

Infrastructure audit

Evaluation of Western Australia's agriculture infrastructure priorities

Final Report

**Department of
Regional Development**

March 2016

The EY logo consists of the letters 'EY' in a bold, white, sans-serif font. Above the 'Y' is a yellow chevron shape pointing to the right.

**Building a better
working world**

Welcome



Hon Terry Redman

Minister for Regional
Development



...there is now a
generational
opportunity to
expand the state's
\$20 billion
agriculture and
food sector



Infrastructure to drive Western Australia agriculture *Forward*

The agriculture industry continues to transform.

Agriculture and food production have been the backbone of regional communities in Western Australia for more than a century.

The growing global demand for food presents an opportunity for Western Australia to realise the long term potential of its agricultural development.

Western Australia's State Government plays a significant role in harnessing international trade opportunities for the Western Australian agriculture and food sector.

The \$300 million *Seizing the Opportunity Agriculture Initiative*, made possible by the State Government's *Royalties for Regions* program, is aimed at enhancing and strengthening the agricultural sector's production and export capacity.

This Audit is one of fifteen programs being delivered under the initiative and is part of the \$77 million Infrastructure Investment Fund. It identifies gaps in major infrastructure, constraints and strategic opportunities to increase production and add value to premium agrifood products for export markets.

Infrastructure supporting the agriculture and food sector will leverage investment in regional food production and processing businesses to meet market demands. This in turn, will support the creation of new jobs, improved income and better prospects for regional businesses and communities.

The Audit enables informed strategic investment that will assist in achieving the target of doubling the value of Western Australia's agrifood sector, by 2025.

Western Australia has a long history of global investment driving its industries and there is now a generational opportunity to expand the state's \$20 billion agriculture and food sector to capture new market opportunities.

Royalties for Regions is diversifying regional economies to bring prosperity and build a better quality of life in regional Western Australia.

I am pleased to present this report that will inform and support strategic investment in infrastructure in our agricultural communities across regional Western Australia. It will contribute to a strengthened and sustainable regional economy and I look forward to seeing the wider benefits it will bring to Western Australians.

*Hon Terry Redman
Minister for Regional Development*

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Acknowledgments

This project has received support from a number of agencies and institutions.

We would particularly like to acknowledge the support provided by the Department of Regional Development (DRD), Department of Agriculture and Food (DAFWA), Department of Water (DoW), Department of Transport (DoT), Department of State Development (DSD) and the nine Regional Development Commissions.

We especially acknowledge the inputs provided by the project Steering Group: Andrew Mann, Keith Anthonisz and Wendy Muir (DRD); Peter Metcalfe (DAFWA); Steve Beyer (DoT); Simon Skevington (DoW); Stuart Crockett and Jane Ardern (DSD). The Steering Group was essential in providing guidance but also in providing contacts within their departments and assisting with visits to the regions.

We acknowledge the valuable comments and advice from Ralph Addis, Director General of the Department of Regional Development and Rob Delane, former Director General of the Department of Agriculture and Food (Director General at the time of consultation).

We acknowledge the support from affiliated *Seizing the Opportunity Agriculture* programs and other government projects such as the *Northern Beef Infrastructure Review* program (being undertaken by DAFWA / ACIL Allen), the *Asian Market Success* program (being undertaken by DAFWA / Coriolis), and the desktop study of transport barriers and opportunities in the grains sector (being undertaken by the DoT). Where practical, the outcomes of these projects have been incorporated into this report. Suffice to say, there has been mutual awareness, active communication and ongoing knowledge sharing between these projects.

Through the course of this project, EY consulted with a large number of people within the Western Australian agriculture industry including farmers and business owners, private sector leaders, departmental agency representatives, agribusiness and farm consultants, and infrastructure providers. Everyone was generous with their time and we acknowledge their contributions. These interactions are listed in Appendix F of the report.

Finally, images in this report were kindly provided and reproduced with DAFWA's permission (copyright © Western Australian Agriculture Authority).

Executive summary

Executive summary

Strategic investment in infrastructure will support the growth of WA's agriculture food and fibre sectors, enable the creation of new jobs, as well as improve income and prospects for businesses and communities in regional WA.

Context

Increased global demand for agricultural products represents a significant opportunity for Western Australia to grow its agriculture and food sectors.

The Western Australian Government aims to capitalise on this demand and double the value of WA's agrifood sector between 2013 and 2025. To grow the value of agrifood production to \$13.2 billion by 2025 will require real growth of 5.9% p.a., with the majority of this growth driven by exports.

Key drivers of export growth include productivity growth, the development of underutilised land, value-adding to primary produce, and the provision of post-farm gate infrastructure.

Purpose of this project

As part of the *Seizing the Opportunity Agriculture* initiative, and to help inform agricultural infrastructure priorities, the Department of Regional Development (DRD) commissioned Ernst & Young (EY) to conduct an Agricultural Infrastructure Audit (the Audit). The Audit has been undertaken in conjunction with a multi-agency Steering Group with representatives from Departments of Regional Development, Agriculture and Food, Water, Transport, and State Development.

The aim of the Audit is to determine infrastructure priority areas that will support the growth of WA's agriculture food and fibre sectors, enable the creation of new jobs as well as improve income and prospects for WA businesses and communities.

The outcomes of this Audit will guide what infrastructure projects will be considered by Government for the allocation of up to \$75 million via a dedicated Infrastructure Investment Fund (the Fund).

The Audit covers the following areas:

- ▶ Freight / transport roads, rail, ports & airports.
- ▶ Production storage, packaging & processing.
- ▶ Other possible constraints to efficient supply chains such access to land, water, energy, telecommunications, and labour.

Approach

This report is the final deliverable of the Audit and represents the culmination of over six months of data gathering, analysis and stakeholder engagement. It has been informed by an extensive literature review and consultations with businesses, government staff and academics working in the agrifood industry (see Appendix E and F for full lists of the documents reviewed and the stakeholders engaged).

To compile this report, EY mobilised a multi-stage screening and evaluation process for opportunity identification across three distinct phases:

1. Desktop review: a review of over 100 relevant agriculture and infrastructure documents across WA's agriculture food and fibre sectors to identify constraints and opportunities.
2. Stakeholder consultations: engagement with over 200 stakeholders to evaluate agribusiness and industry perspectives on infrastructure constraints and opportunities.
3. Analysis and recommendations: development of an *Initiative Database* to collect, categorise, screen and evaluate the almost 500 initiatives collected during Phase 1 and 2 of the Audit.

In consultation with the Steering Group, a set of criteria were then developed to rationalise and evaluate the initiatives.

