Horticulture Innovation Australia

Final Report

Benchmarking and comparing the production and regulatory conditions of Aust vegetable producers with our competitors

Control Risks Group Pty Ltd

Project Number: VG13105

VG13105

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Contents

Summary

The Australian vegetable industry is under increasing competitive pressure in both its domestic and international markets. Innovation, lower cost base and new access to market through trade agreements are some of the factors producing this pressure. To better position the Australian vegetable industry in this competitive landscape, HIA has sought to benchmark Australian vegetable regulations against a set of selected competitors. The VG13105 project (the project), assesses regulatory conditions in Australia and those in seven of its competitors. The project aims to provide clear insight on competition in the regulatory space so both Australian policy makers and industry players can make better informed plans for future regulatory development, industry practice and export strategy.

The scope of the benchmarking study is specifically concerned with the regulatory regime and the effectiveness of enforcement in the following areas:

- Primary production
- The use of chemicals
- Heavy-metal contamination
- Packaging
- Storage and transportation
- Food processing
- Labelling
- Infrastructure support
- Information access
- Buying-local initiatives
- Export subsidies and incentives

And in the following countries:

- The United States
- Canada
- New Zealand
- China
- Thailand
- Peru
- Mexico

The results of the project suggest Australia's regulatory support towards its vegetable industry is strong overall in the areas of food safety and agricultural marketing. However, regulation and enforcement in New Zealand, US and Canada are equally strong, which leaves Australia marginal competitive advantage. Indeed, in certain areas, the regulatory regime in competitor countries is much stronger than that in Australia. For example, the US has more advanced regulatory support for local-grown products and safety standards for primary vegetable production.

China, Thailand, Peru and Mexico in general have weaker regulatory support in the areas of food safety and agricultural marketing, but there is a clear trend towards improvement. Thailand in particular, has more rigorous regulation of food packaging than Australia. The low cost of production and a growing safety and marketing support

in these developing countries, is likely further to challenge the competitiveness of the Australian vegetable industry. However, lack of coordination and effective enforcement suggests that, in the realm of regulation at least, this challenge will only emerge over the medium term.

Keywords

Regulatory support for vegetable industry; Competitiveness; Australia; China; New Zealand; Canada; The US; Thailand; Peru; Mexico

Introduction

Project VG13105 is in response to HIA's tender for Project 5.3 CA – Benchmarking and Comparing the Production and Regulatory Conditions of Australian Vegetable Producers with Our Competitors. The project is related to the Consumer Alignment Objective of Australian vegetable industry's new strategic investment plan 2012-2017.

HIA understands Australian growers are facing increased competitions in both their domestic and export markets. In order to enhance Australian growers' competitiveness, the project aims to benchmark regulatory conditions in Australia against its competitors. It focuses on regulations supporting food safety, vegetable marketing and transportation, as well as export. Despite lower cost in some competitors' countries, it is believed that Australian vegetable products can better place themselves through further strengthening their safety conditions, innovation and marketing ability.

The project is based on extensive desktop research and source enquiries, which provides up-to-date intelligence on regulatory conditions that impact the competitiveness of vegetable industry in Australia and seven of its competitors. The report presents our detailed findings and the areas which we recommend Australian vegetable industry to consider for improvement (see Recommendations).

Methodology

Control Risks executed a comprehensive analysis of the regulations governing vegetable producers and their level of implementation in seven countries plus Australia. The below criteria were used to measure the degree of regulation in each market to inform the target audience, namely Australia's policy makers, industry associations, vegetable growers and retailers. The eleven competitiveness parameters were designed as a tool that can also be used for ongoing monitoring and evaluation of regulatory change in each jurisdiction.

Table 1: Competitiveness parameters table

Categories	Competitiveness parameters
Food safety	C1: Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.
	C2: Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.
	C3: Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.
	C4: Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.
	C5: Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.
	C6: Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.
	C7: Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.
Government support for agricultural marketing	C8: Infrastructure support for farmers aids international competitiveness.
	C9: Information access support is efficient, which makes farmers well-informed of market changes.
	C10: Buying-local initiatives are efficient, which creates opportunities for increasing profits of local growers.
	C11: Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.

The above competitiveness parameters were derived for qualitative rather than quantitative purposes. They were designed to summarise and guide a qualitative comparison of regulation and the effectiveness of the implementation of those regulations.

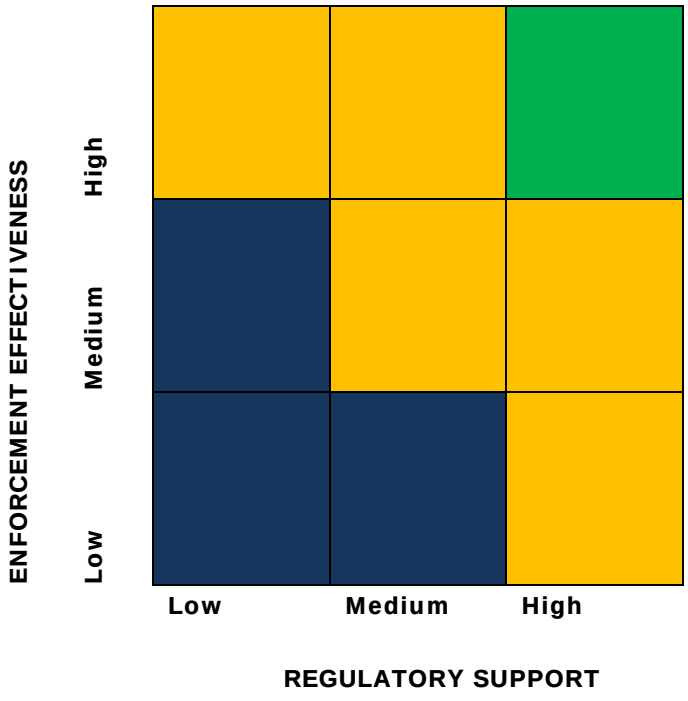
The competitiveness rating of each parameter is based on the evaluation of regulations governing the vegetable industry and their enforcement, as shown in the table below:

Table 2: Level of regulatory standards and enforcement effectiveness

Competitiveness rating	Regulatory support	Enforcement effectiveness
High	There is well-developed regulation related to the parameter that addresses overall or recent challenges and can help enhance competitiveness. For example, the regulation on minor use of chemicals is at a relatively high standard and can help to ensure quality and enhance consumers' confidence.	Regulation directly or indirectly related to the parameter has been effectively enforced by strong implementation agencies or mechanisms, which contribute to overall competitiveness. For example, there is evidence of regular training to help growers understand certain regulations. There are no or very limited recorded cases of major enforcement failure.
Medium	There is regulation related to the parameter, but it lacks details, is not mandatory or is not efficiently responding to the current challenges. For example, a labelling policy is lacking details in comparison to the one in a competitor's country.	Regulation directly or indirectly related to the parameter has been enforced by a certain agency or mechanism, but with limited effectiveness which has reduced competitiveness. There are some recorded cases of enforcement failure or a lack of transparency.
Low	There is no or limited specific regulation related to the parameter. The government generally lacks the intention or the capability to issue specific regulation.	Regulation directly or indirectly related to the parameter should be enforced by a certain agency or mechanism, but there is an absence of a supporting agency or a systematic failure of enforcement that cannot be tackled in the short term.

The competitiveness matrix was developed to support the ratings, which involved assessing the levels of both the regulatory support and the enforcement effectiveness. The methodology was based on extensive discussions with managers with HIA, and our experience in similar studies.

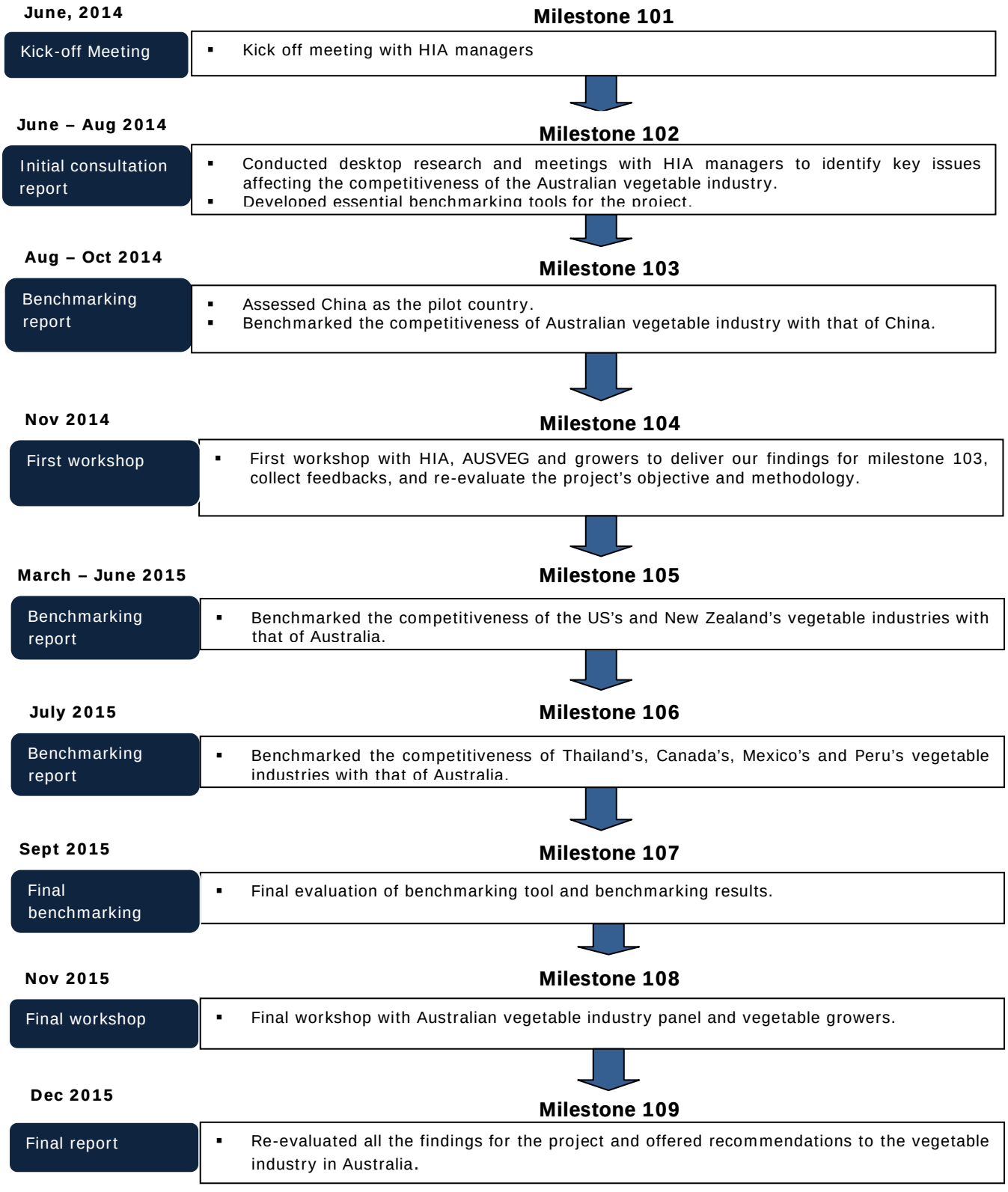
Table 3: Sample competitiveness matrix



Outputs

The project VG13105 kicked off in June 2014. Over 18 months, the project delivered six reports and two workshops to communicate our key findings. The table below details the outputs:

Table 4: List of project outputs



Outcomes

The following benchmarking table summarises overall competitiveness ratings for all eight countries. China and Mexico adopt different regulatory systems in their domestic versus their export markets, and the table reflects such a difference.

R stands for regulatory support, E stands for enforcement effectiveness, O stands for overall competitiveness, L stands for LOW, M stands for MEDIUM and H stands for HIGH.

Table 5: Benchmarking table

Competitiveness parameters	Rating									
	Australia	China		New Zealand	US	Thailand	Canada	Peru	Mexico	
		Domestic	Export						Domestic	Export
Primary production	L (R)	L (R)	H (R)	L (R)	M	L	M	H	L	H
	H (E)	L (E)	M (E)	H (E)	M	L	H	L	L	M
	M (O)	L (O)	M (O)	M (O)	M	L	M	M	L	M
Use of chemicals	H (R)	M(R)	H (R)	H (R)	H	M	H	H	M	H
	H (E)	L (E)	M (E)	H (E)	H	M	H	M	L	M
	H (O)	L (O)	M (O)	H (O)	H	M	H	M	L	M
Metal contamination	H (R)	H (R)		H (R)	L	H	M	H	L	
	H (E)	L (E)		H (E)	M	M	H	L	L	
	H (O)	M (O)		H (O)	L	M	M	M	L	
Packaging	L (R)	H (R)		L (R)	H	H	H	M	M	
	M (E)	M (E)		M (E)	M	H	H	M	L	
	L (O)	M (O)		L (O)	M	H	H	M	L	
Storage and transportation	H (R)	M (R)	H (R)	H (R)	H	M	H	M	L	
	H (E)	L (E)	H (E)	H (E)	L	M	H	M	L	
	H (O)	L (O)	H (O)	H (O)	M	M	H	M	L	
Food processing	H (R)	H (R)	H (R)	H (R)	M	H	H	M	M	
	H (E)	L (E)	M (E)	H (E)	M	M	H	M	L	
	H (O)	M (O)	M (O)	H (O)	M	M	H	M	L	
Food labelling	H (R)	M (R)		M (R)	L	M	H	H	H	
	H (E)	M (E)		M (E)	M	M	H	M	M	
	H (O)	M (O)		M (O)	L	M	H	M	M	
Physical infrastructure development	H (R)	M (R)		H (R)	H	M	H	M	M	
	M (E)	L (E)		M (E)	H	L	H	L	L	
	M (O)	L (O)		M (O)	H	L	H	L	L	
Marketing information service	H (R)	H (R)		H (R)	H	M	H	H	M	
	H (E)	M (E)		H (E)	H	M	H	M	L	
	H (O)	M (O)		H (O)	H	M	H	M	L	
Buy-local initiatives	M (R)	L (R)		L (R)	H	M	M	M	L	
	M (E)	L (E)		M (E)	H	L	M	L	L	
	M (O)	L (O)		L (O)	H	L	M	L	L	
Export subsidies and incentives	H (R)	H (R)		H (R)	H	M	H	H	M	
	H (E)	M (E)		H (E)	H	M	H	H	M	
	H (O)	M (O)		H (O)	H	M	H	H	M	

As indicated in the table:

- **Australian competitiveness benchmarked against China, Thailand, Peru and Mexico is strong overall in the areas of food safety and government support for agricultural marketing.** This offers a competitive advantage for Australian vegetable products against those from these countries. However, China and Mexico have more advanced regulatory support to their vegetable exports compared to those grown for the home market. Given the lower cost of production in these countries, it is important for Australia to seek further enhancement of its safety conditions, innovation ability and marketing support to strengthen its quality value proposition.

- **Australian competitiveness is as strong as New Zealand's, US's and Canada's in most areas of food safety and government support for agricultural marketing.** However, American and Canadian regulatory environment for food safety in primary production and food packaging can be considered more advanced than Australia's in terms of support and enforcement effectiveness. Both of them have a set of guidelines to help growers avoid contamination of vegetables during primary production and packaging, which is likely to help prevent food contamination scandals. In addition, the US and Canada have better developed infrastructure to support food transportation.

In Appendices, we present all the detailed findings in each country and the competitiveness rating on each benchmarking parameter. The results can be used for:

- Policy makers to quickly identify where Australia's regulatory support is strongest and where it is only marginally competitive to plan the future regulatory framework;
- Industry operators to identify the regulatory environment in the selected competitor markets, and discuss how to better place their products in these countries.

A comprehensive export strategy will require detailed assessment on consumers' preference and market conditions, which is beyond the scope of the project VG13105. We recommend industry operators to further study their export markets with a consideration of the competitiveness identified in this project.

Evaluation and Discussion

During the implementation of the project, Control Risks worked closely with Australian stakeholders and collected feedback at each project milestone. Below are the details of key communication with Australian stakeholders:

- **20 June, 2014:** A kick off meeting with Ravi Hegde and Kevin Bodnaruk with HIA to determine the objective of the project.
- **10 July, 2014:** A consultation meeting with HIA managers to discuss the context of the Australian vegetable industry. HIA suggested the use of chemicals and other food safety-related regulations are some of their main concerns; Control Risks agreed to conduct further research in these areas. We also agreed to pick up China as the pilot country for assessment.
- **26 July, 2014:** Control Risks determined a list of stakeholders for the initial consultation, communicated our plans with HIA and collected feedbacks.
- **7 October, 2014:** Control Risks received feedback from HIA on the milestone 102 report, which has been used for the further evaluation of the benchmarking tools, project objective and Australia's challenges.
- **31 October, 2014:** Control Risks received feedback from HIA on the milestone 103 report. Based on the feedback, we determined the agenda and priorities of the milestone 104 (workshop).
- **20 November, 2014:** Control Risks conducted a virtual workshop with HIA and the Market and Value Chain Development Design Team. We communicated our findings for milestone 103, and further evaluated the methodology, benchmarking tools and expected outcomes of the project.
- **4 March, 2015:** Control Risks received feedback from HIA on the milestone 105 report, which set out the format and expectations for the subsequent reports.
- **4 August, 2015:** HIA evaluated the compliance of the project, and confirmed that the project fulfilled the compliance requirements.
- **Sept to Oct, 2015:** There were several discussions on the milestone 106 and 107 reports, which aimed to support the effective delivery of the final workshop.
- **11 November, 2015:** Control Risks conducted a final workshop with Australian stakeholders. We presented the key findings of the project, highlighting the strengths and weaknesses of the existing regulatory support for the Australian vegetable industry. The workshop allowed for active discussion with participants, which enabled us to further address the main concerns of Australian stakeholder to inform the final report.

In the 18 months of the project implementation, we have always delivered our milestone reports on time and within budget. The timely discussions with HIA and other relevant industry bodies have ensured the project is of quality and can effectively represent the interests of Australia's levy payers.

Recommendations

The project identified a number of gaps between existing regulatory support mechanisms in Australia and the support mechanisms provided by governments in competitor countries, as well as Australia's own advantages. Based on the extent of the gap and advantages, we recommended the Australian vegetable industry consider the following:

Domestic market

- **Consider further evaluating the effects of buy-local initiatives and positive measures in supporting local products**. Although it is debatable that a 'buy-local initiative' can positively contribute to an economy, such a programme has been actively implemented by some of Australia's competitors. The US for example has several government programmes supporting local agricultural products. A key government-sponsored initiative aimed at promoting local consumption is the US Department of Agriculture (USDA)'s Farmers Marketing and Local Food Promotion Program (FMLFPP), which provides grants to local agricultural producers for the purposes of boosting domestic consumption of locally produced agricultural products. The USDA also provides support for the connection between farmers and consumers through the 'Know Your Farmer Know Your Food (KYF2)' initiative. Such support has contributed to a large increase of farmers' markets in recent years. In Australia, there is co-operation with non-governmental initiatives such as 'Australia Grown' to promote Australian products, but financial support from government is less pronounced. In recent years, Australian growers have faced increased competition from low cost imports. It is recommended that government, industry associations and retailors to assess the effects of buy-local initiatives, and to what extend such schemes would benefit Australian growers.

- **More infrastructure investment required to maintain competitiveness.** In general, Australia has an advanced infrastructure system. However, Australia ranked 35th in the World Economic Forum's Global Competitiveness Report 2014-15, lower than the US and Canada, which ranked 16th and 19th respectively. Both US and Canadian rural infrastructure has benefited significantly in recent years from government stimulus. Australia's public-private partnership model has produced more fragmented results in infrastructure.

- **Further support pest control and relevant innovation.** Australia has an advanced policy framework governing the use of pesticides and stringent enforcement to ensure food safety. However, New Zealand, the US and Canada have equally stringent frameworks governing the use of pesticides, which leaves Australia marginally competitive. In addition, China, Thailand, Mexico and Peru are enhancing their food safety governance and safety innovation. In these countries, safety enforcement for products targeting export markets is particularly high. It is recommended that Australian government and vegetable industry further study the necessity of the enhancement of safety controls and innovation, including offering more institutional support on minor use of chemicals and developing alternative approaches to pest control.

Export market

- **Support for food packaging safety can be further enhanced.** Australian regulation on safety in food packaging is insufficiently developed compared to some other target competitors. Food Standards Code Standard 1.4.3 places the responsibility for ensuring packaging safety on food manufacturers and retailers without specifying individual packaging materials for food contact or how they should be produced or used. The updated Food Standards Code that will take effect from 1 March 2016 does not specifically address the safety of packaging. Australia's competitors, especially Canada and Thailand, have advanced frameworks governing packaging safety. Both countries have specific agencies tasked with overseeing regulations related to food packaging, which provides ample guidance to food producers and manufacturers on how to submit packaging material for in-house toxicological evaluation.

- **Further evaluating competitor challenges.** This benchmarking study of eight countries provided a 'snap shot' of the comparative regulatory regimes of competitor countries. What would require further research is how rapidly emerging markets such as China, Peru and Mexico are advancing (or indeed regressing) over time. Furthermore, this piece of work did not assess export market consumer perceptions of the regulatory regimes in these countries, or perceptions and impact of varying quality of enforcement.

- **Further monitoring of primary production.** Australia does not have a specific standard in controlling contamination during primary production. Unlike US, Canada and Peru which have specific guidelines covering agricultural water, animal contamination and worker hygiene during primary production, Australia does not have legally binding food safety regulation specific to primary vegetable production. However, Australia has several other guidelines regarding best agricultural practice. It is recommended that policy makers and industry operators in Australia to maintain awareness of market trends and how regulation, versus guidelines in this area, plays in destination markets.

It is worth noting that avoiding regulatory complexity is as important as imposing new regulation were deemed necessary. In our assessment, we found that while some emerging economies focus on expanding their regulatory frameworks in a haphazard manner, Australian regulators have emphasised the need to avoid unnecessary and inconsistent regulations, and this has proven to be highly successful. Of the countries benchmarked, Australia has a low rate of food safety incidents and a high level of compliance. The Australian government should continue evaluating the necessity of certain regulations where genuine gaps remain, promoting best practice in the vegetable industry, and assessing the efficiency of its regulatory framework as whole and relative its competitors.

Scientific Refereed Publications

None to report

Intellectual Property/Commercialisation

No commercial IP generated

References

Table 6: Regulatory reference – China

Laws/regulations	Institutions	Year of issuing	Year of update	Scope
Food Safety Law	NPC Standing Committee	2009	Under revision	The scope covers the governing agencies and general food safety requirements related to production, packaging, processing and import and export.
The standard for Irrigation Water Quality (GB-5084-1992)	MEP	1992	No update	The two standards set up: • Quality standard of irrigation water • Monitoring requirements • Testing method
The standard for Irrigation Water Quality (GB 5084-2005)	Issued by the AQSIQ / implemented by the MOA	2005	No update	
Pesticide Management Regulations of the People's Republic of China	MOA	1997	2001, 2008	Covers pesticide registration, production, selling licences, usage and penalties for violation. Clearly states that highly toxic pesticides (no clear definition) cannot be used on vegetable planting.
Measures for Implementing the Regulation on Pesticide Administration	MOA	1999	2002, 2004, 2010	Similar scope as above and states that persons who use pesticides should ensure the pesticides have clear labels and registration certificates.
Law on the Quality and Safety of Agricultural Products of the People's Republic of China	MOA	2012	No update	Covers general safety standards, production, labelling, packaging and monitoring, but without details. For example, states that 'A producer of agricultural products shall use chemical products such as chemical fertilisers, pesticides, veterinary drugs and agricultural films, etc. in a reasonable way, and prevent such chemical products from polluting the place of origin of agricultural products' but does not set up any detailed requirements.
National food safety standard – Maximum Residue Limits for Pesticides in Food (GB 2736-2014)	NHFPC / MOA	2012	2014	Sets 3,650 limits in 12 categories, including 2,495 limits for 115 kinds of vegetable and 85 kinds of fruit.
Safety Standard of Pesticide Usage	MOA	1982	No update	Covers the classifications of pesticides according to their hazardous levels and the usage of pesticides.
Measures for the Management of Pesticide Label and Manual	MOA	2007	No update	Covers the required content on labels of pesticides, including registration certification and hazardous levels.

Measures for Examination of Pesticide Advertisement	Administration for Industry and Commerce / MOA	1995	1998	The scope covers the release of pesticide advertisements, and banned words in such advertisements. It requires all advertisements of pesticide products to be reviewed by relevant authorities before release to the media in order to prevent misleading claims.
Procedures for Restricting Pesticide Uses	MOA	2002	No update	Covers general conditions for restrictions on using pesticides.
Banned Pesticides in Agriculture – MOA Notice No 1, No 199, and No 1586	MOA	2008, 2002, 2011	Not applicable	Bans the use of 45 pesticides for agriculture, including DDT, camphechlor, dibromochloropane and chlordimeform.
Standards for safety application of pesticides	MEP	1989	No update	Covers the permitted levels, methods of use, and interval periods for pesticide use in agriculture.
China Food Safety National Standard for Maximum Levels of Contaminants in Foods GB 2762-2012	Ministry of Health (currently known as NHFPC)	2012	No update	Covers details of the Maximum Levels of Contaminants in foods, including vegetables.
Packaging, labelling, transport and storage for refrigerated foods in logistics	AQSIQ	2009	No update	Covers definition and requirements, but in a high-level format. For example, says the refrigerated facilities for food should have necessary cooling functions, without giving details.
Detailed Rules for the Sanitation Registration of Factories / Storehouses of Food for Export	AQSIQ	2002	No update	Covers food sanitation requirements for exporting companies, which requires producers of tinned food, frozen vegetables and vegetable juice to adopt the HACCP system.
General rules of packaging and labelling for vegetables	MOA	2008	No update	Covers general packaging and labelling requirements. Bans the use of CFS, EPC, PUR and PVC materials in packaging. Requires producers to label the name, producer, production place and production date (harvest date) and whether it is a genetically modified product.
General Hygienic Rule for Food Processing GB 14881 - 2013	NHFPC	2013	No update	Covers the location and construction requirements for food processing factories, the quality of water for processing, storage requirements, and the health quality of employees. Lacking details for food storage, but has some detailed requirements on

				factory workers. For example, workers are not allowed to wear accessories and watches.
Rules on logistics requirements for safe vegetables	Ministry of Commerce	N.A	N.A	Covers cooling requirements during vegetable packaging, processing, storage, transportation and sales. The requirements cover 15 kinds of vegetables, including tomato, potato, carrot and cucumber. Sets temperature requirements for those vegetables during transportation, storage and sales.
National Food Safety Standard on General Rules for the Labelling of Packaged Food GB7718-2011	NHFPC	2011	No update	Covers general labelling requirements, including date, nutrition and storage conditions.
General Standard for the Labelling of Pre-packaged Food Additives GB28050-2011	NHFPC	2011	No update	Covers labelling requirements on additives.
Administrative Measures for Labelling Agricultural Genetically Modified Organisms Marks	MOA	2004	No update	Covers requirements on labelling genetically modified products and process.

Table 7: Regulatory reference – New Zealand

Laws/regulations	Institutions	Year of issuing	Year of update	Scope
Australia New Zealand Food Standards Code	FSANZ	2003	2014	The code aims to lower food safety incidents, and covers health and hygiene requirements on food planting, processing and labelling.
Food Act 1981	NZFSA (now MPI)	1981	2014	Covers purposes of the legislation, offences and penalties, and guidance on enforcement.
Food Hygiene Regulations 1974	Ministry of Health	1974	2014	Operates under the Food Act 1981 and sets food handling requirements, including registration of food premises and requirements on vehicles used to carry food and food storage.
Resource Management Act 1991 (RMA)	Ministry of Environment	1991	2012	Provides an integrated framework for resource protection, including terms on the use of land, air and water-related resources. It specifies the functions and duties of central and local governments in resource protection, and penalties for violations.
Agricultural Compounds and Veterinary Medicines Act 1997	MPI	1997	No update	Covers standards of registration, importation, manufacture and sale of agricultural compounds.
New Zealand (Maximum Residue Limits of Agricultural Compounds) Food Standards 2014	MPI	2014	No further update	Covers the Maximum Levels of Contaminants in foods, including vegetables.
Management of Agrichemicals code of practice	Environmental Protection Authority	2004	N.A.	Covers general conditions for restrictions on using pesticides.
New Zealand Horticulture Export Authority Act 1987	Ministry of Agriculture and Forestry (now MPI)	1987	2014	Covers requirements to promote effective export marketing of horticulture, such as approval of export marketing strategies for recognised product groups.

Table 8: Regulatory reference – The US

Laws/regulations	Institutions	Year of issuing	Year of update	Scope
Food, Drug and Cosmetic Act (FDCA)	FDA	1938	25 amendments	Provides the FDA the legislative power to oversee the regulation of food, drugs and cosmetics safety. Establishes the Generally Recognized as Safe (GRAS) guidelines employed by the FDA to regulate food safety in the vegetable industry. The Act establishes enforcement penalties available to the FDA.
Food Safety Modernization Act (FSMA)	FDA	2011	No update	The FSMA provides broad powers to prevent food safety problems, detect and respond to food safety issues, and improve the safety of imported foods. The legislation authorizes new regulations for agricultural producers as well as focusing on addressing food safety risks from microbial pathogen contamination. The law grants FDA a number of new powers, including mandatory recall authority. At the same time the FSMA requires the FDA to issue guidance documents, as well as a host of reports, plans, strategies, standards, notices, and other tasks.
Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)	EPA	1947	Updated in 1972	FIFRA gives the EPA authority to determine which pesticides can be used in the US and in which ways. Under FIFRA Section 3, all new pesticides (with minor exceptions) used in the United States must be registered by the Administrator of EPA. FIFRA provides federal control of pesticide distribution, sale, and use. All pesticides used in the US must be registered by EPA. Use of each registered pesticide must be consistent with use directions contained on the label or labelling. Before EPA can register a pesticide that is used on raw agricultural products, it must grant a tolerance or exemption.
Federal Environmental Pesticide Control Act (FEPCA)	EPA	1972	Update of FIFRA and then amended numerous times	Before the EPA can register a pesticide that is used on raw agricultural products, it must grant a tolerance or exemption.
Food Quality Protection Act (FQPA)	EPA	1996	Numerous amendments	The FQPA amended FIFRA and the FDCA by changing the way EPA regulates pesticides. Some of the major requirements include stricter safety standards, especially for infants and children, and a complete reassessment of all existing pesticide tolerances.

Sanitary Food Transportation Act (SFTA)	FDA	2005	Amended in 2006, 2007, 2009, 2010 and 2014	The SFTA requires that FDA prescribe sanitary transportation practices to ensure that food transported by motor vehicle or rail is not transported under conditions that may adulterate the food.
Food Allergen Labelling and Consumer Protection Act (FALCPA)	FDA	2004	Amended in 2010	FALCPA is an amendment to the Federal Food, Drug, and Cosmetic Act and requires that the label of a food that contains an ingredient that is or contains protein from a "major food allergen" declare the presence of the allergen in the manner described by the law. The Act applies to both imports and domestically produced food.

Table 9: Regulatory reference – Thailand

Laws/regulations	Institutions	Year of issuing	Year of latest update	Scope
Food Act B.E. 2522	MOPH	1979	N.A.	The Act covers general requirements on food licensing, packaging safety, storage and transportation, the definition of food safety, and punishments on violations. The MOPH is designated by the Act to be in charge of safety of all food products.
Standards of Contaminated Substances. B.E. 2529	MOPH	1986	N.A.	Covers limits of metal contamination on processed foods. The standard requires the level of arsenic contamination to be less than 2mg per 1 kilogram of foods and that of mercury to be less than 0.5 mg per 1 kilogram of foods.
B.E. 2548 (2005) Qualities or Standard for Container Made from Plastic	MOPH	1988	2005	Covers detailed safety requirements on food packed in plastic containers.
B.E.2549 (2006) Food Packed in Hermetically Sealed Container	MOPH	1992	2013	Covers detailed safety requirements on food packed in hermetically sealed container, including both metal and non-metal containers.
No.193 / 2543(2000) Production Processes, Production Equipment, and Foods Storages	MOPH	2000	No update	Sets standards on food processing, transportation and storage.
No. 194 /2543 (2000) Labels	MOPH	2000	The first standard was issued in 1982, and was updated in 1985 and 2000	Sets standards on food labelling.
The Agricultural Standards Act B.E. 2551	ACFS	2008	No update	Specifies agricultural standards committee, the establishment of future standards, the enforcement of mandatory standards, inspection and certification of standards,

				and penalties.
The Enhancement and Conservation of Environmental Quality Act, B.E. 2535	NEQA	1992	No update	Covers general requirement on environmental protection and monitoring.
Hazardous Substance Act B.E. 2535	MOPH	1992	2013	Covers the requirements of importation, production, marketing, and possessing of hazardous chemicals used in Thailand.
Enhancement and Conservation of Environmental Quality Act, B.E. 2535	Ministry of Natural Resources and Environment	1992	N.A.	Establishes the establishment of the Environmental Quality Board, and the Act covers general terms on environmental protection, pollution control and penalties.
Agricultural Standards Act B.E. 2551	MOA	2008	No update	Aiming for the safety and quality of agricultural commodity, it covers license required for production, export and import, and the Good Agricultural Practices.
Consumer Protection Act B.E. 2522	Ministry of Industry	1979	1998	Specifies the establishment of the Consumer Protection Board, consumers' rights, duties of competent officials, and the requirements on advertisement and labelling to protect consumers' rights.
Product Liability Act B.E. 2551	Bureau of Consumer Protection Plan and Development	2008	No update	Covers the definition of 'product', 'agricultural product' and 'unsafe product', and the general requirements on product's safety.
Pesticide Residues: Maximum Residue Limits (TAS 9002-2556)	ACFS	2014	The first standard was issued in 2004, and was updated in 2006, 2008 and 2014	Set less than 1000 limits on food and covers the method of pesticide residue analysis.
Safety Requirements for Agricultural Commodity and Food (TAS 9007-2005)	ACFS	2005	No update	Covers general requirements on food safety, including level of pesticide residues, metal residues and food additives.
Methods Of Sampling For The Determination Of Pesticide Residues (TAS 9025-2008)	ACFS	2008	No update	Specifies testing requirements on pesticide residues, including minimum size of each laboratory sample.

Principle For Traceability/Product Tracing As A Tool Within An Agricultural Commodity And Food Inspection And Certification System (TAS 9027-2008)	ACFS	2008	No update	Covers the definition and designing of the traceability tool, the operating procedures and training plan.
Controlling Importation and Exportation Goods Act. B.E. 2522	MOC	1979	No update	Covers the control measures for export and import of goods in Thailand.
Thai Agricultural Standard TAS 1500-2004	ACFS	2004	No update	Sets standards on packed asparagus.

