



Australian Coffee Strategic RD&E Plan

by Stuart Orr and Gustavo Escudero
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Australian Coffee Strategic RD&E Plan

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AgriFutures Australia contact details

Building 007, Tooma Way
Charles Sturt University
Locked Bag 588
Wagga Wagga NSW 2650

02 6923 6900
info@agrifutures.com.au
www.agrifutures.com.au

Author contact details

Stuart Orr
Deakin University
221 Burwood Highway
Burwood VIC 3125

03 9244 5535
s.orr@deakin.edu.au

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This Strategic RD&E Plan is the result of extensive desktop research and stakeholder consultation across the Australian coffee industry and pulls together specific recommendations for future investment to support the long-term growth and competitive advantage of the Australian coffee industry.

Foreword

The first recorded coffee consumption in Australia dates back to British colonists arriving in 1788. Coffee growing in Australia commenced during the 19th century. The industry today consists of about 50 commercial coffee growers.

Most coffee production is located in north Queensland and north-east New South Wales, with a small amount grown in south-east Queensland. National annual production is approximately 600 tonnes of green beans from about 850,000 trees, which supplies about one per cent of the coffee consumed nationally.

High-quality products, low food miles and little to no use of pesticides and herbicides are some of the natural advantages of Australian-grown coffee. These benefits provide the industry with great opportunities to grow and take a larger share of the Australian coffee market.

The development of a Strategic Research, Development and Extension (RD&E) Plan is a crucial first step in growth for an emerging industry. This Strategic RD&E Plan clearly identifies opportunities and barriers to industry growth and subsequent RD&E priorities for the industry. Strategic RD&E Plans for emerging industries are resources that can be used by industry to help drive investment and growth within the industry.

This Strategic RD&E Plan is the result of extensive desktop research and stakeholder consultation across the Australian coffee industry and pulls together specific recommendations for future investment to support the long-term growth and competitive advantage of the Australian coffee industry.

This report has been produced as part of AgriFutures Australia's Emerging Industries Program, which focuses on new industries with high growth potential. Emerging animal and plant industries play an important part in the Australian agricultural landscape. They contribute to the national economy and are key to meeting changing global food demands.

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Michael Beer
General Manager, Business Development
AgriFutures Australia

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1 Executive summary

The Australian coffee industry is poised to develop into an internationally competitive sector. The industry has identified a premium segment of the market willing to pay higher prices for Australian coffee that could be attracted with the appropriate narrative.

This narrative would include factors such as low food miles, lack of pesticides and regional branding, and would be supported by increased industry production capacity, knowledge, different cultivars and centralised processing.

To date, the industry has established a solid but mostly small-scale base. In order to establish the industry narrative and improve cost performance as well as production capacity, the industry needs to attract more large-scale growers to the current northern New South Wales and Queensland coffee production areas.

The key issues that the industry is dealing with are:

- The need for a new semi-dwarf cultivar that reduces the cost, time and production loss associated with pruning.
- Achieving a critical mass of coffee-growing capability.
- Establishing an identity that is supported by regional growers and will attract new growers.
- Establishing centralised facilities for processing coffee cherry.
- Centralising, managing and disseminating industry knowledge and approaches as they are developed.
- Creating a narrative to attract new growers to increase capacity and broaden the industry skill base

The industry's strengths are its:

- Product passion
- Research connections
- Established and active subtropical region association
- Authoritative and up-to-date industry growers guide

This Strategic RD&E Plan recommends that:

- Regional post-growing processing services be established to increase quality control, reduce waste and reduce costs.
- Consolidated regional identities for local growers not wishing to develop their own brand be established to achieve economies of scale in marketing and to meet the production capacity requirements of distributors and roasters. Many growers would prefer to maintain an independent approach to marketing their bean, either as green or roasted.
- A new semi-dwarf cultivar that is suitable for machine harvesting be introduced into Australia to reduce pruning activities and provide consistent annual crops.
- A centralised information system, operated through the industry body Australian Subtropical Coffee Association (ASTCA), be established to share results and learnings among industry participants, leading to formalised practice being registered in an industry manual.
- Production capacity (number of trees) be increased to respond to demand from buyers who are committed to Australian coffee and will pay appropriate prices for this quality product.

2 Industry situation analysis

This Strategic RD&E Plan presents the findings from interviews with coffee growers, industry suppliers and customers, industry feedback on a draft of the Plan, and a workshop where the report was discussed. Figure 1 shows the industry value chain. The opportunities to increase industry competitiveness considered in this study involve achieving coordination across the segments of the industry, from growers to distributors.

The project identified two pressing issues that are restraining industry development and that affect the ability of the industry to adopt improvement practices such as environmental sustainability. The first issue is that the industry requires a more productive cultivar for adoption in the subtropical region. The costs associated with pruning and then the loss of production resulting from the vigour of the current K7 cultivar, which is almost exclusively used across the subtropical region of the industry, inhibit development of other industry capabilities, including its environmental sustainability. The industry believes that several overseas rust-resistant semi-dwarf cultivars that are amenable to machine harvesting may be suitable for the subtropical environment and should be trialled. It also believes that the approval process to introduce suitable new cultivars is not progressing sufficiently quickly to meet the industry's needs. A number of cultivars are required to give growers choice based on their location and production aims.

The second issue identified by the industry has two significant dimensions. Firstly, the industry is struggling with the price of land in subtropical regions suitable for coffee growing. Although there is suitable farmland not yet dedicated to horticulture in this area (including grazing land), the land costs preclude new market entrants and encourage existing producers to exit the coffee-growing industry. The production limitations resulting from the vigour of the current cultivar, which requires frequent and hard pruning (and thus limits production), are a second barrier to new market entrants. This has limited the scope of the industry to grow and build economies of scale. These issues create uncertainty and instability in the industry and have been identified as factors that interfere with the adoption of environmental sustainability practices and improvement in industry performance.

Despite these challenges, an attractive opportunity exists to identify a premium segment of the market willing to pay higher prices for Australian coffee as either green

bean or roasted coffee, with specific environmental sustainability performance expectations. Identifying this segment and the environmental sustainability outcomes that the industry needs to achieve to make its product attractive will enable the industry to focus on a smaller and more easily achieved range of sustainability outcomes. Developing a system for demonstrating the environmental sustainability of the Australian coffee supply chain will provide a significant competitive advantage against imported coffee for this customer segment. Imported coffee has inherent disadvantages, such as the use of pesticides and, in some cases, fumigation, as well as its distance to market. By comparison, Australian coffee is produced using no or negligible levels of pesticides, is never fumigated and is close to market. Leveraging these characteristics for this segment of the market will help develop a valuable competitive advantage for the industry.

Other opportunities also exist to extend the industry value chain further to include hospitality and tourism, especially for growers located in tourism regions. The key situational issues will now be discussed in detail.

2.1. Key situational issues

The following section describes the current industry context, pressures and needs. This section is followed by sections describing the immediate development opportunities and the barriers to implementing environmental sustainability in the industry. Figure 2 shows that there are several strategic groups operating within the industry. In terms of quality versus price, we see that there are three strategic groups inhabiting the medium-to-high-quality zone but ranging from lower to higher prices. Looking at the production capacity versus location relationships, we can see that coffee growers inhabit two locations and possess both large and small production capacities. This reflects the different conditions, flavour profiles, phenological cycles, terroir, grower density and grower scale of operations. Differentiated strategies are required to centralise both operations and regional identities across these strategic groups. The introduction of new coffee varieties is critical across the industry, however may also require a differentiated approach, depending upon scale and location.

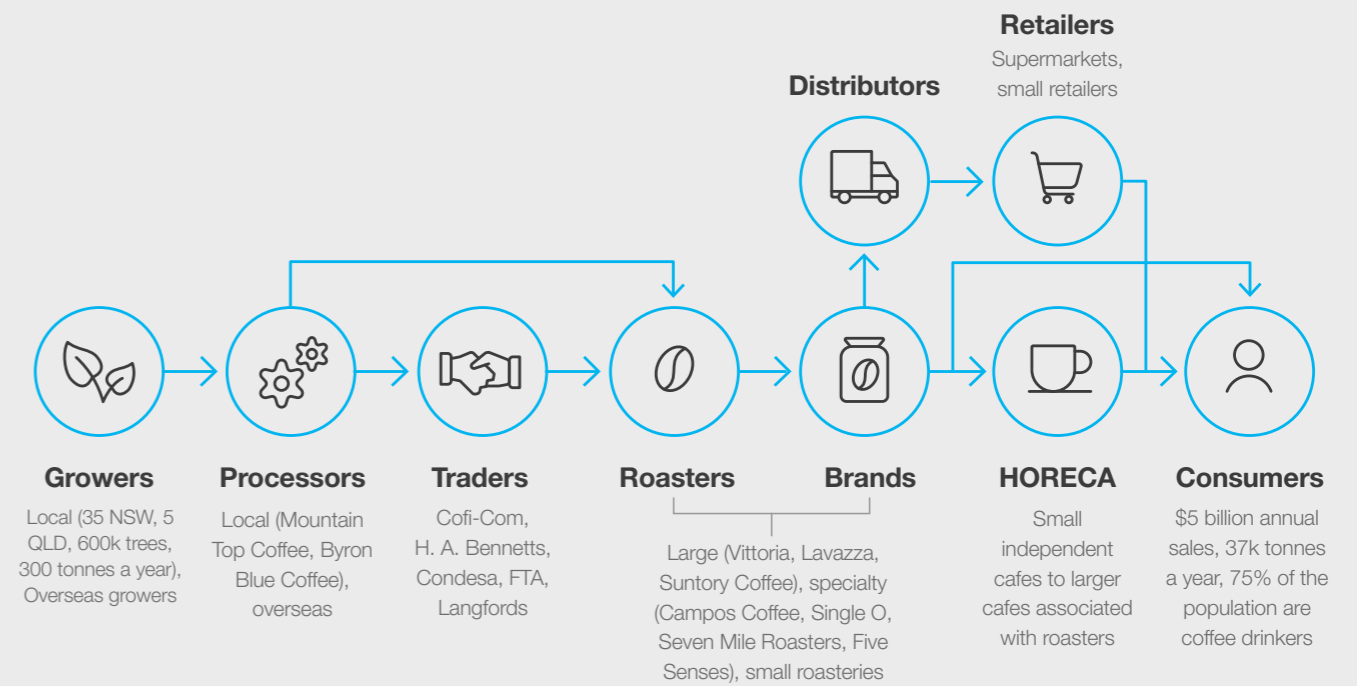


Figure 1: Australian coffee industry value chain. Note: HORECA = Hotels, restaurants and cafes.

