



Raising the Pulse

The view to 2030 for Australian Pulses
– Opportunities and Challenges –

Raising the Pulse

'Raising the Pulse' is a perfect fit with Australian agriculture's vision for a \$100 billion industry by 2030. The comprehensive report, commissioned by Pulse Australia with GRDC support, provides a platform for the pulse industry to capture opportunities and address challenges to achieve that vision. This summary provides a distillation of the key findings of the report.

Pulses were novel to Australia's cropping sector in the 1990s. After 30 years of development, enhanced by breeding and industry programs, pulse crops are now mainstream in Australia's cropping rotations, providing a valuable and sustainable source of protein, as well as holding an enviable reputation for quality in global markets.

The commodity supply and demand scenario for pulse crops to 2030 looks healthy, albeit with some volatility. Globally, consumer attitudes to diet, what they contain and where the ingredients come from is changing rapidly. The consumer interest in healthier plant protein-rich diets is fast-evolving, as evidenced by growth in high-profile meat-substitutes and the flow of investor capital.

Is the emerging food ingredient market a durable trend that delivers significant new markets for Australian pulse producers? 'Raising the Pulse' seeks to balance the opportunities across the spectrum of pulse crop usage — from the staple food commodity pulses, through to high-value ingredients and isolates, as well as growth opportunities in the animal and petfood sectors.

This report examines the macro drivers of the global food industry over the next decade to determine whether increasing demand for plant-based protein is a fixture rather than a fad.

This summary of the findings sheds light on the kind of opportunities and challenges that are emerging while assessing the current positioning of the Australian industry to prosper in the future.

The report has been greatly enhanced by contributions from stakeholders across the value chain who shared their insights and experience to ensure the findings of this review were of the greatest value to the industry. On behalf of Pulse Australia, I thank all of the industry participants who were generous with their time and expertise in making a significant contribution to the report.

Importantly, 'Raising the Pulse' highlights the areas in which the industry can collaborate and intelligently invest. It provides a yardstick for the GRDC and pulse value chain participants to jointly grow the value of pulses, and ultimately for Australian pulse producers to capitalise on future market opportunities as well as mitigate risks.

Ron Storey

Chairman, Pulse Australia

Key findings

- **Megatrends driving global food markets are likely to favour increased consumption of plant-based protein.**
- **Pulses have a significant role to play in the rapidly evolving food markets demanding more plant protein.**
- **Existing markets, in particular the sub-continent, will remain the backbone of the global pulse trade, while China and Africa will emerge to become even larger consumers.**
- **Animal protein production is likely to intensify and requires sustainable sources of feed, and plant protein, including pulses, will be a focus of most rations.**
- **Australian pulses have earned a strong position due to the breeding and supply chain focus on clean, quality grain with desired visual characteristics.**

Megatrends affecting plant protein markets

A framework for thinking about the future

Megatrends influencing global food markets intersect and can have reinforcing or contradictory impacts on demand for protein and pulse commodities

A diverse set of influences

- Developing world increasingly affluent and urbanised
- Growing plant-based protein demand in developed markets
- Complex preferences affecting value, ethics, health and indulgence
- Greater need for convenience
- Preference for natural, avoidance of processing
- Aging demographics affecting protein demands
- Food as medicine, prevention of negative health outcomes

Redefining how to add and capture value

- Shift in capital flows and economic power to the East
- Risks of investment in countries and industries reassessed
- New models emerging for incubating innovation and commercialisation of novel products
- New forms of value chain integration in the food sector
- Evolving retail models affecting purchase and delivery choices