A qualitative screen filtered out duplicate initiatives and initiatives that did not comply with the following **rationalisation criteria**:

- ▶ Hard infrastructure.
- ▶ Common use infrastructure.
- ▶ Contributes to growth / jobs.
- ▶ Funding required.

This reduced the list of initiatives to 139.

Each of these initiatives was then rated as high, medium, or low against the following **evaluation criteria**:

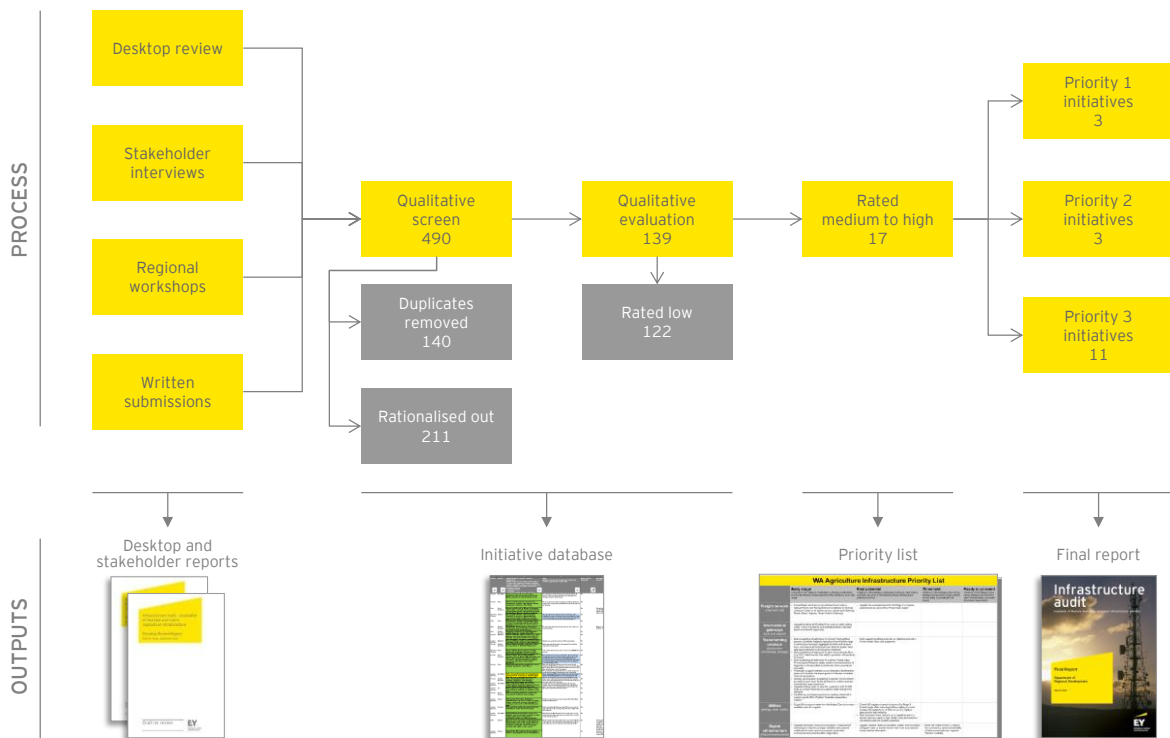
- ▶ Contributes to growth / jobs.
- ▶ Leverage opportunity.
- ▶ Cross-sector benefits.
- ▶ Cross-industry benefits.
- ▶ Transformation potential.
- ▶ Stakeholder support.

At the conclusion of the evaluation process, 17 initiatives emerged with a medium or high rating.

A tailored version of Infrastructure Australia’s approach was then used to classify the 17 medium and high initiatives into a *WA Agriculture Priority List*. This list classifies initiatives by infrastructure category and stage of development.

In consultation with the Steering Group, a series of recommendations on priority infrastructure were then developed. The 17 medium and high rated initiatives were split into Priority 1, 2 and 3 recommendations to facilitate staged application of investment funds.

Figure 1: The Audit’s multi-stage screening and evaluation process



Recommendations

The Audit has identified 17 priority infrastructure initiatives. These initiatives align strongly to the Audit's objectives and scored medium to high against the evaluation criteria developed during the Audit.

The 17 infrastructure initiatives are represented in Figure 2. Each initiative contains a brief description, geographic location, infrastructure category and relative priority.

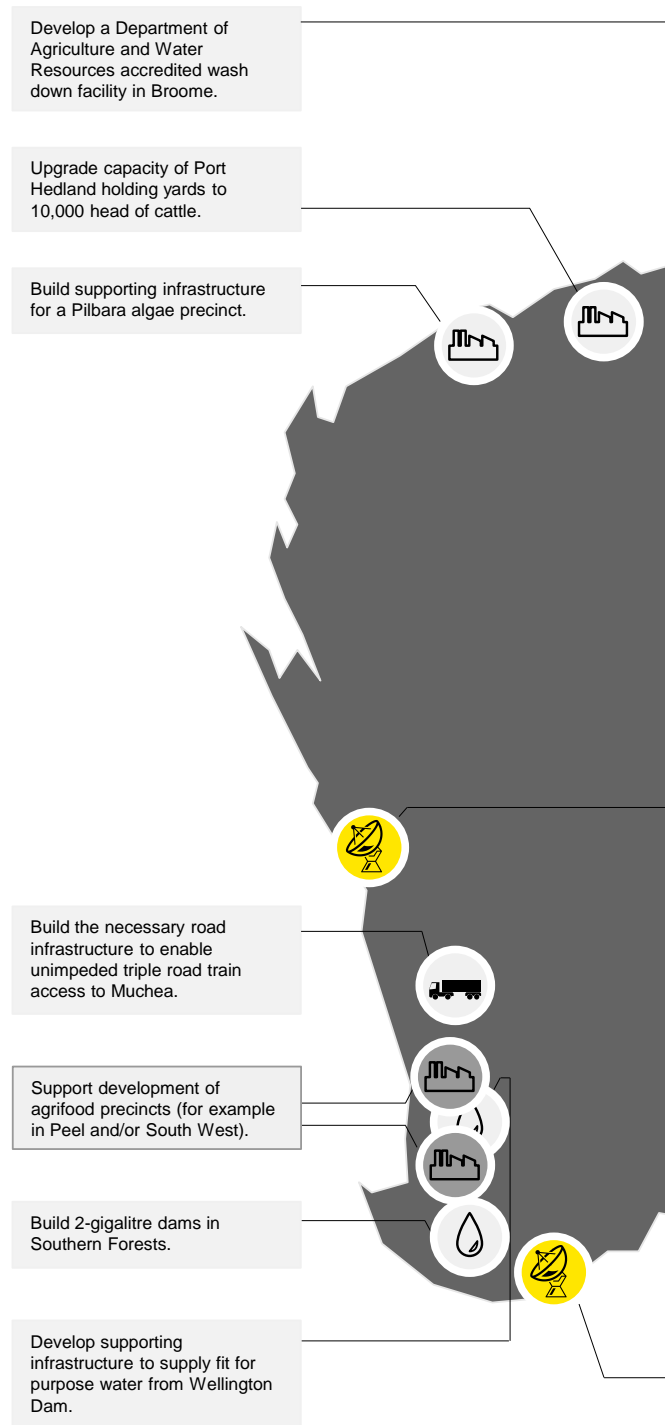
The Audit recommends:

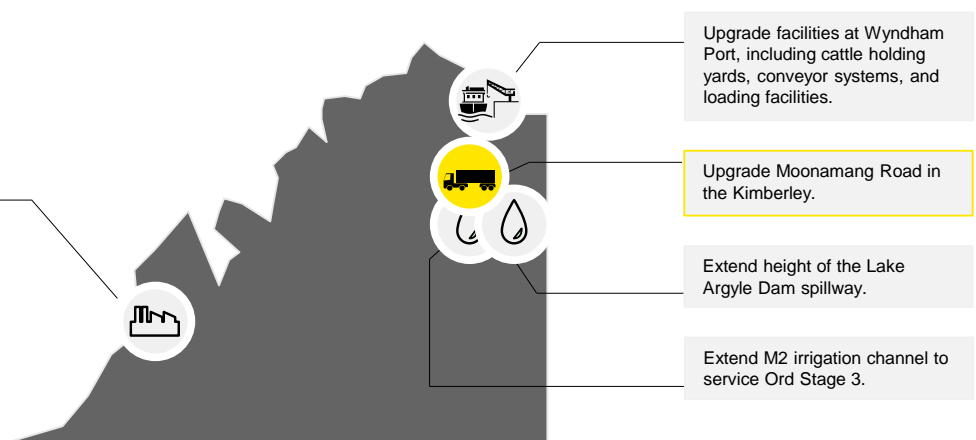
- ▶ Three Priority 1 initiatives (dark green). These scored highly against the evaluation criteria and are relatively well advanced in terms of solution development. It is recommended that they be progressed as formal business cases for funding consideration by State Government.
- ▶ Three Priority 2 initiatives (medium green). These also scored highly against the evaluation criteria but require additional scoping or feasibility studies. It is recommended that a portion of the Fund be put aside to progress these studies.
- ▶ Eleven Priority 3 initiatives (light green). These scored medium to high against the evaluation criteria with most requiring additional scoping or feasibility studies. It is recommended that these be progressed through the staged process set out in this Audit, contingent on available funding and in deference to Priority 1 and 2 initiatives.

The Audit has also identified an additional five supporting recommendations. The aim of these recommendations is to provide guidance to ensure ongoing value is derived from the work undertaken during the Audit.

Please see overleaf for executive summaries of the 17 infrastructure initiatives and five supporting recommendations.

Figure 2: Map of priority infrastructure initiatives





Location pending

- Invest in mobile towers across regional WA.
- Support development of an irradiation facility.
- Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure.
- Upgrade information and communications technology in regional WA.
- Build supporting infrastructure for dairy processing facilities.

Upgrade weather radars in Geraldton, Albany and Esperance.

Legend

- Freight network (road and rail)
- International gateways (port and airport)
- Transforming produce (production, processing, storage)
- Utilities (energy, land, water)
- Digital infrastructure (telecommunications)

- Priority 1 initiatives
- Priority 2 initiatives
- Priority 3 initiatives

Priority 1 initiatives

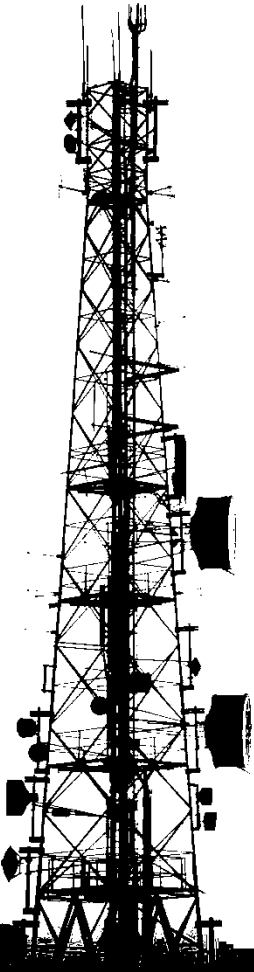
The Audit identified three Priority 1 initiatives. Priority 1 initiatives scored highly against the evaluation criteria and are relatively well advanced in terms of solution development. It is recommended that they be progressed as formal business cases for funding consideration by State Government.

Digital Infrastructure

Invest in mobile towers across regional WA

More mobile towers will improve the quality, speed and reliability of telecommunications in regional Western Australia, delivering productivity, commercial and social benefits.

The number one issue raised by stakeholders during the Audit was access to adequate mobile phone and internet services. Ongoing investment in mobile towers will make a significant contribution to the resolution of this issue. Additional mobile towers will enable individuals and businesses located in regional and remote WA to better access information and markets, collaborate more, and improve their productivity through adoption of technologies such as Variable Rate Technology and precision agriculture. A recent DAFWA report has identified that an additional 122 mobile towers are needed in the first instance to provide better network coverage for the south west region of WA. There is an opportunity to stage this project to provide for flexibility in funding. Potential co-contribution partners could include telecommunications providers and/or the Commonwealth Government.



Digital Infrastructure

Upgrade weather radars in Geraldton, Albany and Esperance

Upgrading existing weather radars to Doppler radar will provide agriculture, fisheries, and communities with more accurate and timely weather information.

Farmers lose thousands of dollars every year due to poor and inaccurate weather information (e.g. by spraying chemicals immediately before a rain event). Upgrading conventional weather radars in Geraldton, Albany and Esperance to Doppler radar will provide farmers with more accurate and timely weather information so they can make better decisions and improve productivity. It will also provide additional benefits to the wider community, including fire and emergency services. There is potential to leverage Commonwealth funding given that the existing radar towers are operated by the Bureau of Meteorology (BoM).

Freight Network

Upgrade Moonamang Road in the Kimberley

An upgrade of Moonamang Road will provide the transport infrastructure required to support the development and ongoing operations of Project Sea Dragon and facilitate the expansion of the Ord Irrigated Agriculture Development.

The Moonamang Road Upgrade Project forms part of an overall, comprehensive investment strategy for the State's Kimberley region. Moonamang Road connects Kununurra to Legune Station in the Northern Territory (NT); however the road is currently impassable in wet conditions. Sealing the road will improve seasonal access and facilitate transport of produce from the region. Approximately 7km of road needs to be sealed in WA; however this project should be carried out in conjunction with the NT Government as there is approximately 31kms of the road that requires upgrading on the NT side of the border.