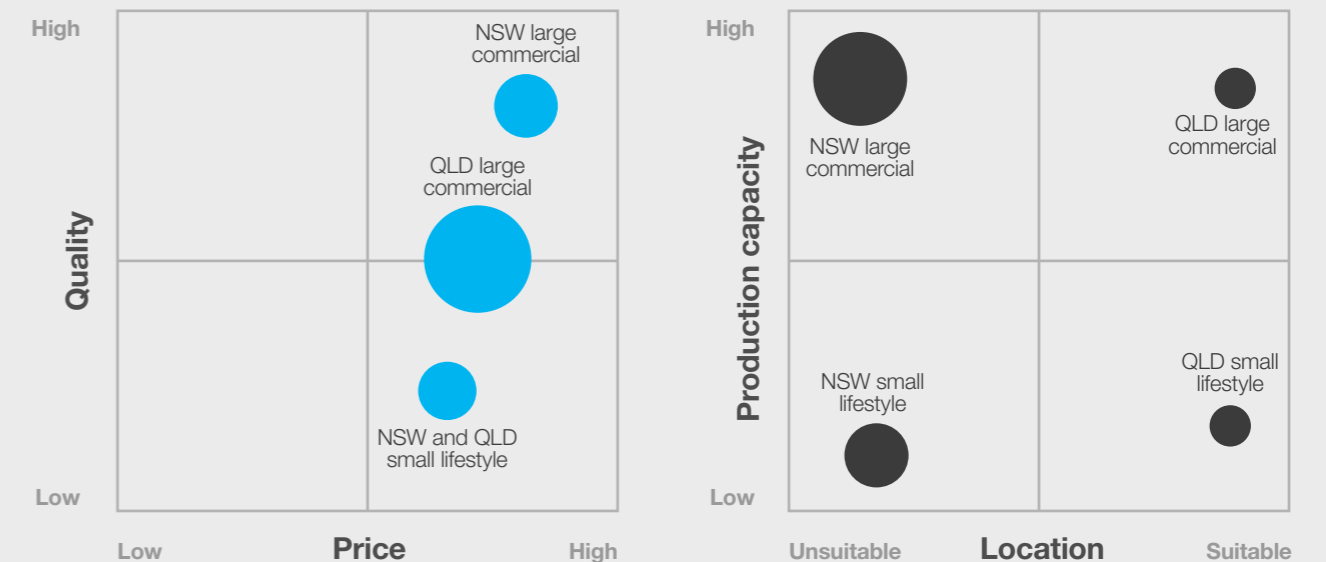


Figure 2: Strategic group maps for the Australian coffee-growing industry.

2 Industry situation analysis

2.1.1. Coordination and collaboration

The industry agrees that it needs to increase coordination and collaboration in order to establish the necessary structure and capabilities required to build an industry narrative, reduce costs and attract more growers. The importance of coordination and collaboration is reflected in Objective 2 of the ASTCA Strategic Plan. Three forms of coordination and collaboration will benefit the industry: within industry coordination and collaboration; coordination and collaboration between the industry and academia; and coordination and collaboration between the industry and other industries.

Increasing coordination and collaboration in the industry would significantly improve its environmental sustainability performance. The industry's established subtropical coffee growers' association has been identified as being critical for coordination and collaboration within the industry and has already made a significant contribution to its coordination to date. Industry has also identified the need for an enhanced communication system that coordinates activities across all stages of the coffee production process and that gathers and distributes ideas among all members of the industry. The establishment of regional identities could be helpful in newly established coffee-growing areas where new growers would benefit from a high level of collaboration as they developed their plantations. This may also help generate support for a coordinated production capacity of small areas of crops on local farms, which would further increase production in the region. Increasing economies of scale in the industry offers many advantages, including reducing costs and increasing the effectiveness of environmental sustainability activities. The similarities in practices among growers identified in this study would simplify coordinating across-industry standard practices,

although competition within the industry may create some barriers to increasing collaboration. The industry association ASTCA focuses heavily on increasing industry collaboration.

The industry is uncertain as to whether the level of cooperation between the industry and academia is currently sufficient, although academia has made a number of valuable contributions to the industry in the past. Southern Cross University was the most frequently identified academic partner, however TAFE and Deakin University have also made valuable contributions. Industry is generally open to collaborating with academic institutions and other industries, especially the macadamia nut industry. These levels of cooperation are likely to introduce new technology, production initiatives and services to the industry.

The ASTCA also would benefit from a stronger link with the wider coffee associations, such as the Australian Specialty Coffee Association (ASCA) and the Australian Coffee Traders Association (ACTA), to open dialogues regarding trends and standards in the delivery of coffee to consumers.

2.1.2. Geographical location

The regional conditions under which coffee can be grown in Australia enable it to achieve the same coffee characteristics as those present in coffee grown in high-altitude northern latitude locations in other countries.¹ The latitude of the New South Wales coffee-growing region means it has similar growing conditions to those of high-altitude growing regions in tropical countries, and results in a slow ripening period through the winter, increasing the quality of the coffee. Taking advantage of the geographical location of coffee growing in Australia is an important part of Objective 7 of the ASTCA Strategic Plan.

Unfortunately, the altitude-latitude combination at which coffee is grown in Australia is a marketing disadvantage for the industry due to customer perceptions of the importance of growing coffee at altitude in northern latitude locations.

Another marketing barrier is the current inability of the industry to achieve economies of scale, which inhibits the development of environmental sustainability practices. The industry believes that ongoing market education is required to overcome this misunderstanding, as well as appreciation of the benefits of a pesticide and of local product. This should form part of the industry narrative and emphasises the 'clean' nature of Australian single-origin coffee and the effect of its unique terroir on flavour. This also supports the importance of identifying a segment of the market upon which to focus when delivering this message and taking advantage of opportunities to share or centralise resources for new growers, small growers or growers wishing to focus on green bean growing. Developing the terroir argument and integrating it with sustainability messages could form part of an industry narrative.

2.1.3. Limited pests and diseases

The absence of major pests and diseases that affect Australian coffee plantations in the Northern Rivers area and presence of only minor diseases in northern Queensland is an advantage for the 'clean, green' characteristic of Australian coffee and the industry's environmental sustainability practices. The reduced need for pesticides and other environmentally unfriendly treatments leads to pesticide-free product and allows for greater flexibility in the farm practices that can be adopted (such as natural approaches to building healthy soils). Taking advantage of this important characteristic is recognised in Objectives 2, 5 and 7 of the ASTCA Strategic Plan. This 'clean, green' advantage also applies to competition between coffee and other discretionary purchase high-end Australian products, such as macadamia nuts. Pest and disease management in these other industries constrains processes and introduces the need to use pest control agents, as well as limiting those industry's farm-based sustainability initiatives options.

The 'clean, green' feature of Australian coffee is an important aspect of the environmental sustainability of the product and could form the basis of a marketing campaign. While some growers have established successful individual brands that incorporate these features, there is an opportunity to make more use of this important industry characteristic. Larger-scale marketing, of the type that would result from larger industry scales and collaborative industry-level marketing, may be necessary to effectively convey these messages to a larger market segment. This collaborative marketing would be of particular benefit to new growers to the industry, as existing growers have established brands and markets. Increased industry-level marketing representing all growers or regional growers will have a greater impact on buyer behaviour – especially in the premium market segment.

2.1.4. Australian societal expectations

The importance of social expectations such as environmental sustainability and the use of technology are opportunities for the Australian coffee industry. In particular, the attention paid to science and technology in Australia and its regulations provides an opportunity to develop new practices in the industry. These technologies could be used to create a competitive advantage relative to other coffee-producing countries that do not have access to high levels of technology nor the infrastructure to support it. This approach would assist with the development of a narrative for Australian coffee that reflects these values and enables it to compete with imported coffee, as well as with attracting new growers to the industry to increase its production capacity and skill base.

¹"Altitude itself is less important than the interaction of altitude, latitude, aspect and slope and their combined effect on temperature and light." – Zimbabwe Coffee Growers Handbook.

"Shade plays a similar role to altitude, by providing a microenvironment that favours good berry growth. It delays pulp maturity and, thus, produces a drink with considerable added value. Yields are lower but more stable from year to year and/or better quality." – Vaast P., Project Coordinator, CIRAD.

"At lower altitudes, unshaded coffee production decreases in response to increasing heat stress, while at higher altitude, it decreases due to low temperatures and possible wind damage." – Wintgens J. N., Coffee: Growing, Processing, Sustainable Production, page 404.

2 Industry situation analysis

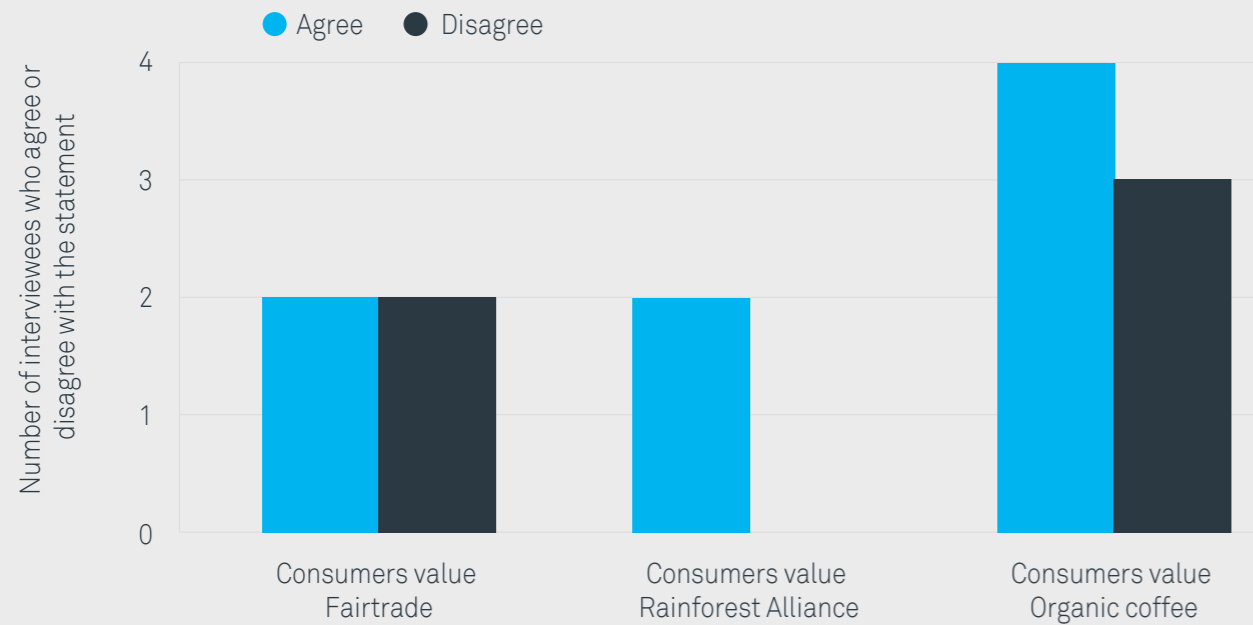


Figure 3: Value of environmental sustainability certifications.