Table 10: Regulatory reference – Canada

Laws/regulations	Institution	Year of issuing	Year of update	Scope
Agriculture and Agri-Food Administrative Monetary Penalties Act	CFIA	1995	2002, 2005, 2006	The purpose of the act is to establish a fair and efficient administrative monetary penalty system for the enforcement of the agri-food Acts
Canadian Food Inspection Agency Act	CFIA	1997	Multiple amendments	The Act is created by the CFIA with the purpose of combining the related inspection services of three separate federal departments. The establishment of the CFIA consolidates the delivery of all federal food safety and plant health regulatory programmes.
Canada Agricultural Products Act	Agriculture and Agri-Food Canada (AAFC)	1985	Multiple amendments	Regulates the marketing of agricultural products in import, export and interprovincial trade. It also provides national standards and grades of agricultural products. The section, 'Fresh Fruit and Vegetable Regulations (C.R.C.,c.285)',regulates fresh fruit and vegetables, which covers packaging, labelling and safety requirements.
Consumer Packaging and Labelling Act	AAFC, Health Canada	1985	2002, 2011	Requires that pre-packaged consumer products have accurate and meaningful labelling information. It also sets out specifications for mandatory label information such as the product's name, net

				quantity and dealer identity
Food and Drugs Act	Health Canada, CFIA, AAFC	1985	Multiple amendments	Regulates the advertising, sales and importation of foods, drugs, cosmetics and medical devices. It covers the powers of stakeholders, marketing authorizations and offences and punishment.
Safe Food for Canadians Act	CFIA, Health Canada	2012		The safe food act consolidates parts of four existing acts: the Fish Inspection Act, Canada Agricultural Products Act, Meat Inspection Act and the food provisions of the Consumer Packaging and Labelling Act.
Pest Control Products Act (PCPA)	Minister of Justice	2002	2006	Covers prohibitions, maximum residue limits, and export controls.
Food Retail and Food Services Code	Canadian Food Inspection System Implementation Group	2004	No recent update	Covers conditions of food retail and services, including storage, water, packaging and temperature control.

Table 11: Regulatory reference – Peru

Laws/regulations	Institution	Year of issuing	Year of update	Scope
General Health Law		1997	Constant updates through rules, decrees and supreme resolutions	Provides the legal framework for Peru's regulations on sanitary supervision and the control of food and beverage products.
Supreme Decree 034-2008-AG	SENASA COMPIAL DIGESA	2008	N.A.	Grants responsibilities to competent authorities (e.g., SENASA in the case of fresh produce) for the issuance of certificates required to comply with export requirements. The decree is explicit in the application of food safety standards of the Codex Alimentarius when local regulations are not developed. Implementation of good agricultural practices, good manufacturing practices and HACCP practices are included in the law to ensure food safety across the supply chain.
Supreme Decree 007-98-SA	DIGESA and INDECOPI	1998	Multiple amendments	Covers monitoring and sanitary control of foods and drinks, particularly regards to food additives.
Supreme Decree 018-2008-AG	SENASA	2008	2008	Covers agricultural food safety. It gives authority to SENASA to investigate complaints and defines SENASA's role in imports and exports.
Supreme Decree 004-2011-AG	Ministry of Agriculture, SENASA	2011	N.A.	Covers general principles of hygiene and good practices for production and handling. It establishes guidelines for ensuring the food safety of primary food and feed products produced locally or imported into Peru, and for exports, including controlling food contamination
Supreme Decree 001-2015-MINAGRI	SENASA, Ministry of Agriculture	2015	N.A.	The decree was formed to consolidate all information about pesticides into one coherent law and equip all of the necessary agencies with the correct authority to control and monitor pesticides.

Legislative Decree 1059-2008	SENASA and DIAIA	2008	2008	This is the 'Primary Production Safety Law', which covers use of agrichemicals and other food safety requirements in primary production.
Legislative Decree 1062-2008	SENASA COMPIAL DIGESA	2008	2012	The decree aims to protect health, recognise rights of consumers and promotes competition between economic entities. It requires production sites to monitor and verify the implementation of Hazard Analysis and Critical Control Point (HACCP) system.
Legislative Decree 1053-2008	Ministry of Commerce and Tourism; National Tax Authority (SUNAT)	2008	2010	Introduces a duty drawback scheme and the refund of certain duties, taxes and fees collected upon the importation of key supplies for local production.
Law 29571-2010	INDECOPI, SENASA and Codex Alimentarius	2010	N.A.	Specifies labelling and additive instructions in accordance with Codex Alimentarius.
Law 27060-1999; Law 27767-2002; Supreme Decree 008-2012-MIDIS	National Food Assistance Programmes	1999	2012, multiple revisions	Regulations related to government funded food assistance programmes aimed at ensuring food security among populations living in poverty and extreme poverty. The government prioritises the purchase of Peruvian-grown produce distributed through food assistance programmes.
Law 27360-2000; Law 29482-2009	Ministry of Agriculture; Ministry of Commerce and Tourism; National Tax Authority (SUNAT)	2000; 2009	Multiple revisions	Introduces tax incentives, including depreciation incentives for a number of activities, including primary production. The laws aim to increase investment in remote areas.
Resolution 0036-2014-MINAGRI-SENASA-DIAIA	SENASA	2014	N.A.	Allows importation of pesticides for agricultural use but specifies requirements on labelling.
Resolution MS-535-97-SA/DM	Ministry of Health	1997	N.A.	Covers hygiene principles for the handling of vegetables and other foods.

Table 12: Regulatory reference – Mexico

Laws/regulations	Institutions	Year of issuing	Year of update	Scope
General Health Act	SALUD and COFEPRIS	2009	No update	Covers details on protection of human health.
Federal Law for Plant Health	SAGARPA	1994	2008	Authorises the Ministry of Agriculture to regulate plant safety, including measures to reduce risks of contamination in primary production.
Article 27 of the Federal Law for Plant Health	SAGARPA	1994	No update	Authorises the SAGARPA to issue international phytosanitary export certificates and to establish procedures for obtaining these certificates based on the relevant Mexican NOMS and the requirements of importing countries.
NOM-051-SCFI-1994	COFEPRIS and SE	2009	2014	Covers requirements on labelling pre-packaged foods.
NOM-051-SCFI-1994 NOM-051-SCFI/SSA1-2010	SE and SALUD	1994	2010	Covers requirements on labelling of pre-packaged foods and non-alcoholic drinks.
NOM-086-SSA1-1994	SALUD	1996	2010, 2012, 2013	Covers nutritional information labelling of pre-packaged foods and non-alcoholic drinks
NOM-002-SSA1-1993	SALUD	1994	No update	Sanitary requisites for food and drink metallic containers.

NOM-117-SSA1-1994	SALUD	1995	No update	Testing methodology for cadmium, arsenic, lead, tin, copper, iron, zinc and mercury in foodstuffs, potable water and purified water.
Federal Law of Metrology and Standardization" (Ley Federal sobre Metrología y Normalización. DOF-30-04-2009).	Mexico's National Standards Office (DGN) of the Secretariat of Economy (SE)	1992	2014	This law establishes two types of regulations: mandatory *Norma Oficial Mexicana* (NOM) and voluntary *Normas Mexicanas* (NMX).
NOM-033-FITO-1995, NOM- 034-FITO-1995 and NOM-052-FITO-1995	SENASICA	1995	No update	This NOM authorises SENASICA to verify and inspect the implementation of laws regarding plant safety, including reducing risks of contamination on primary products.
NOM-001-SAG/BIO-2014	SAGARPA	2014	No update	General specifications for labelling of genetically modified organisms.
PROY-NOM-000-SAG-FITO/SSA1-2013	SAGARPA	2014	Under review	Maximum Residue Levels guidelines and authorisation and review procedure.

Appendices

This section contains all the country-specific reports for the project VG13105.

CHINA

Executive Summary

This report aims to benchmark the competitiveness of Australian vegetable industry with China, and it assesses the regulatory conditions governing food safety in production, food safety along the supply chain and government support for agricultural marketing in both countries. The assessment takes into consideration China's overall condition and its impact on regulatory development and enforcement, as well as the impact on future policy changes in the vegetable industry. This section summarises our findings:

China's evolving vegetable sector

- **China's large vegetable industry is fragmented and decentralised, which significantly hinders the government's ability to enforce national food standards.** There is great variation in how vegetables are grown and processed in China, and many small producers with highly localised distribution networks do not have the resources or incentive to develop their compliance capabilities. In addition, the strength of enforcement varies greatly among local government agencies.

Retailers selling vegetables in a vegetable market in Shanghai

- **China's domestic consumers are those most concerned about poor food safety, and their growing demands for safe food are leading to changes in regulations and industry awareness.** The Chinese government is expected to approve an amendment to the 2009 Food Safety Law by the end of 2014, largely designed to give the original law more teeth to improve enforcement. Consumers' demands and companies' profitability are also driving technological changes, such as the growing use of cold storage and transport facilities.

China's vegetable exports

- **The higher standards imposed on Chinese vegetable exports showcase many of the changes likely to be implemented across China in the coming decade, with more stringent regulations usually comparable to Australian standards.** The larger, consolidated vegetable growers and processors in China producing for export need to meet the standards of their export markets to make their businesses viable. In some areas (e.g. primary production food safety regulation, packaging), Chinese vegetable exporters follow US or EU regulations that exceed safety requirements in Australia.

Australia's competitive position

- **Australian competitiveness benchmarked against China is strong overall in the areas of food safety and government support to agricultural marketing.** Along most measures benchmarked in this report, Australian regulation is more advanced and implementation is significantly higher. The gap in enforcement is likely to persist in the short-to-medium term given the diverse regional challenges Chinese development faces, but it will likely narrow over the next decade.

- **While Chinese regulation is focused on improving standards and enforcement, Australian regulators emphasise the need to avoid unnecessary regulatory costs for producers.** Evaluating whether or not the cost to business of more stringent regulations would outweigh the benefits is outside the scope of this report (for instance the reputational benefits of more stringent food safety laws). However, the following sections compare both Chinese and Australian regulation and enforcement to help Australian growers benchmark their ability to compete with Chinese producers in the future.

Benchmarking food safety in primary production

- Australia's enforcement of high food safety standards in primary production is stronger than in China, but China has comparable regulation in place. When it comes to food safety regulations that explicitly apply to the primary production of vegetables, the highest regulatory conditions on issues like animal contamination risks are set for Chinese vegetable exports.

Retailers selling vegetables in a vegetable market in Shanghai

- Low awareness of chemical safety issues has made the use of pesticides and fertilisers widespread and the enforcement of restrictions more difficult. The decrease of arable land pressures growers to increase productivity, and financial constraints often prevent Chinese growers from buying less toxic products. Soil and water contamination from industrial pollutants is a serious problem, and the poor reporting environment and absence of transparency on this issue will slow improvements.

Benchmarking food safety along the supply chain

- Australian regulation and enforcement of food safety along the supply chain are high, except in the area of packaging. While China has implemented a stringent system along the lines of EU and US models on packaging safety, Australia has minimal regulation in place.

- Similar to primary production, Chinese export regulations on vegetables provide for stringent food safety along the supply chain, though implementation deficits lower the overall rating.

- The consistent use of cold chains in the vegetable industry is not common in China, as much of the distribution and retail networks remain highly localised. However, the use of cold storage and transport is increasing due to both consumer demands for improved food safety and the long-term cost benefit of avoiding waste due to spoilage.

Benchmarking government support for agricultural marketing

- Australia is more effective than China at helping its vegetable producers be competitive. China invests significant sums in agriculture but its spending is largely targeted to helping communities access basic infrastructure. The government-led system of support to the vegetable industry in China often lacks feedback mechanisms on actual growers' needs so resources, such as marketing information delivery or financial support, are not used efficiently.

Overview of China's vegetable industry

China's vegetable industry and vegetable exports have grown in line with staggering economic growth over the past two decades. According to China's government statistics, the country's vegetable exports increased five-fold over the past decade, reaching a trade surplus of USD 11.2 billion in 2013. The rising exposure to international markets and competition has pushed the central government to introduce regulatory reforms to meet requirements of importing countries, steadily increasing the competitiveness of Chinese vegetables in international markets.

The regulatory environment for vegetable production, transportation and marketing in China's domestic market is much weaker and fragmented in comparison with the sector's export market. Vegetable standards have struggled to keep pace with economic growth, challenged by the small size of farms and limited human capacity to implement reforms.

China's land tenure system restricts farmers purchasing and selling their own lands, which in many regions limits the size of Chinese farms. Farmers typically operate small farms (less than 0.2 hectares) in comparison with Australia, which has many larger farms of over 50 hectares. The small size and fragmented production not only hinder farm owners from benefiting from economies of scale, but also present logistical challenges to government agencies implementing policies. The central government has long talked of liberalising land laws in part to consolidate farmland – most recently in mid-October 2014. These reforms will proceed slowly and a significant change in the make-up of Chinese farm ownership will take years.

Vegetable producers as well as regulators lack awareness of best practices in the vegetable sector, increasing risks especially in the area of food safety. In addition to

poor practices by growers or processors, this lack of expertise leads to overlapping and indistinct responsibilities in government institutions. This can result in weaker enforcement as well as insufficient or untimely responses to the industry's needs.

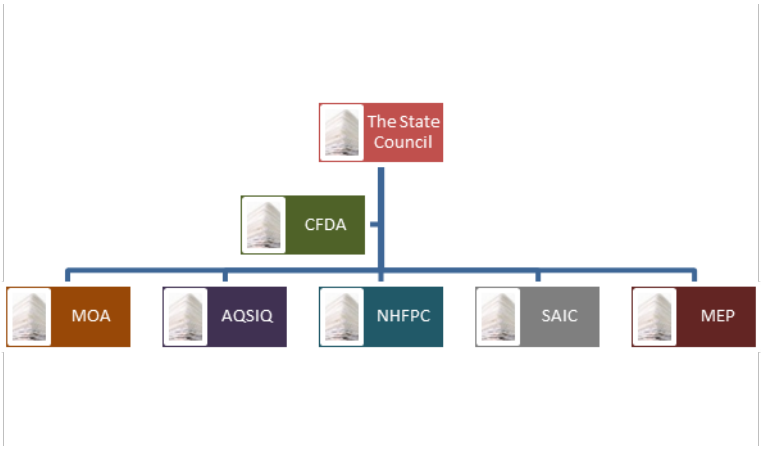
As China grows, its economic growth will help address some of the challenges in the vegetable sector. Already consumers in China's burgeoning middle class demand better food safety, and government and businesses are adapting accordingly. Economic reforms are also seeing consolidation in various industries, putting pressure on businesses to become more effective.

This report investigates and analyses China's vegetable industry. The report aims to offer not only an assessment of China's present competitiveness, but also to provide an insight on potential regulatory developments and wider changes that will impact the future performance of China's vegetable sector.

Food safety

China is strengthening its food safety regulatory environment to meet the rising safety concerns of its citizens. One of the most notable efforts is the restructuring of its administrative agencies to enhance safety management. After a recent restructuring in 2013, a strengthened China Food and Drug Administration (CFDA) replaced the State FDA (SFDA), reducing the number of agencies and overlap involved by reallocating a number of responsibilities and teams from other ministries and agencies. The CFDA was equipped with twice the number of personnel of the SFDA and tasked with improving coordination with other relevant institutions. Currently, issues related to food safety are primarily governed by six agencies, with CFDA taking the lead role, as shown in Table 1:

Table 1: Chinese government institutions responsible for food safety



The State Council: The chief administrative authority in China.

China's Food and Drugs Administration (CFDA): Responsible for drafting laws on food safety, formulating food safety risk monitoring plans and food safety standards, undertaking testing and training, and investigating major violations.

Ministry of Agriculture (MOA): Responsible for monitoring the quality and safety of agricultural products, including governing pesticide registration and developing national and industrial standards on pesticide use and residues.

State Administration for Quality Supervision, Inspection and Quarantine (AQSIQ): Managing import and export food safety and supervising food certification and accreditation, such as organic vegetable accreditation.

National Health and Family Planning Committee (NHFPC): Responsible for supervising public safety, including food safety.

State Administration for Industry and Commerce (SAIC): Responsible for overseeing the quality of goods in market circulation and drafting regulations to regulate safety of food during market circulation.

Ministry of Environmental Protection of the People's Republic of China (MEP): Responsible for developing policies and regulation on environmental protection, including the use of pesticides.

Despite the restructuring, turf wars caused by overlapping responsibilities persist. These have resulted in duplicated policies on food safety governance, which weakens implementation. The Food Safety Law that came into effect in 2009 failed to make the expected impact on food quality due to corruption and generally poor enforcement. Consequently another regulatory overhaul is forthcoming and expected to strengthen food safety governance. Legal reforms proposed in 2013 and 2014 to the Food Safety Law are putting more responsibility for ensuring food safety on distributing companies and are increasing penalties and the prospects for criminal prosecution. Penalties are proposed to rise to five-ten times the total earned through improper or illegal means. Those operating in the food industry without the proper permission can be fined up to RMB200,000. AQSIQ is expected to further increase supervision of food packaging products following the new law.

The following sections assess China's food safety governance in production and along the supply chain to offer a qualitative measure of the competitiveness of China's vegetable industry. Where the regulatory environment and enforcement for vegetable exports differs significantly from China's domestic environment, we have highlighted this in the text.

Primary production

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C1	Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.	China	Low (General)	Low (General)	Low (General)
			High (Exports)	Medium (Exports)	Medium (Exports)
		Australia	Low	High	Medium

Regulatory support

China's regulatory environment for food safety in primary production lacks specificity and clarity, and is rated **LOW** (see methodology in ANNEX). Like most countries, China does not have specific regulations governing food safety for primary production in the vegetable industry. While the 2009 Food Safety Law and the 1995 Food Hygiene Law could be applied to certain aspects of vegetable production, for instance on preventing employees with communicable diseases from handling produce, the laws largely lack specifics that could be implemented at the farm level.

China does have specific safety standards for irrigation water that provide for monitoring and testing. However, two different standards from 1992 and 2005 are enforced by the Ministry of Environmental Protection (MEP) and the State Administration for Quality Supervision, Inspection and Quarantine (AQSIQ) respectively, which causes confusion about which standards apply.

As in Australia, there are a growing number of voluntary certification schemes relating to food safety in farming practices in China. These include major international schemes common in Australian agriculture, such as BRC Global Standards and HACCP. In addition, some major food distributors such as Walmart in China set supplier standards for growing and packaging, but these are generally less extensive and less transparent than in Australia.

Despite overall transparency and clarity of food safety guidelines and standards, **Australia** is rated **LOW** on primary production regulation because it does not having legally binding food safety regulation specific to primary vegetable production. Unlike for dairy or meat products, the Food Standards Code does not have primary production legislation for horticulture. However, the Food Standard Code does provide clear and transparent regulations along the rest of the supply chain (see C4-C7 for more details) that can impact producers indirectly.

The Food Standard Code also provides producers with voluntary guidelines regarding best practice in a number of areas. The Australian and New Zealand Guidelines for Fresh and Marine Water Quality, for instance, include guidelines for testing water quality for pesticides, thermotolerant coliforms (a proxy for human/animal pathogens) and heavy metals.

In February 2014, the government body Food Standards Australia New Zealand (FSANZ) put plans to develop primary production regulations for horticulture on hold, in part because studies commissioned by the government had found substantial adherence by producers to voluntary certification programmes. Major food retailers set food safety standards for their suppliers, and estimates indicate that a high number of vegetable producers in Australia are party to a voluntary certification scheme that evaluates and monitors practices concerning growing, harvesting and packing of vegetables. However, it is not possible to ascertain exactly what percentage of growers is covered by voluntary schemes, and violations of those schemes are not subject to government penalties or fines.

Enforcement effectiveness

Enforcement of food safety standards in primary production is **LOW** in **China**.

Enforcement is marred by insufficient resources and training as well as overlapping responsibilities among enforcing agencies. For example, government agencies compete for budget and resources when regulatory competencies are vaguely defined, which reduces efficiency.

For irrigation, China's environmental departments do not fully accept the mandatory standards issued by AQSIQ in 2005, but AQSIQ does not have the resources to test irrigation water without support from MEP. With this absence of cooperation and clearly defined responsibilities, implementation efficiency is reduced.

Australia's implementation of regulations and established standards is **HIGH** in primary production. The division of responsibilities among relevant regulating bodies in Australia is clearer than in China, and co-operation among institutions is also more effective.

While there are minor incidents of microbacterial contamination, for instance through the presence of salmonella or e coli in salads or sprouts, there are high levels of transparency in reporting and addressing violations by the FSANZ. Food safety risks stemming from primary production activities remain low.

Rating for China's vegetable export sector

Food safety standards relating to primary production for **Chinese** exports are significantly higher than for the country as a whole, scoring a **HIGH**. The Vegetable Export Quality and Safety Controls issued by AQSIQ require growers to systematically assess risks posed to their growing environment, including through the internationally used Hazard Analysis and Critical Control Point (HACCP) approach. The regulation also sets hygiene requirements for primary producers, such as preventing soil and water contamination from sources such as livestock and wildlife.

Implementation is higher among exporting producers in **China**, rating a **MEDIUM**. Exporting farms tend to be larger operations, with better funding and better trained personnel, as meeting the standards of their export markets is key to profitability. That combined with more frequent and targeted government oversight facilitates enforcement, especially when it comes to companies the government has selected and favours with financial and regulatory support on exports (known as 'dragon head' companies). Nevertheless, there is a lack of transparency and there have been cases of enforcement failures, as evidenced by recalls from major export destinations.

Use of chemicals

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C2	Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	China	Medium (General)	Low (General)	Low (General)
			High (Exports)	Medium (Exports)	Medium (Exports)
		Australia	High	High	High

Regulatory support

For example, the use of the pesticide HCH is regulated by both the Standards for Safety Application of Pesticides and the list of Banned Pesticides in Agriculture, among others. While the first rule sets HCH limits due to potential environmental impacts, the second bans it entirely due to safety concerns.

The framework for defining how hazardous pesticides are is at times inconsistent. The Safety Standard of Pesticide Usage measures hazardous chemicals in three levels, while the Measures for the Management of Pesticide Label and Manual outline five categories. Moreover, neither regulation is updated at regular intervals (see summary of regulations in Annex).

The minor use of chemicals is not sufficiently regulated, leading to excessive use of chemicals in some vegetables. Where set, standards for Maximum Residue Limits (MRLs) are often comparable to Australian and international standards, but limits have been set for far fewer chemicals than in Australia. Only in 2014 did some Chinese provinces provide policy support to govern the minor use of chemicals. Zhejiang, for example, has been testing the registration of minor use of chemicals, supported through financial subsidies.

Regulations often lack details that would allow a chemicals-related standard to be implemented effectively. For example, the Safety Standard of Pesticide Usage requires persons who spray pesticides to receive training, but does not specify any detailed requirement such as licensing or implementation bodies.

Australian regulation of the use of chemicals is more transparent and the division of responsibilities among government agencies is better defined than in China. Although pesticide regulation in Australia is less extensive than in some other markets, such as the European Union, it is updated regularly and rated **HIGH**. Primary responsibility for overseeing chemicals resides with the Australian Pesticides and Veterinary Medicines Authority (APVMA), which co-ordinates with FSANZ on MRL levels.

The APVMA's Agricultural and Veterinary Chemicals Code Instrument No. 4 (MRL Standard) 2012 aligns with the Food Standards Code Standard 1.4.2 — Maximum Residue Limits Amendment Instrument No. APVMA 8. Other government bodies such as

the Department of Health and the Department of Agriculture can feed into safety assessments about the use of chemicals.

Enforcement effectiveness

Excessive use of pesticides, fertilisers and other chemicals (even banned ones) is common in **China**, scoring the country a **LOW** on enforcement despite increasing efforts in this area. The government reports significant improvements in compliance, with irregular Ministry of Agriculture results showing around 90% of vegetables free of excessive pesticide residues. However, these findings do not match testing results by environmental groups across China.

There is regular reporting by environmental groups and media on chemical use violations, including the continued use of banned pesticides. Greenpeace in 2011 investigated several supermarkets in six major cities in China and found several vegetables to contain excessive levels of chemical residue, including the banned chemical methamidophos. In 2010 several residents of Qingdao, Shandong province were admitted to hospital with food poisoning. Investigations found that the incident was caused by excessive organic phosphorus in leeks. The leeks were produced by Shouguang, one of the largest vegetable growing and export bases in China.

Continued violations of chemical regulations are due to poor training among growers, personnel shortages in enforcement agencies and insufficient availability of testing equipment at the local level. Financial constraints also hamper the safe use of chemicals, as growers are under pressure to produce a high amount of vegetables but cannot afford more advanced, less toxic chemicals. Most responsibility for enforcing regulations lies with local, rural government agencies, where awareness and availability of resources are lacking. Local authorities thereby fail to prevent the intentional use of excessive chemicals by farmers, but also the sale of banned or unlicensed chemicals to farmers.

It is common for local distributors of chemicals to manufacture new pesticides and sell them to small-scale farmers with the promise of significant returns on vegetable growth. The frequent development of new compounds makes it even more difficult for authorities to keep up with testing and enforcement of these chemicals.

Australia's enforcement effectiveness is rated **HIGH** due to strong implementation of standards. Testing on vegetables is carried out by both private and government organisations, with tests showing a very high rate of compliance. The 24th Australian Total Dietary Study published in April 2014 showed that excessive pesticide consumption was not a health concern, and select testing by the agricultural ministry from 2011-12 showed a very high compliancy in fruits and vegetables regarding MLRs.

However, it is worth noting that there are concerns about the transparency of testing results. Retailers and industry organisations, like the Fresh Test Programme, account for the majority of testing for MRLs. While these organisations may note a high degree of compliance at 97%, the test results are generally unavailable to the public. Many Chinese markets, however, do publicise the results daily. The Australian Department of Health reportedly conducts testing at least once every two years. Critics argued that this testing was not carried out frequently enough when random testing in Western

Australia in 2013 found pesticide residues above permitted levels on apricots and peaches.

Testing varies significantly by state, with smaller states not conducting regular independent testing. Training is required for most professional uses of pesticides in Australia, and although there are regional variations, implementation of training is more effective than in China given the nature and size of farms and the human resources of the Australian vegetable industry.

Rating for China's vegetable export sector

Export standards for pesticides require **Chinese** vegetables to meet the standards of the importing country as well as Chinese standards and are rated **HIGH**. Growers should ensure that residue is within limits provided for in the Codex Alimentarius. The regulations require professional training for those using pesticides, who must also keep records on frequency, timing and reason for use.

However, technology and human resources challenges exist in the export sector as well as in domestic vegetable production, which can cause implementation failures. Earlier in 2014, Japan banned the import of **Chinese** onions after alleging that these contained excessive chemical residues. Implementation is therefore rated as **MEDIUM**.

Metal contamination

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C3	Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	China	High	Low	Medium
		Australia	High	High	High

Regulatory support

Chinese regulation of heavy metals is more extensive than Australian regulation and rated **HIGH**, due in large part to the significant health concerns that metal contaminants pose to Chinese consumers. A new regulation on the maximum levels of contaminants in foods issued in 2012 (GB 2762-2012) by the Ministry of Health (now known as NHFPC), which sets clear standards on the maximum levels (MLs) of metals in different type of vegetables. In comparison, the Australia New Zealand Food Standards Code has fewer details. A comparison of the two regulations is shown in the table below:

Despite an updating of regulations, inconsistencies remain in Chinese standards related to metal contamination. For example, GB-5084-1992 requires that the level of cadmium should not exceed 0.005 mg/L and GB 5084-2005 sets the limit to be 0.01 mg/L.

Table 2: Comparison of Chinese and Australian regulations on the MLs of certain metals in food

Contaminant	Food	Maximum level (mg/kg)	Food	Maximum level (mg/kg)
	China		Australia	
Lead	Vegetables (except brassicas, leafy vegetables, legume and root vegetables)	0.1	Vegetables (except brassicas)	0.1
	Brassicas and leafy vegetables	0.3	Brassicas	0.3
	Legume and root vegetables	0.2	N.A	N.A
	Vegetables and their processed products	1.0	N.A	N.A
Cadmium	Vegetables (except leafy vegetables, legume, root and tuber vegetables and stem vegetables)	0.05	N.A	N.A
	Leafy vegetables	0.2	Leafy vegetables	0.1
	Legume, root and tuber vegetables (except celery)	0.1	Root and tuber vegetables	0.1
	Celery	0.2	N.A	N.A
Mercury	Vegetables	0.01	N.A	N.A
Arsenic	Vegetables	0.5	N.A	N.A

Australia's regulatory framework on contaminants in vegetables is rated **HIGH**. Chinese regulations are more detailed in some areas, for instance in setting limits for mercury and arsenic in vegetables, but Australian MLs are more stringent in other areas.

Enforcement effectiveness

Heavy metal contamination is a major challenge in China, where poor environmental regulation and breakneck industrial development saw significant pollution of waterways and farmland. Although the government is keen to improve food safety, it is also wary of public unrest due to food safety scares. The government has made information on soil quality a state secret, effectively preventing accurate assessments of heavy metal risks in **China**. This scores the country a **LOW** on enforcement.

Insufficient information mars prospects for remediation of soil pollution. A March 2014 report by the Ministry for Environmental Protection showed contamination levels of 16.1% for soil and 19.4% for arable land at nationwide sample testing sites between 2005 and 2013. The report offered little information on how serious contamination levels were across the country, and government-independent testing still does not seem

viable.

Reports have frequently focused on the high percentage of rice contaminated with cadmium, but the impact on vegetables is comparable. The provincial government of Guangdong, in the south of China, in 2013 released statistics showing 10-20% of vegetables grown in nine major production areas contained excessive heavy metals, including arsenic, chromium, copper, lead, mercury, nickel and zinc. The contamination is due to a high concentration of factories in the Pearl River Delta area, including electronics, leather and textile producers. The State Ocean Administration reported that more than 3,700 tonnes of heavy metals were discharged into the South China Sea via the Pearl River in 2012.

Heavy metal contamination is not a major concern in **Australia**, and enforcement is **HIGH**. Some studies have found cadmium, lead, zinc or copper contamination above permissible levels in the vicinity of industrial or urban activities, for example smelters, and farmers have occasionally voiced opposition to nearby extractive projects over soil and water contamination fears, but the overall problem is much less severe than in China.

Packaging

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C4	Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.	China	High	Medium	Medium
		Australia	Low	Medium	Low

Regulatory support

China has stringent regulations on food packaging and rates **HIGH**. Specific standards for materials used in food packaging align with EU and US standards. China sets over 100 standards distinct to types of material used and includes associated testing requirements. Safety certificates awarded as conditional on AQSIQ audits are mandatory for Chinese manufacturers of paper and plastic food packaging materials.

In addition to AQSIC, NHFPC regularly updates lists of permissible food contact additives. Chinese law stipulates penalties regarding violations of food packaging safety standards. If a food product is sold with contamination caused by packaging or transportation, the 2009 Food Safety Law provides for fines of up to 10 times the value of the products sold.

Chinese export regulations on food packaging are also high. In addition to China-wide regulations, vegetable-export regulations specify that packaging should avoid contamination by animals and humans, particularly in regard to faecal matter.

Australian regulation on safety in food packaging is poorly developed, and so rated

LOW. Reforms in 2002 deregulated Australia's food packaging sector, and the Food Standards Code Standard 1.4.3 places the responsibility for ensuring packaging safety on food manufacturers and retailers without regulating whether specific materials may be used for food packaging. A recent FSANZ survey of the food packaging industry said respondents described the regulatory framework as 'inadequate', 'irrelevant', or 'minimalistic'.

Although state and territory-level regulations are at times more specific than national regulations, references in existing standards are extremely vague. Standard 1.4.3 permits usage of packaging materials so long as they are not likely to cause 'bodily harm, distress or discomfort' and Standard 3.2.2 further specifies that packaging should not induce food contamination. The Australian Standard 2070-1999 on plastic materials for food contact use contains standards for plastic packaging, but the standard and up-to-date information are not easily accessible. Many producers refer to EU and US standards in the absence of Australian regulation, partly because of trade relationships with those markets.

Enforcement effectiveness

Insufficient awareness among food retailers and regulators hampers enforcement of food packaging regulation and reduces **China's** enforcement rating to **MEDIUM**. Our interviews indicate that testing is inconsistent and that sellers are often unaware of safety qualifications regarding the packaging they use, including colourful packing tapes that are often used on vegetables in Chinese supermarkets. In a case from 2010, more than seven million disposable foam food containers in Jiangxi province were seized. Boxes that release when exposed to heat are still used at times, despite being banned since 1999.

Although **Australia** has little regulation governing the safety of food packaging, enforcement is rated **MEDIUM** due to the fact that many producers adhere to EU and US standards. A 2010 FSANZ survey assessed the risks of chemicals migrating from packaging to food as very low, as have the more recent iterations of the Australian Total Diet Survey.

Although an FSANZ survey of the food packaging industry found that 70% of respondents required certificates of compliance with Australian standards, some also noted that laws do not force retailers or manufacturers to show that their product is compliant with relevant directives. FSANZ also found that larger companies worry that local manufacturers may not be aware of US or EU standards.

The industry has expressed concern that these facts undermine the enforcement of standards and hinder understanding of potential safety threats stemming from new packaging materials or from imports of cheap packaging materials. Safety concerns have also been echoed by the Australian branch of Friends of the Earth, particularly on the risks of contamination through nanomaterials in packaging. The NGO in August 2014 called on FSANZ to regulate nanomaterials in food packaging, which are not addressed by current regulations.

Storage and transportation

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C5	Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.	China	Medium (General)	Low (General)	Low (General)
			High (Exports)	High (Exports)	High (Exports)
		Australia	High	High	High

Regulatory support

Chinese laws address a wide range of issues impacting food safety in storage and transportation, but the absence of unified regulation scores China a **MEDIUM**. China's general food safety laws reference storage and transportation safety considerations in vague terms, and do not provide specific guidelines.

Several AQSIQ regulations include a general requirement for appropriate cooling during transport and storage, but do not specify indicators by which to gauge compliance. The Ministry of Commerce's Rules of Logistical Requirements for Vegetable Safety do set temperature requirements for 15 types of vegetables during transportation and storage. However, these requirements are not mandatory. There is presently no compulsory requirement on food traceability, but this is expected to change with the approval of pending amendments to the Food Safety Law.

The **Australian** Food Standards Code Standards 3.2.2 and 3.2.3 specify oversight during storage and transport to prevent contamination, scoring **HIGH**. The rules include specific requirements for temperature control in foods potentially hazardous if not handled properly.