More complex and unpredictable markets

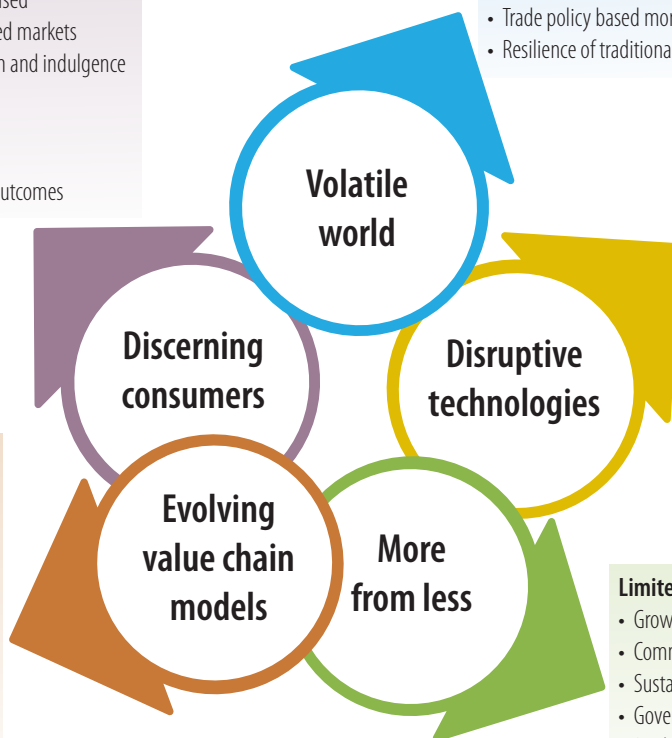
- Climate change impacting commodity production
- Geo-political instability making commodity markets more volatile
- Ad-hoc protectionism of farmers and consumers
- Trade policy based more on production ethics rather than explicit tariffs
- Resilience of traditional farming models threatened by volatile returns

Technologies reshaping the value chain

- Digital tools and platforms changing lifestyles and engagement
- Social platforms rapidly spread news and opinion
