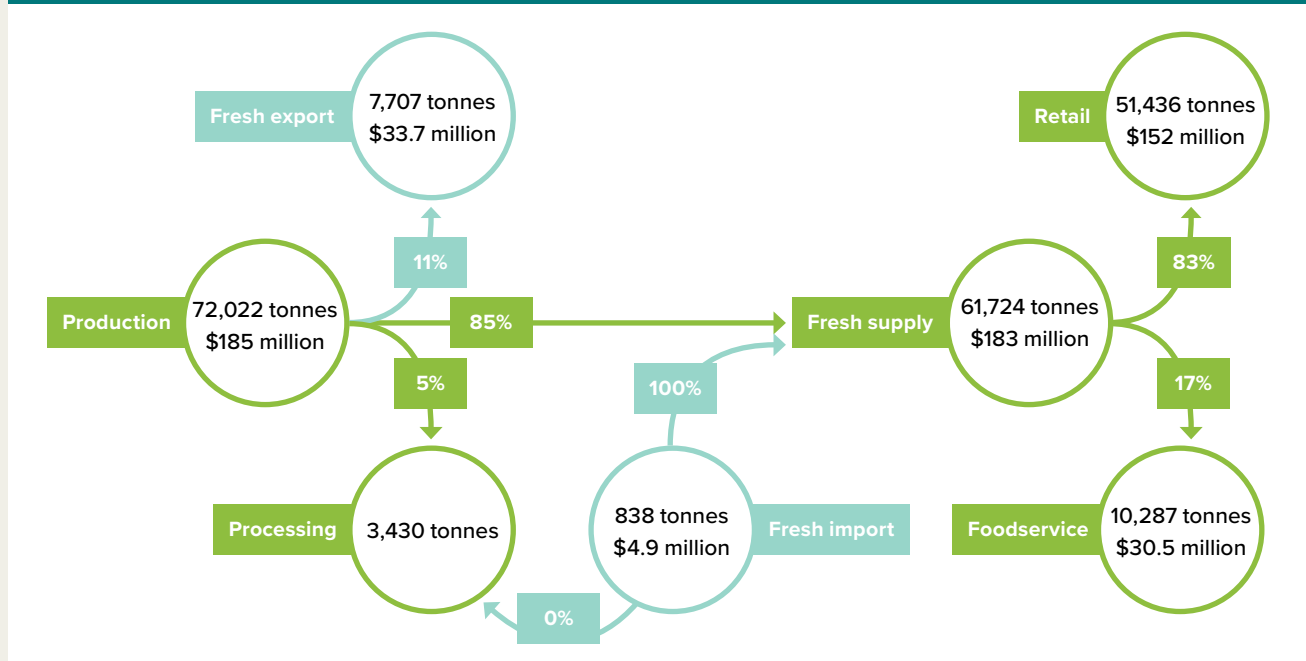
Industry value chain

The Australian mango industry is a high-value tropical fruit industry with approximately 800 mango growers. In addition, the mango supply chain is supported by agronomists, ripeners, consolidators, distributors, wholesalers, retailers and freight providers. Most Australian mangoes are supplied for the fresh domestic and export markets, with only 5% of fruit that is otherwise unsuitable for fresh consumption being processed.

Harvest and postharvest handling of a mango crop is labour intensive and complex because of the fragile nature of the fruit leading to losses from disease and blemishes. Careful postharvest handling throughout the supply chain is critical to maintaining fruit quality. The industry relies heavily on casual seasonal labour to support the manual harvest of the crop.

The mango industry has increased its focus on quality, which has been a key component underpinning the value chain. Quality standards have been established, including dry matter and brix content measured using non-invasive technologies, such as near infrared (NIR) technology calibrated to each variety. While there have been some challenges with NIR calibrations for mango quality, increasingly quality parameters are being measured on-farm and throughout the supply chain

FIGURE 3. Mango supply chain, 2019/20



Source: Australian Horticulture Statistics Handbook (2019/20)

Domestic consumers and drivers of demand

The domestic fresh market is the most important channel for the Australian mango industry which accounted for 84% of the total production volume in 2019/20. The domestic market has continued to grow in recent years underpinned by an increased availability of product across an extended season, increased engagement by major retail channels in merchandising and improved consistency in product quality. Results from consumer research show that satisfaction with sweetness (as a driver of quality) has increased from 82% in 2014 to 86% in 2019, and flavour satisfaction increasing from 83% to 87%¹.