Unlike Chinese rules, Australian food safety standards also specify handling rules for display of food items and for safety controls during the receipt of commercial food deliveries. Australia requires traceability of food products through up-to-date and detailed information on the supplier. Australian laws specify safety standards for storage and transportation facilities, for example that food transport vehicles must be designed to allow for easy sanitising.

Enforcement effectiveness

Enforcement is difficult to assess in a highly decentralised industry of food vendors and transportation services. **China** scores **LOW** in enforcement due to insufficient co-ordination among enforcing agencies, and the high fragmentation in the market.

Regulatory uncertainty does not incentivise businesses to upgrade their facilities, particularly given their expectation that different agencies may enforce differing standards. This is tied to insufficient professional expertise among regulators.

The weak legislative environment results in violations, especially in vegetable storage. Highly toxic materials are reportedly used in storage of fresh vegetables to extend their lifespan, in part because the cold chain technology is inadequate or unavailable.

Statistical reports on China's cold chain vary, but indicate that a fairly low percentage of vegetables are cooled consistently as they travel along the supply chain. Government assessments in 2014 for the overall food industry indicate that only 15-20% of food that should be cooled is actually transported in a vehicle with cooling capacity.

Given a shortage of cooling facilities, their use and development is prioritized for transporting seafood, even though the vegetable sector also lacks cooling capacity. Northern China, where temperatures are lower, still uses traditional cooling underground or in kilns, while professional cooling is more common for produce in the south. Much of China's vegetable sales are highly localised, reducing the incentive for adopting cooling systems for smaller vegetable farmers.

However, cooling technology is increasing significantly across China, driven by policy encouragement, consumers' food safety demands and businesses' cost concerns. Transport trucks packed with ice during periods of high temperatures often result in spoilage of the outer lining of vegetables, increasing costs for businesses. The high waste of food is a national concern in a country that strives for agricultural self-sufficiency despite limited arable land. A significant increase in the awareness and use of cold chain technologies should be expected to impact the Chinese vegetable sector in the coming years.

Australia's enforcement of storage and transportation standards is **HIGH**, with direct oversight of food retailers and distributors by government food safety authorities. As in primary production, significant guidelines and best-practice standards are made available to the industry. Large retailers contribute to enforcement through voluntary certification programmes and by either requiring or encouraging suppliers to participate in such programmes.

In the area of transport, non-food-specific practice codes further help improve general enforcement. For example, major retailers like Woolworths or Coles are signatories to the Australian Logistics Council's Retail Logistics Supply Chain Code of Practice and encourage their suppliers or transport providers to sign up to the code.

Rating for China's vegetable export sector

Chinese export regulations demand stringent oversight to mitigate contamination risks, scoring **HIGH** in both regulatory support and enforcement effectiveness. In addition to requiring appropriate storage conditions specific to vegetables, including light and temperature, the export code for vegetables includes some specifications for technical standards in cold storage temperature controls.

For export regulations, there are strict temperature control requirements. Export

Rating for China's vegetable export sector

regulations specify that vegetables requiring different cooling temperatures cannot be transported together. They state that companies should have specially trained personnel overseeing the temperature control and transportation process. Hygiene regulations for both the vehicle and vegetables are specified in the export regulations.

Vegetable exports need to supply very detailed traceability information, including the source of vegetables and their supply chain path from harvest to processing, to storage to transport, as well as sample testing information. Every source product, additive, and packaging material must be traceable.

Food processing

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C6	Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.	China	High (General)	Low (General)	Medium (General)
			High (Exports)	Medium (Exports)	Medium (Exports)
		Australia	High	High	High

Regulatory support

Safety in **China's** food processing is strictly regulated, resulting in a **HIGH** rating. Safety issues surrounding food additives have led to several scandals and regulation is strongest in this area. In addition to specifications on the manufacture and usage of food additives, Chinese law states that additives must not be used to falsify or cover up deficiencies like rancidness.

The Food Safety National Standards for the Usage of Food Additives GB 2760-2011 sets detailed requirements on the limits of additives. The processing procedures are stringently regulated as well, with rules covering issues like where processing may take place, what quality of water may be used, or what dress code employees involved in food processing must wear.

Australian regulations for food processing are rated **HIGH** due to explicit regulation on temperature control and food additives. The Food Standards Code Standard 3.2.2 includes specific temperature requirements during processing, while Standard 1.3.1 sets limits on the use of food additives. Australia has not developed vegetable-specific

guidelines for processing, but – unlike for primary production – general food safety rules do apply to processing, including auditing and training requirements that are compulsory.

Enforcement effectiveness

Food safety in processing in **China** is rated **LOW**, due to significant violations and challenges enforcing laws among smaller producers. Although the vegetable industry is less at risk than meat and dairy products, there have been notable cases of excessive chemical contamination in processed vegetables. Ad hoc, unapproved additives have been used by processors to dye products to look more pleasing to customers or to mask a cheaper product as a more expensive kind, as was the case with green beans confiscated in 2010.

Contamination in processed vegetable products used to be higher. An inspection in Chengdu, Sichuan province found in 2004 that only 23% of locally produced picked vegetables fell within an acceptable range of chemical additives. Enforcement in this area is improving, and processed foods are a key area of focus in China's drive to bolster food safety. Processed products are likely to be among the main foods affected by draft amendments expected to pass in late 2014 that would significantly increase fines for food safety violations.

Australian enforcement is **HIGH**, aided by direct auditing throughout the supply chain. Like in other food safety areas, enforcement in the food safety segment is aided significantly by voluntary certification schemes, including those required by major retailers (like Woolworths) that require good processing practices. Industry groups have called for improved harmonisation of regulation at the federal, state and territory levels, saying this would facilitate enforcement and help reduce business costs.

Rating for China's vegetable export sector

China's export regulations for vegetable processing are explicit and extensive, scoring **HIGH**. They provide specific health norms for frozen, dehydrated and pickled vegetables. Regulations explicitly list hygiene and other contamination prevention measures for processing procedures, comparable to those listed in the other China export food safety sections.

As in regulations for storage, regulations stipulate specific technological requirements for temperature controls. Processing companies exporting their processed vegetable products are required to adopt the HACCP system. While enforcement among exports is higher than for **China** overall, it is marred by similar challenges in achieving compliance in a high number of processors, rating **MEDIUM**.

Food labelling

ID	Competitiveness parameters	Country	Regulatory environment	Enforcement effectiveness	Overall rating
C7	Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.	China	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

In **China**, different governmental agencies issue separate labelling regulations, and the resulting overlap and ambiguity score China a **MEDIUM**. However, Chinese regulations are more detailed in some areas, such as genetically modified (GM) products. Whereas Australia requires labelling detectable and quantifiable traces of GM materials or ingredients in food products, China requires any product derived from GM processes to be labelled irrespective of whether it contains traces of GM material or not. The tables below provide an overview of differing labelling measures in both countries.

Both China and Australia have clear regulations that set several mandatory requirements for food labelling, but **Australia** has more detailed requirements, scoring **HIGH** (see high-level comparisons in Table 3 and Table 4). Australia's regulations on food labelling are concentrated under the Australia New Zealand Food Standards Code, strengthening the regulatory environment.

Australian rules are more explicit on allergen information, date and food storage, which enhances the level of food safety. For example, the Australian standard on labelling dates sets out clear circumstances in which a use-by date should be used instead of a best-before date, and the difference between 'baked-on date' and 'baked-for date'.

Table 3: Chinese regulations and measures governing food labelling

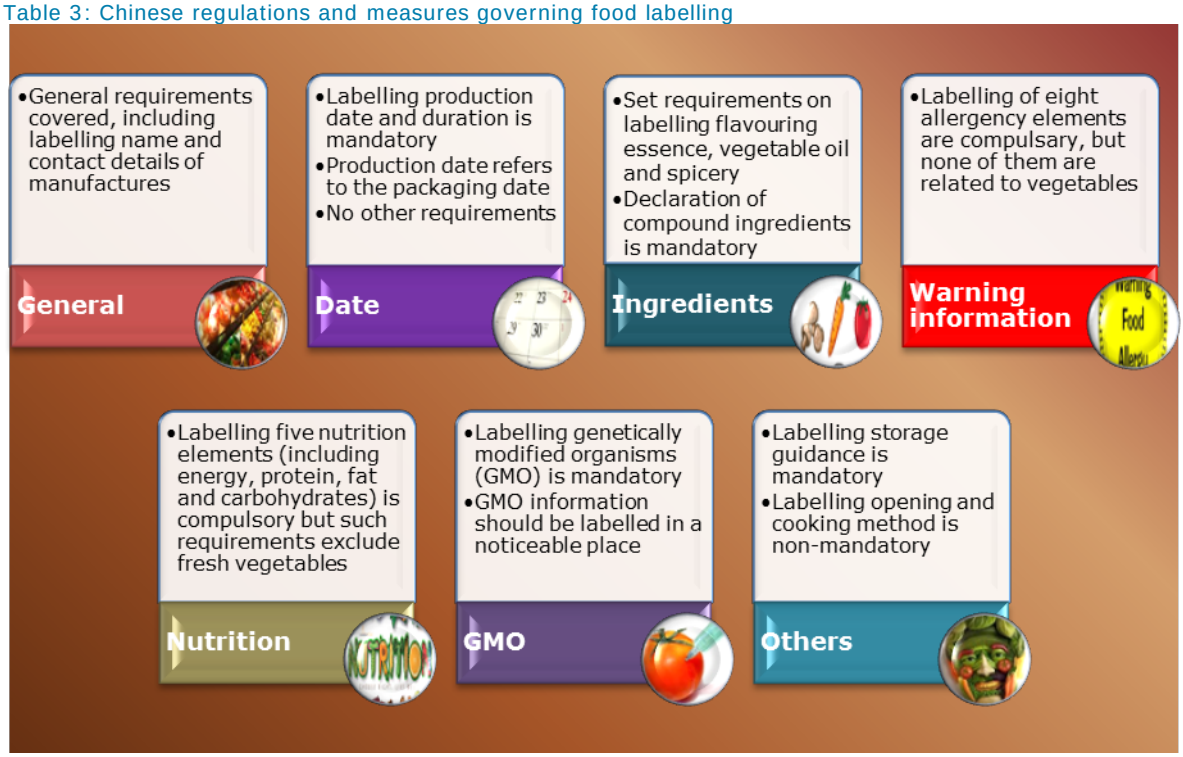
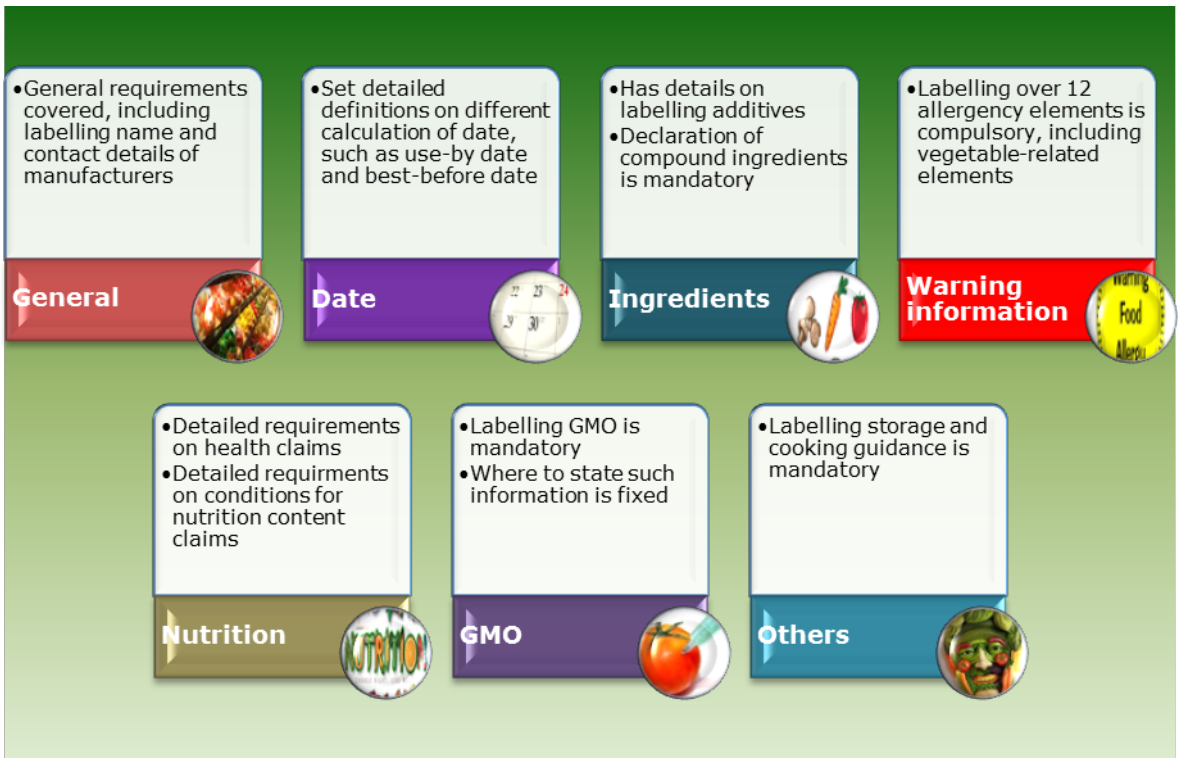


Table 4: Australian regulations and measures governing food labelling



Enforcement effectiveness

Chinese enforcement on labelling scores **MEDIUM**, as lax enforcement is improving at a slow pace and incidents continue. False labelling, especially related to the expiration date, is common and reflects ineffective enforcement mechanisms. For vegetable

labelling, it is not uncommon to see non-organic and normal vegetables labelled as 'organic' or 'green food', with such labels having reportedly been obtained through bribery rather than production that meets the required conditions.

Australia's enforcement of labelling policies is transparent and effective, scoring **HIGH**. Implementation is carried out by each state and territory, with rules and contact points easily available. The most common food recalls in Australia are linked to poor allergen labelling, but easier access to information for consumers helps ensure recourse.

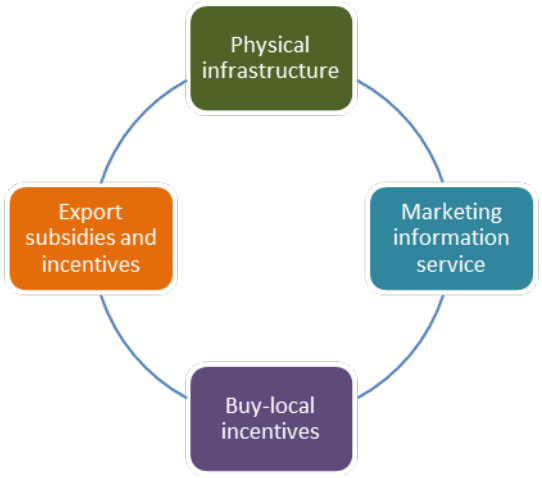
Government support for agricultural marketing

In its assessment of government support for the vegetable sector, Control Risks considered the span of services involved in moving an agricultural product from farm to consumer. Governments can enhance the competitiveness of local producers' agricultural marketing by upgrading infrastructure, providing marketing information, backing buy-local initiatives and supporting exports, as illustrated in Table 8.

These types of government support are interrelated, but we have categorised them for analytical clarity. Setting and enforcing high food safety standards also feeds into the strength of agricultural marketing, and has been analysed separately in the previous sections.

This section is designed to compare supportive measures in the following five categories in China and Australia. Given the wide scope of the topic, this section does not aim to be exhaustive but to flag where the competitiveness of Australian and Chinese vegetable producers is affected.

Table 5: Government support for agricultural marketing that has the potential to enhance competitiveness



Physical infrastructure development

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C8	Infrastructure support for farmers aids international competitiveness.	China	Medium	Low	Low
		Australia	High	Medium	Medium

Regulatory support

China's regulatory support for infrastructure in the vegetable sector rates **MEDIUM** because support is extensive but not yet targeted at higher-end infrastructure that will be key to international competitiveness. China has made physical infrastructure development one of its top priorities in agricultural development over the last two decades through a number of government-funded initiatives such as the 'Vegetable Basket Project', which funded integration of food supply chains and basic production sites in an effort to stabilise fluctuating food supply.

Investment in agricultural infrastructure has been a major budget expenditure item for China's rural development, driven by the significant gaps in infrastructure between China and developed economies. However, as an emerging economy, China's agricultural infrastructure development is less advanced in terms of facilities offered to growers than Australia's. For example, China supports basic internet construction in rural areas while Australia aims to upgrade internet speeds in rural communities to ensure advanced information delivery.

As an advanced economy, **Australia** has relatively mature infrastructure facilities and is rated **HIGH** even though infrastructure challenges persist in some remote rural areas. The country offers regulatory support in infrastructure development for growers, with a focus on efficiency (compared to China's focus on reducing poverty).

Enforcement effectiveness

China's state-led infrastructure development has sped up approval and construction of roads, buildings and telecom facilities, but the government-led system also limits effectiveness of development, scoring China a **LOW**. State-owned enterprises, confident of continued government support, have not been incentivised to allocated resources efficiently or transparently, which has hindered infrastructure development targeted to specific agricultural needs. This is less of a challenge in areas still low on basic infrastructure, but slows China's progress in competing with international standards for agricultural facilities. The overall quality of infrastructure in China is ranked 64 in The Global Competitiveness Report 2014-15, much lower than Australia.

Australia offers infrastructure support – often through state-private co-operation. The overall quality of infrastructure in Australia is not at a highly advanced level, ranking 35th in the World Economic Forum's Global Competitiveness Report 2014-15, rated

MEDIUM. Government studies published in 2012 and 2013 point to the need for better rail infrastructure development to help transport Australian agricultural products more cost-effectively. While many other agricultural sectors are focused on improving export infrastructure, the latter report notes that the vegetable sector is more domestically focused in terms of sales and consequently infrastructure.

Marketing information service

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C9	Information access support is efficient, which makes farmers well-informed of market changes.	China	HIGH	MEDIUM	MEDIUM
		Australia	HIGH	HIGH	HIGH

Regulatory support

The **Chinese** government offers **HIGH** regulatory support for access to agricultural information. The government budget continues to include measures to improve agricultural information transmission, for example through the establishment of village-level agencies that provide production and marketing information to growers. At the same time, the government's agricultural information centres co-operate with state-owned media to deliver a number of agricultural information platforms.

For instance, China's Central Television (CCTV) opened a national agricultural channel in 1995, which transmits country-wide agricultural information. Regional TV stations also offer agricultural information programmes in addition to regular news coverage. A Control Risks source growing vegetables in a remote village in Hainan province states that a town-level TV channel broadcasts daily updates on agricultural product price information. The number of agricultural information websites constructed by regional government agencies in partnership with state-owned telecom operators had exceeded 2500 by the end of 2013.

Australian regulation and institutions facilitate access to agricultural information and are rated **HIGH**. Australia does not have a state-led mechanism to disseminate agricultural information comparable to China's. However, industry associations benefit from government bodies' co-operation and funding in providing essential agricultural marketing information, including on sustainability.

Enforcement effectiveness

The effectiveness of **China's** extensive agricultural information system is hampered by top-down control, scoring a **MEDIUM**. State-led information platforms lack feedback mechanisms from growers, reducing their ability to respond to growers' specific needs. More emphasis is paid to the development of physical information infrastructure than to the development of human resources that can collect and analyse information.

Marketing forecasting services and real-time information offered to growers tend to be inadequate. Moreover, information platforms are occasionally distorted for political purposes.

Australian services relating to agricultural information are varied and market-driven, rating **HIGH**. Undue political influence on agricultural information is not a concern. Innovative capacity is strong, particularly among industry bodies.

Buy-local initiatives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C10	Buy-local initiatives are efficient, which creates opportunities for increasing profits of local growers.	China	Low	Low	Low
		Australia	Medium	Medium	Medium

Regulatory support

China does not have any buy-local campaigns that promote purchasing local produce over imported products, rating **LOW**.

Australia's regulatory support for buy-local initiatives is rated **MEDIUM**. Australia requires country-of-origin labelling for food products, including primary production and processed vegetables (China requires similar labelling, but unlike in Australia this does not tie into a debate on strengthening sales of Chinese products in domestic products). In Australia, there is co-operation with non-governmental initiatives such as 'Australia Grown' to promote Australian products, but the government does not fund these directly.

Enforcement effectiveness

Chinese enforcement of buy-local initiatives is **LOW**, due to poor consumer confidence in the food safety of Chinese produce. The government understands that the most effective way to increase loyalty to Chinese products is to strengthen food safety.

Australia is rated **MEDIUM** on enforcement because although there is a lot of rhetorical support for buying Australian horticultural products, the impact on vegetables is limited. The 'Buy Australian' portal, for instance, has very few vegetable products to distribute.

Media have quoted the Woolworths head of sales saying that switching from imported to domestic brands would strengthen sales, but such rhetoric seems to follow company-specific campaigns to strengthen Australian products rather than representing a policy change.

Export subsidies and incentives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C11	Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.	China	High	Medium	Medium
		Australia	High	High	High

Regulatory support

China considers exporting agricultural products to be a crucial means of boosting the agricultural sector and individual farmers' incomes, and provides support rated **HIGH.** Although China does not offer national-level export subsidies in line with its WTO membership commitments, there are direct and indirect financial aids at the provincial level.

These include direct subsidises to enterprises, especially to the 'dragon head' enterprises (large model companies often favoured for government support), and indirect aid, such as financial support to companies that need to hire lawyers for international trade disputes, or financial and training assistance for enterprises marketing abroad. Insurance is provided by China Export & Credit Insurance Corporation (SINOSURE), a state-funded insurance company covers both political and commercial risks in domestic and overseas markets.

Australia provides support to vegetable exporters through national-level insurance, grants and associated services, rated **HIGH**. The Export Finance Insurance Corporation (EFIC), a state-owned insurance provider, helps Australian business to finance export and mitigate risks through a number of products, including bond insurance, medium-term export payments insurance and political risk insurance.

In addition, the Australian government has several financial supports and information services for exporters, such as the Export Market Development Grants (EMDG) scheme and the International Readiness Indicator, which operates in a more transparent way. Indirect aids include research and development funding that aims to help growers increase their competitiveness in international markets.

Enforcement effectiveness

Provincial-level subsidies vary significantly across **China**, which reduces their overall efficiency. In addition, assistance is inconsistent, absent a clear, transparent supporting mechanism. Although SINOSURE's insurance has extensive coverage, the service is much newer and relatively untested compared to the Australia equivalent. The effectiveness of enforcement is rated **MEDIUM**.

Australian supportive measures for exporters are more transparent than in China and rated **HIGH**. Implementation of measures is generally strong, but industry

representatives have raised concerns about sufficient export promotion for vegetables. Given the anticipated growth of demand for agricultural products, particularly in China, Australia will find this to be an important factor for competitiveness in the future. However, a comprehensive assessment of the export potential for Australian vegetables is outside the scope of this report.

NEW ZEALAND

Executive Summary

This report benchmarks the competitiveness of Australia's vegetable industry with that of New Zealand. It assesses the regulatory conditions governing food safety in production, food safety along the supply chain and government support for agricultural marketing in New Zealand, and compares these with Australia, based on findings in the milestone 103 report.

Because the two countries share the same Australia New Zealand Food Standards Code ('the Code') in most areas, ratings in the majority of categories are the same. However, our assessment takes into consideration New Zealand's specific conditions and regulations that differ from Australia's, and highlights the differences between them. This section summarises our findings:

New Zealand's vegetable industry

- **New Zealand adopts a liberalised agricultural policy, but in a more radical format than Australia.** It is one of the few countries in the world that has completely dismantled agricultural subsidies. However, its horticulture industry remains competitive partly because of its effective mechanisms for implementation, support for research and innovation, and high-level of transparency.

Australia's competitive position

- **Australian competitiveness is as strong as New Zealand's in most areas of food safety and government support to agricultural marketing.** However, Australia arguably has a more robust innovation system, which involves effective co-operation between government, industry and research bodies, as well as higher innovation spending, and a longer period of exclusive protection of scientific information. This difference is subtle, and does not affect the overall competiveness of New Zealand.

Benchmarking food safety in primary production

- Neither New Zealand nor Australia has specific regulations on primary vegetable production. However, general safety standards for agri-production are high in New Zealand; these apply to primary production, scoring its safety competitiveness **MEDIUM** (see methodology of competitiveness ratings).

- Like Australia, New Zealand has stringent regulations on the use of chemicals and control of metal contamination, rated **HIGH** in regulatory support and enforcement effectiveness.

Benchmarking food safety along the supply chain

- New Zealand adopts the whole Food Standards Australia New Zealand (FSANZ) Code on food packaging and most of the Code on food labelling. Unlike Australia, New Zealand does not require mandatory labelling of country of origin and labelling on non-packaged fresh vegetables, which poses safety challenges and lowers its ratings to **MEDIUM.**

- Like Australia, New Zealand has stringent standards and implementation frameworks for food storage and transport, scoring **HIGH**. It does not have a separate regulation on food processing, but general safety rules cover hygiene requirements on processing, also rated **HIGH.**

Benchmarking government support for agricultural marketing

- Regulatory and institutional support for infrastructural construction are comparable to Australia, but the quality of infrastructure in both countries is less advanced than their competitors, such as the US, and therefore rated **MEDIUM**. New Zealand's government is likely to continue increasing investments in infrastructure, which will benefit the agriculture industry.

- Information delivery in New Zealand has a similar efficiency as in Australia, so is rated **HIGH**. Although leading industry associations in New Zealand have less advanced information-providing systems than Australia, improvements are foreseeable as New Zealand is enhancing its innovation capacity.

- New Zealand's regulatory support for buy-local initiatives is rated **LOW**, because it cancelled the 'Buy Kiwi Made' campaign in 2009 and is unwilling to support other buy-local initiatives such as country of origin labelling.

- Despite cancelling agricultural subsidies, New Zealand's government provides reputable insurance and knowledge support to export businesses, which contributes to its vegetable industry's competitiveness in international markets, rated **HIGH**.

Overview of New Zealand's vegetable industry

New Zealand has a liberalised agricultural policy, but in a more radical format than Australia. It is one of the few countries in the world that has completely dismantled agricultural subsidies, price supports and other forms of economic protection for farmers. Government services aim to avoid cumbersome regulations, and many policies are designed to improve accountability and reduce costs.

In a similar vein, the new Food Act that will take effect in March 2016. The Act proposes a risk-based approach, increasing penalties for infringements but reducing regular checks on low-risk activities, such as vegetable growing.

Existing regulations in New Zealand have high levels of enforcement effectiveness, because of the clear guidance given to growers, the effective implementation framework and overall transparency. Powers of government agencies are concentrated (see Table 1), which helps growers to efficiently follow changes of standards and to upgrade their performance.

For the past three years, New Zealand has been rated one of the three most transparent countries in Transparency International's Corruption Perceptions Index, which has largely helped growers save compliance costs in their operations. Moreover, with a vibrant private sector, growers are able to seek professional consultancy services on vegetable growing and marketing from commercial firms.

In the absence of some regulations in New Zealand's horticulture industry, growers refer to policies in their export destinations. The top three export markets for New Zealand's horticultural products are Australia, Japan and the UK, which make additional contributions to the quality and safety of New Zealand's horticultural products. Moreover, consumers and non-governmental groups report food safety issues, which further enhances the quality of New Zealand's vegetables.

A key area of support in New Zealand is innovation and risk management, which aim to better manage the environment and promote sustainable agricultural practices. This support exists in the format of insurance, and in funding for agricultural research and training. The government-owned Crown Research Institutes (CRIs) is the leading agency, which supports agricultural research focusing on efficiency and sustainability. Several nationwide funds, including the Agricultural and Primary Sector Grants, and Agricultural and Marketing Research and Development Trust (Agmardt), offer assistance from vegetable production to marketing.

Despite higher labour costs in comparison with developing nations, New Zealand's horticulture industry is competitive because of its use of technology, diseases control and risk managing. Horticulture is New Zealand's six largest export industry, accounting for 8% of its total merchandise exports in the year to June 2013.

However, Australian innovation benchmarked against New Zealand is arguably slightly healthier. While New Zealand's agricultural innovation is mainly promoted by government-funded CRIs, Australia has a system of joint partnerships between industry, government and research agencies. Innovation initiatives start within the industry, and can be responded to by Horticulture Australia Limited (HAL), which

interacts with government agencies.

A report by Lincoln University in 2011 suggested Australian innovators and the Australian institution equivalent to New Zealand's CRI are more prominent among local businesses than those in New Zealand. In addition, the OECD claimed that agricultural knowledge and innovation systems in Australia were the most heavily supported services from 2011 to 2013, and that support is higher than in New Zealand. A working paper published by the New Zealand Productivity Commission in 2013 demonstrated that the country's labour productivity – average output per hour worked – in the agricultural industry is lower than Australia's. This is partly because New Zealand has less capital, including machinery and computers that affect its productivity.

Moreover, New Zealand's data protection rules could pose challenges in the adoption of new technologies, because it sets five years of exclusive protection of scientific information, in comparison with ten years in Australia. This report does not aim to provide a quantitative study on how innovation policies impact the productivity of New Zealand's vegetable industry, but the following sections will compare New Zealand's safety and marketing regulations and enforcement to help Australian growers better benchmark their ability in the future.

Food safety

New Zealand has a clear legislative framework governing safety of vegetable production and safety along the vegetable supply chain. It shares the FSANZ's Code with Australia on most safety-related issues, with few exempted areas that are managed separately by New Zealand's Food Act 1981 (to be replaced by a new Food Act in 2016), Food Hygiene Regulations 1974 (FHR), and a few other policies.

New Zealand has developed an advanced safety risk assessment framework based on the Codex Alimentarius Commission (CAC) and the Food Act 1981. Registered businesses, including supermarkets, manufacturers and franchise operators, must either operate under the Food Hygiene Regulations 1974 or adopt a Hazard Analysis Critical Control Point (HACCP)-based Food Safety Programme (FSP) as required by the Food Act 1981.

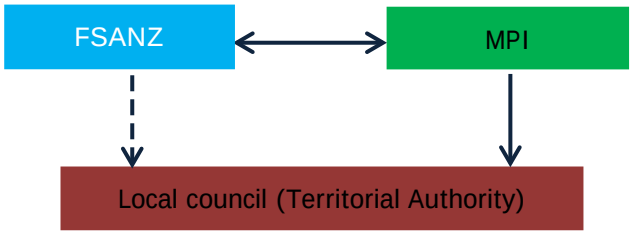
New Zealand is continuing to enhance the efficiency of its food safety governance, aiming to further save management costs. One such effort was the restructuring of its administrative agencies in 2012, when the Ministry for Primary Industries (MPI) replaced the Ministry of Agriculture and Forestry (MAF), the Ministry of Fisheries (MFish) and the New Zealand Food Safety Authority (NZFSA) and became the leading agency for safety governance. Another effort is revising its Food Act to change a control-based approach to a risk-based mechanism.

There are concerns over the safety of vegetables, because the new Act proposes to remove regular safety checks on vegetable-related activities and take a one-off checking approach. However, it is unlikely the new Act will fundamentally affect safety of vegetable products in New Zealand, because supermarkets and farmers' markets are subject to stringent safety rules and conduct regular monitoring. Moreover, violation costs will be higher, as the new Act proposes to increase maximum penalties by 20

times on individuals and 25 times on companies.

Table 1 illustrates the current structure of food safety management in New Zealand to support further understanding of enforcement mechanisms in the country.

Table 1: New Zealand government institutions responsible for food safety



- **FSANZ** is responsible for developing Australia New Zealand Food Standards Code for food available in both countries. In New Zealand, FSANZ is responsible for standards relating to labelling, composition and contaminants. There are some aspects outside the scope of the Code in New Zealand, including the maximum residue limits (MRLs), food hygiene and details of materials permitted to be used to produce food packaging materials. MPI is the implementation agency for the Code in New Zealand.

- **Ministry for Primary Industries (MPI)** is responsible for issuing safety-related regulations, including those outside the scope of the Code, and for the enforcement of policies on primary production. It also undertakes research, which will be used for the development of new food safety standards to help improve the safety of primary products. It has direct co-ordination with local councils in safety governance. National laboratories for food safety testing must be authorised by MPI to ensure testing standards.

- **Local councils** are responsible for enforcement of the FHR and management of food safety at the local level.

The following sections assess New Zealand's food safety governance in production and along the supply chain to offer a qualitative measure of the competitiveness of New Zealand's vegetable industry.

Primary production

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C1	Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.	New Zealand	Low	High	Medium
		Australia	Low	High	Medium

Regulatory support

New Zealand does not have specific regulations governing primary production, rated **LOW**. Primary production of horticultural products is currently exempted from the Australia New Zealand Food Standards Code. While the Food Hygiene Regulations 1974 and the Food Act 1981 could be applied to certain aspects of vegetable production, for instance employees handling agricultural products, the documents largely lack specifics that could be implemented at the farm level.

New Zealand does not have specific safety standards for irrigation water usage or regulations preventing animal contamination during production. The current Resources Management Act touches on some points of water protection, but it is accused of being bureaucratic and ineffective, failing to set mandatory requirements on limits of microbial contamination in water used for agricultural purposes. The Australian and New Zealand Guidelines for Fresh and Marine Water Quality has guidelines with few details on testing water quality for pesticides, thermotolerant coliforms (a proxy for human/animal pathogens) and heavy metals.

Enforcement effectiveness

New Zealand's implementation of regulations and established standards is **HIGH** in primary production. Despite lacking specified regulations, the general safety standards on agri-production are high in New Zealand, and apply to primary production. Safety of production is controlled by the HACCP system that sets detailed critical control points (CCPs). Incidents of vegetable contamination are not prominent, but OECD reports said the incident rate in recent years is slightly higher than in Australia and the other OECD countries.

Use of chemicals

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C2	Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	New Zealand	High	High	High
		Australia	High	High	High

Regulatory support

New Zealand has stringent regulations on the use of chemicals, and is rated **HIGH.** Agricultural chemicals are strictly regulated under the Agricultural Compounds and Veterinary Medicines Act 1997. Primary responsibility for overseeing chemicals resides in the MPI, which co-ordinates with local councils and industry associations on safety governance. The New Zealand (Maximum Residue Limits of Agricultural Compounds) Food Standards are updated regularly to ensure good agricultural practice.

Like Australia, New Zealand has clear safety guidance that covers the safe use of agrichemicals, and specific programmes that support the registration of chemicals for minor vegetables. In addition, the New Zealand Vegetable Industry Agrichemical Registration Strategy Working Group effectively supports the registration of the new uses of agrichemicals.