2.1.5. Industry certifications

The study identified a number of production characteristics that could form part of an industry narrative to attract a greater market share, including certification. Certification is reflected in Objectives 6 and 7 of the ASTCA Strategic Plan. Three existing certification schemes are relevant to coffee sales in Australia: Fairtrade, Rainforest Alliance and Organic. The industry identified all of these as having potential marketing benefits, including the fact that Australian coffee is produced under fair trade conditions. Rainforest Alliance certification was considered to be a source of market advantage for coffee sales in Australia, however the certification is difficult to achieve. Important dimensions of this certification for coffee growing would include soil management, maintaining growing conditions and the protection of native vegetation.

Organic certification was perceived by the industry to be the most attractive source of competitive advantage of the three forms of certification, although there

was some uncertainty among the participants in the study about this advantage (Figure 3). Achieving, maintaining and using Organic certification to achieve competitive advantage is a major challenge (Figure 4). Some distributors and roasters in the industry, however, use Organic certification as a criterion for selecting suppliers. An interesting alternative would be to introduce an industry standard certification that could include criteria such as natural, sustainable and local.

The industry has also considered alternative designations, including 'natural' coffee, which refers to coffee produced with minimal artificial interventions, such as herbicides. The lack of need for pesticides on the farm and fumigation for transportation, however, is the key aspect of sustainability certification that this industry needs to pursue. An 'Australian Coffee' brand or certification that includes a pesticide-free certification is a logical option for an industry narrative, and could be incorporated in all labelling and communication.

Technology is also important in this industry, both for reducing costs through mechanised harvesting, for example, as well as in other stages of the process. Incorporating state-of-the-art technology in the bean processing stage so that standards are maintained at a meticulous level was identified as an important product feature by distributors and roasters.

2.1.6. Industry costs

Implementing practices that increase coffee production relative to the required inputs is an important opportunity for development in this industry. The need for this is identified in Objective 4 of the ASTCA Strategic Plan. Effective pruning is the most significant factor affecting coffee production. The industry currently adopts a range of pruning frequencies, which generally result in the loss of one or two seasons of production by interfering with flowering cycles. Hand pruning using arborist chainsaws or small tractor saw blades has less impact on production levels and subsequently gives a better ratio of product to inputs, making operations more environmentally sustainable. Replacing the trees every 10-15 years may also lead to higher overall production levels and improve the farm product-to-input ratio, and thus the environmental sustainability of the operations as the trees produce their best crops when 5-9 years old. This is an area where the CSIRO may be able to conduct helpful studies. Manual harvesting reduces the overall energy inputs required, however does not result in an economically sustainable coffee operation. Making greater use of the by-products of coffee processing also offers an opportunity for the industry to increase the outputs from the growing process. Potential products include jam and tea made from coffee cascara, dried coffee flour and even distilled alcoholic beverages, which can be incorporated into cosmetics and other personal care items.

2.1.7. Current levels of environmental sustainability in the industry

Generally, the industry strongly focuses on environmental sustainability at the farm level, however there are opportunities to make further improvements to this practice (Figure 5). Environmental sustainability is part of Objectives 6 and 7 of the ASTCA Strategic Plan. The industry is interested in developing its environmental sustainability practices and believes that environmental sustainability is important to many of its customers. As a result, customers, growers, roasters and traders strongly influence the environmental sustainability practices adopted in the industry. Customers are both a support and an influence on the sustainability activities in the industry, however not all customers influenced environmental sustainability levels. In addition, not all customers considered environmental sustainability to be the most important factor in the decision to buy. This suggests that only a segment of the market is positively disposed towards environmental sustainability in Australian coffee. On the other hand, distributors, roasters and suppliers were found to be consistently strong influencers of environmental sustainability activities in the industry and evaluated the sustainability of their suppliers as part of their supply decisions. This finding underlines the importance of identifying a specific market segment that will pay a premium price for coffee and for which the sustainability outcomes of coffee production can be identified and implemented.

The choice of coffee variety affects the environmental sustainability of its production in this industry. Robusta coffee requires less water and fertilisers and so is more environmentally sustainable than Arabica coffee. Unfortunately, its taste is also less attractive to the premium segment of the market, which would be the natural target for this industry, and is less suitable for cool growing conditions. The use of environmentally sustainable fertilisers is also an important sustainability practice in this industry. The use of organic fertilisers (such as seaweed) and recycling coffee plant waste are the most common fertiliser-based sustainability practices in the industry at present.

2 Industry situation analysis

The use of legumes and the benefits of mixed plantations were also common. Regenerative farming by increasing soil health and farm conditions, and fertiliser use optimisation are areas of future development for the industry.

Coffee roasting represents a significant component of the energy consumed in the coffee production process, producing about 15% of the coffee industry's carbon footprint. Eliminating energy consumption in this process is a challenge, however using electric roasting powered by solar sources or operating roasting plants on methane produced in 'digesters' consuming waste coffee husks may be viable renewable energy sources for this process. Economically, however, value adding and selling coffee waste may be more attractive. Seen as a fixed cost by consumers, the energy costs associated with making coffee are not a coffee-growing characteristic that affects the purchasing process. From the entire industry value chain perspective, however, the energy and water consumption from the coffee-making process in cafes is the largest single component of energy and water use.

Sun drying is an effective environmental sustainability practice that can significantly reduce farm energy inputs and is more energy efficient than gas-burning drying systems. Sun drying of fruit is common in lower-rainfall regions of Australia. This approach may not scale up to large volumes, however, and the high levels of rainfall in some regions may also limit its application. Solar dehydrators or heating by burning the chaff from the coffee can also lead to a more environmentally friendly drying process.

Although outside the scope of this project (which focuses on coffee-growing practices), several participants reflected on the importance of environmentally sustainable packaging for the industry. Important concerns included the trade-off between the environmental friendliness of bean packaging and its ability to preserve the quality of the product. One participant reported working with a university to develop applications for used bags and several participants discussed reusing bags or even using barrels for coffee beans.

Treating wastewater from the washing process to eliminate soluble compounds, including caffeine, which is toxic to small animal life such as insects, is also an important environmental sustainability objective for this industry. Interestingly, Australian coffee generally has lower caffeine levels than imported coffee. This information may also be incorporated in the industry narrative. This is a result of the lower pest levels in the Australian growing environment and the subsequent lower caffeine production by Australian coffee trees. This means that Australian coffee wastewater contains less caffeine, simplifying the environmentally sustainable management of this by-product. Using low-water-consumption machinery for the washing and pulping processes also significantly reduces the amount of wastewater that requires treatment. The methane production from decomposing fruit and husks is a significant source of greenhouse gases, which means that the industry needs to find an alternative use for these materials or alternative ways to reduce them to useful compost. The use of enzymes to break down waste materials is one appropriate approach.

Only four participants commented on transport-related aspects of environmental sustainability in the industry. Two participants described actively seeking to cooperate with local suppliers to reduce the amount of transportation required for materials handling. One participant also reported focusing only on customers within 30 kilometres of their farm to reduce the distance the coffee travelled to customers. Another interviewee reflected on the low distances that Australian coffee travels relative to imported coffee. Economies of scale are important contributors to reducing the environmental impact of transportation as well, as transportation efficiency increases with the volume of product being transported.

The findings from Section 2.1 are summarised in the strengths, weaknesses, opportunities and threats table.

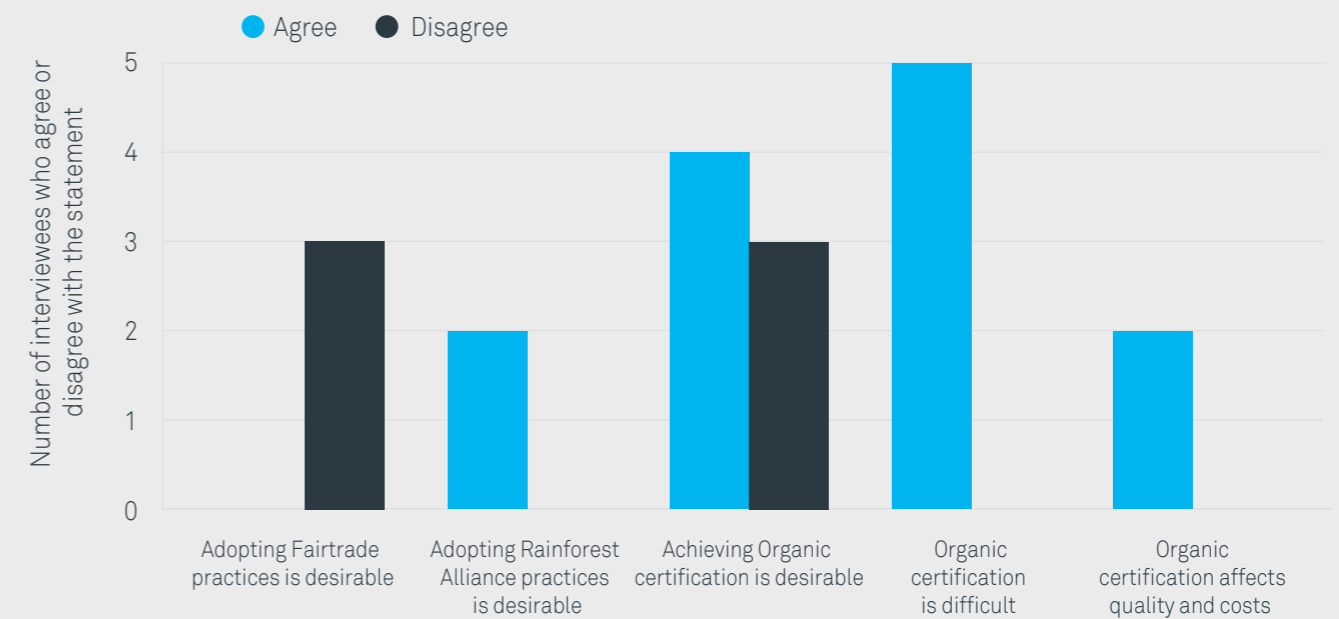


Figure 4: Views about environmental sustainability certifications.