¹ MG19000 Consumer market research for Australian mangoes 2019-20

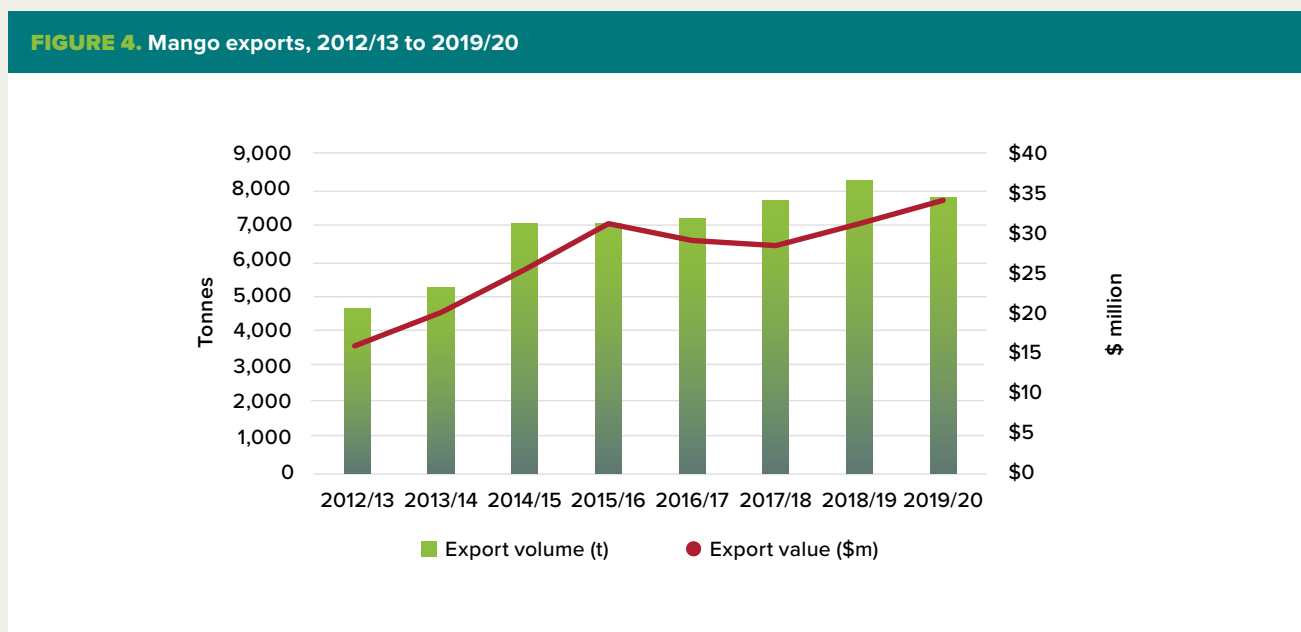
Strategic industry promotions have also delivered increased consumer awareness of ‘Aussie Mangoes’, which has supported purchase intent.

Nielsen Harvest to Home data for the 52 weeks to 22 March 2020 indicates that mango consumption increased by 11.8% compared to the previous 52 weeks in terms of volume, and 7.1% in terms of dollar sales. For the percentage of households purchasing mangoes, the average amount spent per household and the average weight purchased per household all increased.

The cumulative impact of increased domestic demand has ensured that the unit value of mangoes has continued to be supported at retail and farmgate, which supports grower profitability.

To ensure that quality fruit reaches consumers in the highly competitive summer season, the industry has invested in quality improvement Hort Innovation projects including *Quality standards, refinement and testing* (MG15002), which resulted in a uniform quality standard and a means for testing this, which is now carried out across the industry with the end goal of meeting and exceeding consumer expectations.