However, challenges exist in data protection rules in New Zealand, which are accused of limiting agrichemical innovation. The rules set five years of exclusive protection for scientific information, in comparison to ten years in Australia and in many other advanced economies. The shorter term of protection enables products to be quickly copied, which could reduce the motivation for innovation and restrict New Zealand's capacity in the adoption of new agrichemical technologies.

Enforcement effectiveness

Excessive use of pesticides, fertilisers and other chemicals is not common in **New Zealand**, scoring its enforcement effectiveness **HIGH.** In general, there is clear agency support in releasing testing results, with tests showing a very high rate of compliance. The two MPI-authorised laboratories provide easy-to-use services supported by clear testing methodology and high auditing standards. These services effectively help New Zealand growers meet stringent safety requirements domestically and in their export destinations.

There have been few incidents of the excessive use of chemicals in the past. In 2009, the Food Residues Surveillance Programme (FRSP), a national monitoring programme for pesticide residues, found that eight of 27 celery samples and four of 24 spinach samples had excessive levels of chemicals. Furthermore, there were scandals surrounding vegetables sourced from China that avoided chemical residue tests.

Because of New Zealand's labelling regulations, which make country-of-origin labelling

non-mandatory, some Chinese frozen vegetables were mixed with New Zealand produce and labelled as 'made in New Zealand from local and imported ingredients'. However, most of these incidents were released with high transparency. Environmental and consumer groups constantly respond to food safety concerns that contribute to the safety environment in New Zealand.

Metal contamination

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C3	Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	New Zealand	High	High	High
		Australia	High	High	High

Regulatory support

New Zealand has stringent regulations to control metal and non-metal contaminants, and is rated **HIGH.** It shares the same Code with Australia on levels of metal contamination. In addition, the Food Standards Code Standard 1.4.1 further sets detailed standards on the maximum levels (ML) of metal and non-metal contaminants in different type of vegetables. In general, metal pollution of agricultural land in New Zealand is not a severe problem, as strict quality guidelines have been developed and industrialisation is limited.

Enforcement effectiveness

Heavy metal contamination in vegetables is not a major challenge in **New Zealand**, and the overall safety standards and high levels of transparency contribute to a **HIGH** enforcement effectiveness rating. However, testing for some contaminants is only intermittent. For example, the Total Diet Survey (NZTDS) that tests arsenic, cadmium, lead and mercury in food has not been conducted since 2009. The previous NZTDS tests also mainly focused on seafood and had less consideration of vegetables. That testing regime is informed by the fact there has been no major metal contamination incidents in New Zealand in recent years. However, there are local concerns about industrial discharges that have not been addressed adequately.

Packaging

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C4	Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.	New Zealand	Low	Medium	Low
		Australia	Low	Medium	Low

Regulatory support

New Zealand shares the same FSANZ Code with Australia in food packaging; its safety standards are not sufficiently developed, and therefore rated **LOW**. The FSANZ 1.4.3 and the Food Hygiene Regulations 1974 only set broad conditions on food packaging. For example, the latter requires that package material should not cause food to be unsafe or tainted. It does not specify materials that can be used in food packaging or the method of manufacture of food packaging materials. Like Australia, New Zealand's government has placed the responsibility for ensuring packaging safety on food manufacturers and retailers.

However, the FSANZ has released a consultation paper aiming to identify whether current safety measures are appropriate or if further measures are required to enhance the management of the migration of chemicals from packaging into food. But because changes of regulations are unlikely to occur soon and no specific details have been released, the rating of regulatory support remains **LOW**.

Enforcement effectiveness

Like Australia, many producers in **New Zealand** adhere to EU and US standards, which contribute to a **MEDIUM** rating for the enforcement environment. In addition, FSANZ Standard 1.4.1 – Contaminants and Natural Toxicants has provided a mechanism for the government to regulate specific chemical migrates from packaging and a safety framework for manufacturers.

However, although the recent FSANZ survey indicated good practice on packaging and a well-performed traceability system, the industry continues to express concerns about the insufficient regulations that weaken implementation. They claim the insufficient regulations could cause potential safety threats from new or imported packaging materials.

The new Food Act might make food packaging more specifically regulated, as the Act proposes requiring food suppliers to show evidence that their materials in contact with food are safe and meet international standards.

Storage and transportation

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C5	Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.	New Zealand	High	High	High
		Australia	High	High	High

Regulatory support

The Food Hygiene Regulations 1974 in **New Zealand** specify oversight during storage and transport to prevent contamination, scoring **HIGH.** Although terms related to storage and transport have not been updated since 1984, they specify detailed hygiene requirements for store rooms, temperature, vehicles and food handlers. For example, food to be sold in a frozen condition should be maintained in a temperature below -18°C. This is more stringent than in Australia.

Enforcement effectiveness

New Zealand's enforcement of storage and transport standards is **HIGH**, with stringent risk management programmes applied to food businesses. All food storage and transport processes are required to either be monitored by local councils following the Food Hygiene Regulations 1974 or be audited by a third-party expert under the FSP.

Small manufacturers, and food storage and transport operators, should also follow best-practice standards. Clear guidance is offered, which helps businesses to prevent risks. Some retailers and farmers' markets have more stringent rules with detailed vehicle and temperature requirements, which further enhance safety practices.

Food processing

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C6	Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.	New Zealand	High	High	High
		Australia	High	High	High

Regulatory support

New Zealand does not have separate regulations on food processing, but general safety rules apply to vegetable processing and are rated **HIGH.** The Food Standards Code Standard 1.3.1 sets limits on the use of food additives, and the Food Hygiene Regulations 1974 have hygiene requirements on temperature control and rules for food handlers. Processors should either operate under the Food Hygiene Regulations 1974 or register with the FSP under the Food Act 1981, which requires the establishment of a traceability system.

Enforcement effectiveness

New Zealand's enforcement of food processing standards is **HIGH**, aided by effective monitoring and auditing throughout the supply chain. Processed food has maintained a high safety record over the past 15 years. Although there was one pathogen contamination incident surrounding processed fruit in 2002, the incident has been addressed by New Zealand's quality assurance programme and further explored by pathogens contamination research targeting the vegetable and fruit industry.

Food labelling

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C7	Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.	New Zealand	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

Most terms of the Australia New Zealand Food Standards Code on labelling apply to **New Zealand**, but the country is exempted from the country of origin labelling. This has triggered safety concerns, scoring its regulatory support **MEDIUM**.

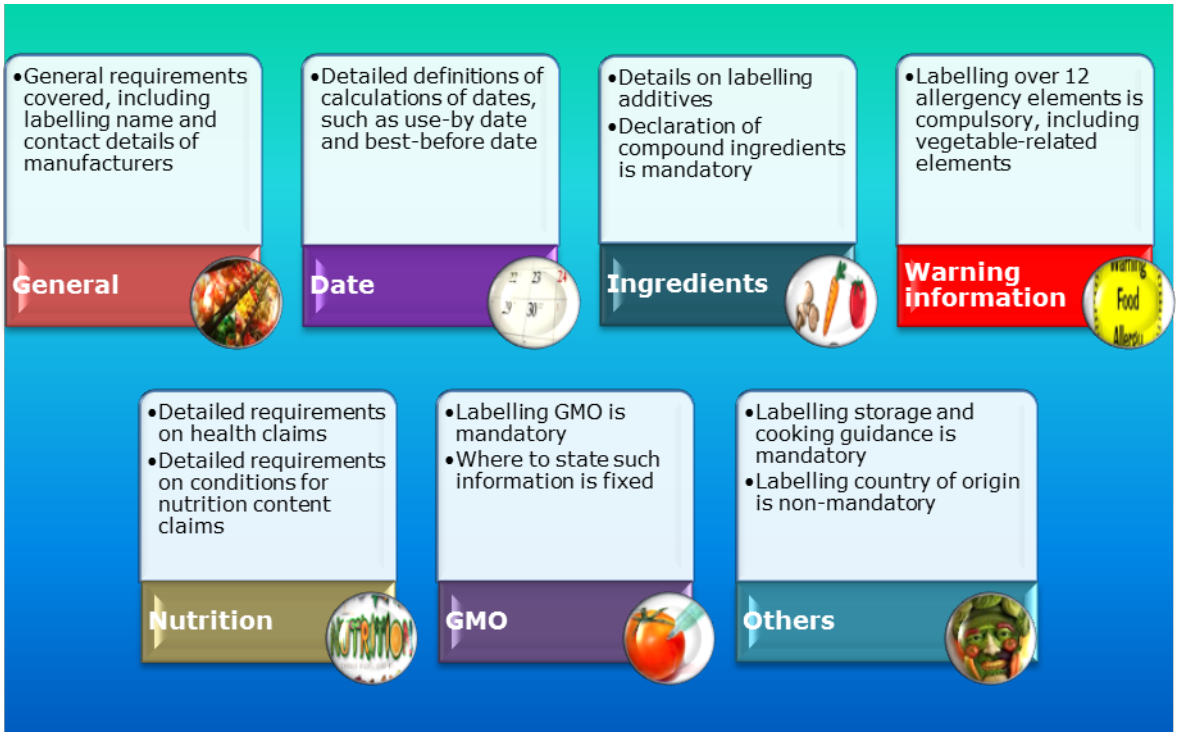
Despite concerns about food safety from consumers and researchers, New Zealand's government decided not to join the mandatory country of origin labelling in 2005. It argued that country of origin labelling is more of a marketing tool than a safety tool. Because New Zealand is highly reliant on imported ingredients, country of origin labelling is likely to remain voluntary to offer manufacturers more flexibility. To address safety concerns, New Zealand government's requires manufacturers to include contact details on products and thus consumers can contact producers to access more information. This, however, is considered to be insufficient in preventing safety incidents.

Another safety challenge is the exemption of some foods from labelling, which include

whole or cut fresh vegetables. The only requirement is that those foods are packed in 'transparent packages', but regulations do not specify details on the standards of packaging transparency.

Australia is impacted by New Zealand's labelling standards, because under the Trans-Tasman Mutual Recognition Arrangement, foods able to be sold in New Zealand can legally be sold in Australia. Australian industry associations claim that there are risks of packaged foods labelled as manufactured by New Zealand, with non-safe ingredients from other countries, being exported to Australia.

Table 2: New Zealand's regulations and measures governing food labelling



Enforcement effectiveness

New Zealand's enforcement of labelling policies is in general transparent and effective. However, the voluntary country-of-origin labelling fails to cover a large number of New Zealand's small food retailers, scoring a **MEDIUM** rating.

Despite the overall transparency of implementation of labelling laws, some breaches have been detected that saw vegetables not labelled. Few more incidents are the result of the non-mandatory country of origin labelling. Australia has reported several times that vegetables from China are processed in New Zealand and sold in Australia without telling the consumers the origin of the vegetables.

Government support for agricultural marketing

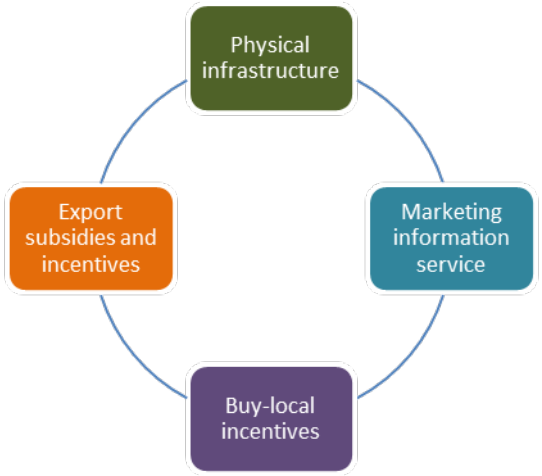
In its assessment of government support for the vegetable sector, Control Risks considered the span of services involved in moving an agricultural product from farm to consumer. Governments can enhance the competitiveness of local producers'

agricultural marketing by upgrading infrastructure, providing marketing information, backing buy-local initiatives and supporting exports, as illustrated in Table 3.

These types of government support are interrelated, but we have categorised them for analytical clarity. Setting and enforcing high food safety standards also feeds into the strength of agricultural marketing, and has been analysed separately in the previous sections.

This section is designed to compare supportive measures in the following four categories in New Zealand.

Table 3: Government support for agricultural marketing that has the potential to enhance competitiveness



Physical infrastructure development

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C8	Infrastructure support for farmers aids international competitiveness.	New Zealand	High	Medium	Medium
		Australia	High	Medium	Medium

Regulatory support

As an advanced economy, **New Zealand**'s regulatory support for infrastructure is comparable to Australia's, which focuses on increasing efficiency, and is rated **HIGH.** The amount of investment to several areas of infrastructural development is increasing; for example, investment in the national electricity grid in 2011 was seven times that in 2001. Many programmes have been launched in recent years that should enhance efficiency of agricultural industry. These include the Rural Broadband Initiative (RBI) to upgrade broadband speed to at least 5Mbit/s to 86% of rural customers by 2016, and the Irrigation Acceleration Fund, which allocates USD 35 million (AUD 45 million) over five years (to 2016) to support the development of irrigation infrastructure.

However, both Australia and New Zealand have higher labour costs in comparison with many less advanced economies. Challenges remain in how to support the development of advanced infrastructure and innovation to further cut costs.

Enforcement effectiveness

Like Australia, **New Zealand** relies on state-private co-operation for infrastructure development with a high-level of transparency. The government aims to reduce unpredictable regulatory intervention to attract international investors and lenders, with proven success. However, the overall quality of infrastructure in both Australia and New Zealand is not at a highly advanced level, ranking 35th and 32nd respectively in the World Economic Forum's Global Competitiveness Report 2014-15.

The report suggested that the inadequate supply of infrastructure is the most challenging area of doing business in New Zealand; this includes insufficient roads, ports and mobile phone subscriptions, especially in comparison with more advanced countries such as the United States. A report by the New Zealand Council for Infrastructure Development in 2013 also indicated that there is a lack of sufficient support in some sectors, such as water supply, scoring the country's enforcement effectiveness **MEDIUM**.

Marketing information service

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C9	Information access support is efficient, which makes farmers well-informed of market changes.	New Zealand	High	High	High
		Australia	High	High	High

Regulatory support

New Zealand's regulations and institutions facilitating access to agricultural information are rated **HIGH.** Like Australia, New Zealand does not have a state-led mechanism to disseminate agricultural information, such as information released by state-funded TV channels. However, the government offers essential data and transparent information on risks to growers, such as natural disasters. Industry associations benefit from government bodies' co-operation in providing information on marketing and innovation.

When benchmarked with Australia, leading industry associations in New Zealand have less advanced information delivery systems. Ausveg, the leading horticulture industry association in Australia, publishes weekly updates on industry development, and delivers vegetable-related research information through its 'InfoVeg' mobile application, while Horticulture New Zealand offers information in a much less frequent and technologically sophisticated way. However, improvements in Horticulture New Zealand's information delivery are foreseeable because the country has been increasing

its innovative capacity and made proven success in recent years.

Enforcement effectiveness

A liberalised agricultural market with supportive policies creates an efficient private sector in **New Zealand**, which is rated **HIGH** in enforcement effectiveness. There are several farming publications that are funded by commercial advertisements and delivered for free to growers. Those publications offer not only timely information on market changes, but also analysis and commentaries on issues relevant to farm businesses. In addition, growers can approach horticultural consultants for information and advice, including those on planting, use of chemicals and pest controls.

Buy-local initiatives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C10	Buy-local initiatives are efficient, which creates opportunities for increasing profits of local growers.	New Zealand	Low	Medium	Low
		Australia	Medium	Medium	Medium

Regulatory support

New Zealand's regulatory support for buy-local initiatives is rated **LOW.** It used to have a 'Buy Kiwi Made' campaign supported by the government to promote New Zealand produce in the domestic market. However, the campaign was suspended in 2009, and the Labour government is unwilling to support other buy-local initiatives such as mandatory country of origin labelling. There are requests from consumers and industry groups for supporting buy-local activities, but the government has not effectively responded by releasing any specific support.

Enforcement effectiveness

New Zealand is rated **MEDIUM** on enforcement because there are non-governmental groups and private companies that push behavioural changes to support New Zealand-made products. This includes the 'Buy NZ Made' campaign to help promote New Zealand-made products online. Local vegetable markets are encouraged and regulated effectively by the government, which can help to promote locally produced vegetables. In addition, voluntary labelling programmes supported by industry groups to label the country of origin are increasing their awareness among businesses.

Export subsidies and incentives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C11	Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.	New Zealand	High	High	High
		Australia	High	High	High

Regulatory support

New Zealand's government provides **HIGH** regulatory support to businesses in international expansion, because exporting is one of the main revenue sources for the country. Financial subsidies have been removed, but this has not fundamentally affected the competitiveness of New Zealand's horticultural industry in international markets.

Like Australia, New Zealand's government provides essential and effective insurance and knowledge support to businesses to help them succeed in international competition. These include trade credit insurance and financial guarantees offered by the New Zealand Export Credit Office (NZECO), and trade advice and market research provided by the government-backed New Zealand Trade and Enterprise (NZTE). These services operate with high transparency, and offer New Zealand's horticulture businesses essential tools to prepare for new markets and mitigate risks.

Enforcement effectiveness

New Zealand's supportive measures are transparent and effective in general, and so rated **HIGH**. Despite the cancellation of subsidies, horticultural exports from New Zealand grew from NZD 100m (AUD 94.3m) in 1980 to NZD 2.23bn (AUD 2.1bn) in 2011. Many pieces of research have suggested that the removal of subsidies has provided a predictable and transparent market access opportunity to companies, and thus created a productive and vibrant horticultural industry.

UNITED STATES

Executive summary

This report aims to benchmark the competitiveness of Australia's vegetable industry with the US, and it assesses the regulatory conditions governing food safety in production, food safety along the supply chain and government support for agricultural marketing in the US. The assessment takes into consideration the US' overall condition and its impact on regulatory development and enforcement, as well as the impact on future policy changes in the vegetable industry. This section summarises our findings:

US's vegetable industry

- **Unlike in Australia, US food safety is governed by guidelines that form the basis of regulatory enforcement as opposed to codified metrics**. While compliance with the guideline-based framework in the US is mandatory under binding legislation, the guidelines lack specific metrics and thresholds for food safety. This situation generates ambiguities for producers, who are required to adhere to general guidelines rather than clear, quantitative, metrics.

Australia's competitive position

- **Australian competitiveness benchmarked against the US is strong overall in the areas of metal contamination, storage and transportation, food processing and food labelling.** In these categories, Australian regulation is in general more advanced and implementation is higher.

Benchmarking food safety in primary production

- **The US regulatory environment for food safety in primary production can be considered reasonably robust both in terms of support and enforcement effectiveness.** However, as with other areas of food safety regulation in the US, enforcement effectiveness is hampered by fact that the FDA has merely issued guidelines for compliance as opposed to specific metrics. Adherence to these guidelines is mandated by legislation but, in practice, ample discretion is given to producers to circumnavigate the regulations.

- **US regulation of heavy metals in vegetables is insufficient**. Unlike in Australia, the FDA, which is responsible for regulating heavy metals, has not established clear values on the maximum amount of metal contaminant values allowed in most foods. The agency merely provides guidelines, as per the Federal Food and Cosmetic Act. The FDA has inconsistent standards for which heavy metals have maximum acceptable amounts and which do not.

Benchmarking food safety along the supply chain

- **Enforcement effectiveness for the regulatory environment in food storage and transportation is weak**. The overall numbers of incidents or outbreaks attributable to transportation failures appear to be vastly

underreported. There have been a number of high-profile cases in recent years that point towards a problem with enforcement.

- **Enforcement for food processing suffers from a lack of specificity in the form of metrics and thresholds for food safety**. The FDA provides only general guidance for the determination of concern levels for food additives and associated testing. There is little evidence that the agency aggressively pursues additive use in agricultural produce or processed foods generally.

- **Regulatory support for food labelling is generally considered as too limited**. There is a lack of FDA regulation regarding expiration dates, with the exception of infant formula. Product dating is generally not required by federal regulations. Furthermore, nutritional labelling for vegetables is voluntary while, with a couple of exceptions, producers are not compelled to include additive information for vegetables.

Benchmarking government support for agricultural marketing

- **The US is relatively competitive in terms of its support for agricultural marketing**. Regulatory support and enforcement effectiveness are relatively robust with regards to support for physical infrastructure in rural areas, marketing information services and export subsidies.

Overview of the US vegetable industry

Despite a growing appetite among US consumers to eat healthier produce, food safety remains a considerable issue in the country. According to a 2013 survey by food safety monitoring company Food Sentry, the US accounts for 5.4% of the world's 3400 violations of food safety laws, taking the number five spot for poisoning incidents, behind India, China, Mexico and France. The study states that vegetables accounted for 24% of the total number of US violations in 2013. Both Australia and New Zealand are not on the top ten lists of violations.

US food safety is governed differently than in Australia in that guidelines form the basis of regulatory enforcement as opposed to codified metrics. While compliance with the guideline-based framework in the US is mandatory under binding legislation, the guidelines lack specific metrics and thresholds for food safety. This situation generates ambiguities for producers, who are required to adhere to general guidelines rather than clear, quantitative, metrics. The Food and Drug Administration (FDA), the federal agency charged with ensuring food safety, including in the vegetable industry, has discretion over which specific violations to address and which to ignore.

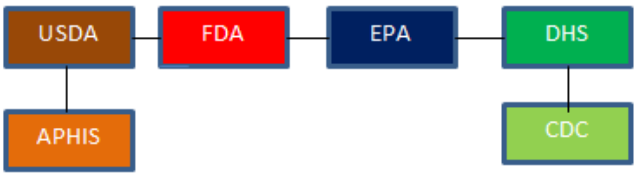
In light of this guideline-based system, producers are motivated more by the desire to ensure consumer confidence (via acceptable food safety levels) than by precise thresholds. Food activists have long argued that this system of food governance lacks regulatory robustness and places too much of the burden of enforcement in the hands of producers.

The FDA has limited ability to regulate food safety effectively. The agency suffers from scarce resources both from a headcount and financial standpoint, especially take consideration of US's population, which is 14 times the size of the Australian. Meanwhile, its responsibilities have increased exponentially in recent years—it currently regulates 25% of all consumer spending—amid a plummeting budget. The FDA's resource shortfall has limited its ability to carry out its enforcement obligations, including routine inspections and the monitoring of imports and exports.

Food safety

The US food safety regulatory environment has long been criticised for its multi-agency structure, which is said to erode efficiency and hinder implementation and enforcement of laws and regulations; fifteen separate federal agencies administer more than 30 laws and regulations related to food safety. Additionally, the regulatory environment is further complicated by its layered structure, and by each state's particular laws, regulations and agencies dedicated to implementing and enforcing food safety regulations in line with federal standards. However, the following six agencies share primary federal responsibility for food safety regulation:

Table 1: US's government institutions responsible for safety of vegetables



- **Department of Agriculture (USDA):** USDA is responsible for developing and executing federal government policy on farming, agriculture, forestry and food.

- **Food and Drug Administration (FDA):** The FDA, as authorised by the federal Food, Drug and Cosmetic Act, oversees food safety for fresh fruit and vegetables.

- **The Environmental Protection Agency (EPA):** The EPA enforces regulations that govern the use of chemicals products (e.g., insecticides and pesticides) in food production.

- **The Center for Disease Control (CDC):** The CDC is a non-regulatory agency, part of the Department of Health and Human Services (DHHS). The Food Safety Office of the CDC detects and investigates food-borne illnesses.

- **The Animal and Plant Health Inspection Service (APHIS):** APHIS, which is part of the USDA, is tasked with protecting agricultural products from domestic and foreign pests and diseases.

- **The Department of Homeland Security (DHS):** The DHS has as one of its objectives the protection of the US food supply from all hazards.

Significant regulatory changes in food safety governance in the US have traditionally been event-driven. The 1938 Federal Food, Drug and Cosmetic Act (FDCA), which serves as the primary legislative framework for food safety in the US, was passed after a mass diethylene glycol poisoning that stirred public demand for stronger regulation. The FDCA mandated the creation of regulatory bodies such as the FDA. Furthermore, following a string of high-profile outbreaks of foodborne illnesses and increasing bioterrorism concerns after the September 11, 2011, the Food Safety Modernization Act (FSMA) was finally signed into law in 2011. The act's purpose is to ensure the safety of the US food supply by shifting the focus of federal regulators from response to prevention.

The key regulatory system employed by the FDA in food regulation is the Generally Recognized as Safe (GRAS) guidelines. The GRAS classification has important regulatory implications for the governance of ingredients, packaging and labelling in food. Under sections 201(s) and 409 of the FDCA, "any substance that is intentionally added to food is a food additive, that is subject to premarket review and approval by FDA, unless the substance is generally recognised, among qualified experts, as having been adequately shown to be safe under the conditions of its intended use, or unless the use of the substance is otherwise excluded from the definition of a food additive".

One criticism of the GRAS system is that it appears to put too much power in the hands of food producers to regulate their own industrial activities. The FDA merely reviews the GRAS overviews that companies submit to the agency's voluntary notification program—the agency does not have information about companies' internal GRAS determinations which are not required to be sent to the FDA for review or verification.

Furthermore, the FDA has not issued specific guidance to companies on how to carry out their GRAS status assessments or, for that matter, sufficiently monitored companies to ensure that they have performed GRAS classifications appropriately. Finally, the FDA does not systematically ensure continued adherence to GRAS guidelines once companies supply their GRAS overviews to the agency. According to FDA regulations, the GRAS status of a food product must be reconsidered as new scientific information emerges, though the agency has not reconsidered GRAS substances since the 1980s. The FDA does not know to what extent, or even whether, companies track evolving scientific evidence.

Given the above challenges, the US has lower competitiveness rating than Australia in many areas of safety governance, including controlling metal contamination, food transportation and storage, and food processing.

The following sections assess the US food safety governance in production and along the supply chain to offer a qualitative measure of the competitiveness of the country's vegetable industry:

Primary production

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C1	Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.	US	Medium	Medium	Medium
		Australia	Low	High	Medium

Regulatory support

The US regulatory environment for food safety in primary production is rated as **MEDIUM**. The FDA has published a comprehensive set of guidelines to help producers avoid contamination of vegetables—among other produce—during primary production processes (e.g. FDA's "Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables"). The guidelines comprise areas such as microorganisms, pests, general sanitation, transportation, water, faecal contamination, and food-contact surfaces (among others), including recommended methods to ensure sanitation and avoid contamination during primary production. However, the guidelines are highly qualitative and lack specific measures of maximum contaminants, with only few exceptions.

Enforcement effectiveness

The FDA has a host of enforcement mechanisms with which to sanction violators. These include inspections, warning letters, recalls, registration suspensions and administrative detention. Coupled with the food safety reform legislation known as the Food Safety Modernization Act (FSMA), signed into law in 2011, the FDA has shifted its focus from response to prevention and to severely sanction producers whose industrial practices are in direct contravention to the guidelines. Specialized companies have sprung up solely to help producers navigate regulations to comply with FDA guidelines.

But despite the above, there are a number of shortcomings in enforcement effectiveness that led to our **MEDIUM** classification for primary production in the US. Specifically, the FDA has merely issued guidelines for compliance as opposed to specific metrics. Adherence to these guidelines is mandated by legislation—such as the FSMA, among others—but, in practice, ample discretion is given to producers to their own activities. Also, the guidelines themselves are highly qualitative and lack specific measures of maximum contaminants, with few exceptions. This lack of specificity compounds producers' ability to circumnavigate regulation during the primary production stage.

Use of chemicals

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C2	Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	US	High	High	High
		Australia	High	High	High

Regulatory support

US has stringent regulation on the use of chemicals, and is rated **HIGH**. The EPA sets clear "tolerances", or maximum residue limits, on the amount of pesticide residue that can lawfully remain in or on each treated food item. In establishing tolerances, the EPA considers the toxicity of each pesticide, how much of the pesticide is applied and how often, and how much of the pesticide (i.e. the amount of residue) remains in or on food. An added margin of safety often ensures that residues remaining in foods are far lower than amounts that could actually cause adverse health effects.

Enforcement effectiveness

Excessive use of pesticides and other banned chemicals is rare in the US, giving the US a **HIGH** score for enforcement. The EPA enforces regulations that govern the use of chemical products in food production, with a primary focus on the regulation of pesticides in food. The agency not only reviews and approves new pesticide products (and their use) before they enter the market, but systematically reviews all older pesticides already on the market to ensure that they meet current testing and safety standards. The EPA is mandated to review all pesticides on the market every 15 years. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) gives the EPA authority to determine which pesticides can be used in the US and in which ways.

The FDA enforces the EPA's tolerances for all imported and domestic foods that move through interstate commerce. Specifically, the FDA assesses data from the Pesticide Data Program (PDP)—a national pesticide residue database program—for apparent violations that require follow-up under its regulatory pesticide program. According to the 2012 USDA annual study, a total of 549 samples with 829 pesticides were reported to FDA as Presumptive Tolerance Violations. Most notably, pesticides exceeding the tolerance were detected in only 0.53% (63 samples) of the total vegetable samples tested (11,893 samples). Of these 63 samples, 54 were imported (86%) and nine were domestic (14%).

However, in recent years US exports have failed to satisfy the safety standards of many industrialized countries (in the EU) and developing countries (including china), primarily in beef and genetically modified produce exports—including vegetables. However, given the US' ease of access to less regulated markets, attempts to block US imports have done little to change industrial processes to bring US standards in line with those of

other countries.

Metal contamination

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C3	Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	US	Low	Medium	Low
		Australia	High	High	High

Regulatory support

US regulation of heavy metals in food is rated as **LOW**. Unlike in Australia, the FDA, which is responsible for regulating heavy metals, has not established clear values on the maximum amount of metal contaminant values allowed in most foods. The agency merely provides guidelines, as per the Federal Food and Cosmetic Act, which deems heavy metal levels to be unacceptable only if a food contains "any deleterious substance which may render them dangerous to health". The language of the act indicates that the mere presence of heavy metals in food does not cause food to be unsafe. The burden is on the food producer to ensure that levels of metal contaminants fall in line with acceptable Codex levels. The FDA does not itself test the products for levels of contaminants but instead relies on summaries submitted by the producer.

The FDA has inconsistent standards for which heavy metals have maximum acceptable amounts and which do not. While it does not prescribe maximum standards for cadmium, lead or mercury, for instance it does so for arsenic. The FDA has long been criticised for dragging its feet on the issue of arsenic regulation, and it was only after the agency was threatened with legal action in 2013 that it announced new limits for the metalloid; the threat of legal action was based on a 2010 science-backed petition in consumer reports showing that arsenic-based drugs in apple juice threatened both animal and human health.

Enforcement effectiveness

Heavy metal contamination is not a significant concern in the US, and enforcement effectiveness is rated as **MEDIUM**. However, by putting the regulatory burden on the producer, the current regulatory environment requires producers to regulate themselves despite a lack of specificity on the maximum amount of heavy metals allowed in food. For most heavy metals, there is effectively no safety standard, increasing the risk of food contamination. Producers use safety levels for heavy metals as set out by the European Union and the WHO-backed Codex.

There are some recorded cases of enforcement failure. According to state-level health department data published by the New York Post in November 2014—through the Freedom of Information Act—vegetables grown in community gardens in New York City were considered tainted by heavy metals by Tulane Medical School in five of seven plots tested, which is just one example of toxic metal introduction into vegetables in spite of the FDA's regulatory responsibilities.

Packaging

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C4	Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.	US	High	Medium	Medium
		Australia	Low	Medium	Low

Regulatory support

Control Risks rates regulatory support for food packaging in the US as **HIGH**. The FDA regulates the packaging of food, classifying any packaging that comes into direct contact with food as a "food contact substance." In an effort to ensure the safe use of these substances, FDA has established a Food Contact Notification Program which sets detailed requirements including chemical identity and technical effect of packaging materials.

The Office of Food Additive Safety and The Center for Food Safety and Applied Nutrition (CFSAN) is responsible for ensuring the safety of these food contact substances. The EPA requires that antimicrobial technology be built into plastic and textiles used in food packaging to prevent the growth of bacteria, mold, mildew, fungi, discoloration and odor.

Enforcement effectiveness

Enforcement appears to be problematic in the US and, as such, is rated as **MEDIUM**. A study published by Cornell University in July 2013 suggested that 175 chemicals used in food contact materials in the US are recognised by scientists and government agencies as chemicals of concern—in other words, chemicals known to have adverse health effects. The FDA's system for approving food contact materials—which it does on an individual basis, with approval granted to a specific company for a particular intended use—depends on how much of a substance is expected to migrate into food. Again, this is assessed based on information a company itself submits to the FDA; the FDA may come back to a company with questions and do its own literature search, but it rarely, if ever, sends substances to a lab for testing as part of the approval process.

Storage and transportation

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C5	Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.	US	High	Low	Medium
		Australia	High	High	High

Regulatory support

We class the regulatory climate for storage and transportation as **HIGH**. Under SFTA, the FDA must regulate packaging, limits on transport vehicles, exchange of relevant information between relevant parties, record logging, and sanitation practices. Notably, the FDA is currently developing regulations that will impose more comprehensive food safety requirements on food distributors and transporters under the recent amendments to the Federal Food, Drug, and Cosmetic Act (FDCA), which were made by the FDA Food Safety Modernization Act (FSMA) and Sanitary Food Transportation Act (SFTA) of 2005. The FDA issued proposed regulations last year concerning Hazard Analysis Risk Based Preventive Controls and Sanitary Transportation of Human and Animal Food. The final regulations are scheduled for publication in August 2015 and March 2016, respectively.

Enforcement effectiveness

Enforcement is rated as **LOW**. Based on industry experience, the overall numbers of incidents or outbreaks attributable to transportation failures appear to be vastly underreported. There have been a number of high-profile cases in recent years that point towards a problem with enforcement. In July 2014, the world's largest food distributor, Sysco Corp., entered into a USD 19.4 million settlement with the California Department of Public Health to resolve allegations that the company had engaged in unlawful food transportation and storage practices and had misrepresented its practices on the company's website. In Pennsylvania, for instance, in 2012, officials stopped 396 trucks in 2013 and found 10 of them had unsafe conditions. Other cases include trucks without proper refrigeration that caused food contamination.

Food processing

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C6	Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.	US	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

We rate regulatory support for food processing in the vegetable industry in the US as **MEDIUM**. The FDA regulates food additives; any substance that is reasonably expected to become a component of food is a food additive that is subject to premarket approval by FDA, unless the substance is generally recognised as safe among experts. Although the FDA publishes a list of permitted food additives, the regulatory status of many additives remains unlisted with the institution apparently consulting the CODEX on specific cases where there is a lack of clear regulatory guidance.

The FDA's regulation has long been criticised for its alleged low bar compared to many other major developed countries. For instance, the chemical brominated vegetable oil (BVO) is illegal as a food additive in Australia, New Zealand, the EU, and Japan but permitted in the US. The FDA has permitted the "interim" use of the ingredient since 1970, pending additional toxicological tests, siting resource constraints as the reason why it has not been given permanent status.