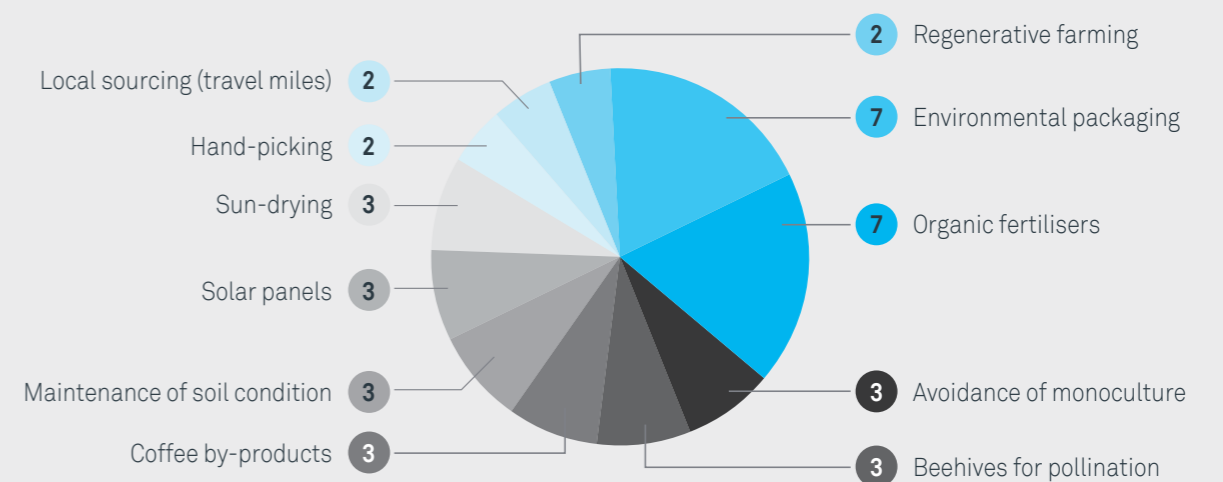


Figure 5: Current environmental sustainability practices. Numbers indicate the number of interviewees who have implemented that practice.

Strengths, weaknesses, opportunities, threats

Strengths

- Terroir – climate, soil, latitude south, frost-free
- Australian-grown – low food miles
- Free of exotic diseases – coffee leaf rust, coffee berry borer disease
- No need to use toxic pesticides
- Passion of growers
- Cohesive industry association – ASTCA
- Established procedures for growing – grower’s manual
- Science and technology focus
- Connections with universities and AgriFutures Australia
- Large demand for coffee in Australia
- Fair labour conditions across industry

Weaknesses

- Too few growers
- Ageing tree population
- Loss of productivity due to pruning
- Cost of inputs
- Passion, but less commercial focus
- Lack of critical mass to support contractors, especially harvesters
- Lack of central processing hubs for dry milling
- Some fragmented and inefficient operations
- Very small market share in a competitive market
- Over-dependence on K7 variety in Australia

Opportunities

- Expand market share – Australian market share is very small
- Develop regional branding/identifies
- Establish quality control/standards for green bean and roasted coffee
- Plant new cultivars – less pruning, more productive
- Implement sustainable cultivation practices
- Focus on soil health and regenerative growing practices
- Focused research and development
- Promote well-recognised local coffee culture
- Blend the art of growing with the clean and green Australian image
- Follow the approach that the Australian wine and avocado industries have taken to transform their image and market
- Focus Australian coffee production on ‘premium’ segment
- Northern Rivers is an old volcanic region, allowing a terroir narrative similar to the Hawaiian narrative

Threats

- Lack of suitable land for growing coffee
- Price of land
- Risk of exotic diseases – coffee leaf rust, coffee berry borer
- Climate change – erratic rainfall
- Cost of inputs
- Cheap imports
- Lack of quality control will tarnish the brand
- Quality perception does not match price
- Industry does not move forward as one with clear vision and aspirations
- Perception that altitude is mandatory for growing high-quality Arabica coffee

2 Industry situation analysis

2.2. Establishing an environmental sustainability narrative

The industry has developed sustainability capabilities at the individual farm level, such as waste recycling and soil conservation. The industry is now facing challenges with achieving a sustainable supply chain. Achieving sustainability in the supply chain is a critical goal for the coffee industry because, as a recent industry report showed, 90% of the impact on the natural environment of a food and beverage producer occurs within its supply chain (Bové and Swartz, 2016).

Discussions with the industry during the design of this Strategic RD&E Plan determined that there is a lack of sustainability information and innovation from the supply chain, limited sustainability cooperation within the supply chain, poor tracking of the sustainability of supply chain inputs (particularly the sustainability of packaging), and a lack of control over the environmental impact of transportation upstream and downstream of the grower. These sustainability problems are also experienced in the coffee supply chain in other countries (Nguyen and Sarker, 2018). Coffee growers bear the responsibility of creating a sustainable system in their supply chain and have indicated that they are interested in acquiring the tools to which to further improve their sustainability.

Consumers are becoming increasingly interested in purchasing socially and environmentally sustainable products, including coffee. The success of fair trade coffee has demonstrated the appeal of socially sustainable imported coffee. Prior studies have shown that environmentally sustainable food and beverage products are even more attractive to developed country customers. Developing a system for demonstrating the environmental sustainability of the Australian coffee supply chain will provide a significant competitive advantage against imported coffee beans. Imported coffee has the inherent disadvantage that it has travelled tens of thousands of kilometres before it reaches the customer and has been fumigated. As the industry is already promoting its sustainability, a system that supports this at the highest level will further strengthen these advantages. Such a system is also likely to appeal to industry customers.

The development of the necessary tools and achieving sustainability requires a system and plan for implementing sustainability initiatives across the entire green coffee bean production supply chain. Achieving sustainability in part of the supply chain will only result in a partially sustainable coffee system. The global coffee industry has spent \$350 million on sustainability initiatives in recent years, however this investment has had a limited effect on industry sustainability because the lack of a systematic/supply chain approach to these initiatives has caused it to ignore many key sustainability issues (Motsinger, 2018). In fact, an analysis of six international coffee farm-level sustainability initiatives showed that each of them also identified the importance of decision-making along the entire supply chain as a system (IISD, 2003).

A systematic approach to sustainability in the Australian coffee supply chain is also important because the industry is currently highly fragmented. This means that the current individual farm sustainability initiatives do not benefit from economies of scale, coordination or strong communication and information transfer. Adoption of an industry-wide supply chain sustainability system will enable the Australian coffee industry to significantly increase its sustainability performance, as the Pharmaceutical Supply Chain Initiative has done for that industry. Such a system would also offer important benefits for stimulating industry growth using sustainability as the basis of competitive advantage.

As Daniele Giovannucci, President of the Committee on Sustainability Assessment, recently noted, sustainability in the coffee industry is the basis of its long-term profitability (Boydell, 2018). Given the \$1 billion value of the coffee bean market in Australia (IBISWorld, 2019), this suggests that the industry has the potential to become a significant component of the Australian sustainable agricultural sector.

Growth through improved sustainability credentials is important for the Australian coffee industry, which is struggling with diminishing capacity due to many growers exiting the industry. The introduction of mechanical harvesting reduced the costs of coffee production in Australia, spurring the industry growth of 20 years ago. The Australian coffee industry has concluded that it must develop other forms of competitiveness, identified as Objective 2 of the ASTCA Strategic Plan.

Studies have shown that sustainability systems can increase competitive advantage in agricultural industries in Australia and overseas (Hatani et al, 2016; Ernst and Young, 2016). Therefore, implementing a sustainable supply chain system in the Australian coffee industry will increase its environmental sustainability and provide a basis for increasing its competitiveness. An increased demand for Australian coffee will help the industry to grow and attract new growers, particularly larger-scale producers that can develop infrastructure and support small producers.

According to the ASTCA, mechanical harvesting in the industry has been conducted by contractors, although no contractor support is currently available. A significant amount of harvesting service for the subtropical coffee-growing region is provided by a Northern Rivers contractor. New industry entrants are investing in larger-scale commercial operations and tend to acquire mechanisation for all farm operations, and therefore generally do not require contract harvesting services. The latest developments in harvesting technology have made this investment more attractive for both growers and contract harvesters.

The entry of larger-scale commercial growers to the industry, attracted by its increased competitiveness, is anticipated to increase the overall level of mechanisation in the industry and will contribute to its price-based competitiveness. In addition, increasing the level of integration in the supply chain through this sustainability initiative will reduce uncertainty in the supply chain and attract more contractors providing mechanical harvesting services. This will improve the harvesting service available to the entire industry.

2.3. Alignment with other industry plans

No RD&E plan exists for the Australian coffee industry. This Strategic RD&E plan is consistent with the Australian Coffee Industry Strategic Plan developed by ASTCA and represents a new dimension to that plan, and should be included as a new section in the industry's grower's manual.

3 Industry consultation

The industry consultation process for this Strategic RD&E Plan comprised the following key features:

- Industry engagement throughout the project, which included support from the only current industry association (ASTCA) and members of the supply chain.
- Joint development of a supply chain sustainability system and accompanying implementation plan with the industry, based on interviews with industry and supply chain participants. The system and implementation plan were written for the industry and are consistent with current industry practices and needs.
- Discussion of the system and plan in industry workshops to increase industry understanding and acceptance, fine-tune the implementation plan, and identify project champions and activity groups who will drive implementation of the system.

The information collection and industry consultation were achieved through a number of processes, including:

1. Initial discussions with the industry association to develop a two-page discussion paper for consideration by the industry and to generate industry input into the project design.
2. Conversations about this project based on the discussion paper at the association meeting (19 February 2020), resulting in feedback and project support.
3. Continual planning meetings and communications with the industry association as the communications and data collection plans and the workshops were finalised.
4. Face-to-face, Zoom and phone-based interviews with all segments of the industry supply chain, ranging from suppliers through to distributors and roasters.

5. Circulation of discussion documents and draft reports and implementation plans for consultation and feedback.
6. Two industry workshops with participants from the consulting, grower, supplier and distributor, and roaster segments of the industry.
7. Circulation of drafts and the final Strategic RD&E Plan.

3.1. Participants

The information for this Strategic RD&E was collected from individual interviews with 30 industry participants, including 15 growers, five roasters, six traders, one association representative, two industry consultants/experts and one journalist from the industry value chain. Information was also obtained via feedback on draft reports and discussion documents that were distributed through the industry for commentary and input, and during two industry workshops.

The interviews were transcribed and thematically analysed by the research team to identify the key findings. The figures presented in Section 2 and Section 4 are representative of the individual interviews, with not all industry participants commenting in each instance, and more than one response captured from individuals in other cases. Interviewees' positions are described in Figure 6, which is an industry stakeholder map that identifies participants within the industry and their relevance to the industry.

3.2. Future engagement activities

Future engagement activities to develop the industry include:

- Providing ongoing support for the industry through annual workshops, field days, guest speakers, focus groups and individual communications during Plan implementation.
- Identifying and creating communities of support for sustainability extension projects.
- Meetings with the elected project champions and activity groups to discuss implementation and establish ongoing communication and support processes.

- Annual workshops to support Plan implementation.
- Email and video chat-based communications with the association, project champions and activity groups throughout the 10-year implementation period.