- Advances in genetic editing and modification applications
- Advances in automation for production and processing
- Rapid production of substitutes (3D printing, synthetics)
- Improving cost-competitiveness of protein alternatives

Limited resources and capacities

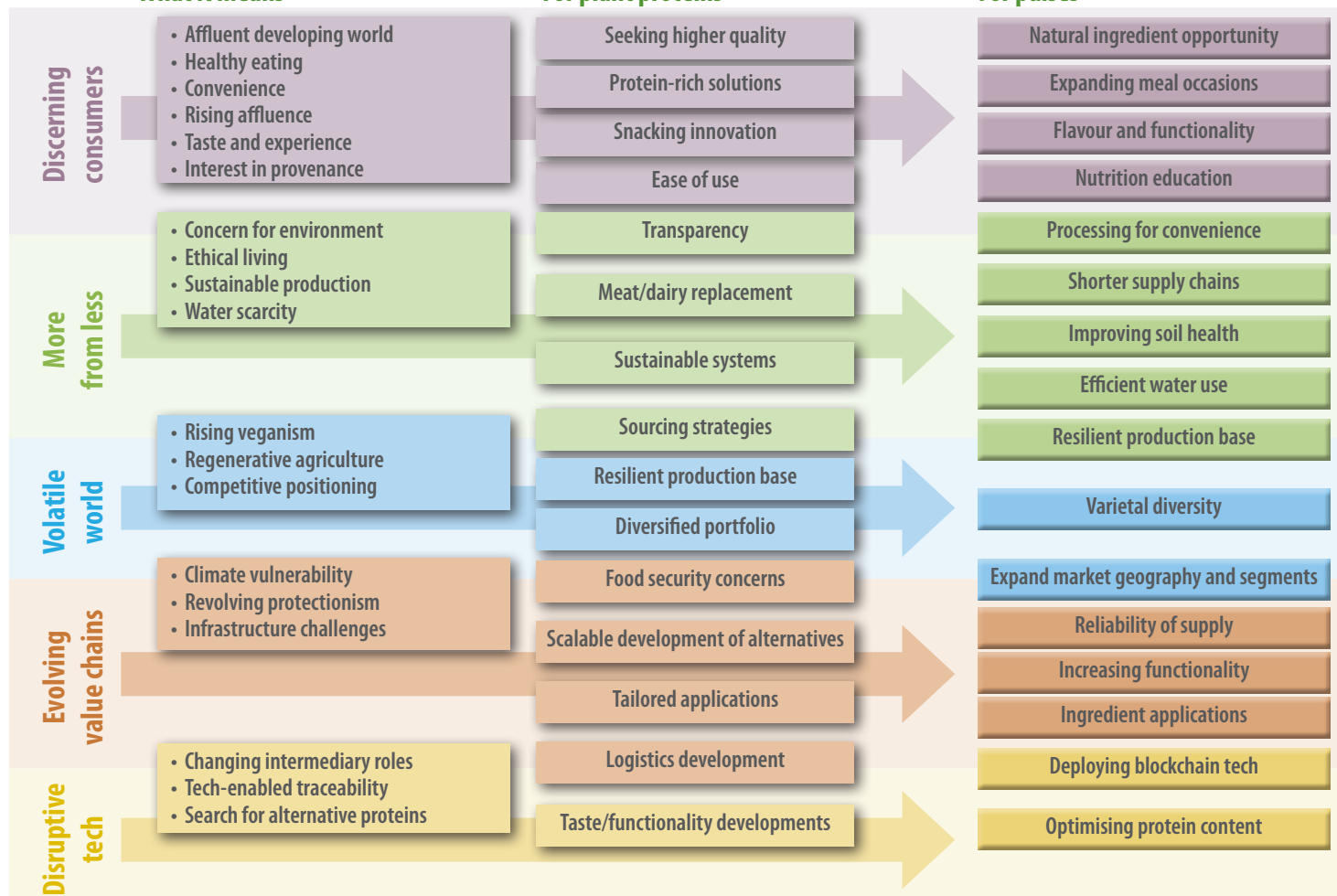
- Growing population to feed from finite resources
- Community concern for sustainable production
- Sustainability agendas driving value chain outcomes
- Government policy create regulatory uncertainty
- Biodiversity concerns with large-scale intensive food production models