Export markets



Source: Australian Horticulture Statistics Handbook (2019/20)

Export volumes have remained relatively stable over the past five years, both in terms of value and volume, after significantly increasing from 2012/13 to 2014/15 (Figure 4). 7,707 tonnes of mangoes were exported valued at \$33.70 in 2019/20. Exports represented 11% of production volume in 2019/20, a figure which has also been relatively unchanged since 2012/13.

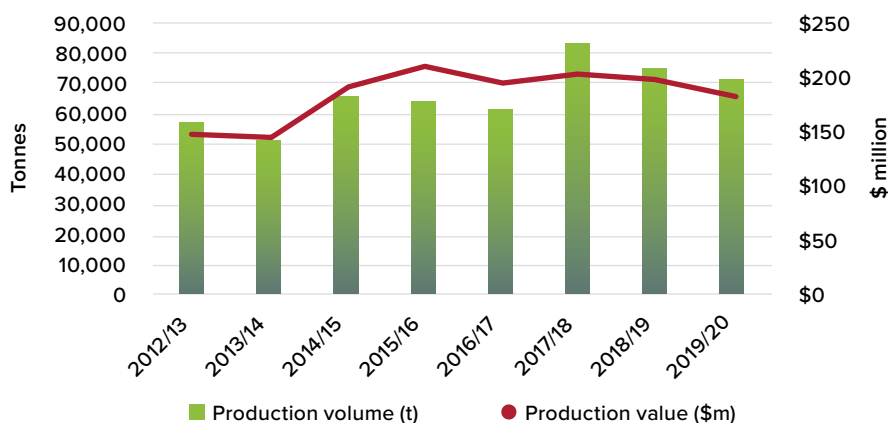
The next frontier for the mango industry, following the successes achieved in the domestic market, is to grow access to more international markets in Asia, Europe and in the USA, which accounts for approximately 30% of global mango imports. The industry could create a diversified portfolio of export markets to reduce the vulnerability to the many external risks which come with international trade.

Currently the mango industry exports primarily to Hong Kong, New Zealand, Singapore, UAE, and the USA. Australian mangoes are positioned in these markets as a premium product with unique varieties and flavour profiles that provide counter-seasonal supply to the northern hemisphere.

Small volumes of fresh mangoes are imported during May to August from Thailand, Vietnam, and Mexico. However, these do not compete directly with the Australian product.

Industry production

FIGURE 5. Mango production, 2012/13 to 2019/20



Source: Australian Horticulture Statistics Handbook (2019/20)

Australian mangoes are grown mostly in the tropical and subtropical regions of Australia. Queensland and the Northern Territory accounts for 96% of production volume in 2019/20. Smaller volumes are also grown in Western Australia and Northern New South Wales (Figure 5).

The production volume of mangoes has increased by 25.9% since 2012/13 to 2019/20 with production value also growing by 26.7%.

Mangoes are grown over the summer months primarily from November through to January, with peak production volume occurring in December. More recently the mango season has been extended to cover more than half the year, with mangoes available in commercial quantities as early as July and as late as March (Table 5).

The most common mango variety grown is Kensington Pride (43% of production volume), followed by Calypso (25%), R2E2 (19%), and Honey Gold (8%). Other varieties including Brooks, Keitt, Palmer and Nam Dok Mai, which account for 5% of volume.

The industry has invested significantly in extension activities to increase the capability of industry and foster a culture of innovation. For example, the Hort Innovation project *Building best management practice capacity for the Australian mango industry* (MG17000) assists growers with on-farm maturity testing, export development and crop protection.

TABLE 5. Seasonality of mangoes in Australia

STATE	19/20 TONNES	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
New South Wales	781							Low	Medium				
Queensland	32,410				Medium	Medium	Medium	Medium	Medium	Low			
Western Australia	2,161				Medium	Medium	Low	Medium	Low				
Northern Territory	36,670	Low	Low	Medium	Medium	Medium	Low						
Availability legend		High			Medium			Low					None

Source: Australian Horticulture Statistics Handbook (2019/20)

APPENDIX 2: Mango industry situation analysis

At the time of refreshing the SIP in 2021, the global coronavirus (COVID-19) pandemic continues to affect horticulture industries to varying degrees. The outcome and ultimate impact of the pandemic are unknown. Investment areas that may be influenced over the period of this SIP include export and trade relationships, domestic and international demand, logistics and supply chain, labour supply – all have potential impacts on grower profitability.

