



Office Use Only

Project Code	
Project Type	

FINAL REPORT 2022

Applicants must read the *SAGIT Project Funding Guidelines 2022* prior to completing this form. These guidelines can be downloaded from www.sagit.com.au

Final reports must be emailed to admin@sagit.com.au as a Microsoft Word document in the format shown **within 2 months** after the completion of the Project Term.

PROJECT CODE	:	Code AEG121
---------------------	---	--------------------

PROJECT TITLE	(10 words maximum)
An economic analysis of Australia's main containerised grain supply chains	

PROJECT DURATION

These dates **must** be the same as those stated in the Funding Agreement

Project Start date	1 July 2021					
Project End date	30 June 2022					
SAGIT Funding Request	(year)		(year)	\$	(year)	\$

PROJECT SUPERVISOR CONTACT DETAILS

The project supervisor is the person responsible for the overall project

Title:	First Name:	Surname:				
Prof	Ross	Kingwell				
Organisation:						
Australian Export Grains Innovation Centre						
Mailing address:						
Telephone:	Facsimile:	Mobile:	Email:			

PROJECT REPORT

Provide clear description of the following:

Executive Summary (200 words maximum)

A few paragraphs covering what was discovered, written in a manner that is easily understood and relevant to SA growers. A number of key dot points should be included which can be used in SAGIT communication programs

The project revealed that grain containerisation complements bulk exports, but also involves a wide array of execution risks very different from those in bulk grain supply chains. Growers need to be better informed and equipped to manage these risks, before venturing into grain containerisation. A 'how-to' manual produced for South Australian growers by the project will help inform farmers about these risks.

Our work also shows that Australian governments could aid cost effective, low emission flows of containerised grain via their oversight and regulatory roles. One of the key recommendations emerging from the project is that governments should more effectively regulate container ports to boost their efficiency and help avoid anti-competitive behaviour. Container port developments need to achieve enduring economic and environmental, social, and governance outcomes rather than provide short-term budgetary relief for governments or commercial advantage solely to incumbents. This was particularly relevant to South Australian growers given Flinders Adelaide Container Terminal Pty Ltd is the sole container stevedore at Port Adelaide.

Finally, the report recommends that local and state governments can actively preserve supply chain efficiency through some key interventions such as:

- Protecting buffer zones for preferred containerised grain pathways.
- Developing intermodal hubs and rail access direct to ports.

Project Objectives

A concise statement of the aims of the project in outcome terms should be provided.

The project's aims that related specifically to the SA grains industry blueprint was to provide insights and recommendations on the following issues:

- Awareness and ability of growers to fill containers for export on-farm.

- Pathways for the movement of empty containers, linking with the internal rail project.
- Road versus rail pricing disparity for containers at port.

Overall Performance

A concise statement indicating the extent to which the Project objectives were achieved, a list of personnel who participated in the Research Project including co-operators, and any difficulties encountered and the reasons for these difficulties.

All the project objectives were achieved through a combination of the following:

- Research and publication of the project's major reports and case studies (listed in the KPIs below).
- Publication of two additional outputs, not listed in the KPIs but useful in meeting the project objectives. These were:
 1. Bulk and containerised grain exports from Australian States.
 2. Stakeholder views of container supply chain issues and solutions.
- Submission to the Productivity Commission's Maritime Logistics System.
- Ongoing extension of the project's findings through seminar, industry briefings and meetings.

Personnel

Professor Ross Kingwell – Project Lead

Mr Scott McKay – Logistics consultant

Mr Nigel Hart – Logistics consultant (until appointed to his Managing Director role in GRDC)

Dr Peter White – Project Manager

The following people were important co-operators to the project:

- Osman Mewet – Australian Seed Federation
- Darren White – AEXCO (Fodder Exporters)
- Neil Chambers – Container Transport Alliance Australia
- John Orr – Premium Grain Handlers
- Peter Wilson – Wilson International
- Sean Mulhall and Domonique Thatcher – Fremantle Ports
- Mick Keogh, Anna Brakey, Matthew Schroder and Sarah Proudfoot – ACCC
- Kurt Wilkinson – Fletcher International Exports
- Colin Bettles – Grain Producers Australia
- Patrick Seares – Westport Program Strategy Stage 3
- Justin Crosby – GRDC
- David McKeon and Zachary Whale – Grain Growers Ltd
- Zachary Whale – Grain Growers - briefing for their productivity commission submission
- Colin Bettles – GPA - briefing for their productivity commission submission

The Covid 19 pandemic caused some difficulties in meeting the project's objectives. These were:

- Limited ability to undertake face-to-face meetings and hence reduced effectiveness of stakeholder consultation. As a consequence, the project needed

to undertake multiple smaller on-line meetings rather than a major stakeholder forum.