An important factor in achieving impact from RD&E investment is the quality and comprehensiveness of the engagement process used to set industry priorities and objectives. While each industry has its own mechanisms to consult and engage with its stakeholders (dependent on the industry structure, size etc.), it is important that those processes are described within the industry's Strategic RD&E Plan.

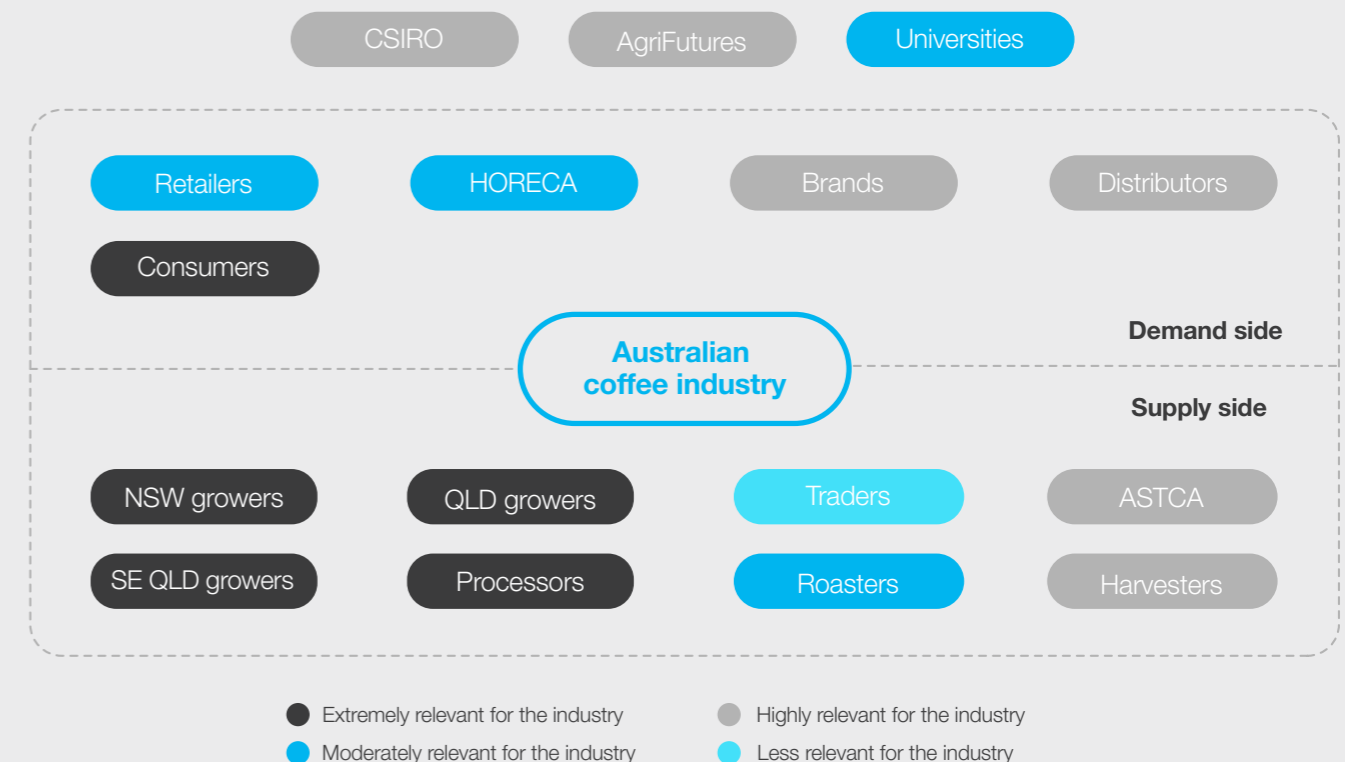


Figure 6: Australian coffee-growing industry stakeholder map.

A close-up photograph of a person wearing a grey apron and white gloves pouring coffee beans from a metal scoop into a green bucket. The person has tattoos on their arm and is wearing a green beaded bracelet. Another person in a grey apron is visible in the background. The text 'Australian Coffee Strategic RD&E Plan' is overlaid in the bottom left corner.

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This section considers the opportunities, barriers and benefits for the industry from the situation analysis and details RD&E activities to respond to these. As the industry notes, green bean sales in Australia exceed \$1 billion per year and increasing the industry's appeal to a segment of the market that is attracted to environmentally sustainable quality coffee could provide significant industry growth. Achieving this requires unleashing the production and development capacity of the industry.

This project determined that seven barriers exist that interfere with industry development and the adoption of new environmental sustainability practices in the industry to increase product attractiveness:

1. High operating costs
2. Challenges associated with climate change
3. Tight profit margins
4. Limited farm resources
5. Insufficient industry-scale resources
6. Lifestyle approach to farm operations
7. Limited industry knowledge

These factors are primarily due to the nature of existing operations, costs and market conditions. Their relative importance is summarised in Figure 7. Responding to these barriers will create the opportunity for increased competitiveness in the industry.

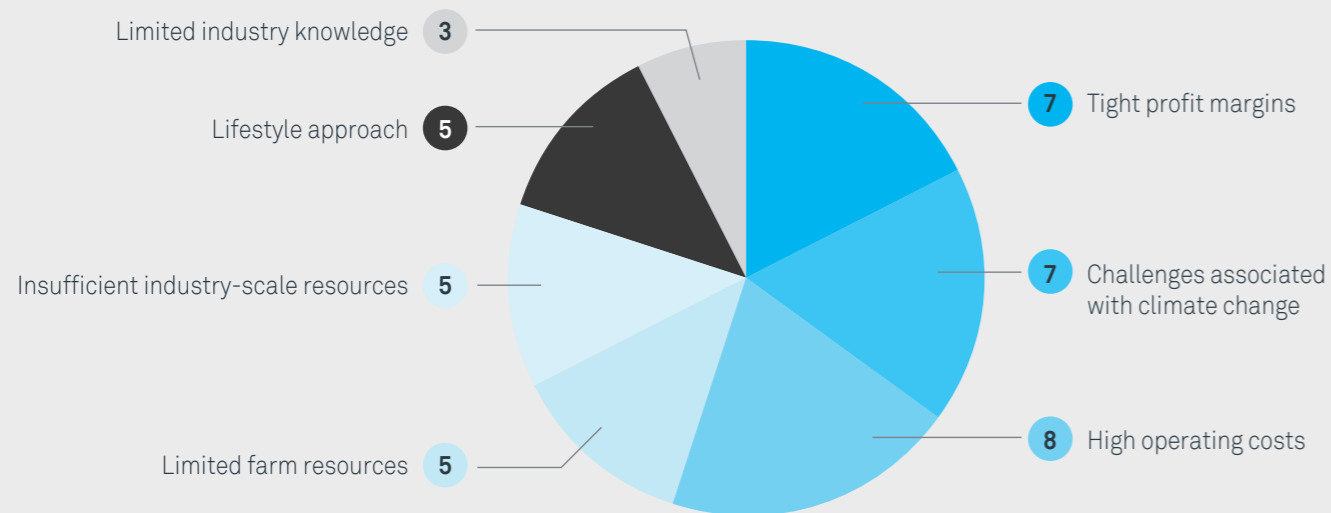


Figure 7: Barriers to increasing environmental sustainability in the Australian coffee industry. Numbers indicate the number of interviewees who identified the issue as a barrier.



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The Strategic RD&E Plan will respond to these barriers by establishing seven priority areas that respond to each of these barriers. The rationale for focusing on each of these priority areas is as follows:

Table 1: Priority areas for the Australian coffee industry

Priority	Rationale
<p>1</p> <p>Reduce industry fixed costs</p>	<p>Land costs and the costs associated with pruning and post-pruning production losses from the current cultivar are key barriers to improvement in the industry. Until these barriers can be overcome, it will be difficult for the industry to move forward with environmental sustainability initiatives and consolidation of corporations to increase economies of scale. The establishment of small regionally located shared facilities and groups of contractors that assist with processing, together with a more attractive cultivar, may create an environment attractive to existing landholders and may encourage them to commence coffee growing and overcome the current barriers of the industry fixed costs. There is a need to identify suitable coffee-growing land in areas priced for agriculture, not lifestyle.</p>
<p>2</p> <p>Increase production volumes</p>	<p>The industry is comprised of predominantly small growers, which creates a high degree of diversity and variation in environmental sustainability practices. Although an important feature of the industry, the geographic spread of farms increases industry transportation costs. Furthermore, many growers who entered the industry in its early days have now exited, which has reduced the overall production capacity of the industry. The reduction in industry capacity reduces the whole-of-industry economies of scale and may slow down industry-level adoption of environmental sustainability initiatives, mechanisation and other technological systems, as well as training and information dissemination.</p> <p>For some growers, and possibly new market entrants establishing their plantations, centralised processing facilities servicing specific regions can offer benefits associated with economies of scale and possibly also create conditions that would attract new market entrants. Other growers will prefer to maintain their own processing operations and focus on their own brands, which would create a valuable diversity in the industry spanning both smaller and larger-scale operations. This would also provide an effective mechanism for coordinating sustainability practice outcomes among growers in a region concerning the expectations of a targeted premium market segment.</p>
<p>3</p> <p>Reduce the cost of production</p>	<p>Compounding the effect of competition with low-cost imported coffee in Australia, the cost of production in Australia is high by international standards due to the need to prune the current cultivar and high land costs. These increase the difficulty of implementing any process changes in the industry. Critical cost factors are pruning, labour and land, although mechanisation has significantly reduced the cost of picking labour in the industry. In addition, some current environmentally sustainable practices, such as hand-picking and sun-drying, are very labour-intensive and increase operating costs on small farms.</p>

Priority	Rationale
<p>4</p> <p>Re-educate the premium segment of the market</p>	<p>The availability of reasonably priced quality coffee from overseas limits profit margins in the local industry. Australian coffee growers are committed to environmental sustainability initiatives, however the low profit margins create an extra hurdle when implementing these initiatives. Australian coffee offers significant counter-advantages, including the absence of pesticides and low food miles, and these provide the foundation for acceptance of a pricing differential in the market. There is a need to develop the end quality of the green bean to place in the specialty coffee arena.</p>
<p>5</p> <p>Reduce uncertainty about climate change effects</p>	<p>Climate change was identified by most industry participants as a source of increased uncertainty in the coffee-growing process (including reduced rainfall and increased likelihood of pests), which makes investment in environmental sustainability less attractive. Land use and its availability for coffee growing is likely to change, although these factors will affect other coffee industries as well. Climate change will also make new locations suitable for sustainable coffee growing, and these will need to be identified.</p>
<p>6</p> <p>Increase commercial orientation</p>	<p>Growers in this industry are strongly motivated by their passion for coffee and are mainly focused on short-term improvements. There is an opportunity to increase the industry's commercial orientation. Roasters have also expressed an interest in purchasing Australian coffee that is produced according to an accredited industry quality standard. This accreditation would contribute to the industry's identity and capability development.</p>
<p>7</p> <p>Increase knowledge and knowledge access</p>	<p>The percentage of growers who have a horticultural education and background is small in this industry, although the association has implemented a manual to assist with knowledge dissemination. In addition, industry consultant David Peasley has prepared an advanced grower's manual, which is also available to the industry. There is an opportunity to include an environmental sustainability section in the grower's manual that addresses the key and well-established environmental sustainability outcomes that the industry is attempting to achieve. Developing issues and trends, however, may require a different communication mechanism as discussed in the implementation plan. These mechanisms could include conversations through the newsletter and biannual reviews of latest practices to identify emergent established outcomes and practices that can be incorporated in the manual.</p>

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4.1. Responding to these priorities

The response to these priorities was developed during the industry workshops and from responses to the circulated discussion documents. This included developing the timeline allocated to the priorities. Responding to these priorities will create two direct benefits for the industry:

1. Increased competitive advantage by meeting the environmental sustainability expectations of an attractive segment of the market
 2. Improved economic performance of the industry
- These can be shared through a range of strategies and actions, as detailed below.
- Colours represent strategies and activities that support multiple priorities.