Environmental, economic, and social sustainability are vitally important to Australian horticultural growers and industries. Customers, consumers, and investors also seek information about the sustainability and ethics of how their food is produced. Sustainability is particularly crucial as topics such as climate variability, health and ethics continue to shape the social, environmental, and political landscape for agricultural industries. The impact of these issues may have influence on a whole range of investment areas for horticulture from production practices and land management, demand and reputation of products, quality expectations and cultural/community engagement.

Strengths, weaknesses, opportunities and threats

Table 6 has been used to analyse the mango industry's strengths, weaknesses, opportunities, and threats (SWOT). The SWOT tool assists the industry to build on what works, observe what is lacking, minimise risks, and take the greatest possible advantage of chances for success.

TABLE 6. Mango SWOT analysis

The mango industry	
Strengths	<ul style="list-style-type: none"> • Good product, unique flavour, versatile, healthy; consumers have an emotional tie • Diversity of varieties; diverse product that can be used in many ways • Seasonality/long season and long production window; countercyclical season to competitors; confined season makes the mangoes special – they 'own' summer • High demand (both domestic and export) • Australian varieties are unique in international markets as they are novel in nature • Stable production base: (have) good idea of who is producing mangoes across Australia; consolidation of producer enterprises



The mango industry	
Weaknesses	<ul style="list-style-type: none"> • Short and intense harvest period, with heavy a heavy peak production window, stretches and often exceeds the capacity of key supply chain infrastructure and transport. This a short and intense harvest period can create other issues, such as access to sufficient and appropriate labour for harvest • Impact of seasonality within a year and between years; weather impact on production and marketing cycle • Limited funds available for R&D and marketing requirements of the industry • Extension services insufficient to cover the whole of the industry, particularly given large geographical territory, and to enhance the uptake of new practices and technology • Communications (from industry groups to growers and departments to growers) would be more effective to target producers about localised issues • Difficulties in accessing reliable distribution networks; export and domestic supply chain coordination; logistics; unreliable temperature control during transit • High level of waste at retail due to poor quality of fruit resulting from supply chain management and or harvest issues • Export: fragmented market and lack of coherent branding in export markets. High costs and regulatory challenges faced for Australian mango industry to export • Biosecurity: lack of preparedness for exotic incursions; incursion management at industry level and biosecurity on-farm and biosecurity in other countries; lack of information on the status of exotic diseases in neighbouring countries • Access to and reliance on chemicals
Opportunities	<ul style="list-style-type: none"> • Export expansion includes seeking high value, fast-growing niche markets • Increase frequency of purchase and number of mangoes per purchase • Branding/market segmentation/consumer understanding of mango varieties and demographics: continue to understand consumer preferences and insights • Improved extension, including use of technology and adoption • Access to labour, including skilled labour and seasonal pickers for harvest • Advanced technology: robotics and real-time measures of crop forecasting • Variety improvement (climate adaption, territory expansion, quality) • Value-add opportunities for waste • Tap into innovative R&D in other industries and overseas • Speed up new productions systems through rootstocks, high density orchards and novel genetics • Improve industry alignment and cohesiveness
Threats	<ul style="list-style-type: none"> • Imports: market displacement and biosecurity • Competition from other fruit available during mango season • Domestic oversupply and subsequent price impacts • Other industries competing for investment and researchers • Chemical residues, market access, chemical regulation changes, access to new chemicals • Climate variability • Ageing industry (demographics) • Production costs, including labour • High turnover of staff, including retail • Difficulties in attracting labour and accessing skilled labour • Environmental issues with water, regulation on land management; regionally based threats

APPENDIX 3: People consulted

The following people are acknowledged for their contribution to the mango SIP development process.