In comparison, regulations regarding water supply and food safety appear more concrete. The regulations state that 'the water supply shall be sufficient for the operations intended and shall be derived from an adequate source. Any water that contacts food or food-contact surfaces shall be safe and of adequate sanitary quality.

Enforcement effectiveness

Enforcement for food processing is rated as **MEDIUM**. When an FDA investigation determines that an additive violation has occurred, the agency can take a number of actions to protect public health. In the absence of voluntary action (e.g., produce recall) by the responsible firm to correct the problem, FDA has several advisory, administrative, and judicial options which include warning letters, detentions, issuance of import alerts, and seizures. However, as with other areas of food safety, enforcement in the US suffers from a lack of specificity in the form of metrics and thresholds for food safety, and resource constraints. The FDA provides only general guidance for the determination of concern levels for food additives and associated testing.

Food labelling

ID	Competitiveness parameters	Country	Regulatory environment	Enforcement effectiveness	Overall rating
C7	Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.	US	Low	Medium	Low
		Australia	High	High	High

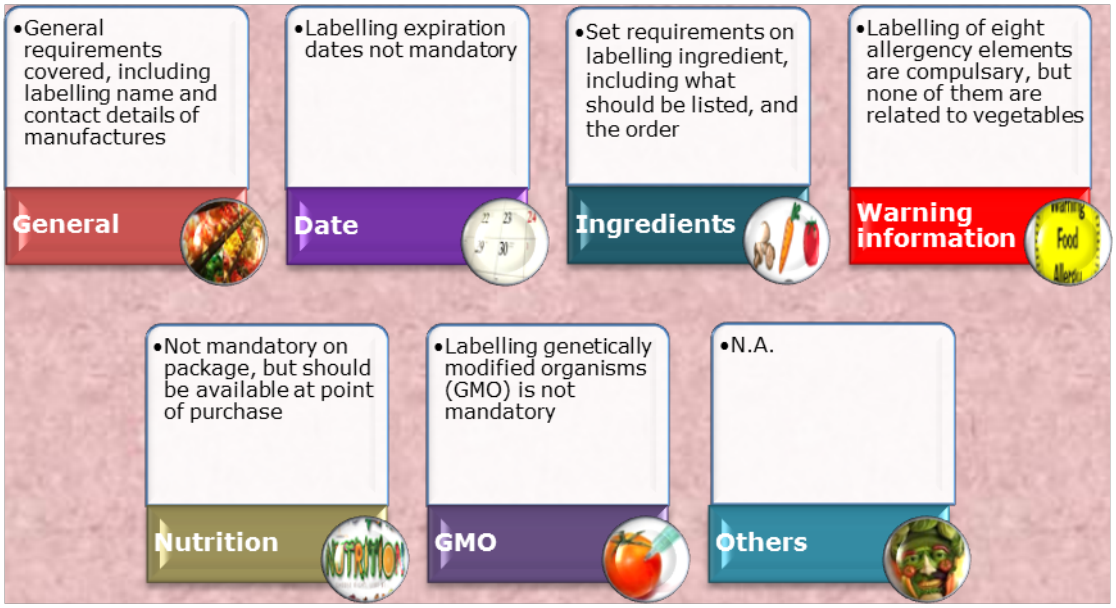
Regulatory support

Regulatory support for food labelling is rated as **LOW**. Regulation in this area is largely limited to the Food Allergen Labelling and Consumer Protection Act of 2004, which states "major food allergens" must be listed on food labelling; major allergens include milk, eggs, fish, tree nuts, peanuts, wheat, and soybeans. In addition, the FDA provides detailed guidelines on what should be printed on labels. However, there are notable omissions. For instance, there is a lack of FDA regulation regarding expiration dates, with the exception of infant formula. Product dating is generally not required by federal regulations. Furthermore, nutritional labelling for vegetables is voluntary while, with a couple of exceptions, producers are not compelled to include additive information for vegetables. Of particular note is that labelling guidelines for Genetically Modified Organisms (GMOs) are not binding, which is not in line with trends in a number of developed and developing countries.

Enforcement effectiveness

Enforcement is rated as **MEDIUM**. In recent years, however, the FDA has been more assertive in its enforcement of food labelling regulations. For instance, in a food labelling enforcement initiative executed in 2010, the FDA issued no less than 17 warning letters on a single day which challenged food labelling claims. Since January 2011, the FDA has issued numerous warning letters to food manufacturers alleging that food and dietary supplement product labelling violated FDCA section 403 requirements, including requirements governing mandatory label statements (e.g., statement of identity, ingredient labelling, and allergen declaration), and those governing the conditions of use for nutrient content claims (e.g., antioxidant claims) and health claims.

Table 2: US's regulations and measures governing food labelling



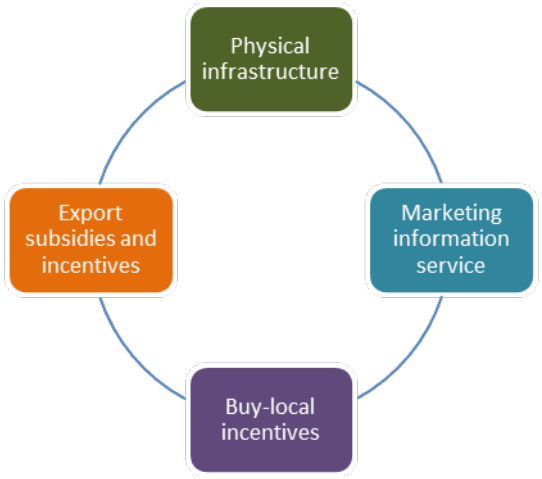
Government support for agricultural marketing

In its assessment of government support for the vegetable sector, Control Risks considered the span of services involved in moving an agricultural product from farm to consumer. Governments can enhance the competitiveness of local producers' agricultural marketing by upgrading infrastructure, providing marketing information, backing buy-local initiatives and supporting exports, as illustrated below.

These types of government support are interrelated, but we have categorised them for analytical clarity. Setting and enforcing high food safety standards also feeds into the strength of agricultural marketing, and has been analysed separately in the previous sections.

This section is designed to compare supportive measures in the following four categories in the US and Australia.

Table 3: Government support for agricultural marketing that has the potential to enhance competitiveness



Physical infrastructure development

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C8	Infrastructure support for farmers aids international competitiveness.	US	High	High	High
		Australia	High	Medium	Medium

Regulatory support

The US' regulatory support for infrastructure in the vegetable sector rates **HIGH**. The USDA, in conjunction with the White House Rural Council, holds primary federal responsibility for overseeing government investment in infrastructure for the agricultural sector. Federal investment in infrastructure in rural areas is for the most

part adequate, a fact underlined by the competitiveness of the country's agricultural sector, and focuses on transportation, telecommunications, energy and water. For example, the Recovery Act authorizes the USDA's Rural Utilities Service (RUS) to spend billions of dollars in loans, grants, and loan-grant combinations to expand access to broadband in rural areas of America. Separately, in 2012, the Department of Commerce's National Telecommunications and Information Administration was given USD 4.7bn (AUD 5.7bn) for its Broadband Technology Opportunities Program to deploy broadband infrastructure in unserved and underserved rural areas.

Though funding shortfalls remain a problem, the Federal government has invested heavily in federal highways in recent years. The Department of Transportation supports the construction and maintenance of highway projects; approximately, 65% of all interstate highway miles and 70% of all Federal-aid highway miles run through rural areas. The RUS continues to provide credit and other assistance to help improve electric, water, and telecommunications services in rural areas. For example, between 2002 and 2009, the RUS invested USD 36bn (AUD 44bn) in electric systems and USD 14bn (AUD 17bn) in water and waste management systems throughout rural America.

Under the Obama administration, there has been a renewed federal focus on improving infrastructure for agricultural producers. In July 2014, the White House Rural Council announced the creation of the new US Rural Infrastructure Opportunity Fund through which private entities can invest in rural infrastructure projects. An initial USD 10bn (AUD 12.2bn) has been committed to the fund with greater investment expected to follow. Target investments include rural water and wastewater systems, energy projects, broadband expansion, local and regional food systems, and other rural infrastructure.

Enforcement effectiveness

We rate enforcement effectiveness as **HIGH**. The overall quality of infrastructure in the US is ranked 16 in The Global Competitiveness Report 2014-15, higher than the Australia. The report suggested US has high quality of roads, railroad infrastructure and electricity supply, and great amount of people using mobile telephones.

Marketing information service

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C9	Information access support is efficient, which makes farmers well-informed of market changes.	US	High	High	High
		Australia	High	High	High

Regulatory support

US government regulation and institutions facilitate access to agricultural information and are rated **HIGH**. In addition to support from business groups, there is an extensive

federal-led system to disseminate information to agricultural producers. The USDA's Economic Research Service (ERS) provides key indicators, forecasting, and other sector data to producers. Along with information on farming practices, structure, and performance, the ERS produces data on commodity markets, food marketing, agricultural trade, food safety, food and nutrition assistance programs and the rural economy. In addition, the Foreign Agricultural Service maintains a global agricultural market intelligence and commodity reporting service to provide US farmers with information on world agricultural trade. The Rural Business-Cooperative Service collects, summarizes, analyzes, and publishes data from annual surveys of US farmer, rancher, and fishery cooperatives. The data is published in RBS Service Reports.

Enforcement effectiveness

The effectiveness of the regulatory system for marketing information can be rated as **HIGH**. US services relating to agricultural information are extensive with no undue political influence. Innovative capacity is strong, particularly among industry bodies. Information access support varies in quality at the state level, with more agriculturally dependent states such as California, Iowa and Kansas maintaining superior levels of support. For instance, the Iowa Department for Agriculture operates an Agricultural Diversification and Market Development Bureau and Agricultural Marketing sector.

Buy-local initiatives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C10	Buy-local initiatives are efficient, which creates opportunities for increasing profits of local growers.	US	High	High	High
		Australia	Medium	Medium	Medium

Regulatory support

We rate US **HIGH** because there is government funding supporting local agricultural products. A key government-sponsored initiative aimed at promoting local is the USDA's Farmers Marketing and Local Food Promotion Program (FMLFPP). A cored component of the FMLFPP is the Farmers' Market Promotion Program (FMPP) which provides grants to local agricultural producers for the purposes of boosting domestic consumption of, and access to, locally and regionally produced agricultural products, and to develop new market opportunities for farm operations serving local markets.

The other component of the FMLFPP is the Local Food Promotion Program (LFPP) which is authorized by the Farmer-to-Consumer Direct Marketing Act of 1946. The LFPP offers grant funds with a 25% match to support the development of local food business enterprises to increase domestic consumption of, and access to, locally and regionally produced agricultural products, and to develop new market opportunities for farm operations serving local markets.

Another core component of the USDA's support for buy local initiatives is the Know Your Farmer Know Your Food (KYF2) initiative. The initiative provides institutional support for the connection between farmers and consumers and strengthens the USDA's support for local and regional food systems. The initiative is carried out by a task force of USDA employees representing every agency within the Department.

There are a number of the other key institutional supports promoting local agriculture in the US at both the state and community level, including Community-supported agriculture (CSA), a partnership between farmers and the local community, in which the responsibilities, risks and rewards of farming are shared. Also in place is the National Farm to School Network (NFSN), an information, advocacy and networking hub for communities working to bring local food sourcing and food and agriculture education into school systems.

Enforcement effectiveness

Although there is no known federally-led 'Buy-American' initiative which focuses on the promotion of production at the national level in the US. The breadth and success of buy-local initiatives across the country ensures that enforcement should be rated as **HIGH**. According to the USDA's statistics, the number of farmers markets has grown by 67% since 2008; there are now more than 7,800 listed in USDA's National Farmers Market Directory. In addition, all 50 states in the US have agricultural branding program.

Export subsidies and incentives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C11	Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.	US	High	High	High
		Australia	High	High	High

Regulatory support

Regulatory support for export subsidies and incentive policies are rated as **HIGH** for the US. The Food, Conservation, and Energy Act authorizes a range of export-related support for US producers through the USDA's Foreign Agricultural Service (FAS), including export market development programs, export credit guarantee programs and direct export subsidies. The Market Access Program (MAP) aids in the creation, expansion, and maintenance of foreign markets for US agricultural products. Separately, the Foreign Market Development Program (FMDP) assists industry organizations in the expansion of export opportunities. Alongside this is the Emerging Markets Program (EMP) which provides funding for technical assistance activities intended to promote exports of US agricultural products to emerging markets. The USDA also oversees export credit guarantee programs to facilitate sales of US agricultural exports.

The USDA's agricultural export programs are funded through the authority of the Federal government's Commodity Credit Corporation (CCC) at levels established in statute. Annual appropriations acts, however, sometimes amend the spending limits on these mandatory programs.

Enforcement effectiveness

Enforcement can be rated as HIGH, a point reinforced by the large growth in agricultural exports in recent years. In fact, US agricultural exports have exceeded agricultural imports in every year since 1970, according to the USDA. US agricultural exports reached USD 139.5bn (AUD 170.4bn) in Fiscal year 2013, an all-time high. A 2010 report sponsored by the USDA's Foreign Agricultural Service concluded that the USDA's market development expenditures have had a positive and significant impact on US agricultural trade. The report concluded that increased spending on market development (MAP and FMDP) over the period 2002-2009 is estimated to have increased the US agricultural export market share from 18.6% to 19.9% and the value of exports from USD 90.5bn (AUD 110.5bn) to USD 96.1bn (AUD 117.4bn). The success of the federal government's export support programs was further reinforced by Congress' decision to reject the US government's attempts to reduce MAP funding by 20% in both FY2010 and FY2011.

Thailand

Executive Summary

This report benchmarks the competitiveness of Australia's vegetable industry with that of Thailand. It assesses the regulatory conditions governing food safety in production, food safety along the supply chain and government support for agricultural marketing in Thailand, and compares these with Australia, based on findings in the milestone 103 report.

Thailand's vegetable industry

- **Thailand's vegetable industry is fragmented, and farmers typically operate small farms.** Most farmers have limited financial resources, no direct access to market and insufficient knowledge of agricultural practices such as the safe use of pesticides.

- **To meet requirements of export destinations and the increasing safety awareness in domestic market, Thailand government is enhancing food safety regulations.** However, Thailand's food safety governance involves several stakeholders with duplicated responsibilities, which weakens enforcement.

Australia's competitive position

- **Australian competitiveness benchmarked against Thailand is strong overall in the areas of food safety and government support to agricultural marketing.** In general, Australian regulation is more advanced and implementation is significantly higher.

Benchmarking food safety in primary production

- **Australia's enforcement of food safety standards in primary production is stronger than in Thailand**. Thailand's food safety is challenged by fast industrial development that causes pollution to its irrigation water and soil in some areas.

- **Thailand has a less advanced regulatory framework governing the use of pesticides than Australia**. Safety of Thai vegetables is challenged by farmers' insufficient knowledge of using pesticides.

Benchmarking food safety along the supply chain

- **Australian regulation and enforcement of food safety along the supply chain are higher, except in the area of packaging**. Thai government considers packaging safety to be an important element of food safety control, and it takes active steps in enhancing packaging safety and innovation. However, Thailand's enforcement on safe transportation, storage, processing and labelling is weaker than Australia.

Benchmarking government support for agricultural marketing

- **Australia is more effective than Thailand at supporting agricultural marketing.** It has better transportation, information delivery system and supports on local products. In comparison, Thailand suffers from lower technology-intensity and fewer resources in delivering information and trainings to growers.

Overview of Thailand's vegetable industry

Thailand is one of the leading fresh fruit and vegetable producers in Asia. Although most of vegetables are for its domestic consumption, the country has been actively exporting to other countries, including advanced economies such as Australia, the US and Canada. However, regulations specifically supporting vegetables being exported are limited. The global traceability program launched by Thailand's Ministry of Agriculture and Cooperatives (MOAC) and IBM in 2010 that has helped to enhance safety performance is limited to chicken and mangoes, and has not been effectively extended to other areas. In other areas of safety governance, Thai regulations supporting domestic and export markets are relatively equal.

As a tropical county, Thailand encounters with many challenges in vegetable growing, particularly the prevention of insects and diseases. This has posed challenges in pest control. In the meantime, farmers in Thailand typically operate small farms (around 4 hectares per family), and most farmers have limited financial resources, no direct access to market and insufficient knowledge of agricultural practices such as safe use of pesticides. This fragmented production does not only hinder farm owners from benefiting from economies of scale, but also present logistical challenges to governmental agencies implementing policies. Such unique condition of Thai farms and the difficulties in government's supervision have resulted in the excessive use of pesticides in several areas. Although Thai government has long considered of upgrading its strategies, the effect is far from being sufficiently effective. The most prominent national 'Q-GAP' (Good Agricultural Practice) certification programme which was launched in 2004 to limit pesticide-residues has not been internationally benchmarked. In addition, agencies responsible for certifying farmers have financial constraints. Growers said it can take more than a year to get the certification, which hinders their motivations in applying.

The following sections further investigated policies supporting food safety and agricultural marketing in Thailand, and their implementations. Please note that we adopt the original translations of regulations' names by Thai government in this report.

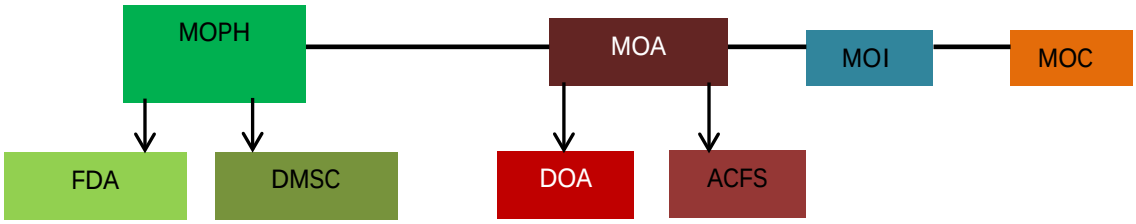
Food safety

In Thailand, safety of agricultural products is governed by several government agencies, with the Minister of Public Health (MOPH) and Ministry of Agriculture and Cooperatives (MOAC) take the primary responsibility. The MOPH is designated by the Food Act B.E.2522 to be in charge of safety of all food products. At the food import and processing level, safety control is managed by the Food and Drug Administration (FDA) and the provincial public health offices of MOPH, with the support of the food analytical

services of the Department of medical Sciences (DMSC) and several accredited laboratories. Safety of agricultural products is governed by the MOAC, with the National Bureau of Agricultural Commodity and Food Standards (ACFS) the key agency under the MOAC. The ACFS manages the coordination among authorities that are responsible for standards of agricultural products, and the implementation of the Agricultural Standards Act B.E. 2551.

The major problem of Thailand's food safety governance is the complexity of its system involving many stakeholders and authorities implementing various laws and regulations without effective cooperation and information exchange. There are competitions for exclusive jurisdiction over safety governance, which weakens enforcement of regulations.

Table 1: Thai government institutions responsible for food safety



- **Ministry of Public Health (MOPH)**: the primary agency responsible for the oversight of public health in Thailand, including protecting consumers in terms of food safety. It takes executive charge of the Food Act B.E.2522.
  - **Food and Drug Administration (FDA)**: under the Food Act B.E.2522, it is responsible for the quality and safety of food. Its primary role includes registering food, drugs, cosmetics and other products; controlling of the production and importation of food; setting up detailed food standards and labelling requirements; approval of packaging materials and conducting sampling of food products. It also enforces Maximum Residue Limits (MRLs) on domestic agricultural products.
  - **Department of Medical Sciences (DMSC)**: it conducts analytical test on food safety, including monitoring on pesticide residues on agricultural products.
- **Ministry of Agriculture and Cooperatives (MOAC)**: the ministry is responsible for the administration of agricultural policies and oversight the safety of primary production.
  - **Department of Agriculture (DOA)**: it establishes national GAP and develops infrastructure to reduce pesticide use at farms.
  - **National Bureau of Agricultural Commodity and Food Standards (ACFS)**: it is responsible for coordination among authorities that are responsible for standards of agricultural products. It establishes standards to ensure the safety of agricultural commodities. It is also responsible for the supervision, enforcement, and monitor food safety program, and for the Agricultural Standards Act B.E. 2551.
- **Ministry of Industry (MOI)**: it manages the Industrial Product Standard Act. B.E. 2511, which is a voluntary standard on product safety.

- **Ministry of Commerce (MOC)**: it manages the Controlling Importation and Exportation Goods Act. B.E. 2522, which is a voluntary standard on import and export goods.

The following sections assess Thailand's food safety governance in production and along the supply chain to offer a qualitative measurement of the competitiveness of Thailand's vegetable industry.

Primary production

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C1	Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.	Thailand	Low	Low	Low
		Australia	Low	High	Medium

Regulatory support

Thailand does not have compulsory regulation governing primary production, rated **LOW.** The Thai Agricultural Standard TAS 9001-2009, which is a pre-farm-gate standard regulates growing site, use of agrochemicals and product storage, operates in a voluntary base. It lacks details on irrigation water safety and animal contaminations. Inspection method of the standard is based on visual inspection as the first step, and is in many circumstances lacking of accuracy.

Nevertheless, Thailand has a well-developed environmental protection framework which benefits primary production. For example, The Pollution Control Department (PCD) is responsible for water safety enforcement of the Enhancement and Conservation of Environmental Quality Act, B.E. 2535, and it conducts safety monitoring regularly. PCD has detailed standards controlling water discharged into irrigation system, which includes the clear-defined permitted levels of PH, cyanide, pesticides and heavy metals**.**

Enforcement effectiveness

The insufficient regulatory supports and the fast industrial development challenge Thailand's primary production, scoring enforcement effectiveness **LOW.** Thailand State of Pollution Report 2013 indicated 23% of surface water in Thailand is badly polluted and only around 20% is in safe condition. Irrigation areas have been contaminated by waste water from factories and untreated sewage from residential areas. Several other reports suggested that land and water resources are under threat from rapid urbanisation and industrialisation in Thailand. The improper use of pesticides is another cause of irrigation water pollution.

Thailand has several market-based instruments for pollution control, which include pollution charges, a deposit refund scheme, and the Thailand Environmental Fund (established in 1992). However, these instruments insufficiently cover small factory owners and farmers, who have financial difficulties in adopting high environmental

standards.

Use of chemicals

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C2	Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Thailand	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

Thailand regulates the use of chemicals in vegetable production but is lacking of specifications, rated **MEDIUM.** The Maximum Residue Limits (TAS 9002-2556) sets around 1000 limits on pesticides residues on food, which is far less than regulations in many developed and developing countries. The Methods of Sampling for the Determination of Pesticide Residues (TAS 9025-2008) covers the method of testing, but it does not state specific equipment and the frequency of such test.

The Hazardous Substance Act controls the production, importation and registration of pesticides, and Thailand adopts FAO guidelines for pesticide registration. Government monitors pesticides through taking samples for analysis at port of entries, production factories and markets. At the farm level, pesticide use is overseen by GAP, which has details on pesticide usage, such as workers' clothing, pesticide spraying method and pesticide storage.

However, the regulatory framework in Thailand is not as advanced as Australia. First, some highly toxic pesticides, such as dicrotophos which has been banned of using on many vegetables in Australia, are still used in Thailand without restrictions. Second, the guidance to support the minor use of chemicals is absent, which increases the risk of improper use of pesticides. Third, the above-mentioned GAP framework is voluntary, which weakens its implementation.

Enforcement effectiveness

Excessive use of pesticides, fertilisers and other chemicals (even banned ones) is a problem in Thailand, scoring the country a **MEDIUM** on enforcement. During the past decade, Thailand has experienced an approximate four-fold rise in pesticide use. Such increase presents a challenge for its government in effectively managing and controlling pesticide use. One of the main challenges is the large number of unlicensed pesticides retailers, which results in the purchase of unregistered pesticides and the sale of prohibited pesticides. In addition, trade names are insufficiently controlled by government, and one pesticide can have multiple trade names, which has caused the abuse of pesticide. Another challenge is the lack of information and knowledge among Thai growers regarding the quality and handling of pesticides. Our contacts suggested that people have some knowledge on using pesticides in general, but the knowledge of the harmful effects of pesticide exposure and safe use methods differ in regions. In

some regions, farmers are found to spray pesticides frequently, and harvest their crops for marketing before the end of the recommended waiting period. In addition, farmers' decisions on using pesticides are largely based on information given by retailers, other farmers and sometimes pesticide companies rather than qualified government auditors, trainers or third party consultants. The Central Laboratory of Thailand does test on pesticide residues, with modern technical devices equipped. However, the laboratory has resources constrains and does not fully cover all the retailers.

Incidents of excessive use of pesticides occur in recent years. In 2014, a report jointly released by Thailand Pesticide Alert Network (Thai-PAN) and Foundation for Consumers suggested among 2557 fruit and vegetables samples being tested, there were a high proportion of residues. The problems were also detected in products with a Q label, with 62.5% of Q-labelled products contained excessive pesticides. Although ACFS authorities argued that farmers might have mixed Q-marked products with unsafe ones to increase their sales, such argument only suggested that there is an enforcement failure in governing safety, including Q-marked products. In February 2015, another report by Thai-PAN suggested that 29.1% of kale out of 117 samples contained excessive pesticides and some contained highly toxic pesticides that are not permitted to use.

Metal contamination

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C3	Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Thailand	High	Medium	Medium
		Australia	High	High	High

Regulatory support

Similar to Australia, Thailand has strict standards on the level of metal residues on vegetables, scoring regulatory support **HIGH.** The Safety Requirement for Agricultural Commodity and Food (TAS 9007-2005) issued by the ACFS sets residue limits of lead and cadmium on certain vegetables. Some of the standard is more specific than that of Australia. However, similar to Australia, the regulation does not set detailed residue limits of some toxic metals, such as mercury on raw vegetables, which could pose safety challenges to consumers. The contamination of arsenic and mercury is addressed separately by the MOPH in its Standards of Contaminated Substances. B.E. 2529 that targets processed foods. The table below compares the two countries' regulations on the Maximum Limits (MLs) of certain metals on vegetables:

Table 2: Comparison of Thailand and Australian regulations on the MLs of certain metals in food

Contaminant	Food	Maximum level (mg/kg)	Food	Maximum level (mg/kg)
	Thailand		Australia	
Lead	Vegetables (except brassicas)	0.1	Vegetables (except brassicas)	0.1
	Brassicas and leafy vegetables	0.3	Brassicas	0.3
Cadmium	Brassica vegetables, Bulb vegetables, and Fruiting vegetables	0.05	Brassica vegetables, Bulb vegetables, and Fruiting vegetables	N.A.
	Leafy vegetables	0.2	Leafy vegetables	0.1
	Other vegetables	0.1	Other vegetables	0.1
	Celery	0.2	N.A.	N.A.
Mercury	Vegetables	2 mg per 1 kilogram of processed vegetables	N.A.	N.A.
Arsenic	Vegetables	0.5 mg per 1 kilogram of processed vegetables	N.A.	N.A.

Enforcement effectiveness

Heavy metal contamination has become a problem since the industrialisation in Thailand, but the level varies among different regions. Pollution incidents occur occasionally, as factories dumped industrial waste-water in agricultural areas in some provinces, such as Prachinburi. But those incidents are released in transparency, scoring enforcement **MEDIUM**.

Groundwater is contaminated by heavy metals, including arsenic, manganese and lead in some regions, according to Thailand State of Pollution Report 2013. Thai government does not conduct timely test and release results on metal contamination levels in food, making safety of Thai food a problem to concern. According to a report released at the annual meeting of the American Chemical Society in 2013, rice from Thailand is found to contain higher than acceptable levels of lead. However, rice from China is found to be more problematic, with the highest levels of lead residues among rice from all countries being tested.

Packaging

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C4	Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.	Thailand	High	High	High
		Australia	Low	Medium	Low

Regulatory support

Thailand has clear and detailed regulations on food packaging and rates **HIGH**. Packaging safety is governed by the Food Act B.E. 2522, which requires food manufacturers to comply with standards on food containers. MOPH is designed to be in charge of the execution of the Act and to approve packaging materials. More detailed standards on containers are released as notifications by the MOPH, which include the B.E. 2548 (2005) Qualities or Standard for Container Made from Plastic and the B.E.2549 (2006) Food Packed in Hermetically Sealed Container. These standards set detailed and quantitative requirements on metal residue limits in food packed in both metal and non-metal containers and accepted level of microorganisms.

Standards are further developed to apply to some popular vegetables. For example, Thai Agricultural Standard TAS 1500-2004 sets standards on packed asparagus, an important product for export.

Enforcement effectiveness

Thai government considers packaging safety to be an important element of food safety control, and it takes active steps in enhancing safety awareness and innovation, rated **HIGH**.

National Economic and Social Development Plan in 1984 required an establishment of Thai Packaging Centre (TPC), which aimed to upgrade packaging practice and increase export. It operates under department of Thailand Institute of Scientific and Technological Research (TISTR). TPC conducts testing of packaging materials, and manages to provide packaging information to private sectors. It also actively organises seminars and trainings for companies in packing industry.

The packaging sector in Thailand is dominated by large companies, which in general have good awareness of safety practice. Incident regarding to packaging materials is not common in Thailand. In addition, the Thai government has been promoting sustainable packaging materials to protect environment, which including investment in innovation on packaging materials.

Storage and transportation

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C5	Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.	Thailand	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

The Food Act B.E. 252, and 'No.193 / 2543(2000) Production Processes, Production Equipment, and Foods Storages' specify oversight process in food storage and transport. However, both documents are lacking of quantitative details, including temperature control and vehicle standards. Good Manufacture Practice (GMP) is adopted in Thailand, but vegetables packed in plastic bags are not subject to compulsory GMP, scoring regulatory support **MEDIUM**.

Enforcement effectiveness

Thailand's enforcement of storage and transportation standards is rated **MEDIUM**. The broad risk management programme applies to food businesses poses safety challenges. There were incidents on bacterial contamination of vegetables during transportation, as voluntary traceability system failed to effectively control safety. However, unlike China, which is rated LOW in this parameter, Thailand does not report any systematic failure that causes highly toxic materials being used for food storage.

Food processing

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C6	Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.	Thailand	High	Medium	Medium
		Australia	High	High	High

Regulatory support

Safety in Thailand's food processing is strictly regulated, resulting in a **HIGH** rating. In general, food processing and additives are governed by the Food Act of B.E. 2522. In addition, there are couple of notifications regulating food processing. The Notification No. 360, B.E. 2556 (2013) sets detailed requirements on the limits of additives. The Notification No.193 / 2543(2000) Production Processes, Production Equipment, and Foods Storages sets stringent rules on processing site, water quality and hygiene

requirements for employees.

Enforcement effectiveness

Implementation is rated **MEDIUM**, as non-compulsory GMP system and fragmentation of industry weakens safety standard's implementation. Thailand has over 8,500 food processing companies, mainly in small and medium-size. Thai firms rather than multinationals are more concentrated in vegetable processing sector, according to the National Food Institute. Safety conditions vary among manufacturers, because Thai government hasn't pushed all the vegetable processing businesses to mandatorily adopt the GMP. The voluntary safety control is likely to continue in the short term, as cost of small processing firms to adopt safety standard is high.

Processed foods of Thailand generally have acceptable safety records. But in recent years, there are incidents surrounding packed foods from Thailand. In earlier 2015, a tuna cannery in Thailand is being investigated by Australian Government authorities after seven people in Sydney who ate canned tuna manufactured by the cannery reported sick.

Food labelling

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C7	Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.	Thailand	Medium	Medium	Medium
		Australia	High	High	High

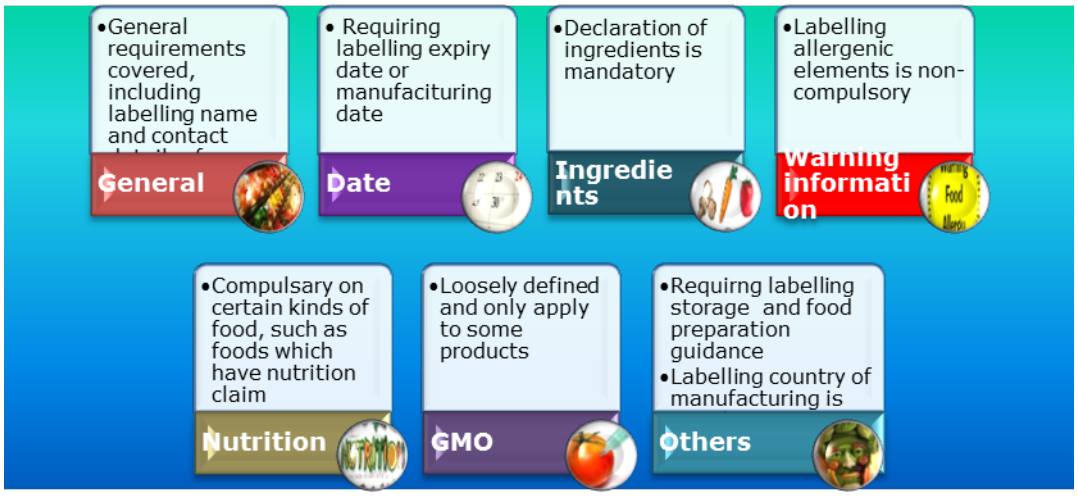
Regulatory support

Thailand has basic labelling requirements but some elements that adopted by Australia and many other countries are missing in Thailand, scoring its regulatory supports **MEDIUM**.

The No. 194 /2543 (2000) Labels is the primary labelling law, which lacks details on labelling nutrition, allergenic elements and best-before-date. Regulation on labelling genetically modified organisms (GMOs) is loosely defined, as it only requires the top three ingredients of a product with more than 5 percent of its weight ratio deriving from genetic modification being labelled.

Thailand has proposed a change of its labelling law to the WTO in 2013. The new law will require labelling of the best-before-date and 8 allergenic substances. However, the date of the law's publishing has not been confirmed.

Table 3: Thailand's regulations and measures governing food labelling



Enforcement effectiveness

Thailand's enforcement on labelling scores **MEDIUM**. In general, Thai food is packed and labelled in a good condition, especially in the export sector. However, some information considered to be essential by Australian, such as allergen, is frequently missing in packed food in Thailand. The issuing of new labelling law in Thailand is likely to change the situation.