Table 2: Strategies and activities that respond to the priority areas

Priority		Strategies	Activities
1 Reduce industry fixed costs Aligns with ASTCA Strategic Plan Objective 2	High	Consolidate regional processing activities (e.g. pulping, drying, grading and hulling)	Agreements among co-located growers to use regional processing facilities in key locations, and encourage new growers to use these facilities to ensure the volume is sufficient to attract such a facility Approach processors in other industries such as the macadamia nut industry to operate this facility
	High	Increase coffee/farm production from existing resources	Introduce companion crops Adopt a higher-yield cultivar
	Medium	Consolidate regional identities supplied by a consortium of plantations	Agreements among co-located growers to attract distributors and roasters willing to establish a regional coffee identity that represents their plantations ¹ Resource and equipment sharing among growers supplying a single regional brand Represent regional identity by developing a quality assurance vehicle that sets standards that the industry agrees to and can achieve

Priority		Strategies	Activities
2 Reduce the cost of production Aligns with ASTCA Strategic Plan Objective 2	Low	Consolidate regional identities supplied by a consortium of plantations	Agreements among co-located growers to attract distributors and roasters willing to establish a regional coffee identity that represents their plantations Resource and equipment sharing among growers supplying a single regional brand Represent regional identity by developing a quality assurance vehicle that sets standards that the industry agrees to and can achieve
	High	Reduce pruning and the associated production loss costs	Introduce new cultivars from Central and South America, and conduct trials that have been identified by the industry as appropriate for the regions
	High	Reduce operating costs	Reduce water consumption and recycling of nutrients (e.g. through composting) Reduce energy consumption and inputs, including through use of solar power Centralise processing and independent harvester
3 Re-educate the premium segment of the market Aligns with ASTCA Strategic Plan Objective 7	High	Implement a communication program to re-educate the market about the differences between Australian coffee and imported coffee	Communicate the differences between Australian coffee and imported coffee through the mainstream media Communicate the importance of geographic location rather than the altitude at which the coffee is grown Promote the fact that Australian coffee is natural and pesticide and chemical-free Promote Australian coffee growers as farmers who produce healthy soil, leading to superior soil conservation and native vegetation and wildlife-friendly operations Measure CO ₂ production at farm level and report Use natural herbicides and fertilisers, and biological inputs

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Priority	Strategies	Activities
<p>4</p> <p>Increase production volumes</p> <p>Aligns with ASTCA Strategic Plan Objective 2</p>	High	<p>Attract new growers to the industry and encourage existing farmers to include coffee crops</p> <p>Agreements among co-located growers to attract distributors and roasters willing to establish a regional coffee identity that represents their plantations</p> <p>Resource and equipment sharing among growers supplying a single regional brand</p>
	Medium	<p>Consolidate regional identities supplied by a consortium of plantations</p> <p>Agreements among co-located growers to attract distributors and roasters willing to establish a regional coffee identity that represents their plantations</p> <p>Resource and equipment sharing among growers supplying a single regional brand</p> <p>Represent regional identity by developing a quality assurance vehicle that sets standards that the industry agrees to and can achieve</p>
	High	<p>Increase coffee/farm production from existing resources</p> <p>Introduce companion crops</p> <p>Adopt a higher-yield cultivar</p>
<p>5</p> <p>Reduce uncertainty about climate change effects</p> <p>Aligns with ASTCA Strategic Plan Objective 3</p>	Medium	<p>Inform industry of likely environmental changes that will affect production, such as rainfall variation</p> <p>Model climate change effects for the next 20 years in current and potential growing regions</p> <p>Disseminate information through ASTCA</p>

Priority	Strategies	Activities
<p>6</p> <p>Increase commercial orientation</p> <p>Aligns with ASTCA Strategic Plan Objectives 6 and 7</p>	Medium	<p>Increase commercial orientation of existing growers</p> <p>Agreements among co-located growers to attract distributors and roasters willing to establish a regional coffee identity representing their plantations</p> <p>Resource and equipment sharing among growers supplying a single regional brand</p> <p>Develop greater awareness of the standards of practice in the wider Australian coffee industry²</p> <p>Develop stronger connections with ASCA and ACTA</p> <p>Represent regional identity by developing a quality assurance vehicle that sets standards that the industry agrees to and can achieve</p>
	Medium	<p>Attract commercial growers with previously developed commercial orientation</p> <p>Develop an industry accreditation scheme that confirms the important characteristics of the coffee produced by that grower</p>
<p>7</p> <p>Increase knowledge and knowledge access</p> <p>Aligns with ASTCA Strategic Plan Objectives 2 and 6</p>	Medium	<p>Introduce new information to industry from local and international sources</p> <p>Establish cooperative exchanges with industries in other coffee-growing regions, trade shows, and coffee media</p> <p>Growers to monitor conversations with the horticultural industry and share through the industry association</p>
	High	<p>Trial and consolidate industry knowledge</p> <p>Share contemporary ideas through the newsletter</p> <p>Biannual consolidation of emergent ideas into new sections of the industry grower's manual</p> <p>Incorporate learnings into the industry grower's manual</p> <p>Establish a cooperative arrangement with ASCA and ACTA</p>

Notes:

1. Producers located in close proximity in agricultural sectors jointly sell some or all of their production to one or more distributors and roasters, creating a sufficient volume to attract larger distributors and roasters seeking high-quality Australian agricultural product. This approach can create a regional brand. While many growers will have developed their own brands and wish to focus on those brands, other growers, especially growers just entering the industry, may prefer that distribution agencies market on their behalf.
2. Creating an appropriate certification for the industry (mentioned in Section 3.1.5) and ensuring that environmental sustainability awareness is disseminated and practised require that an industry accreditation scheme be operated and delivered by ASTCA. Once the processes are in place and measurable results can be obtained, this accreditation would become a significant part of the industry's marketing, bolstering growers' individual assertions in their own branding.

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4.2. Rationale for strategies

This section explains why each of the strategies presented in Section 4.1 are important to the industry and its priorities.

Consolidate regional processing activities (e.g. pulping, drying, grading and hulling)

Centralising aspects of the coffee production process will increase industry cooperation and coordination and create opportunities for resource sharing. Schemes are already in place for some harvesting services, but more are urgently required, especially contract harvesters in the Northern Rivers region of New South Wales. There are some processing services and equipment available for use by other growers but their impact on operating costs and environmental sustainability is limited. There is a need for more cooperation and coordination in the industry, including the development of regional processing points, which could be based on advanced environmental sustainability approaches.

The availability of shared and contracting equipment for the industry is unreliable, and there is only one key supply servicing the entire industry in several domains such as harvesting. While future industry growth will encourage multiple suppliers to enter each domain, ensuring consistent supply of services such as harvesting services as the industry grows is an immediate issue. The industry has the mechanisms in place to manage shared services, but the costs associated with establishing these shared services may be prohibitive. This is an area where financial support may have a significant impact upon the growth of the industry. Such shared services could even be combined with those of other compatible horticultural industries, such as the macadamia nut industry, to achieve critical mass and scale. This will reduce operating costs by introducing economies of scale for non-farm activities. It will also reduce on-farm energy consumption and greenhouse gas production, increasing environmental sustainability of the operations, and should reduce transportation activities and costs by establishing a hub-and-spoke supply network.

Increase coffee/farm production from existing resources

This is an important initiative that will reduce the fixed cost per kilogram of green beans. It will also increase environmental sustainability by reducing inputs required per kilogram of green beans produced.

Reduce pruning and the associated production loss costs

The vigour of the current K7 variety has proven to be a significant challenge for the industry, requiring significant pruning labour costs (anecdotally up to 70% of labour costs and 20% of fuel consumption) and, importantly, resulting in a loss of fruiting wood that takes a minimum of 12 months to regrow.

Reduce operating costs

Farm operating costs, transportation costs and energy and consumable material costs add significantly to the cost of coffee production and result in tight profit margins. This means that small-scale operations have limited viability, however operations that are large enough to generate a sufficient profit at these margins require capital outlay, which is a barrier to entering the industry. The tight profit margins also make small coffee plantations vulnerable to running at a loss in difficult years.

Reducing costs and finding useful applications for waste products are critical to both the long-term success of the industry and creating an environmentally sustainable industry. The methane produced from decomposing coffee material waste has 20 times the greenhouse gas impact of CO₂. On the other hand, composted cherry waste does not produce methane as composting is aerobic and also returns nutrients to the soil. Repurposing this waste will reduce the industry's environmental impact and operating costs. Subsequently, creating an environmentally sustainable coffee industry is strongly linked with creating an economically sustainable industry. For example, reducing water consumption and recycling will ultimately lead to savings in operational costs, especially the costs of transporting wastewater,

pumping and constructing infrastructure such as bores and dams. Companion cropping to reduce wastage may increase farm production as well.

Implement a communication program to re-educate the market about the differences between Australian coffee and imported coffee

It is important to remind consumers that imported coffee is less fresh than Australian coffee and has long associated food miles. The Australian consumer is unaware of some of these issues and has not considered the significance of long food miles. A premium market segment would be the most attractive group upon which to focus on when communicating these facts. This communication could address waste minimisation; pesticide and chemical-free products; healthy soil leading to superior soil conservation and native vegetation and wildlife-friendly operations; and productive, healthy trees. This could be supported by an industry-wide identity.