Priority 2 initiatives

The Audit identified three Priority 2 initiatives. Priority 2 initiatives scored highly against the evaluation criteria but require additional scoping or feasibility studies. It is recommended that a portion of the Fund be put aside to progress these studies.

Transforming produce

Support development of agrifood precincts

Development of agrifood precincts will generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding.

Well-designed precincts can facilitate high value-add production and the linking of businesses, organisations and research institutions so as to generate economies of scale and scope. They also make it easier for businesses to access pools of skilled labour and establish mutually beneficial business relationships. This then helps to attract and retain businesses in the regions and generates sustained regional economic activity. Nambeelup, West Mundijong and Waterloo have been identified as potential precinct locations for future agri-industry investment in the Peel and South West regions. Other regions have been identified with the potential to expand or create new agrifood precincts through Water for Food, Ord, the Pilbara Hinterland Agricultural Development Initiative (PHADI) and Gascoyne Food Bowl initiatives.

Transforming produce

Support development of an irradiation facility

Supporting investment in irradiation as an alternative disinfestation protocol will facilitate the export growth and value-add potential of Western Australian horticultural produce.

Western Australia does not currently have a large scale commercial irradiation facility. Irradiation – which reduces the risk of contamination, controls food spoilage and extends the shelf-life of foods with minimal effect on nutritional or sensory quality – will facilitate interstate trade and overseas export of WA produce, improving market access for horticultural producers. To attract investment for a facility, a study to determine the potential volume of products both agricultural and non-agricultural is required and the potential benefit to the State determined.

Transforming produce

Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure

A coordinated approach to building a feed mill will support growth in the Western Australian aquaculture industry and reduced reliance on interstate imports.

There are currently no aquaculture feed manufacturers in Western Australia so aquaculture producers currently import feed from the east coast. Feed production facilities are important elements of an integrated aquaculture industry. A number of stakeholders stated that it is the single biggest infrastructure investment that the aquaculture industry needs for development. Other needs for aquaculture infrastructure have been highlighted including the need for a hatchery. A coordinated approach could ensure that feed is also produced for other aquaculture sectors (e.g. finfish) and potentially exported to rapidly growing aquaculture producers in Asia.

Priority 3 initiatives

The Audit identified eleven Priority 3 initiatives. Priority 3 initiatives scored medium to high against the evaluation criteria with most requiring additional scoping or feasibility studies. It is recommended that these be progressed through the staged process set out in this Audit, contingent on available funding and in deference to Priority 1 and 2 initiatives.

Freight network

Build the necessary road infrastructure to enable unimpeded triple road train access to Muchea

Extending access for large road trains to and from Muchea will reduce transport times and the need for trucks destined for Muchea Livestock Centre to be broken up.

International gateways

Upgrade facilities at Wyndham Port, including cattle holding yards, conveyor systems, and loading facilities

Upgrading facilities at Wyndham Port, including the cattle holding yards, conveyor systems, and loading facilities will facilitate private investment opportunities, supporting continued economic development in the East Kimberley.

Transforming produce

Develop a Department of Agriculture and Water Resources accredited wash down facility in Broome

Developing a Commonwealth Government accredited wash down facility in Broome will deliver biosecurity benefits including the ability to segregate cattle in the event of an outbreak.

Transforming produce

Build supporting infrastructure for a Pilbara algae precinct

The provision of primary level infrastructure for a 440ha Pilbara algae precinct will help foster economic diversity and growth in the region.

Transforming produce

Upgrade capacity of Port Hedland holding yards to 10,000 head of cattle

Upgrading the capacity of the Port Hedland holding yards to 10,000 head of cattle will facilitate accumulation of cattle in the Pilbara and allow improved flow of cattle through the port.



Transforming produce

Build supporting infrastructure for dairy processing facilities

The construction of supporting infrastructure for dairy processing facilities (such as extended shelf life, infant formula, and/or free stall processing facilities) will facilitate the production of high-value milk products for export markets.

Utilities

Extend height of the Lake Argyle Dam spillway

Extending the height of the Lake Argyle Dam spillway by 4 metres will increase its capacity ten-fold. This additional water could be used by the irrigated agriculture sector in the Kimberley.

Utilities

Extend M2 irrigation channel to service Ord Stage 3

Extending the M2 irrigation channel to service Ord Stage 3 will accommodate growth in the cropping area of the Ord Irrigation Scheme.

Utilities

Build 2-gigalitre dams in Southern Forests

The construction in Southern Forests of dams of up to two gigalitres in size will enable the provision of reticulated water systems to multiple properties in the South West. This will facilitate increased output from the irrigated agriculture sector.

Utilities

Develop supporting infrastructure to supply fit for purpose water from Wellington Dam

The supply of fit for purpose water from Wellington Dam will increase available water for irrigation in the South West and unlock increased activity in the irrigated agricultural sectors.

Digital infrastructure

Upgrade information and communications technology in regional WA











Improving the coverage, reliability and speed of mobile and internet services will deliver productivity, commercial and social benefits in agriculture. Further investigation of innovative telecommunications solutions should be undertaken.










WA Agriculture Infrastructure Priority List

The seventeen Priority 1, 2 and 3 initiatives are represented in the *WA Agriculture Priority List* below. Developed based on Infrastructure Australia’s approach, it classifies each of the initiatives by infrastructure category and stage of development (see Project Overview chapter for further detail).

Figure 3: The WA Agriculture Infrastructure Priority List

WA Agriculture Infrastructure Priority List	
	Early stage <i>Initiatives in this category moderately or strongly meet criteria, but the identification or development of the solution is at an early stage.</i>
Freight network <i>(road and rail)</i>	 Build the necessary road infrastructure to enable unimpeded triple road train access to Muchea
International gateways <i>(port and airport)</i>	 Upgrade facilities at Wyndham Port, including cattle holding yards, conveyor systems, and loading facilities
Transforming produce <i>(production, processing, storage)</i>	<ul style="list-style-type: none">  Support development of agrifood precincts (for example in Peel and/or South West)  Support development of an irradiation facility  Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure  Build supporting infrastructure for dairy processing facilities  Develop a Department of Agriculture and Water Resources accredited wash down facility in Broome.  Upgrade capacity of Port Hedland holding yards to 10,000 head of cattle
Utilities <i>(energy, land, water)</i>	 Develop supporting infrastructure to supply fit for purpose water from Wellington Dam
Digital infrastructure <i>(telecommunications)</i>	 Upgrade information and communications technology in regional WA

Culture Infrastructure Priority List

Real potential <i>Initiatives in this category moderately or strongly meet criteria, and there has been a considerable amount of analysis of potential solutions.</i>	Threshold <i>Initiatives in this category have strong strategic and economic merit, and are almost ready to proceed (CBA known).</i>	Ready to proceed <i>Initiatives in this category have strong strategic and economic merit, and are ready to proceed (Business Case written).</i>
 Upgrade Moonamang Road in the Kimberley		
 Build supporting infrastructure for a Pilbara algae precinct		
 Extend height of the Lake Argyle Dam spillway  Extend M2 irrigation channel to service Ord Stage 3  Build 2-gigalitre dams in Southern Forests		
 Upgrade weather radars in Geraldton, Albany and Esperance	 Invest in mobile towers across regional Western Australia	

Supporting recommendations

The Audit has identified five supporting recommendations. The aim of these recommendations is to provide guidance to ensure ongoing value is derived from the work undertaken during the Audit.