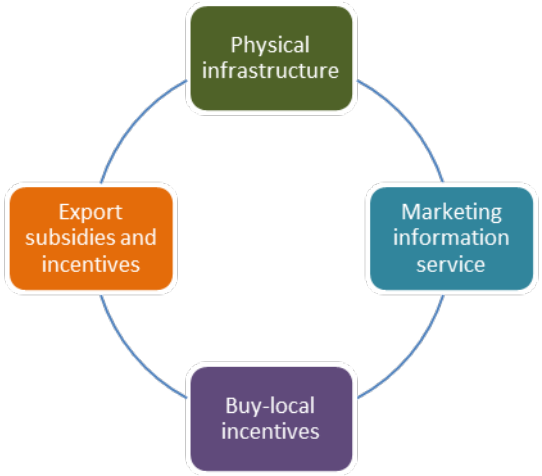
Government support for agricultural marketing

In its assessment of government support for the vegetable sector, Control Risks considered the span of services involved in moving an agricultural product from farm to consumer. Governments can enhance the competitiveness of local producers' agricultural marketing by upgrading infrastructure, providing marketing information, backing buy-local initiatives and supporting exports, as illustrated in Table 4.

These types of government support are interrelated, but we have categorised them for analytical clarity. Setting and enforcing high food safety standards also feeds into the strength of agricultural marketing, and has been analysed separately in the previous sections.

This section is designed to compare supportive measures in the following four categories in Thailand and Australia.

Table 4: Government support for agricultural marketing that has the potential to enhance competitiveness



Physical infrastructure development

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C8	Infrastructure support for farmers aids international competitiveness.	Thailand	Medium	Low	Low
		Australia	High	Medium	Medium

Regulatory support

Thailand government has a moderate spending on infrastructural development, rated **MEDIUM**. As Southeast Asia's second largest economy, Thailand is not equipped with equally advanced transportation system. In recent year, Thai government is upgrading its infrastructure because trade within the country and with its neighbouring ASEAN members becomes increasingly important to Thai economy. The 11th National Economic and Social Development Plan (2012-16) proposes an aggressive infrastructure construction which includes a budget of 123 billion baht (AUD 4.7 billion) on infrastructure development for the year 2015, construction of 11 new railways and enhanced roads linking neighbouring countries in the following years.

In the meantime, Thailand is likely to benefit from infrastructure development in the broader region, especially the part of the Kunming-Hai Phong Transport Corridor that belongs to the Greater Mekong Subregion (GMS) cooperation program connecting Vietnam, Laos, Cambodia, Thailand, Myanmar and China.

Enforcement effectiveness

We rate enforcement effectiveness as **LOW**. The overall quality of infrastructure in Thailand is ranked 76 in The Global Competitiveness Report 2014-15, much lower than Australia. The report indicates that the quality of road and railroad infrastructure in

Thailand needs significant improvement. However, Thailand has a higher amount of mobile telephone subscriptions than Australia (ranked 34th globally in comparison to Australia's ranking which is 81th).

Corruption is the big problem in Thailand, which lowers the efficiency of its infrastructural development. The country ranked 85 in Transparency International's Corruption Perceptions Index 2014. The deep-rooted political conflict in Thailand is another challenge of its development.

Marketing information service

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C9	Information access support is efficient, which makes farmers well-informed of market changes.	Thailand	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

The Thai government offers moderate regulatory support for access to agricultural information, rated **MEDIUM**. The Department of Internal Trade (DIT) manages offering price information on vegetable products. The price information is collected nationwide and is updated daily. However, information on risk management is not offered frequently, especially on the proper use of pesticides. Information delivered by government and industry associations are lacking of advanced technology support, which limits their access to nationwide growers.

Enforcement effectiveness

Information delivery is rated **MEDIUM**. The DIT offers updated price information, and growers living in large cities are particularly informed of market changes. However, technology barriers limit the access to information of growers living in remote areas. Community-based information services in remote villages are not well-developed. Information provided on how to use pesticides safely is particularly insufficient to cover small farmers.

Buy-local initiatives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C10	Buy-local initiatives are efficient, which creates opportunities for increasing profits of local growers.	Thailand	Medium	Low	Low
		Australia	Medium	Medium	Medium

Regulatory support

Thailand does not have systematic supports on the buy-local campaigns, rated **MEDIUM**. There was a 'One Tambon One Product (OTOP)' programme launched in 2001 by Thailand's former Prime Minister Thaksin Shinawatra to support locally made products. However, the project has seen its budget dropped significantly after 2004 and a further decline caused by the political instability in Thailand. At the end of last year, the Ministry of Interior (MOI) initiated another project namely 'Community Market Project: Thai Helping Thai, Thais Can Smile', which aims to link Thai farmers directly to consumers. The continuity of the new project has not been well-tested.

Enforcement effectiveness

Thailand's enforcement of buy-local initiatives is **LOW**, due to poor buy-local incentives and educations to Thai consumers. Thai people used to shop fresh vegetables in fresh food markets, but there is a growing trend for people shopping at supermarkets. It is reported that middle-class Thai consumers have a growing belief that imported products have better quality than local produce. Both Big C and Tesco Lotus have responded by introducing a new concept store namely 'Extra', which offers a great range of imported products targeting middle and high income customers. Supports on purchasing local food are still in an infant stage, and they have not sufficiently balanced the trend of consuming international products.

Export subsidies and incentives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C11	Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.	Thailand	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

Thailand government provides moderate regulatory supports to business exporting agricultural products, rated **MEDIUM.** The Export-Import Bank of Thailand (EXIM Thailand), a state-owned financial institution under the Ministry of Finance, provides financial supports to Thai exporters. However, insurance products provided by EXIM are not as extensive as Australia.

Thailand shares the objective of removing all the export subsidies on agricultural products with other member countries of the WTO and the Cairns Group. The market-oriented agricultural trading system will further impact Thailand's regulatory support on export, but further assessment of the trading system is beyond the scope of this report.

Enforcement effectiveness

Export of Thailand benefits from a couple of Thailand Free Trade Agreements (FTAs) with ASEAN countries and China. The FTAs have contributed to the increase of Thai

export, scoring enforcement **MEDIUM**. However, vegetable sector accounts for a small percentage in the overall Thai food export. The lacking of cold chain, excessive use of pesticides and the low R&D intensity continue to challenge Thailand's vegetable exports.

CANADA

Executive Summary

This report benchmarks the competitiveness of Australia's vegetable industry with that of Canada. It assesses the regulatory conditions governing food safety in production, food safety along the supply chain and government support for agricultural marketing in Canada. The assessment takes into consideration of Canada's overall condition and its impact on regulatory development and enforcement, as well as the impact on future policy changes in the vegetable industry. This section summarises our findings:

Canada's vegetable industry

- **Canada is generally recognized as possessing one of the most transparent and effective food safety systems of the industrialized world.** As a result, following a string of high-profile food safety violations in recent years the Canadian government is implementing an aggressive modernization program aimed at improving the global competitiveness of the country's food safety system. At the heart of the modernization program is the Safe Food for Canadians Act which aims to consolidate and simplify existing legislation under one law while also making improvements in the areas of traceability and recalls.

Australia's competitive position

- **Australian competitiveness benchmarked against Canada is weaker in the areas of primary production, packaging and infrastructure.** But such weakness is subtle and is subject to conditions. For example, Australia has higher rate of mobile phone subscribers which shall keep on benefiting its agri-information delivery.

Benchmarking food safety in primary production

- **The Canadian regulatory environment for food safety in primary production can be considered competitive in terms of support and enforcement effectiveness.** Health Canada establishes clear and transparent food safety standards for primary producers, as outlined in numerous regulatory and guideline documents. At the same time, the Canadian health authorities have an extensive history of pursuing producers who violate regulatory requirements during the primary production phase.

- **Canadian regulation and enforcement effectiveness of the use of Chemicals in vegetables is strong.** There are clear Maximum Residue Limits (MRLs) set for each chemical against a wide range of specific foods, including vegetables. The MRLs set by Health Canada are generally assessed as robust

and are in line with those of other major OECD countries. The Canadian Food Inspection Agency (CFIA) reports that over the last 10 years, residue data shows that the compliance rates are consistently very high for fresh fruits and vegetables.

- **Canadian regulation of heavy metals in vegetables is insufficient.** There appears to be some inconsistency in terms of how heavy metal contaminants are regulated by Health Canada. The agency sets MRLs for some heavy metals such as mercury while for others it establishes specific risk management strategies and directorates for managing dietary exposure.

Benchmarking food safety along the supply chain

- **Regulatory support and enforcement effectiveness for the regulatory environment in packaging is robust.** The Health Products and Food Branch of Health Canada is responsible for implementing regulations related to food and drugs, which include detailed requirements for packaging. While there is no published list of specific packaging materials for reference during the production process, the Food Directorate provides ample guidance to food producers and manufacturers on how to submit packaging material for in-house toxicological evaluation—in exchange for a letter of no objection.

- **Similarly, storage and transportation regulatory support and enforcement effectiveness are both strong in Canada.** The 'Fresh Fruit and Vegetable Regulations (C.R.C., c. 285)' of the Canada Agricultural Products Act clearly delineates permitted and unpermitted practices related to production, packaging and storage (among other things) of fresh vegetables. Canada is proactively encouraging food producers to follow best-practice standards and comply with relevant food-related legislation, and has a history of strict enforcement measures against those to fail to comply.

- **Food processing is also rated highly competitive for regulatory support and enforcement effectiveness.** Health Canada has published 15 relatively exhaustive lists detailing which additives are allowed in foods marketed and sold in Canada ('Lists of Permitted Food Additives'). All sellers, producers and manufacturers directly or indirectly involved in food processing are legally compelled to comply with legislation, down to the level of food additives and toxicity levels—which are spelled out in great detail in numerous regulatory and guideline documents issued by Canadian health authorities.

Benchmarking government support for agricultural marketing

- **Canada is relatively competitive in terms of its support for agricultural marketing.** Regulatory support and enforcement effectiveness are robust with regards to support for physical infrastructure in rural areas, marketing information services and export subsidies. Buy-local initiatives are rated as medium and vary in strength from province to province.

Overview of the Canadian vegetable industry

Canada has a large, rapidly expanding vegetable industry. According to a 2014 report published by the agency Agriculture and Agri-Food Canada, total Canadian vegetable exports in 2013 amounted to CAD 1.3 billion (AUD 1.36 billion), an increase of 24% from 2012. Canada's top export commodities (tomatoes, peppers, cucumbers, gherkins and mushrooms) each experienced a five-year high in export value.

Canada is generally recognized as possessing one of the most transparent and effective food safety systems of the industrialized world. The country's effective food safety governance structure is underscored by consistently low levels of food-borne illness and recalls in several years.

Despite possessing a highly competitive food safety system, Canada has suffered several of high-profile food recalls over contamination concerns in recent years. For example, one person died and more than twenty people fell ill across several provinces following an outbreak of E. coli in British Columbia. The incident, which occurred in September 2013, led to a product recall issued by the Canadian Food Inspection Agency (CFIA) for a brand of cheese. In a separate incident in 2012, an E. coli outbreak at a southern Alberta beef plant, which is operated by XL Foods, caused 18 people to fall ill and led to the biggest beef recall in Canadian history. A November 2013 report by the Auditor General was critical of some areas of the CFIA, including its follow-up practices. The report also criticised the lack of national supply-chain traceability, which is now being addressed through strict regulation. Canada suffered its worst food safety scandal in 2008 when a listeriosis outbreak at a meat production facility contaminated 57 people, killing 22.

The abovementioned food safety violations are not characteristic of the Canadian food industry. For this reason, such high-profile regulatory failures (particularly the 2008 listeriosis incident) have prompted the Canadian government to implement an aggressive modernization program to improve the global competitiveness of the country's food safety system. The new program, the 'Safe Food for Canadians Action Plan', will work to ensure stronger food safety rules, more effective inspection and the dissemination of better information to protect consumers.

As part of the plan, government agencies tasked with overseeing food safety have been given significant funding support. The 2014 federal budget provides CAD 153.6 million (AUD 161.4 million) over the next five years to enhance food safety programs. This involves hiring over 200 new inspectors. It should be noted that the CFIA already has far more inspectors than any other investigation body in Canada, with approximately 3,500 across the country—more than in most OECD countries. In addition, the budget provides CAD 30.7 million (AUD 32.3 million) over the next five years to establish the Food Safety Information Network, whose aim is to link federal and provincial food safety authorities and private food testing laboratories across Canada.

The key component of the Safe Food for Canadians Action Plan is the Safe Food for Canadians Act, which aims to update, consolidate and modernize existing food safety legislation. The act is the result of recommendations by an independent investigator's report in the wake of the 2008 listeriosis outbreak. One of the investigation's principal

recommendations was to update and modernize the various pieces of legislation governing food safety in Canada (the Food and Drugs Act, the Fish Inspection Act, the Meat Inspection Act, the Canada Agricultural Products Act, and the Consumer Packaging and Labelling Act.). The Act consolidates the four statutes under one law with the aim of strengthening oversight of food commodities being traded inter-provincially or internationally. The Safe Food for Canadians Act was passed in November 2012 and came into force in January 2015.

Food safety

The Food and Drugs Act 1985 represents the primary overarching legislation governing food safety in Canada. The federal Act governs the control of the full spectrum of food safety, including labelling, advertising, additives, chemical and microbial safety, pesticides and packaging. There are four federal-level institutions with primary responsibility for food safety regulation in Canada:

- **Health Canada (HC)**: The institution develops policies, regulations and standards related to the health and safety aspects of foods governed under the Food and Drugs Act and associated regulations. HC sets standards and policies governing the safety of all food sold in Canada. Furthermore, the ministry develops guidance documents to assist industry in compliance. The HC also performs a checks-and-balances role, assessing the effectiveness of the CFIA's food safety activities.
- **The Canadian Food Inspection Agency (CFIA)**: The CFIA enforces the Food and Drugs Act and associated standards established by HC as well as all federally mandated food inspection, compliance and quarantine services. It also develops and manages inspection related programs and publishes the Guide to Food Labelling and Advertising, a tool to help industry, consumers and inspectors interpret food policies and regulations.
- **Agriculture and Agri-Food Canada (AAFC)**: The AAFC provides information and guidance to industry groups on food policy and regulatory issues. Many CFIA programs are based on policies developed with AAFC. AAFC works with the agriculture industry to develop capacity, tools and practices through various incentives and programs towards furthering food safety objectives.
- **The Public Health Agency of Canada (PHAC)**: The PHAC is responsible for surveillance of food-borne, water-borne and enteric human illnesses and provides comprehensive expertise and support for epidemiological and microbiological investigations carried out by the CFIA.

Table 1: Canadian government institutions responsible for food safety

The Canadian food safety system is multi-jurisdictional, involving federal, provincial/territorial and municipal authorities. Provinces and territories enact legislation governing foods produced and sold within their own jurisdictions. These laws are complementary to federal statutes. Provincial, territorial and local-level government institutions regulate food processing within their jurisdiction, implement food safety programs, lead outbreak investigations within their jurisdiction and communicate food safety messages to members of the public.

The Safe Food for Canadians Act

Although the Canadian food safety system is generally applauded for its relative institutional clarity, the development of the Safe Food for Canadians Act, as part of the broader Safe Food for Canadians Action Plan underlines the need for improvements in the legislative framework governing the food safety system. In addition to modernizing and simplifying it, the Act consolidates the current suite of different food safety statutes in the country, including the Fish Inspection Act, the Meat Inspection Act, the Canada Agricultural Products Act, and the Consumer Packaging and Labelling Act into one law. The Food and Drugs Act remains separate, providing overarching protection for consumers from any foods that are unsuitable for consumption.

The Safe Food for Canadians Act focuses on three key areas, specifically; improved food safety oversight to better protect consumers, streamlined and strengthened legislative authorities, and enhanced international market opportunities for Canadian industry. Provisions include new prohibitions against food commodity tampering, strengthened food traceability, improved import controls as well as aligned inspection and enforcement powers. Finally, the Act provides the authority to certify all food commodities for export, allowing the CFIA to treat exported food commodities consistently. The most notable part of the act is that all food manufacturers are required to implement traceability systems that produce documentation of the passage of a food product through their systems in a standard format that could speed up a recall. They also have to develop and maintain a prevention plan to ensure food safety.

Although the Act has been roundly backed by consumers and producers alike a number of concerns have been raised. Most noticeably, it only applies to federally inspected plants as opposed to both federal and provincial plants, just half of Canada's overall food market.

The following sections assess Canadian food safety governance in production and along

the supply chain to offer a qualitative measure of the competitiveness of the country's vegetable industry:

Primary production

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C1	Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.	Canada	Medium	High	Medium
		Australia	Low	High	Medium

Regulatory support

The Canadian regulatory environment for food safety in primary production is rated **MEDIUM**. Health Canada establishes clear and transparent food safety standards for primary producers, as outlined in numerous regulatory and guideline documents. For instance, in the 'Code of Practice for Minimally Processed Ready-to-Eat Fruit and Vegetables,' clear guidelines are established regarding primary production regulation to help producers operate in line with government legislation on food production. To illustrate, food production should take place away from: 'environmentally polluted areas and industrial activities which could pose a risk of contaminating produce; areas subject to flooding unless sufficient safeguards are implemented; areas prone to infestation of pests or where wastes cannot be removed effectively,' among others. Similar to the US, Canada has guidance covering agricultural water, animal contamination and worker hygiene. However, such guidance does not have many specific measures that could be implemented at the farm level.

Enforcement effectiveness

Canada's enforcement of regulations for primary production is rated **HIGH**. The Canadian health authorities have an extensive history of pursuing producers who violate regulatory requirements during the primary production phase. The bulk of enforcement falls under the purview of the Food Directorate, a division of Health Canada. The agency frequently sanctions food producers during the primary production stage for violation involving: chemical/biological contaminants (including E. coli), irradiation, genetically modified food nutrition, and transmissible spongiform encephalopathy, among others. Hygiene standards must be strictly adhered to during primary production, down to the ceilings, walls and fitting of the facilities where food is produced. Food contact with surfaces, lighting, sewage disposal and air quality/ventilation are all subject to strict regulation by the CFIA.

Use of chemicals

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C2	Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Canada	High	High	High
		Australia	High	High	High

Regulatory support

Canada has stringent regulations on the use of chemicals in food, and is rated **HIGH**. Health Canada regulates the use of pesticides under the Pest Control Products Act (PCPA) and its associated regulations. The Act dictates that Health Canada has primary responsibility for the approval of new pesticides. Minor uses of chemicals are regulated under the PCPA with clear guidance namely 'User Requested Minor Use Registration'. Minor use is supported by provincial government with details, including contacts of coordinators.

There are clear and stringent Maximum Residue Limits (MRLs) set for each chemical against a wide range of specific foods, including vegetables. This information is clearly available to members of the public in a transparent manner. The MRLs set by Health Canada are generally assessed as robust and are in line with those of other major OECD countries. Under the guidance of international organizations like the OECD and the United Nations, Health Canada participates with other countries in developing the standards and processes used worldwide for determining acceptable pesticide residue levels.

Enforcement effectiveness

Enforcement effectiveness is assessed as **HIGH**. The CFIA has primary responsibility for the monitoring and enforcement of MRLs in both domestic and imported foods. Federally registered agricultural commodities are monitored by the CFIA under the National Chemistry Residue Monitoring Program (NCRMP). The CFIA reports that over the last 10 years, residue data shows that the compliance rates are consistently very high for fresh fruits and vegetables. If tested food products exceed residue limits, enforcement action is clear with recalls, seizures, import rejections and the prosecution of offenders all available to the federal government.

The Food Safety Action Plan (FSAP) aims to modernize and enhance Canada's food safety system. As a part of the FSAP enhanced surveillance initiative, targeted surveys are used to test various foods for specific hazards. The CFIA carried out a 2014 survey into a number of fruit and vegetable samples; less than 1% (11 samples) of the total 3078 samples collected contained pesticide residues in violation of established Maximum Residue Limits. All violations were assessed and appropriate follow-up actions reflecting the magnitude of the health risk were taken. The overall compliance rate of this targeted survey was 99.6%.

Metal contamination

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C3	Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Canada	Medium	High	Medium
		Australia	High	High	High

Regulatory support

Regulatory support for heavy metal contamination in Canada can be rated **Medium**. Health Canada holds primary responsibility for assessing the risks posed to Canadians by heavy metal contaminants in food. There appears to be some inconsistency in terms of how heavy metal contaminants are regulated by Health Canada. The agency sets MRLs for mercury only while for others it establishes specific risk management strategies and directorates for managing dietary exposure. Both systems are covered under the Food and Drugs Act.

Enforcement effectiveness

Enforcement can be rated **HIGH**. Heavy metal pollution to agricultural land in Canada is not a national problem to concern. The CFIA tests a variety of foods available in Canada for heavy metal contamination and contaminants. When test levels are above the established limits for the food being analysed, results are referred to Health Canada for a risk assessment. Based on the risk assessment outcome, the CFIA makes a final decision on whether further action, such as product seizure or recalls are necessary. Control Risks understands that violations are rare.

Packaging

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C4	Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.	Canada	High	High	High
		Australia	Low	Medium	Low

Regulatory support

Regulatory support for food packaging in Canada is rated as **HIGH**. Health Canada and the CFIA are the agencies tasked with overseeing regulations related to food packaging, as legislated by the Food and Drugs Act (and expanded by the Safe Food for Canadians Act). Specifically, the Health Products and Food Branch of Health Canada is responsible

for implementing regulations related to food and drugs, which include detailed requirements for packaging. To illustrate, packaging must not be made of poisonous or harmful substances, render food unfit for human consumption, contain putrid, rotten, diseased animal/vegetable substances, be 'adulterated' (clear definitions of such terminology are provided in various government documents) or be manufactured or stored in unsanitary circumstances.

The CFIA does not publish a list of prohibited packaging materials but does establish unacceptable levels of toxicity in packaging materials. If food producers and manufacturers lack the resources to perform inspections and toxicological analyses on their produces, the Food Directorate (a division of the Health Products & Food Branch of Health Canada) offers guidance to how to submit packaging to its laboratories for a premarket safety assessment and provide a 'letter of no objection' for products that pass inspection. Food producers and sellers are encouraged to advertise letters of no objection to consumers as to generate confidence that their products are suitable for consumption. Moreover, based on a database of letters of no objection, Canadian health authorities provide detailed guidance on the use of polymers in the production and selection of packaging materials, as well as tips on drafting an effective recall plan to trace materials back to manufacturers in the event of a regulatory violation.

Enforcement effectiveness

Enforcement effectiveness in Canada is rated as **HIGH**. While there is no published list of specific packaging materials for reference during the production process, the Food Directorate provides ample guidance to food producers and manufacturers on how to submit packaging material for in-house toxicological evaluation—in exchange for a letter of no objection (as mentioned above).

While it is not compulsory to obtain such a letter, a database of previous drafted letter has helped actors throughout the food industry avoid the use of toxic or other unsafe packaging materials, thus avoiding punitive measures. To illustrate, a database of polymers deemed hazardous to public health has been compiled based on previously drafted letters of no objection. Producers frequently try to obtain such letters not only to instil confidence among consumers in their products' suitability for consumption, but also to avoid hefty fines and sanctions that could result from regulatory violations. Finally, the Canadian health authorities provide guidance on implementing a recall program to identify and weed out suppliers who commit regulatory violations, a testament to the severity with which Canada treats the integrity of its food industry.

Storage and transportation

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C5	Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.	Canada	High	High	High
		Australia	High	High	High

Regulatory support

Control Risks rates the regulatory climate for storage and transportation in Canada as **HIGH**. There are a number of regulations to address health and sanitation issues surrounding food transportation and storage. The Canadian Food Inspection System's Implementation Group, for instance, issued a regulatory document titled "Food Retail and Food Services Code" (amended in 2004) to detail food-related requirements at a very granular level. The code outlines facility design (premises, ventilation, storage areas, plumbing, water and steam supply, sewage disposal, etc.), food hazard control (supervision, package identification, temperature control, reheating, parasite destruction, packaging supply storage, transportation, etc.), maintenance and sanitation (cleaning, pests, use of chemicals and toxic substances), hygiene and communicable disease (hair, personal habits, injuries, etc.) and education/training of personnel with food-related responsibilities. It classifies packaged vegetables to be the medium risk foods, and requires special attention. There are details on storage and transportation on raw vegetables as well. For example, it requires raw vegetables to be refrigerated but should not be stored below raw meat and fish products. Furthermore, the 'Fresh Fruit and Vegetable Regulations (C.R.C., c. 285)' of the Canada Agricultural Products Act clearly delineates permitted and unpermitted practices related to production, packaging and storage (among other things) of fresh vegetables. Finally, the CFIA issued a document titled 'Code of Practice for Minimally Processed Ready-to-Eat Fruit and Vegetables' that sets out regulations for transportation and storage of vegetables 'to minimize the growth of pathogenic microorganisms.' Relevant areas outlined in the document include temperature control, conveyances and containers, packaging materials, and non-food chemicals used during transportation and storage (including safety requirements to avoid contamination).

Enforcement effectiveness

Enforcement effectiveness for storage and transportation in Canada is rated **HIGH**. There are a number of local, provincial and national regulatory guideline documents meant to help ensure compliance with transportation- and storage-related processes for food safety. These guidelines are typically highly specific, with little to no ambiguity around what constitutes compliance with food regulations. Topics examined in these documents include temperature control, sanitation and food-surface contact (among others mentioned directly above). But, more significantly, they frequently allude to stipulations in the Food and Drugs Act, and subsequently the Safe Food for Canadians

Act, regarding the punitive measures that can be taken by the Canadian authorities to address regulatory infractions. In sum Canada is proactively encouraging food producers to follow best-practice standards and comply with relevant food-related legislation, and it has a history of strict enforcement measures against those to fail to comply.

Food processing

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C6	Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.	Canada	High	High	High
		Australia	High	High	High

Regulatory support

We rate regulatory support for food processing in the vegetable industry in Canada as **HIGH**. The Canadian health ministry, Health Canada, has published 15 pages lists detailing which additives are allowed in foods marketed and sold in Canada ('Lists of Permitted Food Additives'). The lists comprise additives such as colouring agents, firming agents, enzymes, polishing agents, preservatives, sequestering agents, water-correcting/anti-acid agents, and others. In addition to listing the additive name and purpose, each list details specific foods in which additives may be used as well as maximum acceptable levels of food additives. Health Canada hosts an 'e-Notice' mailing list for food producers to stay abreast of changes in the regulatory framework governing food additives. Canadian authorities are also specific about the agents that do not constitute food additives (salt, sugar, starch, vitamins, minerals, amino acids spices, seasonings, flavouring, agricultural chemicals, veterinary drugs and food packaging materials).

The regulation of food additives is further bolstered by a broad landscape of regulatory initiatives including the Food and Drugs Act, the Consumer Packaging and Labelling Act, and the Canada Agricultural Products Act, among others, meant to inform and protect consumers from misleading or dangerous food production processes. The government of Canada has a history of swift reaction to food-related health threats, as evidenced by a 2009 report prepared by a host of independent actors to analyse the safest food production practices, in response to a 2008 listeriosis outbreak that led to the deaths of twenty two Canadian citizens.

The CFIA has sketched out the clear distinction between legislation, regulation and guidelines, specifying the compliance burden of each classification, and reiterates the consequences for non-adherence to food processing standards. These include seizures warning letters, the seizure of equipment, fines and judicial action. All sellers, producers and manufacturers directly or indirectly involved in food processing are compelled to comply with legislation, down to the level of food additives and toxicity levels—which are spelled out in great detail in numerous regulatory and guideline documents issued

by Canadian health authorities.

Enforcement effectiveness

Enforcement for food processing in Canada is rated **HIGH**. Health Canada has a number of enforcement mechanisms at its disposal (as outlined in various legislative acts) and the willingness to quickly and effectively respond to food-related crises affecting public health. The abovementioned 2008 outbreak of listeriosis is but one example of the Canadian authorities' resolution in enforcing regulations and ensuring that threats to public health are effectively addressed.

Canadian health authorities are proactive in supporting food safety regulation and educating producers and consumers on safe and legal production processes, particularly as regards food additives, water usage and appropriate storage temperatures. The Canadian Food Inspection Agency in particular has issued guidelines addressing compliance with legislation governing aspects food production including: training for personnel in hygiene to prevent contamination, water quality, temperature control, equipment cleaning and maintenance, and others.

Food labelling

ID	Competitiveness parameters	Country	Regulatory environment	Enforcement effectiveness	Overall rating
US 7	Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.	Canada	High	High	High
		Australia	High	High	High

Regulatory support

Regulatory support for food labelling is rated as **HIGH** in Canada. The Canadian Food Inspection Agency, which has joint responsibility for regulating food labelling alongside Health Canada, maintains the Industry Labelling Tool, a clear and easy-to-use online platform that lists detailed guidance on all food products that require a label as well as general principles for labelling and advertising, and a self-assessment labelling requirements checklist.

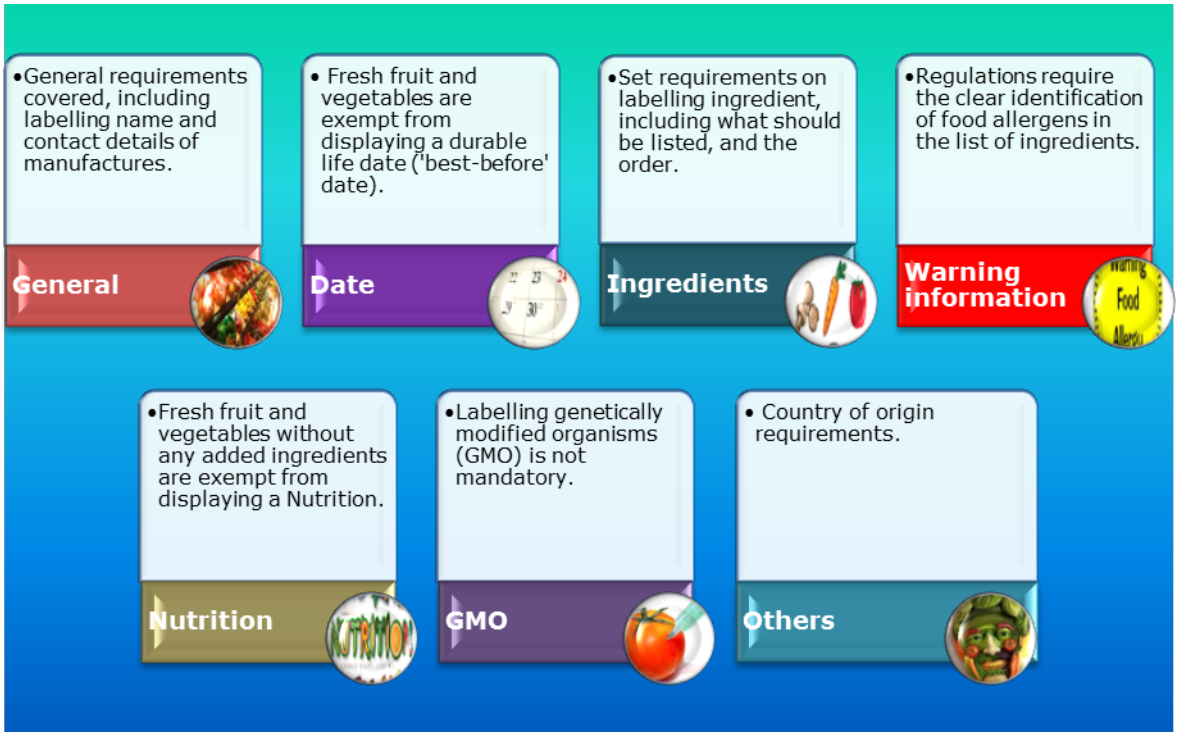
Health Canada is responsible, under the Food and Drugs Act (FDA), for the establishment of policies, regulations and standards relating to the health, safety, and nutritional quality of food sold in Canada. Activities include providing a list of ingredients for food allergen labelling and instructions for safe use/consumption, storage, and handling. The Canadian Food Inspection Agency (CFIA) is responsible for the administration of non-health food labelling regulations related to misrepresentation, labelling, advertising, composition, grade and packaging.

However, critics say that Canada allows front-of-package symbols and health claims being designed by the food industry, which has potential risks of misleading consumers. The Canadian Standing Committee on Health believed that Canada needs standardized labelling, especially on health-related items, such as nutrition.

Enforcement effectiveness

Enforcement is transparent and effective, rated as **HIGH.** The CFIA is responsible for the enforcement of food labelling regulations in Canada. Where compliance with the legislation administered and enforced by the CFIA is not achieved, there is a progression of tools in place to respond to non-compliance under federal law. These include seizures warning letters, the seizure of equipment, fines and judicial action. CFIA informs food producers by e-mail notifications when it finds potential serious hazard associated with food labelling, such as undeclared allergens. Violations of labelling regulation are not common, and failures leading to food safety concerns are rarer.

Table 3: Canada's regulations and measures governing food labelling



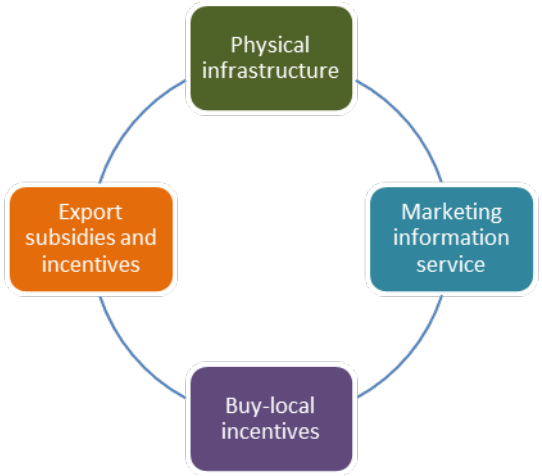
Government support for agricultural marketing

In its assessment of government support for the vegetable sector in Canada, Control Risks considered the span of services involved in moving an agricultural product from farm to consumer. Governments can enhance the competitiveness of local producers' agricultural marketing by upgrading infrastructure, providing marketing information, backing buy-local initiatives and supporting exports, as illustrated below.

These types of government support are interrelated, but we have categorised them for analytical clarity. Setting and enforcing high food safety standards also feeds into the strength of agricultural marketing, and has been analysed separately in the previous sections.

This section is designed to compare supportive measures in the following four categories in Canada and Australia.

Table 4: Government support for agricultural marketing that has the potential to enhance competitiveness



Physical infrastructure development

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C8	Infrastructure support for farmers aids international competitiveness.	Canada	High	High	High
		Australia	High	Medium	Medium

Regulatory support

Canada's regulatory support for infrastructure in the vegetable sector rates **HIGH.** Rural infrastructure has benefited significantly in recent years from the launch of Canada's Economic Action Plan in 2009, a multi-billion dollar stimulus fund aimed at boosting the country's economy during the global recession. A key component of this plan was the Infrastructure Stimulus Fund which saw CAD 4 bn (AUD 4.2 bn) invested in more than 4,000 projects, including in the creation, improvement and rehabilitation of road, transit and water infrastructure. Other funds included the Municipal Infrastructure Fund as well as the Canada Strategic Infrastructure Fund, which saw significant investment in large-scale infrastructure projects (highways and railways, local transportation, water and broadband), many of which benefited rural agriculture areas.