Attract new growers to the industry and encourage existing farmers to include coffee crops

Achieving a greater level of competitiveness will provide little benefit to the industry if it does not increase its capacity to meet demand. In addition, diversity of skills knowledge and industry connections will further enhance the ability of the industry to communicate its strength to the target market segment and encourage more service providers to enter the industry.

Consolidate regional identities supplied by a consortium of plantations

A regional identity can include a quality assurance vehicle to set standards that the industry agrees upon and can achieve. It would be available for any grower to use as part of their marketing if they wished and could be very helpful for new growers entering the industry before they had developed their own markets and brand. A regional identity will facilitate market development cooperation among growers, and will also attract

more service suppliers, which will further support the entrance of new growers. Sharing services at the regional level can also lead to lower-cost services and increase industry profitability, as well as improve the profile of coffee in the Australian market. Establishing regional identities will assist with educating the market to appreciate the specific characteristics of coffee produced in different regions, as the Australian wine industry has successfully achieved. It will also facilitate development of an industry accreditation scheme as a marketing vehicle and assurance of practices and product characteristics.

Inform industry of likely environmental changes that will affect production, such as rainfall variation

This information is important for the long-term development of the industry and will specifically inform industry regional development plans. In addition, it will be useful to farmers for planning changes to farm resources as a result of environmental changes. It will also inform larger-scale industry development plans, such as regional processing and product market development plans.

Increase commercial orientation of existing growers

The industry has great passion and commitment to coffee growing and production. Many growers, however, have entered the industry from non-agricultural backgrounds. Introducing more skills and agri-commerce capabilities through training, such as in soil care and organic production, and attracting new growers to the industry will further develop the commercial capabilities of the industry.

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Attract commercial growers with previously developed commercial orientation

Attracting growers to the industry who are engaged in other agricultural sectors, especially other sectors in the current coffee-growing regions, will introduce a range of complementary skills and knowledge that will assist with the development of the industry's capabilities. Growers in the macadamia nut industry, for example, could be encouraged to diversify into coffee growing as a result of the industry's development and provide valuable agricultural perspectives.

Farmers in coffee-growing regions may be amenable to introducing coffee into their crop profiles/rotations. In many cases, these new industry entrants may be small-scale and disinclined to engage in processing activities, including roasting, as they are resource and knowledge-intensive. Establishing a good range of support services and a regional identity would help considerably with making it attractive for farmers already in the region to undertake coffee growing. New entrants, particularly those choosing to establish small crops, would require particular support from ASTCA.

Introduce new information to industry from local and international sources

In addition to local industry input from new entrants, relevant technical and market information from both domestic and international sources (such as the BeanScene magazine, trade shows and national organisations such as the specialty coffee association) is necessary if the industry is to compete on the basis of quality and environmental sustainability. This information will need to be drawn in with a broad net and requires a robust process to ensure dissemination and incorporation by the industry. Robust information

collection and formalisation would be a significant contributor to industry capability development and would underpin the focus on the discerning segment of the market.

Trial and consolidate industry knowledge

Part of incorporating knowledge into the industry will involve validation and contextualisation of the information. This requires experimentation and extension of the information and practices that the industry considers important. This process already occurs in an ad hoc manner. Confirmation, dissemination and capture, however, is necessary for knowledge and practices to affect the industry as a whole.

5 Communication and extension

To communicate and coordinate implementation of the Strategic RD&E Plan, it is necessary to:

- Conduct workshops to build awareness of the Strategic RD&E Plan and its expected outcomes and strategies, so that key stakeholders understand research priorities and investments
- Conduct expert consultations, including with producers, service providers, other value chain participants, government agencies and, where appropriate, consumer and community groups.
- Establish an interactive industry website
- Confirm the role of the industry association as a coordinating agency
- Establish formal links with ASCA and ACTA

Key communication and extension activities are described in Table 4. These extend the priorities, strategies and activities described earlier.

5 Communication and extension

Table 3: Communication and extension plan for the Australian coffee industry

Activities	Target audience	Method of communication
Agreements among co-located growers to use a single regional processing facility operated by a third party	New growers Existing growers who wish to opt-in	Newsletter to shire councils and farmers who have expressed interest in coffee growing Regular articles in major coffee journals, such as BeanScene, Café Culture and Caffeine
Approach processors in other industries, such as macadamia nut, to operate this facility	Macadamia processors in the Northern Rivers, south-east Queensland and Mareeba regions	Team of growers who initiate discussion with sugar mills and macadamia processing facilities
Introduce companion crops	Coffee growers	Maintain discussion with SCU
Adopt a higher-yield cultivar		Establish links with CSIRO Newsletter updates
Agreements among co-located growers to attract distribution companies willing to establish a coffee brand supplied by their plantations	Farmers in relevant shires	Representative of coffee growers to discuss at local meetings Workshop with growers interested in working as a co-op
Resource and equipment sharing among growers supplying a single regional brand		
Optional agreements among co-located growers to attract distribution companies willing to establish a coffee identity supplied by their plantations	Existing and potential growers	Develop discussion with qualified bean trader (Q Grader) to advise on quality
Resource and equipment sharing among growers supplying a single regional brand		
Introduce new cultivars from trials that have been identified by the industry as appropriate for the regions	Existing and potential growers CSIRO	ASTCA to select appropriate cultivars Establish links with CSIRO to source more cultivars

Activities	Target audience	Method of communication
Reduce water consumption and recycling	Existing and potential growers	Newsletters and coffee magazine articles
Reduce energy consumption and inputs		
Centralise processing and independent harvester		
Communicate the differences between Australian coffee and imported coffee through the mainstream media	Green bean traders Coffee roasting companies General public (coffee consumers) Food writers	Articles in coffee journals each edition Articles in general magazines and food stores Newsletters to growers on techniques available Newsletters to growers
Communicate the importance of geographical location rather than the altitude at which the coffee is grown	Existing and potential growers	
Promote the fact that Australian coffee is sun-dried, pesticide-free and chemical-free		
Promote Australian coffee growers as farmers who produce healthy soil, leading to superior soil conservation and native vegetation and wildlife-friendly operations.		
Measure CO ₂ production at farm level and report		
Use natural herbicides		
Agreements among co-located growers to attract distribution companies willing to establish a coffee brand supplied by their plantations	Existing growers	Initiation of meetings at local level. ASTCA to initiate opportunity among members Advertise central processing plants currently available Develop opportunities for new centralised plants
Resource and equipment sharing among growers supplying a single regional brand		

5 Communication and extension

Activities	Target audience	Method of communication
Agreements among co-located growers to attract distribution companies willing to establish a coffee brand supplied by their plantations	Existing and potential growers Bean traders Roasting companies	Initiate meetings with each of these groups to determine requirements Establish a database of suppliers of fertiliser, equipment, grain pro bags and hessian bags
Resource and equipment sharing among growers supplying a single regional brand		
Introduce companion crops		Establish regular training sessions/information nights with guest lecturers
Adopt a higher-yield cultivar		
Model climate change effects for the next 20 years in current and potential growing regions	Existing and potential growers CSIRO	Establish relationship with CSIRO for technical help Newsletters/training sessions
Disseminate information through ASTCA		
Agribusiness training programs for existing growers	Existing growers	Newsletters/training sessions
Agreements among co-located growers to attract distribution companies willing to establish a coffee brand supplied by their plantations	Growers	Establish local groups for discussion Provide information on bean traders and roasters willing to source green bean Invite industry champions, roasters and traders from Sydney and Melbourne to discuss trends Introduce regular cupping sessions with industry champions from Sydney and Melbourne
Resource and equipment sharing among growers supplying a single regional brand		
Develop greater awareness of the standards of practice in the wider Australian coffee industry		
Develop stronger connections with ASCA and ACTA		

Activities	Target audience	Method of communication
Establish cooperative exchanges with industries in other coffee-growing regions	Growers in all coffee-growing regions	Annual meeting/conference on growing trends Newsletters summarising SCU and WCR coffee research
Growers to monitor conversations with the horticultural industry and share through the industry association		
Share contemporary ideas through the newsletter	Growers Bean traders	Appoint industry spokesperson to write articles, liaise with wider industry and report back to growers
Biannual consolidation of emergent ideas into new sections of the industry grower's manual	Coffee roasters	Update manual
Incorporate learnings into the industry grower's manual		
Establish a cooperative arrangement with ASCA and ACTA		

6 Monitoring, evaluation and reporting

The monitoring, evaluation and reporting (MER) plan for the Australian coffee industry will be based around the following five metrics:

1. Customer perceptions
2. Industry fixed costs
3. Industry production costs
4. Industry capacity
5. Industry learning activities

As shown in the plan below, these targets reflect the short, medium and long-term timelines identified for the priorities in Section 4.1. The metrics shown in the MER plan below are based on metrics normally collected for the industry.

Table 4: MER plan for the Australian coffee industry

Metric	Monitoring	Evaluation	Reporting
Customer perceptions	Increase in public knowledge of Australian-grown coffee	Survey of consumers Survey of bean traders and roasters	Survey results distributed to growers via newsletter
Industry fixed costs	Freelance harvester Established central processing	All growers with access to mechanised harvester	Annual report on crop size and costs
Industry production costs	Crop sizes steady to increasing Centralised processing with increasing green bean sales Acceptance of green bean brand and standard Uptake of new cultivars	Annual audit of crops harvested Standard of green bean assessed by sensory methods and Q Grader cupping Increasing sales and price for green bean Replacement of K7 on existing farms; new farms planting new cultivars	Annual report on crop size and costs Report to growers on sensory assessment and cupping; specialty coffee score Annual report on sale volume and price Audit of all coffee farms and cultivars in production
Industry capacity	New growers entering market Higher production from new cultivars	Increase of coffee trees by 100,000 per year Increase in tonnage of green bean available for sale	Annual audit of tree numbers and crop size
Industry learning activities	Quarterly workshops for growers Information flow to roasters, traders and consumers	Majority of growers participating Articles regarding Australian-grown coffee in each coffee magazine Survey of consumers re Australian-grown coffee	Attendance records Media monitoring Report on survey



7 Implementation

This section describes how this Strategic RD&E Plan can be implemented. It combines information received from the interviews, document circulation feedback and two industry workshops.

7.1. Motivations

The workshops included discussion of scenarios to examine how the changes identified in this report might affect the industry. The findings from these scenario exercises are included in the implementation steps following. The workshop discussions also addressed the motivations that would drive these changes.

High-quality coffee and profitable operations require economies of scale in operations. The industry needs to consider which activities should occur on-farm and which should be centralised to reduce costs and provide access to specialised skills and large-scale resources.

Producing and drying high-quality green beans, maintaining healthy soil, and achieving superior farm environmental sustainability and biodiversity are key on-farm activities that may be better prioritised by centralising bean processing operations off-farm for groups of growers in specific regions. Such facilities are more likely to be economically viable for the processor and attract new growers to the region. Independent operators will also need to adhere to standards.