What it means

For plant proteins

For pulses



Opportunities and Challenges for Australian Pulses

The megatrends analysis helps identify the implications for plant protein demand and what this may mean for pulses. Each of the implications for pulses identified in the previous table presents opportunities to be realised, but also presents challenges that need to be addressed. The opportunities and challenges outlined in the table below help to distill priority areas of industry investment and activity that can optimise opportunities, address challenges and mitigate risks for Australia’s pulse sector over the next decade.

	Implication	Opportunity	Challenge
Discerning consumers	‘Natural’ ingredient opportunity	Preference for healthy minimally processed foods • Non-GMO, organic and sustainability credentials • Less volatile, predictable demand • Plant-based sustainable aquafeed sources	Accessing global ingredient supply chains competitively • Consumer understanding of pulse benefits • Reliability of supply to service growing markets • Extracting value for animal feed inputs
	Expanding meal occasions	Consumers seeking healthier snacking options • Development of ready to eat and on-the-go meals • Increased pulse ingredients in breakfast cereals • Opportunities for pulse flour in sweet & savoury applications	Consumers understanding pulse benefits • Competition from Northern Hemisphere suppliers
	Flavour and functionality	Boosting protein and fibre content • Offer texture, viscosity, stability to food products • Water and oil holding capacity • Meat and dairy substitution and enhancement	Off-flavours inherent in some pulses • Increasing complexity of food requirements • Regulations of food labels and novel ingredients
	Nutrition education	Opportunity to ‘talk-up’ pulse protein credentials • Role of pulses in vegan and vegetarian diets • Greater consumption of pulses in a range of formats • Fortification through pulse ingredients • Greater interest in provenance of food	Cutting through consumer confusion • Targeting segment requirements down value chain • Winning and maintaining food supply chain trust
	Processing for convenience	Ease of preparation, reduction of waste • Packaging and presentation innovation • Development of easy-cook pulse products and blends • More snacking options to target new consumer segments • Higher value animal feed rations tailored for end-product	Maintaining ‘natural’ halo in more processed products • Limited local processing capacity • Connecting with end-consumers and product innovation • Sustainable supply of animal feed sectors
More from less	Shorter supply chains	Transparency and connection from end-user to producer • Contracts that prioritise traceability and assured supply • Minimising waste, avoiding over or under production • Mitigating counter-party risks • Flexible, agile supply • Grower expertise at maintaining quality allows strategic marketing	Greater onus on pulse producers to monitor markets • Ability to efficiently aggregate supplies • Counter-party risk worn by producers • Timely market intelligence to optimise opportunity • Grower skills, storing, handling and marketing • Critical mass to supply growing markets
	Improving soil health	Increasingly important in challenged environment • Greater community and consumer understanding of benefits • Highlight contribution to regenerative practices	Profitability beyond agronomic benefits • Achieving holistic, strategic approach to production • Engage/explain technical aspects of pulse production • Process claims to consumers hard to convey/verify
	Efficient water use	Pulses offer high water use efficiency • Greater application in more variable climate • Leveraging breeding advantage in drought resilience	Maintaining productivity with variable rainfall • Increased pulse production in importing regions • Exporting breeding know-how in drought resilience • Optimising available soil moisture locally
	Resilient production base	Increasing challenges to competitor pulse producers • Buyers diversify sourcing to secure supplies • Reliable year to year requirements for new end-user segments • Greater scope to include pulses in crop rotations • Animal production sectors seeking sustainable inputs	Increasing climate variability challenging yields • Trading off market returns versus cropping needs • Dominance of cereal co-crop for producers • Limited market intelligence for decision-making • Ability to reliably supply diverse and growing markets
Volatile world	Varietal diversity	Leveraging breeding expertise • Develop varieties that can adapt to increasing climate volatility • Revenue from Australian genetics	Trade-off between market and agronomic properties • Effective feedback loops in value chain • Adoption of fit-for-purpose varieties by growers • Overseeing compliance in genetics licensing
	Expanding markets	Increased market access • Expanding segments in the domestic market • Offer strategic sourcing capability	Priorities of trade negotiators • Critical mass and capability to reliably more markets • Maintaining competitiveness in targeted segments • Volatility in demand from developing markets
Evolving value chains	Reliability of supply	Sophisticated end-users pay premium to secure product • Timely supply to end-users compared to some competitors • Quality standards offer end-user assurance • On-farm storage capacity for strategic crop marketing	Year-to-year variation in pulse production • Recurrent droughts undermine ability to produce, and confidence of customer • Quality with increased climate variability • Dominance of cereal crops in rotations • Limited pulse market intelligence
	Increasing functionality	Increasing consumer interest in meat replacement products • Protein fortification from a range of pulse ingredients • Avoidance of GM soy ingredients • Specialised and sustainable animal feeding	Understanding likely future requirements • Reliably matching requirements • Complexity challenging value chain capability • Effective feedback loops
	Ingredient applications	Service premium segments and end-users • Segment and service niche opportunities • Quality attributes prioritised by end-users	More exacting end-user requirements • Competition from Northern Hemisphere suppliers • Lack of local processing capacity
Disruptive tech	Deploying Blockchain tech	Reduced counterparty risk • Transparency and shortening of supply chain • Growers directly supply specific end-users • Leverage flexible supply chain capabilities	Uptake of blockchain from producers and end-users • Identifying market opportunities • Critical mass to supply targeted segments
	Optimising protein content	Addressing functional and nutritional deficiencies • Specific varieties to address taste and functionality requirements • Tailored rations for high value animal production sectors	Competition from cost-effective alternative proteins • Trade off between agronomic and functional attributes • Effective feedback loops • Cost-effective supply of animal feed solutions