Through Canada's Economic Action Plan, the federal government provided CAD 225 million (AUD 236.4 million) over three years, beginning in 2009–10, to develop and implement a strategy for extending broadband coverage to as many unserved and underserved communities as possible. Such funds were structured as public-private, with the Government of Canada working in productive partnerships with provinces, territories, and municipalities to invest in local infrastructure projects.

Enforcement effectiveness

We rate enforcement effectiveness as **HIGH**. The overall quality of infrastructure in Canada is ranked 19 in The Global Competitiveness Report 2014-15, higher than

Australia, which is ranked 35. The report suggested Canada has high quality of electricity supply, fixed lines, air transport infrastructure and railroad infrastructure. However, the mobile phone subscription rate is lower than Australia.

Marketing information service

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C9	Information access support is efficient, which makes farmers well-informed of market changes.	Canada	High	High	High
		Australia	High	High	High

Regulatory support

Canadian government regulation and institutions facilitate access to agricultural information are rated **HIGH**. Agriculture and Agri-Food Canada produces market information to producers by product, including crops and horticulture. Regular online publications are produced by the institution, including weekly price summaries for selected crops as well as feed grain facts and market outlook reports, import and export data.

The Horticulture and Cross Sectoral Division of Agriculture and Agri-Food Canada's (AAFC) Sector Development and Analysis Directorate is engaged in ongoing research and analysis of the sector, including economic factors and conditions, and policy and other strategic issues affecting the productivity and competitiveness of Canadian horticulture. Additionally, the Horticulture and Cross Sectoral Division provides market information (Infohort), which offers current storage and price reporting on a wide range of commodities in key Canadian markets to support decision-making by the sector, and within government. Infohort states its objective is to provide all components of the horticultural industry with the necessary intelligence so that they can make informed decisions about their industry.

In addition, the federal government also organizes round-table events with industry representatives to share market information and updates with producers. The Department for Agriculture and Agri-Food Canada maintains a global agricultural market intelligence and commodity reporting service to provide Canadian farmers with information on world agricultural trade.

Enforcement effectiveness

The effectiveness of the regulatory system for marketing information can be rated as **HIGH**. Canadian services relating to agricultural information are extensive with no undue political influence. Information access support varies in quality at the provincial level, with more agriculturally dependent states such as Ontario and Alberta maintaining superior levels of support. For instance, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) issues several newsletters to meet producers' needs.

The newsletters are promoted online and at industry events. Amongst other information they provide details on crop, livestock and business management technology transfer and advice to enable innovation and strengthen the agriculture sector

Buy-local initiatives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C10	Buy-local initiatives are efficient, which creates opportunities for increasing profits of local growers.	Canada	Medium	Medium	Medium
		Australia	Medium	Medium	Medium

Regulatory support

Regulatory support for Buy-local initiatives in Canada can be rated as **MEDIUM**. To help increase the competitiveness of Canadian food producers and processors at home, Agriculture and Agri-Food Canada has developed a new domestic branding initiative to help producers promote their food products to Canadian consumers. The Canada Brand is a strategy to gain recognition for Canadian food and agriculture products in key markets.

Nevertheless, buy-local programs in Canada are sponsored primarily at the provincial government level and vary significantly in depth, focus and breadth from province to province, with the strongest institutional support found in more agriculturally dependent states. For instance, in British Columbia (B.C.), the province's government is expanding the Buy Local program with an additional CAD 2 million (AUD 2.1 million) to help B.C. farmers and food processors promote their products, and support food security in B.C. The Program aims to increase consumer demand and sales of B.C. agrifoods. Businesses and organizations can apply for matching funding from the B.C. government for projects that promote local foods. The campaign uses social media tools in combination with media advertisement to raise awareness of local farmers' markets across B.C. Other programme includes the Really Local Harvest Co-op (RLHC), a co-operative of about 30 farms in southeastern New Brunswick, teamed up with the school district and the newly formed non-profit organization to promote local agricultural products.

Some programmes get government funding though this is largely not at the federal level. However, the Canadian Agricultural Loans Act (CALA) Program is a federal loan guarantee program designed to increase the availability of loans to farmers and agricultural co-operatives at the local level. Farmers can use these loans to establish, improve, and develop farms, while agricultural co-operatives may also access loans to process, distribute, or market the products of farming.

Enforcement effectiveness

Enforcement effectiveness can be rated as **MEDIUM.** There is a limited federally-led 'Buy-Canadian' initiative which focuses on the promotion of production at the national

level in Canada (Canada Brand). The breadth and success of buy-local initiatives across the country varies from province to province. Success therefore needs to be measured at the provincial level. Some provinces which have particularly large agriculture industries such as B.C. have invested and focused more heavily on buy-local initiatives and have therefore seen success. Growing support in B.C. for locally produced food has contributed to the number of farmers' markets across B.C. increasing from about 100 to almost 150 with total direct sales also increasing by approximately 150% between 2006 and 2012.

The number of farmers' markets in Canada has increased substantially at the national level. In 2008, there were 508 recognized farmers' markets across Canada. According to Farmers Markets Canada, that number grows by five to seven percent each year. In 2014, there were approximately 635 farmers' markets in Canada. In 2009, Farmers' Markets Canada conducted its National Farmers' Market Impact Study, which involved farmers' markets from every province, making it the most comprehensive study of farmers' markets conducted in North America.

Export subsidies and incentives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C11	Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.	Canada	High	High	High
		Australia	High	High	High

Regulatory support

Regulatory support for export subsidies and incentives in Canada can be rated as **HIGH**. There are several federal incentive programs in place to support Canadian agricultural exporters. The Canada Business Network (federal government agency) provides financing such as grants, contributions, subsidies and loan guarantees for agricultural producers. In addition, Farm Credit Canada (FCC) Loan Program provides financing for producers to expand their business domestically or export and to fund diversification projects.

The Canadian Commercial Corporation acts on behalf of Canadian industry and makes it easier for Canadian exporters to sell their products and services around the world. This corporation offers financing, insurance and risk management solutions to Canadian businesses, including agricultural producers. Export Development Canada helps Canadian exporters and investors expand their business into international markets. The Business Development Bank of Canada makes loan programs available to Canadian businesses to export their products or services.

The export financing support is also strong at the provincial level. For instance, the Alberta International and Intergovernmental Relations Ministry is responsible for coordinating Alberta's relationships with governments across Canada and around the world; Enhancing Alberta's national and international presence on behalf of Albertans; and Facilitating export development and investment attraction from targeted international markets.

Enforcement effectiveness

Enforcement can be rated as **HIGH**, a point reinforced by the growth in agricultural exports in recent years**.** Canada is the world's top per capita agricultural trader, according to Farm Credit Canada's (FCC) annual report on global trade. In 2013, total Canadian vegetable exports, comprising field vegetables, greenhouse vegetables and mushrooms, recorded CAD 1.3 bn (AUD 1.37 bn), an increase of 24% from 2012. The country is actively expanding its export to emerging countries. Canada's agriculture export to Brazil, Russia, India and China (BRIC countries) has outpaced growth to OECD countries since 2006. Between 2006 and 2012, exports to BRIC countries increased by 336% and exports to OECD counties increased by 48%, according to the FCC.

PERU

Executive Summary

This report benchmarks the competitiveness of Australia's vegetable industry with that of Peru. It assesses the regulatory conditions governing food safety in production, food safety along the supply chain and government support for agricultural marketing in Peru, and compares these with Australia, based on findings in the milestone 103 report.

Peru's vegetable industry

- **Peru's regulatory framework has been progressively improved in recent years to meet international food safety standards**. Its framework is harmonised with the Codex Alimentarius as well as with European and US food safety standards.

- **Despite having a well-developed regulatory framework that meets international standards and the standards of Peru's main trading partners, enforcement effectiveness is not in an advanced level**. Although enforcement agencies have clear mandates, oversight is limited and is primarily concentrated in Peru's urban and semi-urban areas along its coast. Moreover, deficient infrastructure remains an impediment to the industry.

Australia's competitive position

- **Australia's competitiveness benchmarked against Peru is strong overall in the areas of metal contamination, storage and transportation, food processing and agricultural marketing**. In these categories, Australian regulation is in general more advanced and better implemented.

Benchmarking food safety in primary production

- **The Peruvian regulatory environment for food safety in primary production can be considered as reasonably robust**. Regulatory support consists of extensive regulations that adopt Codex Alimentarius principles and the US and European Union food safety standards. However, enforcement is of limited scope and primarily takes place along coastal areas of the country, particularly those agricultural areas located near to or with easy access to the capital Lima. The export-oriented vegetable industry has voluntarily increased its safety standards to ensure access to foreign markets.

- **Regulation of controlling the use of chemicals is more comprehensive but is not always consistently enforced.** The US and the EU have been reported refusing primary food imports from Peru due to the concern of excessive use of chemicals.

- **Peruvian regulation of heavy metals in vegetables is insufficient**. Unlike in Australia, there are no clear regulations for setting limits on metal pollutants.

High levels of heavy metal pollutants have been found in agricultural areas and control remains inefficient.

Benchmarking food safety along the supply chain

- **The regulatory environment in food storage and transportation is relatively strong, though not as wide-ranging as in Australia**. The lack of information with regards to incidents (particularly outbreaks attributable to transportation failures) indicates generally inadequate enforcement measures.

- **Enforcement for food processing is ineffective.** Oversight of food processing is limited, particularly as a result of limited training of auditors and limited enforcement capacity. Furthermore, legislation, especially that relating to food handlers, is inadequate.

- **Regulatory support for food labelling is comprehensive**. There is an abundance of legislation related to food labelling, which is very clear and does not differentiate between food for export and food for local consumption. Enforcement is not always effective as enforcement agencies lack the resources to address all complaints and incidents.

Benchmarking government support for agricultural marketing

- **Peru is not as competitive as Australia in terms of its support for agricultural marketing.** Regulatory support and enforcement effectiveness are robust with regards to support for marketing information services and export subsidies. Areas of weakness include poor infrastructure and buy-local initiatives.

Overview of Peru's vegetable industry

Peru's agricultural industry is becoming increasingly important. The average growth rate of the industry was 4.55% between 1990 and 2010, equalling that of the mining industry, one of the country's other main economic contributors. Currently, Peru is the world's leading exporter of asparagus and an important supplier of mangos, avocadoes, grapes, artichokes, coffee, quinoa and several other foods (including vegetables). The value of fruits and vegetables exports jumped from USD 596 million (AUD 755 million) in 2008 to USD 1.52 billion (AUD 1.93 billion) in 2013, Exports to EU countries and the US represented 45% and 39% respectively of export value in 2013.

The positive growth of Peru's vegetable industry and the need to ensure access to EU and the US markets has been in association with a progressively improved food safety regulatory framework. Trade agreements with over 15 countries or trading blocks, including the EU and the US have created robust incentives for Peru to have a strong food safety regulatory support framework. The enhanced framework is supported by agricultural best practices across the primary foods supply chain and by an overall public-private commitment to enhance vegetable and food safety standards.

However, there remains a gap between food safety regulations and enforcement capacity. Although enforcement agencies have clear mandates, oversight is of limited reach and is primarily concentrated in Peru's urban and semi-urban areas along its coastal areas, where the majority of fruits and vegetables are grown. Limited enforcement capacity has meant, for example, that enforcing agency, the National Agricultural Health Service (SENASA) has yet to fully implement many policies. This includes the National Monitoring Programme of Food Contaminants in Primary Foods and Feed. Approved in 2011, the programme to track contaminants in food and feed was initially designed to start operations by early 2013. However, delays in budgetary allocations and training of personnel have limited its implementation. Similarly, while the country set a 10-year ban on importing and using seeds containing genetically modified organisms (GMOs) in 2010, GMO seeds have accessed the local market and have been used in local production.

Nonetheless, enforcement is likely to improve over the next five-years. This will be driven by the growing importance of the sector to the economy as well as commitments made between the Peruvian government and its trade counterparts in the signing of trade agreements. Currently, Peru's regulatory framework does not differentiate between vegetable production for local consumption and that for export, but the fruit and vegetable export industry complies voluntarily with food safety standards to ensure access to destination markets.

Food safety

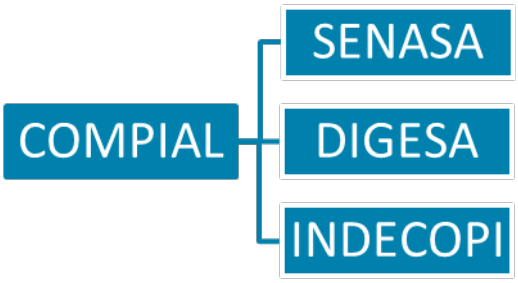
The country's regulatory environment for food safety has seen significant improvements during the last decade. While the country established a solid institutional framework for food safety in the late 1990s following the enactment of General Health Law 26842-1997, it has undergone a significant overhaul since 2008 with the approval and enactment of the Food Safety Law (Legislative Decree (DL) 1062-2008), the Primary Production Safety Law (DL 1059-2008, Consumer Protection Law (Law 29571-2010) and subsequent regulations to further develop these laws.

Two factors explain the changes that Peru's food safety regulatory framework has experienced since 2008. On the one hand, regulatory improvements have been linked to persistent pressure of export-oriented agribusinesses to encourage the government to adopt food safety reforms that are in compliance with food safety international standards. On the other hand, the improvements have responded to commitments that Peru made to improve its food safety environment following the signing of its trade agreement with the US in April 2006 and subsequently with the EU in 2012.

Currently, issues related to food safety in primary production are governed by the National Agricultural Health Service (*Servicio Nacional de Sanidad Agraria* or SENASA). The Office of Environmental Health (*Dirección General de Sanidad Ambiental* or DIGESA) is the competent authority for safety supervision of food and beverage manufacturing, distribution and marketing.
The following four agencies share the primary responsibilities for food safety regulation

at the national level:

Table 1: Peruvian government institutions responsible for food safety



- **Permanent Multi-sectorial Commission for Food Safety (COMPIAL)**: The Ministry of Agriculture, the Ministry of Health and the Ministry of Production form COMPIAL. The commission is responsible for food safety policy, including food safety in primary production. The commission coordinates public-private activities that ensure compliance with provisions of the Food Safely Law and guarantee safe food for human consumption along the food chain.

- **National Agricultural Health Service (SENASA)**: The SENASA is an agency affiliated with the Ministry of Agriculture. The SENASA is exclusively responsible for food safety applicable to agricultural products and processing of primary products and animal feed. The agency is also Peru's sanitary and phytosanitary authority, and certifies the safety of agriculture production for domestic consumption and for export. The SENASA issues protocols for compliance with food safety standards in primary production and manages implementation of a system of quality assurance following HACCP standards.

- **Office of Environmental Health (DIGESA)**: The DIGESA is an agency affiliated with the Ministry of Health. It has exclusive responsibility over the safety of processed foods for human consumption produced domestically or imported from abroad. The agency also develops standards for maximum residue limits (MRLs) for pesticides, veterinary drugs and other chemical contaminants, and develops standards for physical and microbiological contaminants.

- Although its functions are different from those of the SENASA – the SENASA is only responsible for safety in agricultural production and processing of primary products – enforcement often involves both agencies. This creates bureaucratic redundancies for producers, processing companies and importers/exporters of primary and processed foods. For example, import/exports operations are likely to require certifications from both agencies, with the issuance of SENASA certificates often being contingent on a DIGESA certificate. COMPIAL has identified redundancies in the agency's oversight capacities and has worked with both to minimise unnecessary bureaucratic hurdles. Nonetheless, overlapping

responsibilities persist, undermining regulatory support for primary food production and exports.

- **National Institute for the Defence of Competition and Protection of Intellectual Property (INDECOPI)**: INDECOPI is the agency responsible for competition and consumer protection issues. The agency also serves as the national standards body and is responsible for approving standards for all sectors (Norma Técnica Peruana, NTP or a conformity standard), including primary production. Just as SENASA and DIGESA, INDECOPI is a highly independent agency, strongly shielded from political interference, which ensures effective enforcement.

Peru's food safety and regulatory system is well-developed and on-par with international standards. When Peruvian regulations do not set minimum safety standards throughout the food supply chain, the default standard is the Codex Alimentarius. This applies across the food safety for primary production and processed foods, making Peru's regulatory support strong. Basing local standards on the Codex Alimentarius is the result of government efforts (since the mid-2000s) to ensure vegetable products' access to foreign markets, while providing local consumers with a regulatory framework to guarantee safe products for local consumers. However, enforcement is often slow and burdensome, as SENASA and DIGESA have overlapping responsibilities that create redundant processes and confusion among market players. Exporters have repeatedly complained about excessive paperwork and complex procedures in the issuances of necessary export certification requirements, generating significant delays for fresh food and agriculture exports. Although the country has significantly improved the capacity of its food safety institutions, their area of influence remains limited to larger urban areas and areas of easy access along the coast of the country. Moreover, SENASA's food safety monitoring and risk warning systems are still at an early stage (approximately three years of implementation), with sanctions in primary food production currently primarily focused on creating food safety awareness among producers instead of enforcement focused on closure of fields or financial penalties. The following sections assess Peru's food safety governance in production, and along the supply chain, to offer a qualitative measure of the competitiveness of Peru's vegetable industry.

Primary production

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C1	Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.	Peru	High	Low	Medium
		Australia	Low	High	Medium

Regulatory support

Peru's regulatory environment for food safety in primary production is rated as **HIGH**. Peru has extensive food safety laws and regulations for processed foods and feeds as well as for primary vegetable production. The country's Food Safety Law and its regulations (i.e. Supreme Decree (DS) 018-2008-AG and DS-004-2011-AG, among others) establish that primary food producers carry out their activities in compliance with Good and Hygienic Practices developed by SENASA. Regulations include traceability plans to prevent animal contamination in an effort to ensure food safety. SENASA's Good Agricultural Practices are standard procedures, with the agency supporting implementation of these practices via irregular training activities with small producers. INDECOPI has developed a number of National Standards (Normas Técnicas Peruanas or NTPs) for the growing of asparagus, mangoes, coffee and other horticultural products.

Enforcement effectiveness

Enforcement of food safety standards in primary production is **LOW** in Peru. Primary foods are exempted from registration, which challenges SENASA's supervision. In addition, SENASA's oversight capacity is focused on coastal areas of Peru because access to growing sites is easier in these areas. In the sierra and highland areas of the country, safety controls are less frequent than in coastal areas. Although SENASA's budget has grown over the years, it remains insufficient to broaden the scope of on-site oversight throughout the country.

Enforcement is likely to improve in the medium term (four years) if the National Monitoring Programme of Food Contaminants in Primary Foods and Feed is effectively implemented. The programme, in its third year of implementation, surveys primary foods at retail points and growing fields to test for metal contamination, excessive use of chemicals and other non-compliance issues. At present, the programme is primarily focused on data gathering and creating awareness among producers about the use of good practices for planting. If sampling detects any non-compliance issues, growers will receive warning alerts and training sessions on how to improve practices. Control Risks' source indicated that the implementation of the programme could also result in the closure of growing fields if authorities found consistent non-compliance problems in their testing samples. However, the effectiveness of enforcement and punishments are not clear, and thus our rating on enforcement remains **LOW**.

Use of chemicals

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C2	Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Peru	High	Medium	Medium
		Australia	High	High	High

Regulatory support

Regulatory support for the registration and use of chemicals is rated as **MEDIUM.** Regulatory support improved recently with the issuing of decree DS-001-2015-MINAGRI in January 2015, but it does not include specific Maximum Residue Limits (MRLs). The decree provides extensive details for the registration of pesticides for agricultural use, as well as penalties for the production, distribution or importation of pesticides lacking proper registration. According to the decree, registration is mandatory for chemical pesticides for agricultural use, biological pesticides for agricultural use, plant growth regulators and uncommon pesticides. While local regulations defining MRLs have yet to be developed, DS-001-2015-MINAGRI indicates that the US' Environmental Protection Agency (EPA) standards or MRL regulations applicable in the EU (article 42) should apply. The regulation is further supported by SENASA's regulations on pesticides allowed in primary production, including the explicit prohibition of the highly toxic ingredients such as BHC/HCH or DDT.

Detailed regulations on permitted levels of pesticides and restrictions are to be drafted following the release of DS-001-2015-MINGARI. However, the decree has raised criticism because it authorises the use of a certain type of highly hazardous pesticides (HHPs), which the World Health Organisation categorises as 'toxic' or 'very toxic'. Gaps persist in training activities and information campaigns to growers about the safe use of pesticides and the rinsing and disposal of pesticide containers. Fatal incidents have been reported in rural areas following the use of contaminated containers for cooking.

Enforcement effectiveness

Despite the existence of general regulations defining limits on the use of chemicals in primary production and the adoption of foreign standards in the absence of local standards, control of excessive use of pesticides and banned chemicals is not consistently enforced, rating enforcement as **MEDIUM**.

SENASA develops programmes to assess levels of chemical residue in primary foods by sampling randomly selected agriculture growing sites in areas of the country with significant horticulture activity. Testing is conducted in laboratories, including SENASA's Toxic Residues Laboratory that is certified under the ISO/IEC 17025. Sampling is also conducted at customs clearance locations and retail locations throughout the country.

SENASA has increased its training budget for auditors in an effort to increase monitoring of the use of chemicals in primary production. However, monitoring continues to be limited to coastal areas and urban centres of easy access to the SENASA, even though agricultural production for both local consumption and exports takes place across the country.

With limited testing capacity in growing areas in the highlands and jungle areas, SENASA, the Ministry of Health and local governments aim to train small growers in best practices for the use of chemicals and disposal of pesticide containers. Sources consulted by Control Risks indicated that large-scale producers and companies commercialising pesticides work in tandem with the government to raise awareness among small growers about best practices in the use of chemicals. However, when non-

compliance activities are detected, SENASA is likely to recommend the best practices to growers rather than adopting stringent penalties such as the temporary or permanent closure of a plantation. The Peruvian produce has been found to possess excessive chemical traces at destination and remain a source of import refusals. Between 2011 and 2013, the US refused an average of 30% of shipments of primary foods from Peru due to the presence of unacceptable pesticide levels. Improper use of chemicals was also evidenced in 2012, when 378 farm workers at a large export-oriented plantation owned by the Beta Agro-industrial company were reported sick after inhaling a pesticide sprayed in company's plantations in central Ica Region. The company grows and packages fresh produce such as asparagus, citrus and grapes.

Metal contamination

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C3	Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Peru	High	Low	Medium
		Australia	High	High	High

Regulatory support

Regulatory support for metal contamination in primary food is rated as **HIGH.** The Primary Production Safety regulation DS-004-2011-AG and other applicable regulations do not typify limits on the residence of metal pollutants such as lead, cadmium, mercury and arsenic in food. However, article 15 of DS-004-2011-AG specifies that in the absence of specific local regulations, the Codex Alimentarius should be used to set maximum applicable limits. The Codex Alimentarius applicable limits have been adopted in SENASA's annual monitoring plans.

Enforcement effectiveness

The enforcement of heavy metal contamination is rated as **LOW**. Metal contamination remains a persistent challenge in Peru as a result of limited environmental oversight of the country's mining and hydro-carbons industry. Independent research and government-commissioned reports have highlighted high levels of metal contaminants in water, including in agricultural areas. Heavy metals have also been found in foods and human blood samples in areas of hydro-carbon activity, particularly in the north of the country.

In recent years, the government has been addressing the problem through investing in irrigation and water treatment projects. Associations within the vegetable industry also endeavour to enforce the best practices to reduce metal contamination in irrigation water. However, there has not yet been any major progress.

Packaging

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C4	Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.	Peru	Medium	Medium	Medium
		Australia	Low	Medium	Low

Regulatory support

Although Peruvian regulation on safety in food packaging is poorly developed, Codex Alimentarius standards apply, rating regulatory support as **MEDIUM**. The country lacks specific regulations on primary food packaging, and companies have to refer to international standards such as the Codex Alimentarius. Compliance with these standards is mandatory for foods and vegetables that undergo any process. The DS-007-98-SA specifies that packaging material must be free from substances that could affect the safety of food products. It also requires that packaging made of metal, alloys and plastics should not contain unsafe residues for human consumption. However, the regulation is lacking in detail, which weakens its implementation.

Enforcement effectiveness

Enforcement is mainly left to market actors, and such market-driven enforcement lead us to rate this parameter as **MEDIUM.** Enforcement of packaging rules is often a condition demanded by a retailer (particularly large retailers). This means that the retailer will require adequate packaging and labelling to be able to trace the origin of a primary food. SENASA conducts some on-site inspections of packaging plants to ensure compliance. It also partners with various agencies (including export promotion agency Promperú) to carry out extensive activities to deliver information and training sessions on best practice. Despite these public-private efforts, packaging and labelling violations remain the main source of import rejections. In 2013, approximately 25% of vegetable shipments were rejected by US customs authorities because of packaging and labelling violations.

Storage and transportation

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C5	Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.	Peru	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

The regulatory support for storage and transportation is rated as **MEDIUM**. The Food Safety Law (D.S. Nº 007–98–SA) governs food storage and transportation, and where the Food Safety Law lacks details, Codex Alimentarius principles and good agricultural practices apply. Together, these provide a moderate level of regulatory support for food storage and transportation. The Food Safety Law explicitly states that transporters must keep records of the foods being transported as well as procedures for handling food cargo. Records must be made readily available to government authorities if required. However, there are no detailed standards outlining the basic characteristics of vehicles transporting foods within Peru.

Regulations on required temperature exist in the form of guidance, and they mainly apply to those working in restaurants or food processing establishments, rather than primary producers. Article 60 of the General Health Law specifies that food to be transported must be in an appropriate vehicle which is potentially air conditioned depending on the product being transported, but no detailed temperature is given.

Enforcement effectiveness

Enforcement is rated as **MEDIUM** as the industry has continuously shown interest in improving storage and transportation practices. This has been particularly evident through industry efforts to ensure effective implementation of HACCP risk monitoring and mitigation practices in the storage and transportation of primary foods. However, implementation of these strategies remains largely voluntary. HACCP is only mandatory in the processing and packaging of primary foods.

Food processing

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C6	Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.	Peru	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

We rate regulatory support for food processing in the vegetable industry in Peru as **MEDIUM**. DIGESA is the regulatory body which governs the use of food additives. There are a number of regulations relating to food additives, including DS-018-2008-AG, DS-004-2011-AG in addition to other product specific NTPs. Additives must meet DIGESA's regulations with regards to food safety standards. In addition to this, only Codex Alimentarius-permissible food additives are accepted. The only exception to this is with regards to flavourings (not additives in general) whereby those accepted by the US Food and Drug Administration (FDA) are also applicable in Peru. Adherence to international regulations for additives and flavouring, in addition to national legislation and the widespread availability of this information, means that regulatory support is

extensive. However, regulatory support for this parameter is not as extensive as in Australia. For example, Peru does not distinguish between rules for food handlers who suffer from food-borne illnesses as oppose to injuries or potential contamination.

Enforcement effectiveness

Enforcement for food processing is rated as **MEDIUM.** SENASA (primary foods) and DIGESA (all other foods) have a clear distinction of responsibilities and they hold regular meetings to further discuss improvements and responsibilities. For example, in June 2013, SENASA raised uncertainty as to whether additives in potatoes changed the nature of the product. The two parties agreed that, under Codex Alimentarius norms, the product is not changed and DIGESA then agreed that monitoring was its responsibility.

Staff training is taken to ensure well informed practices take place regularly. For example, in October 2014, a food additive training exercise was launched jointly by DIGESA and FDA to ensure institutional capacity building. Personnel from 24 places in Peru attended the training and the exercise will be repeated in 2015 to further share knowledge between the two countries.

When food safety violations are detected by the Regulatory Authority (market surveillance, complains or incidents), the provider is notified and further information is given which may require an intervention. However, there are several incidents reported. During 2014, DIGESA recorded infractions in 600 producers and vendors. The majority of these violations were related to inefficient food handler hygiene (i.e. not wearing gloves, aprons and hairnets). A study from 2012 in Lima, showed that up to 72% of food handlers had internal parasites. This indicates that not all areas of food processing are being adequately addressed by enforcers.

Food labelling

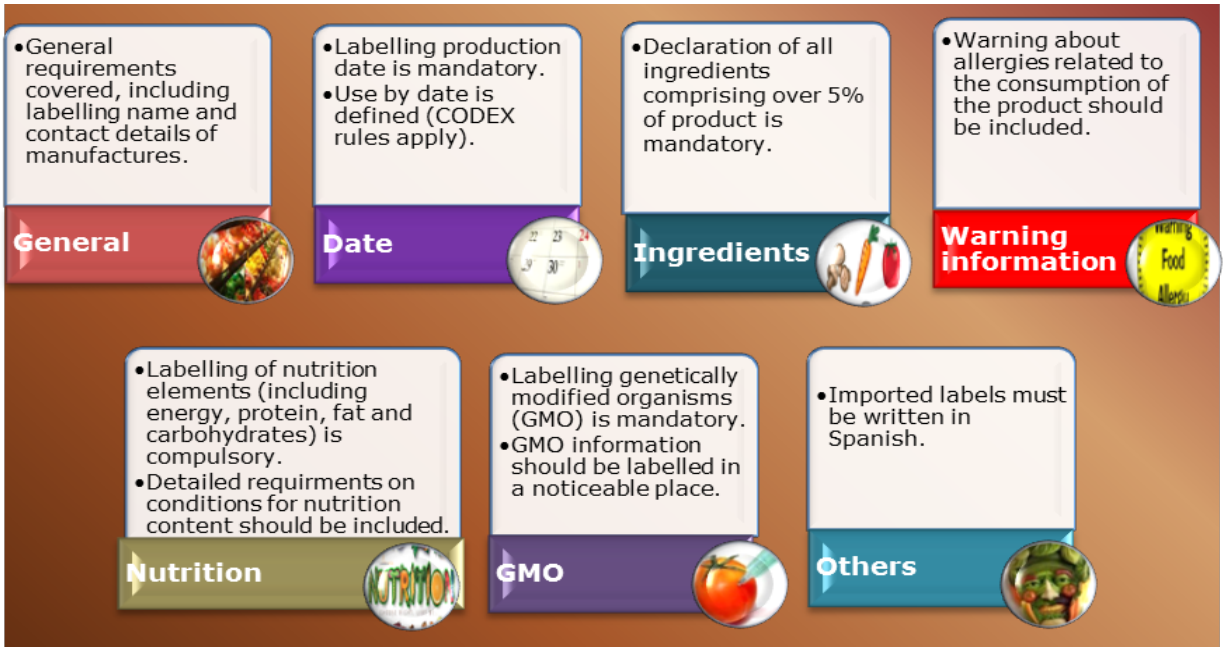
ID	Competitiveness parameters	Country	Regulatory environment	Enforcement effectiveness	Overall rating
C7	Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.	Peru	High	Medium	Medium
		Australia	High	High	High

Regulatory support

Regulatory support for food labelling is rated as **HIGH** due to a strong and effective structure governing food labelling. Article 5 of the Food Safety Law (2008) requires both primary producers and food businesses to comply with labelling requirements. A number of further laws and several NTPs detail labelling requirements for all value-added products consumed, imported or manufactured and sold in Peru – there is no differentiation between regulations for food for local consumption and regulations for

food for export. All Laws are subject to periodic revision and in addition, all foods must conform to Codex Alimentarius general principles. The combination of these measures ensures that food labelling is of a high standard and complies with a number of international labelling standards. Both Australia and Peru have very clear regulations that set out mandatory requirements for food labelling. In Peru, information about additives, producers, ingredients and nutrients are very clear.

Table 2: Peruvian regulations and measures governing food labelling



Enforcement effectiveness

Peruvian enforcement on labelling is rated as **MEDIUM.** INDECOPI monitors compliance at the retail/wholesale level for all products distributed in Peru. DIGESA and SENASA share enforcement responsibilities on labelling for processed foods and primary foods, respectively. Food importers are required to re-label the product before it goes through customs if requirements are not met.

Products that do not comply with labelling requirements are subject to fines and product confiscation. Penalties include closure of the processing, packing and retail establishments. INDECOPI is a well-respected organisation in Peru that functions as the 'market's referee', though recent reports indicated that it is overloaded. If prompt action is not taken to improve the organisation's personnel capacity, implementation could be weakened. In 2014, INDECOPI worked on 110 complaints relating to food production. This made up only 1.43% of the total complaints the agent received that year. INDECOPI is politically independent, which helps it to maintain the transparency of testing results.

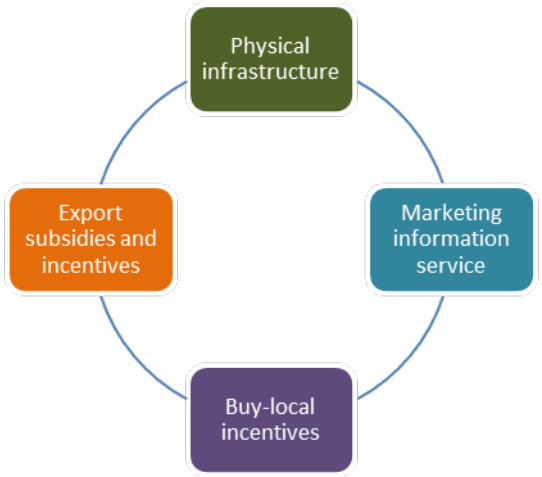
Government support for agricultural marketing

In its assessment of government support for the vegetable sector in Peru, Control Risks considered the span of services involved in moving an agricultural product from farm to

consumer. Governments can enhance the competitiveness of local producers' agricultural marketing by upgrading infrastructure, providing marketing information, backing buy-local initiatives and supporting exports, as illustrated below.

These types of government support are interrelated, but we have categorised them for analytical clarity. Setting and enforcing high food safety standards also feeds into the strength of agricultural marketing, and has been analysed separately in the previous sections. This section is designed to compare supportive measures in the following four categories in Peru and Australia.