- Container availability was substantially reduced, and freight charges skyrocketed soon after the project commenced. Many stakeholders were therefore pre-occupied with the effects of these unprecedented changes to their operating environments. Shifting their attention away from these issues to other components of the supply chain was sometimes difficult.
- Lock-down periods in NSW made accessing some of the case study participants in a timely fashion more difficult.

Key Performance Indicators (KPI)

*Please indicate whether KPI's were achieved. The KPI's **must** be the same as those stated in the Application for Funding and a brief explanation provided as to how they were achieved or why they were not achieved.*

KPI	Achieved (Y/N)	If not achieved, please state reason.
Two case study reports written and reviewed by the participant that provide an overview of their containerized grain business, the reasons for its success and the obstacles overcome.	Y	
A stakeholder forum (possibly on-line) to discuss the issues affecting SA's containerized grain trade.	Y	Due to COVID 19 disruptions, a single large forum was not held, but multiple meetings with a range of relevant stakeholders occurred online.
Short videos describing the two containerized grain business, the reasons for their success and the obstacles they have overcome.	Y	
A formal glossy project report that fully describes containerized grain supply chains in the main grain exporting States and outlines State and national findings and recommendations.	Y	
A "How to" manual outlining the various ways in which a farmer could engage in the containerized grain trade; the steps, hazards and opportunities.	Y	
Radio interviews and other communication products (GrainCentral and/or	Y	

GroundCover articles) outlining the project's findings and recommendations.		
---	--	--

Technical Information (Not to exceed **three** pages)

Provide sufficient data and short clear statements of outcomes.

Australian grains and fodder container exports

Despite the dominant role of bulk shipping and bulk grain supply chains in Australia, containerised grain exports continue to play an important role for certain grain and fodder exports from Australia. Containerisation is especially important for specialty grains such as pulses and in Australia's eastern states. By illustration, on average over the period 2014–15 to 2020–21, the proportion of grain exports that came from containerisation in Vic, NSW and Qld was 36, 28 and 34 per cent, respectively.

The mix of crops exported via containerisation differs between Australian states. Wheat, lentils and faba beans dominate containerised grain exports from Vic, whereas wheat and chickpeas dominate exports from NSW and Qld. SA displays the most even mix of containerised grain exports, featuring lentils, faba beans, wheat, field peas and malt. Similarly, WA exports a diverse range of grain exports, but mostly wheat, malt and processed oats. Each grain type, however, tends to be sent to a narrow range of destination countries. Pulses predominately are sent to South Asian and Middle East countries. Malt is exported to only a handful of countries. Sorghum is mostly sent to Japan and wheat is principally sent to China, Taiwan and a subset of South East Asian countries.

What is not always appreciated is how much fodder is exported via containers from Australian ports. Over several decades, Australia has developed some key markets for its export of hay, especially Japan and China, such that often around 1mmt of fodder is exported via containers from Australia.

Why export grain in containers?

In general, container packing or shipment of grain or fodder via containers is commercially feasible, relative to bulk shipping, when there is:

1. **A viable shipping option for small cargoes that can be relied on:** such as high margins on small volumes, or storage constraints for large volumes at destination.
2. **Opportunities within the bulk supply chain:** such as where farmer's grain is produced near a container packer but distant from their nearest bulk terminal or grain buyers want verifiable traceability.
3. **Complementarity to a bulk grain supply chain.** Containerisation of grain can complement bulk supply chains, whilst usefully injecting some competitive pressure on both supply chains (i.e. bulk and container supply chains).
4. **An opportunity to extract value from atypical or differentiated varieties or to unlock value from crop breeders' stranded crop lines.** Containerisation and/or closed loop marketing arrangements offer a means to extract value from uniquely functional varieties rather than being co-mingled with large bulk grain stacks.

5. **Reward for protecting grain quality from reduced handling.** Containerisation involves less co-mingling and damage to the grain from repeated handling compared with bulk handling systems. This can limit financial losses that arise from phytosanitary events or quality disputes
6. **A perceived need for greater diversity in grain supply chains.** In some regions, grain producers opt for selling some of their grain through containerisation to lessen their dependence on the services of the dominant or sole bulk grain handler or marketer.
7. **Access to food grade empty containers.** When there is a consistent ease of access to food grade containers this facilitates grain containerisation.

Relative costs of container and bulk grain supply chains

Supply chain costs impact the competitiveness of the Australian grain industry. Data describing Australia's bulk grain export supply chains for the 2020–21 and 2021–22 harvests were collated and compared. Overall bulk grain supply chain costs in SA and Australia's eastern states were similar in both years. By contrast, bulk grain supply chain costs in WA substantially increased in 2021–22.