What this means for Australian Pulses

	Chickpeas	Lentils	Faba bean	Field pea
Current positioning	<ul style="list-style-type: none"> • Production and trade dominated by India • Australia largest exporter • Significant global supplier of Desi chickpeas • Australian chickpeas preferred in Bangladesh • Reliable, flexible supply chain with ability to respond to market signals • Reputation for clean, quality product • The most liquid of pulse markets with opportunity to absorb increased production 	<ul style="list-style-type: none"> • Nipper lentil size favoured in a range of markets, attracts premium in key Bangladesh market • Lentils offer premiums over other possible pulse crops in the most favourable production areas and has been resilient • Reliable, flexible and quicker supply chain to Asia than competitors • Drier cleaner product offers superior milling yields and attracts premium 	<ul style="list-style-type: none"> • Australia is the 3rd ranked producer and largest exporter • Visual characteristics • Faba beans offer premiums over other possible pulse crops in the most favourable production areas • Highly exposed to Egyptian market • Reputation for quality meeting end-user specifications 	<ul style="list-style-type: none"> • 7th ranked producer and exporter • Yields tend to be lower and more variable than competitor countries • Reliable, flexible containerised supply chain • Most whole peas exported to India • Growing Bangladesh market for split peas • Large window before Northern Hemisphere harvest • Significant niche market for Kaspia-type pea • Established local feed market offering less volatile prices
Future opportunities	<ul style="list-style-type: none"> • Expanding chickpea ingredient market • Widely accepted in western diets • Increased demand for vegan and vegetarian meals • Developing producer to end-user supply chains • Increasing snacking opportunities • Expansion of growing areas with new, adapted varieties 	<ul style="list-style-type: none"> • Development of farm to end-user supply chains • Expansion of growing areas with new varieties • Proved resilient and have out-competed field peas in southern Australia rotations • Increased ingredient opportunity for lentil flour • Canada not competing in small size lentil market against Australian product • Added as a complement to rice dishes and extender for meat • Easy preparation, familiarity offers opportunities in non-traditional markets 	<ul style="list-style-type: none"> • Farm to end-user supply chain • Snack food markets in East Asia and Middle East • Possible aquafeed market opportunities • Opening of China market is significant opportunity • Highly functional ingredient in plant-based alternatives • Aquafeed opportunity with reduced fishmeal availability 	<ul style="list-style-type: none"> • GMO-free stockfeed opportunity • Increased ingredient demand as alternative to soy in meat-alternative products • Expanded southern Australia planting areas with suitable varieties • Niche opportunities where attributes are preferred
Challenges faced	<ul style="list-style-type: none"> • Major staple markets will remain price-sensitive • Consistency of supply to access higher value opportunities • Barriers to trade and risk of contract defaults in key south Asian markets 	<ul style="list-style-type: none"> • Major developing markets will remain price-sensitive • Canada a major competitor offering similar attribute 	<ul style="list-style-type: none"> • Planting expansion may be capped for current varieties • Large single market that can be over-supplied from year-to-year • A range of competitors in North America, the Balkans and Africa • Understanding the dimensions and requirements of the functional ingredient opportunity 	<ul style="list-style-type: none"> • Volatile pricing, substitution with chickpeas • Compete with soy in ingredients market • Canada dominates production and export • New ingredient opportunities likely to be dominated by low-cost Northern Hemisphere suppliers • Locally produced Dun peas not suited for some markets