Table 3: Government support for agricultural marketing that has the potential to enhance competitiveness



Physical infrastructure development

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C8	Infrastructure support for farmers aids international competitiveness.	Peru	Medium	Low	Low
		Australia	High	High	High

Regulatory support

We rate regulatory support for infrastructure in the vegetable sector as **MEDIUM**. Since the administration of former President Alejandro Toledo (2001-08), political commitment to improve infrastructure has been reflected by efforts to increase investment in roads, ports, hydro-electric projects, irrigation systems and water coverage. The Bicentenary Plan 2021 is evidence of the country's political commitment to improve its infrastructure competiveness. The plan guides policy decisions and sets investment priorities in a range of areas until 2021, including infrastructure investment. Political parties from across the spectrum have endorsed the plan, which reflects political commitment to improve infrastructure competitiveness. By the end of President Ollanta Humala's term in July 2016, he is likely to have spent over USD 16billion in improvements of transportation infrastructure such as roads, ports, airports and

railways. In addition, an estimated USD 18billion will be spent on infrastructure projects executed via public-private partnerships from 2015 to 2017. The National Centre for Strategic Planning (CEPLAN) coordinates the plan's implementation with government ministries and agencies with budgetary and spending power in the infrastructure sector. A clear regulatory framework regulates contracting for infrastructure projects, which is done via a variety of mechanisms. Contracting mechanisms include direct contracting, competitive tender process, public-private partnerships, and the funding of construction projects through a tax credit scheme. Under this scheme, a company (regardless of its sector) can pay up to half of its income in funding for public infrastructure projects in their areas of influence.

Commitment to improving infrastructure competitiveness is also reflected in current investments in irrigation infrastructure. For example, the Olmos irrigation project in north-western Lambayeque Region will provide irrigation to 43,500ha of uncultivated land. The project started in 2004 and is 90% complete. Other large-scale irrigation projects include the Majes-Siguas II and Chavimochic III irrigation projects. Irrigation investment over the years has contributed to increase cultivated areas and primary production productivity for export-oriented growers as well as for small and medium-sized growers.

Although there is a strong regulatory framework in the infrastructure construction sector, and political commitment to improve long-term infrastructure competitiveness, project execution has been challenged by overspending and corruption, particularly in projects managed by regional governments.

Enforcement effectiveness

We rate enforcement effectiveness as **LOW**. Despite government commitment to improving infrastructure competitiveness, Peru infrastructure is of poor quality and of limited coverage. The overall quality of infrastructure in Peru is ranked 105 in The Global Competitiveness Report 2014-15, much lower than in Australia and many other developing countries such as China.

The country's road quality ranked 102. Gravel roads remain vulnerable to mudslides and other environmental hazards. Mudslides and other environmental obstacles blockading roads heighten during the wettest months of the year (April-June). This prevents the transportation of primary foods (and other raw and semi-processed commodities) from cultivation areas in the jungle and highland regions to markets in Lima and other areas of high population concentration, as well as to ports for export.

Marketing information service

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C9	Information access support is efficient, which makes farmers well-informed of market changes.	Peru	High	Medium	Medium
		Australia	High	High	High

Regulatory support

The Peruvian government offers **HIGH** regulatory support for access to agricultural information. The Agriculture Ministry's statute (Decree Law 25891-1992) grants it the responsibility of collecting, analysing and distributing information about primary production, cattle and poultry pricing. Along with SENASA, the Ministry is also responsible for collecting, analysing and distributing information about risks to primary production, including information about pests and the controlling mechanisms.

Legislative Decree 1082-2008 creates the Information System of Supply and Prices (SISAP). According to this regulation, the SISAP offers real time pricing, volume and origin information about agricultural products, processed primary foods and stock farming. The export promotion agency Promperú is required to provide information that facilitates access of Peruvian products, including vegetables, to foreign markets.

Enforcement effectiveness

The effectiveness of the regulatory system for marketing information is rated **MEDIUM,** because SISAP's collection of real time information only takes places in major urban markets. Although the Ministry of Agriculture, SENASA and other agencies carry out technical trainings with medium-sized and small growers in highlands and other remote areas, access to pricing information for these communities remains limited. In the absence of a SENASA office in rural areas, responsibility for providing training and information to these growers lies with the regional government's agriculture offices – which in the vast majority of cases lack the technical acumen and financial capacity to provide marketing information. SISAP is an online platform, and the government has estimated that only 10% of the country's rural population has access to Internet.

Buy-local initiatives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C10	Buy-local initiatives are efficient, which creates opportunities for increasing profits of local growers.	Peru	Medium	Low	Low
		Australia	Medium	Medium	Medium

Regulatory support

Regulatory support is rated as **MEDIUM**. Contrary to the practices markets such as Australia and the US, where food safety concerns have led governments to encourage consumption of locally-produced goods, there are no buy-local initiatives encouraging consumers to purchase locally grown produce in Peru. However, according to The National Food Assistance Programmes Law (Law 27060-1999), the government is required to procure produce for its food assistance programmes from small and medium-sized Peruvian growers. These programmes seek to ensure food security for populations in poverty and extreme poverty. Food assistance is provided directly to the programmes' beneficiaries (usually children in rural areas). Voucher mechanisms do not exist in Peru. The programmes are driven by food security concerns. Country of origin labelling is required for primary foods and other products, but this responds to practices common in international trade regulations, and not to an active government strategy to favour locally-grown products over imported goods.

Enforcement effectiveness

Enforcement effectiveness can be rated as **LOW**. While there are extensive food safety regulations as well as extensive regulations promoting the Peruvian agriculture sector, there are no specific programmes or regulations aimed at boosting local consumption of Peruvian-grown products. The only exception includes government funded food assistance programmes. The low score also stems from persistent corruption in government funded food assistance programmes for low income populations, primarily in rural areas. In 2012 Humala suspended the 1992-created Peruvian Food Assistance Programme (PRONAA) amid the continued delivery of damaged foods to beneficiaries as well as persistent corruption in the programme's food procurement processes. The government has yet to announce the financial loss that resulted from corruption in the programme.

Corruption in food assistance programmes has persisted despite the PRONAA's suspension. The programme was replaced in 2012 by the Qali Warma National School Nutrition Programme. Qali Warma has been marred by allegations of bogus procurement processes and the delivery of junk and expired food (instead of fruits and meals compliant with the programme's standards) to beneficiaries since it started operations in 2013.

Export subsidies and incentives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C11	Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.	Peru	High	High	High
		Australia	High	High	High

Regulatory support

Regulatory support for export subsidies and incentives policies is rated as **HIGH**. Although there are no direct export subsidies benefiting primary production exports, the customs law (Legislative Decree 1053-2008) introduced a duty drawback scheme – the refund of certain duties, taxes and fees to local producers. The scheme has significantly benefited vegetable exporters and exporters of processed primary foods.

In addition, there are a number of tax incentives benefiting primary production for exports. For example, Law 27360-2000 grants tax credits to primary food and agro-industrial producers. Law 29482-2009 provides income tax exemption for investments in high altitude areas (2,500 meters above sea level) across sectors, including primary production.

Regulatory support is equally strong in export promotion activities, which include access to information and training activities. Supreme Decree 010-93-PCM created the country's export promotion agency Promperú. The agency works with multiple government agencies as well as with industry associations to provide information to current and likely exporters from across industries. It also markets Peru's products in trade rounds and works with the Ministry of Commerce and Tourism to lower barriers for Peru's products in foreign markets.

Enforcement effectiveness

Peru's supportive measures are effective in general, and are rated **HIGH**. The success of the country's fruit and vegetables export industry has been the result of public-private concerted efforts to increase primary food and agribusiness competitiveness over the course of the last 15 years.

Through work carried out by Promperú and the Ministry of Commerce and Industry, the government has achieved a progressive reduction of barriers to trade in foreign markets as evidenced by the country's multiple trade agreements. This is also supplemented by frequent dialogue with trade partners such as the US, the EU, China and Japan on the reduction of phytosanitary and other non-trade barriers. Primary food exports have driven growth in the agriculture industry since 2000. Peru has become one of the world's leading exporters of asparagus and an important supplier of mango, avocado, grapes, artichokes, coffee, quinoa and other foods and vegetables. The value of fresh fruits and vegetable exports jumped from USD 596 million in 2008 to USD 1.52 billion in 2013, an increase of 156%). In addition, Peru has strong links to its key trading partners, as a result of trade agreements with over 15 countries or trading blocks, including Canada, China, the EU (2012), the European Free Trade Association (ETFTA), Japan, and South Korea.

MEXICO

Executive Summary

This report benchmarks the competitiveness of Australia's vegetable industry with that of Mexico. It assesses the regulatory conditions governing food safety in production, food safety along the supply chain and government support for agricultural marketing in Mexico, and compares these with Australia, based on findings in the milestone 103 report. This section summarises our findings:

Mexico's vegetable industry

- **Mexico's food safety system is governed by guidelines that form the basis of regulatory enforcement (as opposed to codified metrics).** Compliance with the guideline-based framework is mandatory under binding legislation. However, the guidelines lack specific metrics and thresholds for food safety, and there are significant violations among food producers.

- **The key regulatory agencies governing food safety have a limited ability to enforce policies effectively**. The agencies suffer from scarce resources, both from a headcount and from a financial standpoint.

- **The Official Mexican Standards (*Norma Oficial Mexicana* – NOM) is the primary regulation governing food production.** It is weakly enforced, although efforts are under way to remedy this.

Australia's competitive position

- **Australia's competitiveness benchmarked against Mexico is strong overall in the areas of food safety and government support to agricultural marketing.** In general, Australian regulation is more advanced and implementation is significantly higher. There is no area that Mexico has higher competitiveness than Australia.

Benchmarking food safety in primary production

- **Mexico's enforcement of food safety standards in primary production is weaker than in Australia**. Despite the fact that Mexico has mandatory guidance, ample discretion is given to producers to elude the regulations.

- **Mexican regulation of heavy metals in vegetables is absent**. In Mexico, the National Water Commission (CONAGUA) is responsible for regulating heavy metal maximum residue levels in the water supply. Although it has established clear values on the maximum amount of metal contaminant values, the agency faces significant deficiencies in its reporting capabilities.

Benchmarking food safety along the supply chain

- **Mexican regulation and enforcement of food safety along the supply chain is lower than in Australia.** Regulations, such as on additives, are much

less detailed in Mexico. Furthermore, Mexico also suffers from significant violations.

Benchmarking government support for agricultural marketing

- **Mexico is less competitive in terms of its support for agricultural marketing**. Regulatory support is robust with regards to support for physical infrastructure in rural areas, though enforcement faces some difficulties. Marketing information services and export subsidies are competitive. While buy-local initiatives are not part of regulatory support, they are a feature of Mexican culture.

Overview of Mexico's vegetable industry

Over the last two decades, Mexico's vegetable industry has grown at high rates. Since the inauguration of the North American Free Trade Agreement (NAFTA) in 1994, the Mexican fresh vegetable industry's net production value has grown by 470%. Additionally, according to Mexican government statistics, Mexico is among the top ten global exporters for a number of vegetables, including tomatoes, avocadoes, cucumbers, onions and asparagus. Available statistics for the country's vegetable trade balance show a 44% growth from 2008 to 2013, with the surplus reaching $4.9 billion in 2013. The US market absorbs over 95% of total exports.

The dependence on the US market has led Mexican authorities to introduce regulatory reforms that closely resemble the US regulatory framework. In order to export to the US, producers must comply with more stringent sanitary regulations, such as the Good Agricultural Practices (*Buenas Prácticas Agrícolas* or BPA), Hazard Analysis and Critical Control Points (HACCP) and the US Food and Drug Administration (FDA) guidelines (among others) which guarantee the quality and safety of Mexican agricultural export products.

However, producers for the domestic market struggle to keep abreast with these standards, in large measure due to lopsided access to investment resources for modernisation. Additionally, given the government's limited enforcement capacity, legislation is exceptionally difficult to implement and standards are not always enforceable. Furthermore, underdeveloped infrastructure in certain regions is a challenge for producers with export prospects.

Agriculture accounts for 4.1% of GDP but employs 15% of Mexico's labour force. The structure of farming in Mexico is influenced by an outdated land tenure system. About 50% of farmland is held as social property (*ejidos* and *comunidades agrarias* or 'agrarian communities'), and the remainder is privately owned. This means that the average farm size is 5ha, though this varies significantly by region. 88% of farms are smaller than 10ha. Therefore, a significant proportion of producers find it hard to take advantage of economies of scale, and can only manage to service local markets or engage in subsistence farming.

Food safety remains a considerable issue in Mexico. According to a 2013 survey by food safety monitoring website Food Sentry, Mexico is the third worst country for worldwide food safety violations, behind only India and China. This was exemplified in June 2014,

when a massive outbreak of Cyclospora-contaminated salads and cilantro grown in Mexico resulted in 304 people falling ill. This suggests that Mexico still has significant areas for improvement with regards to food safety.

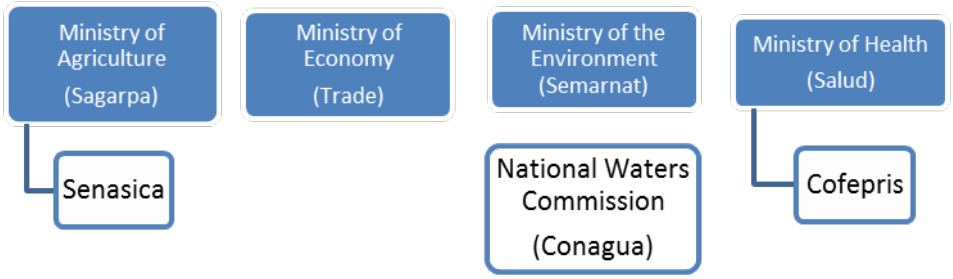
Food Safety

The Mexican government publishes technical regulations (*reglamentos*) and standards (NOM) in the *Diario Oficial de la Federación*, the Mexican equivalent of the US Federal Register. The Ministry of Trade (*Secretaría de Economía* or SE) coordinates the overall regulatory process, and while other Mexican federal agencies may develop regulations under their jurisdictions, they must work through the SE. The NOM is coded by subject and is revised approximately every five years.

The two primary laws concerning food safety in Mexico are the Federal Law on Plant Health (FLPH) which was revised in 2008 and authorises the Ministry of Agriculture, Livestock Breeding, Rural Development, Fisheries and Foodstuffs (SAGARPA) to regulate plant health and to implement systems which mitigates risk of contamination. The General Health Law, revised in 2009, authorises the empowerment of the Federal Commission for the Protection from Sanitary Risks (COFEPRIS) to identify risks to human health.

The National Service for Agro-Alimentary Public Health, Safety and Quality (SENASICA) and the COFEPRIS are the two primary agencies governing the food industry. Both were officially formed in 2001. Apart from the SENASICA and the COFEPRIS, issues related to food safety are jointly governed by seven agencies:

Table 1: Mexican government institutions responsible for food safety



- **SAGARPA** (Ministry of Agriculture, Livestock Breeding, Rural Development, Fisheries and Foodstuffs): in charge of coordinating the federal government's rural development policy; administering and promoting the agricultural, livestock and fisheries industries; creating enterprises that help producers plan, coordinate and apply financial resources and technical assistance; coordinating the issuance of official standards for quality of agricultural, livestock and fish products and establishing a national system for inspection and certification.

- **Ministry of Trade** (*Secretaría de Economía* or SE): supervises regulatory reform across the federal government, and keeps and publicises information on market integration and development.
- **Ministry of Health** (*Secretaría de Salud* or SALUD): establishes policies to guarantee the population's right to health protection through an inter-sectorial National Health System, focusing on prevention measures.
- **SEMARNAT,** (the Ministry of the Environment and Natural Resources): in charge of coordinating environmental policy; particularly relevant for regulatory support and enforcement of introduction and use of genetically modified organisms.
- **CONAGUA**: a federal government agency in charge of preserving national water resources, ensuring their sustainable administration and the country's water security, including issuing and enforcing regulations on water use.
- **SENASICA**: a SAGARPA agency in charge of enforcing sanitary regulations in agricultural, livestock and fisheries production and with applying and certifying contamination risk reduction systems, to facilitate domestic and international trade.
- **COFEPRIS**: a Ministry of Health agency focusing on issuance, control and enforcement of sanitary regulations, as they apply to human health.

As shown above, Mexico's food safety environment is complex and is regulated by a number of agencies. This means that there are frequent overlaps between the jurisdictions of each organisation. While SENASICA and COFEPRIS are at the forefront of establishing and enforcing food safety regulations, SAGARPA, SALUD, SE, SEMARNAT and CONAGUA have purview over specific inputs or processes that affect the food supply and processing chain.

The way food safety and ancillary regulations interlock creates a complex framework that hampers universal application. In addition, the competing organisational priorities and lack of coordination between bureaucracies lead to poor implementation of training programmes for agency staff and programme beneficiaries, including primary producers. The US Department of Agriculture audit in 2012 (albeit on meat products) identified significant flaws in the Mexican government's oversight on food safety measures. Although SENASICA planned to launch a training programme for primary producers in 2011, it was suspended due to a lack of funds. An online course, 'Basic Aspects of Agri-Food Safety' was made available in 2011, but contained no content other than a schedule of classes and exams.

Primary production

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C1	Regulations on primary production are well-developed and implemented, which helps to enhance food quality and consumer confidence.	Mexico	Low (General)	Low (General)	Low (General)
			High (Export)	Medium (Export)	Medium (Export)
		Australia	Low	High	Medium

Regulatory support

Mexico's regulatory environment for food safety in primary production lacks clarity, and is rated **LOW**. The FLPH sets requirements for primary production by defining Good Agricultural Practices (GAPs) as 'A set of minimum sanitary measures that are performed at the site of primary production of plants, to ensure minimizing the possibility of physical contamination, chemical and microbiological quality of a plant or fresh product.'

Enforcement effectiveness

Mexico's enforcement of regulations for primary production is rated as **LOW**. The Plant Production Law authorises SENASICA to audit farms and other primary production facilities on its own initiative or at the request of an interested party. However, interviews with SENASICA officials revealed that the agency faces a dearth of qualified personnel, so implementation lags considerably behind perceived needs. Implementation of GAPs and Good Manufacturing Practices (BPMs) is not mandatory.

However, although GAPs are not compulsory, they are still an incentive for farmers to comply. This is especially relevant for exporters, as Mexican consumers are mostly unaware of this standard.

Rating for Mexico's vegetable export sector

Export standards for primary production require Mexican vegetables to meet the standards of the importing country as well as domestic standards, and are thus rated **HIGH**. Growers must ensure that levels of contamination remain within the bounds outlined in the Codex Alimentarius. These regulations require professional training for those using pesticides, who must also keep records on frequency, timing and reason for use.

Vegetables produced for export are much more closely inspected than those produced for domestic consumption. Audits are in place for the certificates of BPM compliance for primary productions facilities. These can occur without notice. Requiring these certificates is meant as a reciprocal measure of assurance with other vegetable

Rating for Mexico's vegetable export sector

exporting countries. Therefore, there are clear incentives for exporters to acquire and continually update this certification. A certificate is valid for two years. This indicates that there is stringent enforcement in place for primary production facilities, although a general lack of qualified personnel means that only industrialised farms are covered – while those in more remote areas often go without the certificates.

In recent years, Mexican exports have failed to satisfy the safety standards of industrialised and other developing countries. Implementation is therefore rated as **MEDIUM**.

The rating for export also applies to the next parameter: 'use of chemicals'.

Use of chemicals

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C2	Regulations on the use of chemicals are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Mexico	Medium (General)	Low (General)	Low (General)
			High (Export)	Medium (Export)	Medium (Export)
		Australia	High	High	High

Regulatory support

Mexico's regulatory environment for the use of chemicals is rated **MEDIUM**. The Inter-Secretariat Commission for the Control Process and Use of Pesticides, Fertilisers and Toxic Substances (CICOPLAFEST) is in charge of governing the use of pesticides. The organisation has been in place for nearly 30 years and, although it is not a regulatory body itself, it coordinates with the Mexican government about what actions to take with regards to pesticides through its member agencies. Each member agency has regulatory authority for certain aspects of pesticide use, including imports and exports. The four member ministries are: SAGARPA, SEMARNAT, SALUD and SE.

Through CICOPLAFEST, authorisations regarding the use of fertilisers, pesticides, and toxic substances in all food processing areas including planting, packaging, handling, transportation, distribution, application, storage, commercialisation, keeping, use, and final disposal are monitored.

Maximum residue levels (MRLs) are established by SEMARNAT and are prescribed in NOM-232-SSA1-2009 which was established on 13 April 2010. These MRLs are largely shared with those in the US. However, there are no explicit regulations regarding the minor use of chemicals. Some prohibited and restricted pesticides continue to be used

in Mexico.

Enforcement effectiveness

Enforcement of this parameter is rated as **LOW**. In a 2012 study, COFEPRIS, in large part responsible for the control of pesticides, was compared to other organisations of its calibre. The survey found that the US employed 11,516 people in the FDA while the COFEPRIS only employed 1,575 people. The lack of human resources has posed strong challenges to policy implementation, and several incidents have occurred. For example, in 2012, Japan and the US issued alerts against imports of Mexican avocadoes, prickly pear leaves and chilies, respectively, given chemical and biological contamination in shipments. In 2014, an organic tomato imported to Canada from Mexico, was found to contain excessive pesticide residues.

Metal contamination

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C3	Regulations on heavy-metal contamination are clear and implemented strictly, which helps to enhance food quality and consumer confidence.	Mexico	Low	Low	Low
		Australia	High	High	High

Regulatory support

Mexico's regulatory environment for metal contamination is rated as **LOW**. There is no specific regulation on metal contamination in vegetables. The only relevant regulation controls metal residues in water from industrial discharges, which does not significantly benefit primary production.

Enforcement effectiveness

Enforcement effectiveness is rated as **LOW**. There is no readily available specific information on heavy metal contaminants for public consultation. Reports from NGOs and the media suggest that rivers in Mexico are heavily polluted by heavy metals. Some of these rivers run through key vegetable production areas.

Packaging

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C4	Regulations on packaging ensure the quality of products and are supported by an efficient quality assurance system.	Mexico	Medium	Low	Low
		Australia	Low	Medium	Low

Regulatory support

Mexico's regulatory environment for packaging is rated **MEDIUM** as legislation is insufficient. The General Health Law authorises SALUD to regulate food packaging so that it identifies key health concerns. NOM-002-Salud1-1993 sets the standards that must be met by manufacturers of metal containers intended to hold food and beverages, as well as by importers and distributors of canned foods and beverages. This regulation bans the sale or import of foods and beverages in metal containers with lead solders and specifies the type of seams permitted for hermetically sealed containers. However, regulations lack qualitative details that can be implemented on food packaging.

Enforcement effectiveness

Given that legislation related to food packaging is minimal in Mexico, there is very little enforcement, which is therefore rated as **LOW**. There is no evidence to suggest that domestic consumers actively demand higher packaging standards or lodge complaints against current practices.

Storage and transportation

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C5	Regulations on storage and transportation (including cold chain) ensure the quality of products and are supported by an efficient quality assurance system.	Mexico	Low	Low	Low
		Australia	High	High	High

Regulatory support

Mexico's regulatory environment for storage and transportation is rated as **LOW**. Although Mexican legislation does not mandate traceability for fresh produce, the voluntary GAPs and GMPs programmes require farms and packers to log details of the product from the field to the store. This must include information on the production

unit, product, batch, date cutting process on the date of packaging unit and number of boxes of each batch. There are no specific NOM's for controlling storage and temperatures while storing or transporting fresh vegetables.

Enforcement effectiveness

Transportation and distribution methods inside Mexico are undeveloped in many regions, and there are vast differences in the degree to which private sector companies deploy resources to comply with GAPs and GMPs. As with other safety areas, Mexico exhibits significant deficiencies in manpower, training and transparency to adequately evaluate storage and transportation safety. Hence, we rate enforcement effectiveness as **LOW**.

Food processing

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C6	Regulations on food processing ensure the quality of products and are supported by an efficient quality assurance system.	Mexico	Medium	Low	Low
		Australia	High	High	High

Regulatory support

Regulations on food processing are insufficiently developed, and are rated **MEDIUM**. SALUD, through COFEPRIS, regulates the use of additives in the preparation of food intended for human consumption. Mexican regulations define a food additive as a substance that is added directly to food and beverages during their manufacture in order to provide or intensify aroma, colour, or flavour, to improve their stability or preservation. SALUD has established a reference list that indicates the permitted and prohibited additives as well as the maximum and minimum levels of additives in food, beverages and food supplements. However, regulations in Mexico do not adequately cover other safety requirements, such as temperature and hygiene during food processing.

Enforcement effectiveness

Although President Enrique Peña Nieto's speech on 8 April 2015 said that Mexico successfully certified 83.6% of all food processing and sale establishments in 2014, helping reduce food-transmitted diseases by 8% year on year, there are several plants that still haven't been certified, and more small plants that are unlikely to have been calculated. Food-transmitted diseases still represent the second most common cause of infectious and gastrointestinal illnesses in the country. Therefore, enforcement is rated as **LOW**.

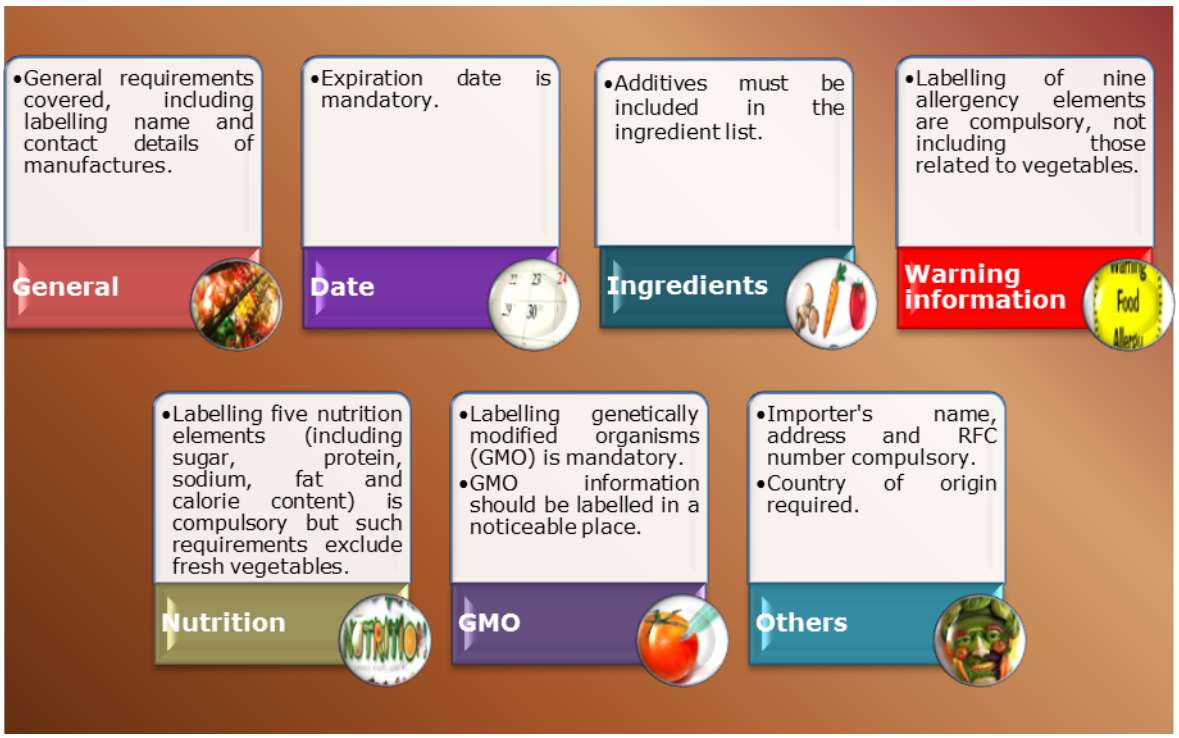
Food labelling

ID	Competitiveness parameters	Country	Regulatory environment	Enforcement effectiveness	Overall rating
C7	Regulations on labelling ensure consumers make well-informed choices, which could enhance consumer confidence in purchasing.	Mexico	High	Medium	Medium
		Australia	High	High	High

Regulatory support

Mexico's regulatory environment for food labelling is extensive, and is therefore rated **HIGH**. Labelling regulations are covered in 'General Specifications for Labelling Pre-packaged Foods and Non-alcoholic Beverages' NOM-051-/Salud1-2010 which came into effect in January 2011. Various institutions and companies contribute to this rule. Products that legally require labels should have the information in Spanish as required by the Mexican Official Standard NOM-051-SCFI/SSA1-2010. Mexico announced new labelling rules with a compliance deadline of April 2015, under which the content of energy, fats, sugar and sodium will be required to appear on the front of pre-packaged foods and non-alcoholic beverages – demonstrating an increase, albeit a slow one, in health consciousness and customer attention to food labelling.

Table 2: Mexican regulations and measures governing food labelling



Enforcement effectiveness

Mexican enforcement on labelling is rated as **MEDIUM**. The enforcement of the new NOM-051 is monitored jointly by the Federal Consumer Protection Agency (PROFECO) which is part of SE and COFEPRIS. However, the implementation of the labelling law lacks transparency. For example, there is no information available detailing the consequences of violations.

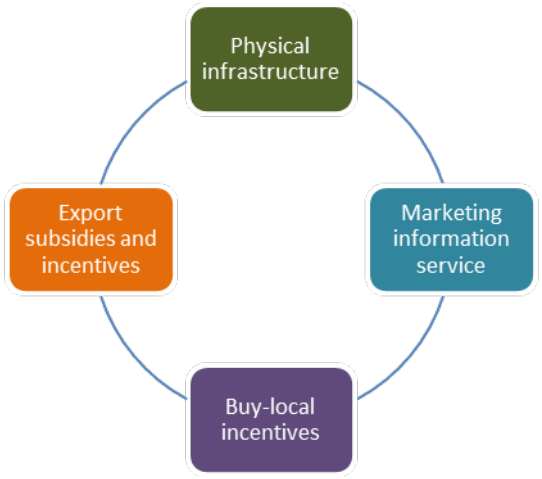
Government support for agricultural marketing

In its assessment of government support for the vegetable sector in Mexico, Control Risks considered the span of services involved in moving an agricultural product from farm to consumer. Governments can enhance the competitiveness of local producers' agricultural marketing by upgrading infrastructure, providing marketing information, backing buy-local initiatives and supporting exports, as illustrated below.

These types of government support are interrelated, but we have categorised them for analytical clarity. Setting and enforcing high food safety standards also feeds into the strength of agricultural marketing, and has been analysed separately in the previous sections.

This section is designed to compare supportive measures in the following four categories in Mexico and Australia.

Table 3: Government support for agricultural marketing that has the potential to enhance competitiveness



Physical infrastructure development

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C8	Infrastructure support for farmers aids international competitiveness.	Mexico	Medium	Low	Low
		Australia	High	High	High

Regulatory support

Mexico's regulatory environment for infrastructure development is rated as **MEDIUM**. Mexico has made infrastructure development one of its top priorities and government support is extensive and targeted at higher end infrastructure which has also benefited the agricultural industry. For example, the new Durango-Mazatlán highway, which connects the Pacific and Atlantic coasts, has provided agricultural producers in the state of Sinaloa with easy access to the central and eastern markets of the US. The Mexico Conectado programme, which aims to increase Internet connection, has covered over 30,000 public spaces in rural areas. This will stimulate information delivery to growers in villages. In addition, SAGARPA has invested MXN 18.9 million (AUD 1.6 million) into greenhouse projects in 17 states in the hope that this investment will protect against unreliable weather conditions and ensure all year round production – traditionally, certain states have only been able to produce during certain months of the year which has made income levels from agriculture unreliable.

Enforcement effectiveness

Enforcement effectiveness for infrastructure development is rated as **LOW**. Although the Mexican government acknowledges the importance of improving infrastructure, the development has not covered the whole country. States in the north and central regions, such as Sonora, Sinaloa and Guanajuato, have excellent infrastructure in place, whereas others, mostly in the south, like Guerrero and Michoacán, are harder to reach and lack the technology to bring them up to date. The Global Competitiveness Report 2014-15 ranks the overall quality of infrastructure in Mexico as 69, much lower than in Australia. The report suggested that mobile telephone subscription rate in Mexico is particularly low, ranked 111.

Marketing information service

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C9	Information access support is efficient, which makes farmers well-informed of market changes.	Mexico	Medium	Low	Low
		Australia	High	High	High

Regulatory support

The Mexican government offers **MEDIUM** regulatory support for access to agricultural information. The primary agency providing information on vegetable markets is the SE's National Market Information and Integration Service (*Servicio Nacional de Información e Integración de Mercados* or SNIIM). SNIIM provides prices for a large variety of crops in the 28 largest domestic terminal markets and 20 international markets, as well as product quality, origin and unit of sale. Additionally, SNIIM offers a module of commercial links that allows users to place online offers or calls for perishable products. However, information on risk management and the use of pesticides is not readily available.

Enforcement effectiveness

Enforcement effectiveness for this parameter is rated **LOW**. Access to SNIIM's services and information is dependent on having internet access, which is very limited in most rural areas.

Buy-local initiatives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C10	Buy-local initiatives are efficient, which creates opportunities for increasing profits of local growers.	Mexico	Low	Low	Low
		Australia	Medium	Medium	Medium

Regulatory support

Mexico's regulatory support for buy-local initiatives is rated as **LOW**. Mexico does not currently have any regulations sponsoring buy-local programmes, including with regards to supporting small farms accessing to markets.

Enforcement effectiveness

Enforcement is rated **LOW** because of the absent of relevant policies. However, it is worth noting that the weekly 'markets-on-wheels' (organised by vendors' associations that include both primary producers and resellers of fresh foodstuffs) and neighbourhood markets are an intrinsic part of Mexican culture. Such markets have provided instant links between growers and consumers.

Export subsidies and incentives

ID	Competitiveness parameters	Country	Regulatory support	Enforcement effectiveness	Overall rating
C11	Export subsidies and incentive policies are well-designed, which creates opportunities in selling to international markets.	Mexico	Medium	Medium	Medium
		Australia	High	High	High

Regulatory support

Regulatory support for export is rated as **MEDIUM**. Mexico followed a very aggressive adherence to free market policies during the 14-year implementation period of NAFTA's agricultural chapter, essentially dismantling the previous framework for guaranteeing production prices.

However, SAGARPA offers a large variety of other production supports – including refunds for diesel costs, as well as subsidised fees for irrigation and futures markets coverage, which are not defined as subsidies. The main problem with these support programmes is that a large majority of the benefits are concentrated on a small minority of commercial producers. For example, from 2006 to 2012, the top two deciles of agricultural producers received 60% of direct transfers and the top decile received 60% of indirect subsidies.

Enforcement effectiveness

Enforcement effectiveness for export subsidies and incentive policies are rated as **MEDIUM** for Mexico. Although Mexico has seen a large and steady growth of agricultural exports in recent years, the lack of transparency hampers the evaluation of supports allocations.

Mexico is currently one of the most open economies in the world, and is the country with the most free trade agreements in Latin America. That openness has resulted in an increase in agricultural exports, which totalled USD 14.4 billion (AUD 18.3 billion) in 2014.