Australia, bulk grain supply chains costs in WA still currently remain the lowest, and since 2014–15, bulk grain supply chain costs in WA have decreased by the greatest in real terms. In 2021–22 the bulk grain supply chain costs in WA were between \$17.5 to \$26 per tonne cheaper than in other states for an equivalent distance to port. Each main component of bulk grain supply chain costs (i.e., freight, port fees, and warehouse storage and handling) is less costly in WA.

Although a variety of containerised grain supply chains exist across Australia, often a key difference in those chains is whether packing occurs on the farm or at a distant packing facility located either at a regional intermodal centre or at port. An examination of the current typical costs of different containerised grain supply chains reveals that packing on-farm is rarely the more profitable avenue for engaging in the containerised export of grain. Ideally use of packing facilities, either at or near port or at regional packing facilities with direct access to cost-effective rail services, is preferable

The need to scrutinise and regulate parts of grain supply chains

In Australia, a Productivity Commission inquiry into Australia's maritime logistics system is underway and is due to report in August 2022. In addition, the ACCC (2021), in its statutorily required monitoring report on container stevedoring, observed that "Shipment delays have been mounting as shipping lines are increasingly omitting ports, rolling over cargo and cancelling bookings."

Widening the Productivity Commission's review of shipping to consider the nature and efficiency of domestic shipping is also likely to reveal further opportunities for reform from which domestic consumers and the wider Australian economy will benefit. Reliance on cost-effective interstate shipping of grain and fodder is especially important during prolonged periods of regional drought when large volumes of grain and fodder need to be transported from regions of surplus to regions of deficit.

There also needs to be greater regulation of privatised ports and for oversight of export grain supply chains including the need to protect buffer zones around least-cost, low emission grain paths.

Australia lacks the legislative framework to ensure adequate monitoring of its bulk and container grain supply chains; and the opaqueness in the costs and inadequacies of efficiency assessments of supply chain services act as barriers to entry and raise risk premia in transactions.

Governments need to ensure that grain supply chain businesses and service providers are subject to monitoring, scrutiny and regulation (where required) to ensure that the wider Australian economy and not just a handful of entities within those supply chains are beneficiaries of the operations of those supply chains. Government action is an increasingly pressing need. Governments of Australia's key grain export competitors, Canada and the USA, are already taking action to create greater efficiencies in their containerised grain export industries.

Supply chain investment

There is an on-going need for governments and industry to support investments that create or maintain least-cost, low emission grain paths for containerised grain and fodder. There are planned investments in intermodal terminals and associated rail and road access and infrastructure that will complement the Inland Rail to facilitate cost-effective movement of containerised grain and fodder. These investments and their maintenance and upgrade, together with empty container park facilities, will need to be an on-going feature of the containerised grain and fodder.

Future supply of container ships

The future increased supply of container vessels and the trend towards larger ships should mean that major destination ports of Melbourne, Sydney and Brisbane will eventually benefit from eased access to more containers, with grain and fodder once again becoming attractive back freight opportunities. Smaller ports in Adelaide and Fremantle are less likely to benefit to the same degree due to their lesser growth in containerised freight trade.

Availability of food grade 20 foot containers

The proportion of 20ft containers within the stock of all containers handled in Australia is gradually declining. Shippers of non-grain commodities prefer to use 40ft containers as their profit margins per shipping slot are greater with 40ft containers. If the proportion of 20ft containers eventually falls to sufficiently low levels, then 20ft containers will become less available, and the cost to convert more of those containers to a food grade level will become an additional expense for exporters.

There needs to be industry and government monitoring of the availability of 20ft food grade containers and discussion about the most cost-effective responses to the potential structural challenge of gradual reduced availability of 20ft food grade containers. Investing in transport modes and pathways that increase mass limits would appear one obvious component of a solution.

Conclusions Reached &/or Discoveries Made (Not to exceed one page)

Please provide concise statement of any conclusions reached &/or discoveries made.

Government and industry actions can generate enduring value for the Australian containerised grain and fodder export industry

The following actions are immediately and strategically worthwhile.

Market access

Collaboration between Australian governments and the Australian grains industry can ensure new or existing market opportunities for Australian containerised grain and fodder are maintained, further developed, or freshly developed.

Supply chain investment

Opportunities for new investments in supply chain infrastructure can create or maintain least-cost, low emission grain paths for containerised grain and fodder. Such least-cost, low emission grain pathways are essential if Australia's international competitiveness is to be protected and road congestion around ports is to be reduced. The following should be a focus:

- Inadequate rail access to container ports and a shortage of space in some empty container parks.
- Intermodal hubs and rail access to ports.
- Land and infrastructure for empty container parks and rail services to ports.

Oversight and regulation

The ACCC should be provided with statutory powers to gather the information from industry players to closely monitor key efficiency metrics and margins throughout the containerised grain supply chain, including domestic and international shipping, to ensure no excessive use of market power is occurring and that information flows are sufficient to encourage the discipline of competition.