	Lupins	Mungbeans	Soybeans
Current positioning	<ul style="list-style-type: none"> • Leading producer and exporter • South Korea and Japan key export stockfeed markets • Planting areas have been highly variable, focussed in WA • Has lost competitiveness in rotations to canola & cereal crops 	<ul style="list-style-type: none"> • Small producer, major exporter • Well-established industry body representing and supporting sector • More management intensive than other pulses but significant agronomic support available • Limited growing regions and variable supplies • Certification and assurance protocols in place to access high-value markets • Competitors are low-cost developing countries 	<ul style="list-style-type: none"> • Small producer, importer of soybean meal • Planting areas have been highly variable with limited irrigation water in favoured regions • Geographically diverse growing region requires multiple varieties • Positioned as a premium product • Well developed domestic market with value-added processing capacity
Future opportunities	<ul style="list-style-type: none"> • Requirement for "soft N" in cereal cropping rotations could increase plantings in favoured regions • Likely increased demand for stockfeed from local and Asian markets • Offers sustainable high-protein alternative to soy and PKE stockfeeds • Well-developed supply chain could service feed markets if scale and competitiveness improved • Niche opportunities in food applications 	<ul style="list-style-type: none"> • Diverse markets and end uses with broad cultural acceptance throughout Asia • Emerging opportunity in US ingredient market for meat alternatives • Indonesia is a key new market opportunity for snack foods, beverages, bread and pastry • Higher value markets in Europe for high quality beans • Low allergenicity compared to other pulses improves market prospects 	<ul style="list-style-type: none"> • Non-GM soybeans offer marketing advantage in food applications for culinary markets like Japan • Continued development of varieties to target culinary market • Adoption of higher yielding crop varieties for northern sugar-growing regions • Higher yielding tropical varieties offering expansion in planting areas
Challenges faced	<ul style="list-style-type: none"> • Low consumer familiarity and allergen declaration has limited inclusion in food markets • Managing flavour and waste issues to improve competitiveness as protein source • Stockfeed prices likely to remain volatile • Competition from soymeal and other low-cost stockfeeds 	<ul style="list-style-type: none"> • Competition in key Asian markets from large competitors in the region • Continuity of supply from Australia with lack of grower focus • Limited market intelligence affects pricing signals to growers 	<ul style="list-style-type: none"> • Northern Hemisphere exporters are dominant and produce both GM and non-GM soybeans • Continuity of supply to service discerning markets • Volatility of soybean commodity markets • Diverse planting areas require the development and management of multiple varieties

The growing opportunity for pulses

The role of pulses in protein markets

Pulses are a staple food in the Sub-Continent and the Middle East, and will continue to be for the foreseeable future. Consequently, production and trade to these regions dominate. However, production impacts from variable monsoon conditions, combined, and interdependent with, political, price and trade issues resulting in a market which is highly volatile.

The pulse ingredient market, in contrast, is more stable, and on a solid growth trajectory of around 4% per annum. The market includes products such as flour, starch, protein, protein isolates, fibres and grits. The increased interest in plant-based eating and in particular, the rise of high-profile meat substitute products have significantly increased demand for pulse products as an ingredient, particularly with pea protein. As a plentiful, cost-effective, non-allergenic alternative to soy, pea protein isolate and powder demand is outstripping supply, prompting significant investments in large-scale processing capacity in Canada and China.



The role of pulses in feed markets

The role of pulses as a safe, nutritious and digestible protein source in animal feed diets should not be overlooked. The type of feed required by global markets will be influenced by changing dietary habits, developments in livestock production systems and various government policies. However, protein meal demand (derived mostly from oilseeds of which soybean represents around 60%) is projected to grow 23% between 2015-17 and 2027.

Sustainable, cost-effective sources of protein are vital for the future of livestock production systems. Pulses make an important contribution to food security by providing valuable products for animal feeding. There is considerable potential in using pulse crop by-products such as straw, chunies (a mix of seed coats and endosperm fractions) and husks, obtained during processing of pulses for human consumption. Many pulse by-products do not compete with human food, and contribute to reducing cereals and soybean meal in the diets of livestock in intensive livestock production systems.

Similarly, aquaculture is another plant protein market, with farmed-fish production expected to overtake capture fisheries output (including that utilised for non-food uses) by 2021. Reduced use of high-cost fishmeal has already created a new market for oilseed protein meals in the aquaculture industry, and the FAO expects usage to reach 9 million tonnes in 2026.

The fastest growing feed segment, however, is that of petfood. The global pet food market has experienced an annual growth rate of 6% since 2013, and draws heavily on chickpeas, lentils and peas to provide the non-animal based protein base.



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