Maintain an active pipeline of infrastructure initiatives by adopting the frameworks developed as part of this Audit

Prior to the Audit, there was no systematic process for developing an agriculture infrastructure investment pipeline. A number of frameworks were developed as part of this Audit including an *Initiative Database*, screening and evaluation process and *WA Agriculture Infrastructure Priority List*. It is important that these frameworks and the investment pipeline be kept current.

Investigate strategic and policy opportunities that will foster growth in the Western Australian agricultural industry

The Audit identified over 100 strategy and policy initiatives related to agricultural infrastructure and the industry in general. Whilst the focus of the Audit has been on hard infrastructure, additional work could be undertaken to investigate strategy and policy levers that optimise infrastructure investment.

Collaborate with other government bodies such as Infrastructure Australia to ensure Western Australian agricultural infrastructure priorities are made visible

The *WA Agriculture Infrastructure Priority List* was developed based on Infrastructure Australia's approach. The infrastructure investment process has been designed so that it can easily slot into the Infrastructure Australia framework. Given major infrastructure projects are evaluated by Infrastructure Australia and assessed against other competing infrastructure investments it makes sense to share the State's priorities with them. A number of other Commonwealth agencies should also be made aware of the outcomes of this work, given the significant commitments to infrastructure made in a number of recent publications and announcements.

Communicate outcomes to targeted stakeholders engaged as part of this Audit

Over 200 stakeholders across the State contributed valuable insights to this Audit. It is important for the development of good policy that strong relationships are maintained with the WA agricultural and regional communities. There is value in sustaining an appropriate level of connection with the stakeholders and groups consulted during the course of the Audit.

Identify mechanisms and processes to leverage *Royalties for Regions* investment to enable targeted engagement with potential funders and financiers

A core objective of the Audit is to leverage the Fund with other sources of public and private capital. This is desirable given the:

- ▶ Substantial capital required for infrastructure investments.
- ▶ Finite limits of State capital available for the program.
- ▶ Availability of alternative pools of capital that could be deployed.

As part of the preparation of future business cases, careful selection of funding and financing options, risk assessment and allocation, potential delivery models and targeted engagement with potential funders and financiers will help to leverage the Fund. This is important given indicative costs for some of the initiatives are beyond the capacity of the Fund. This should also be undertaken with regard to existing WA Government procurement processes (such as the Strategic Asset Management Framework).

Project overview

Project overview

The Western Australian Government has committed \$300 million of *Royalties for Regions* funding to growing the agrifood industry through the *Seizing the Opportunity Agriculture* initiative.

Context

The *Seizing the Opportunity Agriculture* initiative aims to attract new investment, diversify export markets, and build capacity and capability within the sector through a whole-of-government approach supporting the delivery of 15 targeted programs.¹

The *Seizing the Opportunity Agriculture* initiative strongly supports the Agrifood 2025+ strategy, which aims to double the value of the WA agrifood industry by 2025. To grow the value of agrifood production to \$13.2 billion by 2025 will require real growth of 5.9% p.a., with the majority of this growth coming from exports. A key enabler of this growth will be the provision of post-farm gate agricultural infrastructure. Not only will strategic investment in infrastructure help to grow agrifood exports, it will also create new jobs and improve income and prospects for businesses and communities in regional WA.

Purpose of this project

To inform agricultural infrastructure priorities – as part of the *Seizing the Opportunity Agriculture* suite of programs – the Department of Regional Development (DRD) commissioned Ernst & Young (EY) to conduct an Agricultural Infrastructure Audit (the Audit). The Audit has been undertaken in conjunction with a multi-agency Steering Group (see Acknowledgments section for structure of the group).

The aim of the Audit is to determine infrastructure priority areas that will support the growth of WA's agriculture food and fibre sectors, enable the creation of new jobs as well as improve income and prospects for WA businesses and communities.

The overarching objective of the Audit is to develop a state-wide priority list of agricultural infrastructure initiatives to inform the strategic allocation of investment funds.

Specific objectives of the Audit are:

- ▶ Identify supply chain constraints and opportunities to facilitate the expansion of the agriculture food and fibre sector.
- ▶ Identify infrastructure required to assist the export of more premium quality food and fibre products from regional WA to key global markets through improved supply chain efficiencies.
- ▶ Identify priority initiatives for improving supply chain efficiencies across the agriculture food and fibre sector.²

The Audit covers the following areas:

- ▶ Freight / transport roads, rail, ports & airports.
- ▶ Production storage, packaging & processing.
- ▶ Other possible constraints to efficient supply chains such as access to land, water, energy, telecommunications, and labour.

Approach

This report is the final deliverable of the Audit and represents the culmination of over six months of data gathering, analysis and stakeholder engagement. It has been informed by an extensive literature review and consultations with businesses, government staff and academics working in the agrifood industry (see Appendix F for a full list of stakeholders).

To compile this report, EY mobilised a multi-stage screening and evaluation process for opportunity identification across three distinct phases.

Phase 1: Desktop review

Phase 1 involved a comprehensive desktop review of over 100 relevant agriculture and infrastructure documents to identify key

¹ *Seizing the Opportunity Agriculture: Program Overview*, version 10, 2015, p. 3

² *Infrastructure Audit – Evaluation of Western Australia's infrastructure: Request No DRD201500972*, 2015, p. 3

constraints and opportunities. This involved collating relevant industry data from across Commonwealth and State government agencies, industry associations, private sector organisations, and media (see Appendix E for full lists of the documents reviewed).

Phase 2: Stakeholder consultations

Phase 2 involved consultations with over 200 stakeholders to augment desktop findings with agribusiness and industry perspectives. Stakeholder consultations entailed a series of 57 interviews with government and industry representatives (based primarily in the Perth metropolitan area) and a series of 13 workshop sessions undertaken in regional Western Australia. In addition to this, thirteen written submissions were received from stakeholders (see Appendix F for full lists of the stakeholders engaged).