The industry acknowledges that significant greenhouse gas and energy consumption occurs further along the value chain (such as at the retail and coffee-making stage) and the focus on natural environmental impact issues associated with farm operations may be more effectively directed towards soil health, biodiversity and recycling farm waste products to increase soil health. Reuse of waste materials, including cascara, to produce products such as food, beverages, cosmetics or medicines is an important way to increase the amount produced from the same energy and resource inputs (as well as fixed costs).

There may need to be some differences in the approaches taken between coffee plantations located in the subtropical and tropical regions, and even between groups of growers located in the same regions.

This reflects the different conditions regarding pests and diseases, flavour profiles, phenological cycles and grower density. In addition, the introduction of a suitable successor cultivar to replace K7 is a necessary requirement across the industry to provide a foundation for economically viable production.

These motivations and the conditions described in the previous sections of this document lead to an implementation plan, which is summarised in the following section and detailed as a step-by-step process in the section after.

7.2. Implementation plan overview

The implementation plan will have the following key outcomes/characteristics:

- A focus on key practices that specifically meet the expectations of the premium market segment.
- Development of a section in the manual about environmental sustainability. This is considered to a substantive and permanent resource.
- Identification of new and emerging concepts, approaches, practices and resources, information about which is acquired and collected until sufficient information has been collected so that it can be consolidated and adopted by the industry.
 - These will be added to the industry manual and discussed during industry forums and association meetings.
 - Their adoption will trigger an annual training session. These sessions may also include industry-wide initiatives based on data collected from across the industry, for example soil samples or annual electricity consumption. These training sessions could also include field workshops conducted with horticultural advisors.
 - Communities of practice will also be formed to deal with difficulties in training or adopting initiatives across the industry.

7.3. Implementation steps

To achieve these outcomes, the industry must build its internal development capabilities though:

1. Forming a premium customer focus group, including distributors and roasters, to identify their key characteristics and expectations.
2. Matching existing industry environmental sustainability strengths to these expectations (see the industry situation analysis for the industry's environmental sustainability strengths).
3. Working with suppliers to determine how they can support the industry to meet these expectations (e.g. knowledge and specialty materials).
4. Inviting research and overseas organisations, including the university sector, CSIRO and overseas producers, to contribute ideas on approaches to meet these needs.
5. Identifying existing cooperation and knowledge exchange systems in the industry (e.g., ASTCA, CSIRO, Southern Cross University) and connecting with them in order to supplement coffee industry communications.
6. Using the industry newsletter to create an industry-wide communication platform that is open to growers, suppliers and customers, and that disseminates and stores this information.
7. Inviting early adopters to share experiences through the newsletter, field trips and association meetings.
8. Identifying initiatives that have a proven record of success and for which there is a sound body of knowledge collected.
9. Initiating industry training events, such as farm field days and soil care meetings, and including identified approaches in the industry manual.
10. Establishing teams and champions to assist with training and reaching out to external experts for additional input, such as SoilCare and Northern Rivers Food.

Risk management

An important component of the Strategic RD&E Plan is identifying any potential risks to industry and specifically to the achievement of outcomes from RD&E investment. In general, risk is categorised by two dimensions: the likelihood of occurrence and the magnitude of the impact (consequence). A simple 1-5 scale may be used to rank risk and identify where there are high-risk areas. An effective risk management process should identify potential solutions or mitigating activities that either minimise or remove the risk.

8 Conclusion

Australia's coffee-growing industry has developed and applies an impressive range of competencies, including environmental sustainability. Application by growers is quite varied across the industry, however, which reduces the collective benefit to the industry, as well as the resources that are available to support them. Integrating these practices into an industry-wide scheme that enables growers to develop regional identities and attract new suppliers and customers will strengthen the industry capabilities and environment, which will thus attract new industry entrants (and further increase capacity and skills). The industry association ASTCA is well positioned to support this development.

To achieve this, the industry needs to accomplish the following:

1. Stimulate industry growth
2. Entice new market entrants into the subtropical growing region in the context of high land costs
3. Introduce new cultivars to reduce pruning costs and limit the subsequent loss of production
4. Further develop a system for the collection, validation and consolidation of industry information
5. Create opportunities for regional coffee identity development and subsequently increase the attractiveness of the industry for new market entrants in those regions
6. Attract processors to coffee-growing regions who can make the latest technology available to small growers and new growers entering the industry
7. Develop an industry narrative to attract new growers and to appeal to the premium segment of the market using factors such as the quality, purity and environmental friendliness of Australian coffee
8. Implement an industry accreditation scheme that growers may choose to use for marketing and that ensures adherence to the practices and standards

The capture, storage and dissemination of information in the industry is central to achieving the above goals. The Australian subtropical coffee grower's manual is a key information source in this industry and should be extended to incorporate a section on environmental sustainability outcomes and new practices that are valuable to the industry. In addition, a mechanism for more dynamic and emergent outcomes and factors also needs to be established in the industry. This mechanism can be thought of as 'concept boxes' in which information on new ideas is accumulated from a variety of sources until the information is sufficient for a taskforce to identify established practices to be disseminated across the industry and incorporated into the manual.

Increasing the number of services available in the industry will provide existing growers and new growers entering the industry with more options for their business models. The availability of larger-scale support services will provide the opportunity for growers to access facilities, which may be more cost-effective than individual services and make entry into the industry easier. This could especially be the case for small-scale entrants such as farmers already in the coffee-growing regions who decide to introduce a small number of trees to increase their crop diversity. Creating regional identities will provide the opportunity for consolidated messaging to the targeted segment of the market that values these outcomes. This would include incorporating a 'low caffeine, pesticide-free' brand as part of the industry narrative conveyed by these consolidated parts of the industry. Other narrative features would include the unique terroir and how this results in single-origin beans with exceptional flavour, as well as the industry's stewardship of the horticultural environment. This would enable the environmental sustainability of the industry to have a great impact on competitiveness as well as reducing costs and increasing product consistency through larger-scale centralised operations.

This work should commence with a census of the current growing capacity of the industry. A survey of ASTCA members and non-members would provide a clearer picture of the growing capacity in the coffee-growing regions of Australia. A deeper understanding of the current state of the industry will provide the foundation for achieving the objectives identified in this report.

9 References

- Bové, A.T. & Swartz, A. (2016). Starting at the source: Sustainability in supply chains, in Sustainability, McKinsey & Co, <https://www.mckinsey.com/business-functions/sustainability/our-insights/starting-at-the-source-sustainability-in-supply-chains>.
- Boydell, H. (2018). Sustainability in Coffee: What Are The Main Issues?, in Perfect Daily Grind, <https://perfectdailygrind.com/2018/11/sustainability-in-coffee-what-are-the-main-issues/>.
- IBISWorld (2019). Coffee Bean Distributors in Australia – Market Research Report, IBISWorld, <https://www.ibisworld.com/au/industry/coffee-bean-distributors/5477/>.
- Ernst and Young (2016). The state of sustainable supply chains. 2016.
- Bacon, C. M. (2013). Quality revolutions, solidarity networks, and sustainability innovations: following Fair Trade coffee from Nicaragua to California. *Journal of Political Ecology*, 20(1), 98-115.
- Gliessman, S. R. (1990). Agroecology: researching the ecological basis for sustainable agriculture. In *Agroecology* (pp. 3-10). Springer, New York, NY.
- Hatani, L., et al. (2016). Development Model of Cacao Agro-Industry with Sectoral Competitive Advantage Based in Southeast Sulawesi, Indonesia. *Global Journal of Flexible Systems Management*, 17(2), 229-246.
- Holt-Giménez, E. (2002). Measuring farmers' agroecological resistance after Hurricane Mitch in Nicaragua: a case study in participatory, sustainable land management impact monitoring. *Agriculture, Ecosystems & Environment*, 93(1-3), 87-105.
- International Institute for Sustainable Development (2003). Sustainability in the Coffee Sector: Exploring Opportunities for International Cooperation, United Nations Conference on Trade and Development, Geneva, Switzerland, December 8 and 9.
- Le, Q. V., Jovanovic, G., Le, D. T., & Cowal, S. (2020). Understanding the Perceptions of Sustainable Coffee Production: A Case Study of the K'Ho Ethnic Minority in a Small Village in Lâm Dong Province of Vietnam. *Sustainability*, 12(3), 1010.
- Levkoe, C. Z. (2018). Engaging the tensions of ecological internships: Considerations for agroecology and sustainable food systems movements. *Agroecology and Sustainable Food Systems*, 42(3), 242-263.
- Linton, A. (2008). A niche for sustainability? Fair labor and environmentally sound practices in the specialty coffee industry. *Globalizations*, 5(2), 231-245.
- Motsinger, H. (2018). A Sustainable Coffee Industry? Not Quite. *Specialty Coffee Association News*, 25(7).
- Nguyen, G.N.T. and Sarker, T. (2018). Sustainable coffee supply chain management: a case study in Buon Me Thuot City, Daklak, Vietnam. *International Journal of Corporate Social Responsibility*, 3(1).
- Pretty, J. N., Noble, A. D., Bossio, D., Dixon, J., Hine, R. E., Penning de Vries, F. W., & Morison, J. I. (2006). Resource-conserving agriculture increases yields in developing countries. *Environmental Science & Technology*, 40(4), 1114-1119.
- Pronti, A., & Coccia, M. (2020). Multicriteria analysis of the sustainability performance between agroecological and conventional coffee farms in the East Region of Minas Gerais (Brazil). *Renewable Agriculture and Food Systems*, 1-8.
- Silva, E. C., Gusmão, A. K. H., de Barros, M., da Silva Azevedo, A., Guimarães, E. R., & de Castro Júnior, L. G. (2019). Governança privada e sustentabilidade na indústria do café. *Revista agroalimentaria*, 25(48), 35-51.
- Vanderhaegen, K., Akoyi, K. T., Dekoninck, W., Jocqué, R., Muys, B., Verbist, B., & Maertens, M. (2018). Do private coffee standards 'walk the talk' in improving socio-economic and environmental sustainability? *Global Environmental Change*, 51, 1-9.
- Relevant AgriFutures Australia publications**
- Biosecurity Plan for the Australian Coffee Industry (2018)
- Identification of desirable coffee secondary metabolites (2015)
- Australian subtropical coffee grower's manual (2014)
- Subtropical Coffee Conference and Industry Strategy (2010)
- Emerging Animal and Plant Industries – Their Value to Australia (2nd Edition) (2009)



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AgriFutures Australia

Building 007
Tooma Way
Charles Sturt University
Locked Bag 588
Wagga Wagga NSW 2650

02 6923 6900
info@agrifutures.com.au

agrifutures.com.au