NAME	INDUSTRY ROLE	REGION
Alan Ruttiman	Grower	Queensland
Andrew Macnish	Researcher	Queensland
Andrew Robson	Researcher	New South Wales
Ben Martin	Grower; Chair, Australian Mangoes Industry Association; Mango SIAP member	Far North Queensland
Benjamin Reilly	Industry	Queensland
Brett Kelly	CEO, Australian Mangoes Industry Association	Queensland
Craig Shepard	Researcher	New South Wales
Dale Williams	Grower; Mango SIAP member	Queensland
Dario Stefanelli	Researcher	Western Australia
David Morcombe	Board member, Australian Mangoes Industry Association	Western Australia
Debbie Nucifora	Grower	Queensland
Galen Waterford	Researcher	Canberra
Gavin Scurr	Grower	Queensland
Geoff Dickinson	Researcher	Queensland
Ian Bally	Researcher	Queensland
Ian Groves	Grower; Mango SIAP member	Queensland
Joe Moro	Grower; Mango SIAP member	Queensland
John Nardi	Grower	Far North Queensland
Joseph Ling	Grower	Western Australia
John Nucifora	Grower; Board member, Australian Mangoes Industry Association	Queensland
Karl Gygar	Board member, Australian Mangoes Industry Association	Southern Queensland
Kerry Walsh	Researcher	Queensland
Leo Skilros	NT Mango Industry Association	Northern Territory
Linda Bachmann	Representative, Australian Mangoes Industry Association	Queensland
Marie Piccone	Grower; Mango SIAP member	Far North Queensland
Marine Empson	Representative, Australian Mangoes Industry Association	Queensland
Martina Matzner	Grower; Mango SIAP member	Northern Territory
Muhammad Sohail Mazhar	Researcher	Northern Territory
Noel Ainsworth	Researcher	Queensland
Petrena Welch	Representative, Australian Mangoes Industry Association	Queensland
Reiko Nishiyama	Industry participant	Queensland

Continued >>

NAME	INDUSTRY ROLE	REGION
Samantha Frolov	Grower; Mango SIAP member	Queensland
Sarah Hain	Industry Development Officer; Representative, Australian Mangoes Industry Association	Northern Territory
Tara Slaven	Researcher	Western Australia
Saramat Ruchkaew	Grower	Northern Territory

In addition to the above, the following consultation was undertaken:

Mango industry SIP refresh workshops held on 30 and 31 March 2021 via Zoom (*originally planned face-to-face which could not occur due to COVID-19 restrictions*). 35 participants attended the session, including growers, industry stakeholders and researchers.

APPENDIX 4: Reference material

Footnotes

1. Horticulture Innovation Australia Limited, 2020, Consumer market research for Australian mangoes 2019/20 (MG19000), <https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mg19000/>

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Horticulture Innovation Australia Limited, 2020, Consumer market research for Australian mangoes 2019-20 (MG19000)



APPENDIX 5: List of acronyms

AMIA	Australian Mango Industry Association
AFPA	Australian Fresh Produce Alliance
AIP	Annual Investment Plan
APVMA	Australian Pesticides and Veterinary Medicines Authority
BMP	best management practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFQ	Department of Agriculture and Fisheries, Queensland
DITT	Northern Territory Department of Industry, Tourism and Trade
FY	financial year
GI	glycemic index
IDM	integrated disease management
IPDM	integrated pest and disease management
IPM	integrated pest management
IRB	Industry Representative Body
KASA	knowledge, attitudes, skills and aspirations
KPI	key performance indicator
M&E	monitoring and evaluation
MRL	Maximum Residue Limit
NHRN	National Horticulture Research Network
NIR	near infrared
PHA	Plant Health Australia
R&D	research and development
RDC	Research and Development Corporation
RD&E	research, development and extension
SARP	Strategic Agrichemical Review Process
SIAP	Strategic Investment Advisory Panel
SIP	Strategic Investment Plan
SWOT	strengths, weaknesses, opportunities and threats
UAE	United Arab Emirates
UN	United Nations
USA	United States of America



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