Phase 3: Analysis and recommendations

The desktop review and stakeholder consultations yielded almost 500 initiatives, incorporating a mix of hard and soft infrastructure. An *Initiative Database* was developed to collect and categorise the data so that potential initiatives could be easily filtered (e.g. by region, sector or infrastructure type). In consultation with the Steering Group, criteria were then developed to screen and evaluate the initiatives.

Qualitative screen

The qualitative screen included identification of duplicate initiatives and the filtering out of initiatives that did not comply with the following rationalisation criteria:

- ▶ Hard infrastructure.
- ▶ Common use infrastructure.
- ▶ Contributes to growth / jobs.
- ▶ Funding required.

The qualitative screen reduced the list of 500 initiatives to 139. A number of duplicate initiatives were removed and 211 initiatives did not meet the rationalisation criteria.

Qualitative evaluation

Each of the remaining 139 initiatives was then evaluated as high, medium, or low against the following evaluation criteria:

- ▶ Contributes to growth / jobs.
- ▶ Leverage opportunity.
- ▶ Cross-sector benefits.
- ▶ Cross-industry benefits.
- ▶ Transformation potential.
- ▶ Stakeholder support.

Seventeen initiatives rated medium or high against the evaluation criteria and 122 rated low.

Classification

A tailored version of Infrastructure Australia's approach was then used to classify the 17 medium and high rated initiatives into a *WA Agriculture Priority List*. This list classifies initiatives by infrastructure category and stage of development.

The infrastructure categories are:

- ▶ Freight network (road and rail).
- ▶ International gateways (port and airport).
- ▶ Transforming produce (production, processing, storage).
- ▶ Utilities (energy, land, water).
- ▶ Digital infrastructure (telecommunications).

The stages of development are:

- ▶ Early stage: Initiatives in this category moderately or strongly meet criteria, but the identification or development of a solution is at an early stage.
- ▶ Real potential: Initiatives in this category moderately or strongly meet criteria, and there has been a considerable amount of analysis of potential solutions.
- ▶ Threshold: Initiatives in this category have strong strategic and economic merit, and are almost ready to proceed (CBA known).
- ▶ Ready to proceed: Initiatives in this category have strong strategic and economic merit, and are ready to proceed (Business Case written).

Initiative linkages

The 17 medium and high rated initiatives were then linked to any predecessor and/or successor initiatives within the *Initiative Database* to ensure dependences were taken into account. For example, the economic rationale underpinning upgrades to the facilities at Wyndham Port will

be made stronger after “trigger” events such as Project Sea Dragon are undertaken.

Recommendations

In consultation with the Steering Group, a series of recommendations on priority infrastructure were developed. The 17 medium and high rated initiatives were split into Priority 1, 2 and 3 recommendations to facilitate staged application of investment funds, as follows:

- ▶ Three Priority 1 initiatives (dark green).
These scored highly against the evaluation criteria and are relatively well advanced in terms of solution development. It is recommended that they be progressed as formal business cases for funding consideration by State Government.
- ▶ Three Priority 2 initiatives (medium green).
These also scored highly against the evaluation criteria but require additional scoping or feasibility studies. It is recommended that a portion of the Fund be put aside to progress these studies.
- ▶ Eleven Priority 3 initiatives (light green).
These scored medium to high against the evaluation criteria with most requiring additional scoping or feasibility studies. It is recommended that these be progressed through the staged process set out in this Audit, contingent on available funding and in deference to Priority 1 and 2 initiatives.

The Audit also identified an additional five supporting recommendations. The aim of these recommendations is to provide guidance to ensure ongoing value is derived from the work undertaken during the Audit.

Priority 1 recommendations

Invest in mobile towers across regional WA

More mobile towers will improve the quality, speed and reliability of telecommunications in regional Western Australia, delivering productivity, commercial and social benefits in agriculture.

At a glance

Initiative	Invest in mobile towers across regional WA
Priority	Priority 1
Region	Cross-region
Sector	Cross-sector
Infrastructure category	Digital Infrastructure
Investment stage	Threshold
Indicative project cost	~\$1 million per tower ³
Leverage opportunity	High
Potential WA Government funding contribution	Approximately 50% of the total project cost (\$0.5 million per tower)
Potential co-contribution funding and financing sources	<ul style="list-style-type: none"> ▶ Telco providers ▶ Commonwealth Government ▶ Value capture (Local Government, private sector farmers)

Overview

The number one issue raised by stakeholders during the Audit was access to adequate mobile phone and internet services (digital reception). Ongoing investment in mobile towers will make a significant contribution to the resolution of this issue. Additional mobile towers will enable individuals and businesses located in regional and remote WA to better access information and markets, collaborate more, and improve their productivity through adoption of technologies such as Variable Rate Technology (VRT) and other elements of precision agriculture.^{4 5}

³ AEC, loc. cit. (Please note, that where indicative costs for each initiative have been included the indicative costs have not been independently assessed or verified by EY.)

⁴ A. Vidot, 'Vodafone calls for government to prioritise expanded mobile coverage over copper network spending', ABC, 4 February 2016, http://www.abc.net.au/news/2016-02-04/vodafone-nff-call-for-digital-transformation/7140142?WT.mc_id=newsmail, (accessed 12 February 2016).

A recent DAFWA report has identified that an additional 122 mobile towers are needed in the first instance to provide better network coverage for the south west region of WA.⁶ There is an opportunity to stage this project to provide for flexibility in funding.

Purpose

Currently, many farmers are unable to take advantage of existing digital opportunities due to poor mobile coverage in many areas of regional WA. Existing studies have found that seventy per cent of Australia's landmass does not have terrestrial mobile coverage and that for many areas, communication services, even when available are unreliable or expensive.^{7 8 9 10}

Mobile communications infrastructure is seen as critical to overcome significant barriers to the adoption of emerging technology and the consequent growth of the agricultural industry.¹¹

Comprehensive data connection services would enable for communications, operating machinery, surveillance and weather updates. Further improvements in data speed would facilitate benefits of telemetry and automation of plant and equipment for precision agriculture as well as provide the opportunity for the real time

⁵ L. Goedde, M. Horii, S. Sanghvi, 'Pursuing the global opportunity in food and agribusiness', McKinsey & Company, July 2015, p.4.

⁶ AEC, loc. cit.

⁷ *Agricultural Competitiveness White Paper / Mid-West Regional Blueprint*.

⁸ N. Metz, 'Farm Scale Wifi', SEPWA, <http://www.sepwa.org.au/projects/current-projects/69-farm-scale-wifi>, (accessed 24 February 2016).