Biosecurity protocols and processes, and the way staff implement them need to be frequently monitored and revised to improve their cost-effectiveness.

Low emission grain pathways should be actively monitored, protected and maintained by state and local governments.

Opportunities for education

Industry and government need to collaborate to collate information to lessen the opaqueness of containerised grain supply chains and also invest in education and training for prospective participants. In addition, the training of authorised officers should be regularly appraised to ensure biosecurity protocols and processes remains fit-for-purpose in form and in content.

Intellectual Property

Please provide concise statement of any intellectual property generated and potential for commercialisation.

IP contained in the report and outputs from the report are jointly held by SAGIT, GRDC and AEGIC, but this IP does not have the potential to be commercialised.

Application / Communication of Results

A concise statement describing activities undertaken to communicate the results of the project to the grains industry. This should include:

- *Main findings of the project in a dot point form suitable for use in communications to farmers;*
- *A statement of potential industry impact*
- *Publications and extension articles delivered as part of the project; and,*
- *Suggested path to market for the results including barriers to adoption.*

Note that SAGIT may directly extend information from Final reports to growers. If applicable, attach a list of published material.

Communication of the project's findings has been through publication of various reports (see list below), easy-to-read factsheets, promotion of reports through press releases, radio interviews, social media (Twitter, YouTube, Blogs) seminars and Crop Updates presentations and targeted briefings to stakeholders as appropriate.

The main findings include:

- Australia regularly exports over 3mmt of grain in containers.
- Australia regularly exports around 1mmt of fodder in containers.
- Relative to the bulk export of grain, containerisation offers several advantages but also some disadvantages.
- The ramifications of COVID have greatly affected the profitability of containerised grain exports.
- Government and industry actions (in the areas listed below) can generate enduring value for the Australian containerised grain and fodder export industry. These include:
 - Market access.
 - Supply chain investment.
 - Oversight and regulation.
 - Grower and industry education.

The potential impact from this project will be firstly through improved oversight and regulation of containerised supply chains in South Australia (and the rest of the country) leading to reduced cost of containerised grain export. This will benefit growers by:

- Assisting in maintaining Australia's international competitiveness in export markets and;
- Assist the diversification of grain production in Australia, by improving grower returns from high value and specialty crops exported through containerised supply chains.

Secondly, the "User Manual" for growers will assist grain farmers to make better decisions about whether or not, and how to, become involved in grain containerisation.

The main publications and extension materials produced by the project are listed below. All are publicly available and can be accessed by clicking on the titles:

- Final Project Report - [Improving Australia's containerised grain export.](#)
- How To Manual - [Participating in the containerised export grain trade: an information guide for farmers.](#)
- Stakeholder Survey - [Stakeholders' views of Container supply chain issues and solutions.](#)
- Supplementary Report - [Bulk and containerised grain exports from Australia's main grain producing states.](#)
- Factsheet – [Improving Australia's containerised grain exports.](#)
- Case Studies:
 - [AG Schilling & Co \(SA\).](#)
 - [Fletcher International \(NSW\).](#)
 - [Boolah Farms \(NSW\).](#)
- Groundcover Article - [Improving Australia's containerised grain supply chains.](#)

The path to market for the main research reports published by the project will be through government agencies and industry bodies. An early version of the projects' main report has already been submitted to the [Productivity Commission's Public Enquiry into Australia's Maritime Logistics System](#). Similarly, GRDC's state panels have also been briefed on the report's findings. The effort to extend this information to these bodies will continue where opportunities arise.

The path to market for the grower related information is through growers directly accessing information contained in the YouTube videos and the User Manual published on the SAGIT website. Extension of this information will be facilitated by presentations at GRDC's Research Updates where appropriate.

POSSIBLE FUTURE WORK

Provide possible future directions for the research arising from the project including potential for further work and partnerships.

Further research is needed to determine the potential economic benefits from a supply chain monitoring system for Australia (grain handling, storage, transport, ports and shipping). Would such a system lead to improved policy and investment decisions, how would economic benefits be realised, how would benefits flow through the system, what are potential down sides, how would the system operate and how much would it cost?

Increased productivity of Australia's containerised and bulk grain supply chains is necessary to ensure the competitiveness of Australian grain producers. Australia's key grain export competitors, Canada and the USA, are already taking action to create greater efficiencies in their bulk and containerised grain export industries.

To be effective, investments, and policy changes need to be informed by quantitative measures of supply chain efficiency. In this way governments can better gauge whether a change in policy or regulation will have the intended effects. Similarly returns to an investment in supply chain infrastructure can be more accurately estimated.

Australia does not effectively monitor its grains supply chains. A first step to bring Australia up to speed with our competitors will be to establish the specific details of a monitoring system as outlined above.