⁹ T. de Landgraft, 'Better mobile communication tops Christmas wish list of Christmas for WA farm lobby groups', ABC, 24 December 2015, <http://www.abc.net.au/news/2015-12-24/wa-lobby-group-wish-list-this-christmas/7053330>, (accessed 24 February 2016).

¹⁰ N. Metz, 'Regional data access: Connection to our economic future', SEPWA, 2015.

¹¹ The Grain Industry Association of Western Australia (GIWA), 'Inquiry into the role of technology in increasing agricultural productivity in Australia', submission by GIWA.



transfer of data from the field.¹² Precision agriculture technology, such as VRT, is a farm management concept that allows farmers to observe and respond to variability in agricultural land.¹³ These farm management practices rely on yield sensors and mapping tools which require adequate mobile coverage. Similarly, northern beef businesses are trialing Precision Pastoral Management Tools (PPMT) for remote cattle management.^{14 15}

Recognising the importance of technology to agriculture, in 2014 the Government's *Royalties for Regions* program funded the installation of 113 mobile towers. Funding of \$40 million for the Regional Mobile Communications Project (RMCP) initiative aimed to improve mobile telephone highway and town-to-town coverage in regional, rural and remote communities of the

¹² D. Berman & S. Wai, 'The Next Food Frontier: How AgTech Can Save The World', *TechCrunch*, 7 September 2015, <http://techcrunch.com/contributor/samantha-wai/>, (accessed 24 February 2016).

¹³ Goedde et al., op. cit., p. 8.

¹⁴ L. Bell, 'Remote cattle management system puts data from satellites and stock yards into beef producers' hands', *ABC*, 9 November 2015, <http://www.abc.net.au/news/2015-11-09/remote-herd-mgt-technology-on-show-in-the-pilbara/6924140>, (accessed 24 February 2016).

¹⁵ M. Cawood, 'Station management goes high-tech', *The Land*, 30 October 2015, <http://www.theland.com.au/story/3458202/station-management-goes-high-tech>, (accessed 24 February 2016).

State.¹⁶ Sixteen towers were installed in the Pilbara and 24 in the Kimberley. Following this, the WA Government invested an additional \$45 million under the Regional Telecommunications Project (RTP) to establish 85 mobile base stations at priority locations by 2018.¹⁷

Further investment in mobile telecommunications towers is still required.

Indicative costs

- ▶ Mobile towers cost approximately \$1 million to construct.
- ▶ Annual maintenance costs are typically around two per cent of the upfront construction costs.

Indicative benefits

- ▶ Improved yields and reduced input costs, including labour.
- ▶ Improved supply chain efficiencies and farm practices (via adoption of VRT).
- ▶ Improved communications with work colleagues and customers.
- ▶ Reductions in administration time and costs.
- ▶ Enabler of remote monitoring of farm operations.
- ▶ Improved farm safety including emergency management.
- ▶ Improved social and community benefits through access to telecommunications.

¹⁶ *Regional Mobile Communications Project overview*, Department of Commerce, <https://www.commerce.wa.gov.au/industry-and-innovation/regional-mobile-communications-project-overview>, (accessed 12 February 2016).

¹⁷ *Regional Telecommunications Project overview*, Department of Commerce, <https://www.commerce.wa.gov.au/industry-and-innovation/regional-telecommunications-project-overview>, (accessed 12 February 2016).

Indicative cost benefit ratio

- ▶ Based on the DAFWA study, an indicative cost benefit ratio is 1.75.¹⁸

Funding and financing

A co-contribution arrangement with telecommunications providers, the Commonwealth Government, or with beneficiaries from value uplift (Local Government, private sector farmers) should be considered. The business case should explore delivery models for asset providers and financing sources. Consideration could be given to co-funded trials or phased roll out.

¹⁸ AEC, op. cit., p. iv.

Upgrade weather radars in Geraldton, Albany and Esperance

Upgrading existing weather radars to Doppler radar will provide agriculture, fisheries, and the communities with more accurate and timely weather information.

At a glance

Initiative	Upgrade weather radars in Geraldton, Albany and Esperance
Priority	Priority 1
Region	Cross-region
Sector	Cross-sector
Infrastructure category	Digital Infrastructure
Investment stage	Real potential
Indicative project cost	Estimated \$6.6 million ¹⁹
Leverage opportunity	Low
Potential WA Government funding contribution	Likely that WA Government would have to contribute majority if not all of funds
Potential co-contribution funding and financing sources	<ul style="list-style-type: none"> ▶ Commonwealth Government (BoM) ▶ Value capture (Local Government, private sector farmers)

Overview

In 2015, the State Government announced \$23 million investment in Doppler radars in WA's Wheatbelt region (Newdegate, South Doodlakine, and Watheroo).²⁰ It is expected that this will provide much-needed radar coverage with real-time weather information to transform the way that WA farmers do business. Building on this initial investment, the Audit recommends upgrading existing weather radar towers in Esperance, Albany and Geraldton to Doppler radar. This will enable farmers in these regions to have access to real-time weather information

that will enable them to make better farm management decisions and improve productivity.

Doppler also provides additional benefits to the wider community, including fire and emergency services.²¹

Purpose

Weather is the most important factor contributing to the success of the agriculture industry.²² Grain tonnages are highly dependent on rainfall as crops in WA are not irrigated. Improvements in radar technology will have a significant effect on the profitability of the grains industry in WA.²³

Doppler radars are technically advanced digital radar systems able to provide a higher quality of data (resolution and direction information) than conventional weather radars. Without Doppler radars, farmers rely on conventional radar images and output from static weather stations to make decisions about key farming inputs such as sowing, chemical and fertiliser applications and movement of stock. There is greater risk when making these decisions as they are unable to accurately forecast weather changes and have sufficient lead-times for weather warnings. If weather patterns change during application of key inputs, there is a significant impact on efficiency and cost due to a need to duplicate processes. For example, if a significant weather event occurs during spraying, chemicals can be washed away or blown away thus requiring the process to be repeated. Such situations are not uncommon.²⁴

¹⁹ J. Connell (DAFWA), email, 29 January 2016. (Please note, that where indicative costs for each initiative have been included, the indicative costs have not been independently assessed or verified by EY.)

²⁰ *Doppler radar investment*, Department of Agriculture and Food Western Australia (DAFWA), <https://www.agric.wa.gov.au/r4r/doppler-radar-investment>, (accessed 12 February 2016).

²¹ AEC, op. cit., p.27.

²² AEC, op. cit., p.v.

²³ *Western Australian grains industry*, Department of Agriculture and Food Western Australia (DAFWA), <https://www.agric.wa.gov.au/grains-research-development/western-australian-grains-industry>, (accessed 12 February 2016).

²⁴ AEC, op. cit., p.43.



Figure 4: Weather radar at Albany

water, and better controlled bushfires and burn management.

The initiative provides cross-regional benefits and has been prioritised due to the high level of grain activity in these regions. The grains sector is the largest agricultural sector in WA and hence potential benefits are significant.²⁷

Indicative cost benefit ratio

- ▶ Based on a recent study by DAFWA, the cost benefit ratio of three new Doppler radars in the Wheatbelt was estimated at eight. This was subsequently revised down slightly in negotiations with Treasury and DRD. A cost benefit ratio greater than one could be expected for this initiative.²⁸

Funding and financing

There is potential to leverage Commonwealth funding given that the existing radar towers are operated by the Bureau of Meteorology (BoM). A co-contribution arrangement with the BoM should be considered.²⁹ There is also compelling value uplift and local beneficiaries could be prepared to finance the investment (e.g. Local Government, farmers).³⁰

Indicative costs

- ▶ To upgrade the Esperance weather radar tower: approximately \$1.2 million.
- ▶ To upgrade the Albany weather radar tower: approximately \$0.5 million.
- ▶ To upgrade the Geraldton weather radar tower: approximately \$0.5 million.^{25 26}

Indicative benefits

- ▶ Improved yield opportunities and enhanced production.
- ▶ Supply chain efficiencies, farm behaviours and optimisation of resources such as fertiliser application.
- ▶ Improved farm safety including emergency management.
- ▶ Improved environmental impacts from reduced agrichemical runoff, drift and contamination, more targeted allocation of

²⁵ J. Connell, loc. cit.

²⁶ However, it is recommended by DAFWA that the existing radar at the airport be relocated to a higher location, east of Geraldton, before upgrading. From an agricultural perspective, this option will be more beneficial as it will maintain coverage to the airport and coastline, gain better overlap with the Watheroo radar, and improve coverage through Chapman Valley to Northampton. The estimated cost of new installation and upgrade is approximately \$4.9 million.

²⁷ EY Analysis of:

Value of Principal Agricultural Commodities Produced, Australia, Preliminary, 2013-14, Australian Bureau of Statistics, cat. no. 7501, January 2015

Value of Agricultural Commodities Produced, Australia, 2013-14, Australian Bureau of Statistics, cat. no. 7503, May 2015

Australian Fisheries and Aquaculture Statistics 2013, Australian Bureau of Agricultural and Resource Economics and Sciences, December 2014

²⁸ AEC, op. cit., p.46.

²⁹ J. Connell (DAFWA), phone, 08 March 2016.

³⁰ However, at an estimated capital expenditure of \$6.6 million, the delivery choices might be limited to traditional procurement models.

Upgrade Moonamang Road in the Kimberley

An upgrade of Moonamang Road will provide the transport infrastructure required to support the development and ongoing operations of Project Sea Dragon and facilitate the expansion of the Ord Irrigated Agriculture Development.

At a glance

Initiative	Upgrade Moonamang Road in the Kimberley
Priority	Priority 1
Region	Kimberley
Sector	Cross-sector
Infrastructure category	Freight network
Investment stage	Real potential
Indicative project cost	\$15 million ³¹
Leverage opportunity	Medium
Potential WA Government funding contribution	Likely that WA Government would have to contribute majority of funds
Potential co-contribution funding and financing sources	<ul style="list-style-type: none"> ▶ Commonwealth Government ▶ Possible value capture

Overview

The Moonamang Road Upgrade Project forms part of an overall, comprehensive investment strategy for the State's Kimberley region. The State and Commonwealth Governments have historically invested in the development of infrastructure in the region in order to encourage private investment, given the significant cost and geographical hurdles associated with the Kimberley. The upgrade meets the objectives of *Royalties for Regions* funding by growing prosperity, building capacity and expanding opportunity in the East Kimberley, through attraction and retention of the economic and social benefits of Project Sea Dragon in the region and encouraging further investment in the expansion of the Ord Irrigation Scheme.

Moonamang Road connects Kununurra to Legune Station in the Northern Territory (NT), however the road is currently impassable in wet conditions. Sealing the remaining 7km to the NT border will improve seasonal access and facilitate transport of produce from the region. The unsealed gravel road to the border is unlikely to handle the traffic type and volumes generated by new and emerging transformational projects, particularly during the wet season. This project should be carried out in conjunction with the NT Government as there is approximately 31kms of the road that requires upgrading on the NT side of the border.

Purpose

In WA, 41kms of Moonamang Road was sealed as part of the State Government \$322 million investment in supporting infrastructure for development of the Ord Irrigation Expansion Project (Stage 2).

The upgrade of Moonamang Road will complete the transport infrastructure to the NT border and along with the road upgrade in the Northern Territory may encourage further private sector investment in the Ord River Irrigation Scheme Stage 3.

A Memorandum of Understanding between the Northern Territory, Australian and West Australian Governments was signed in 2012, demonstrating a commitment to work together to facilitate expansion of the Ord Irrigation Scheme.

The Commonwealth Government has also committed to spending up to \$5 million for detailed examination of the economic feasibility of Stage 3 development.^{32 33 34}

³¹ J. Ardern (DSD), email, 04 March 2016. (Please note, that where indicative costs for each initiative have been included, the indicative costs have not been independently assessed or verified by EY.)

³² S. Neales, 'Ord a 'pretty big bang' for our bucks', *The Australian*, 23 May 2015, <http://www.theaustralian.com.au/national-affairs/ord-a-pretty-big-bang-for-our-bucks/news-story/9d15e6b3c02c13afa44cd1666490ff69>, (accessed 28 February 2016).



Figure 5: Moonamang Road

A sealed road will also facilitate the development of Project Sea Dragon, a large-scale, integrated, land-based aquaculture project that will produce black tiger prawns for export markets. In 2015, Project Sea Dragon was granted major project status by the Commonwealth, Northern Territory and Western Australian governments.

Stage 1 of Project Sea Dragon is expected to create 300 construction jobs and 122 permanent positions in Kununurra and an export industry generating \$94 million per annum. Project proponent, Seafarms, has forecast that Australia's aquaculture industry could expand from less than \$1billion annually, to \$13billion by 2020.³⁵

An upgrade of the road will also service the future development of the Knox Plain and the planned Sorby Hills mine in Western Australia.

Indicative costs

- ▶ Capital cost for WA Government to upgrade the 7.5km section of WA road is \$15 million.
- ▶ The NT Government has estimated \$84 million for the NT project (access road and two bridges) and is seeking \$68 million of Commonwealth funding.

Indicative benefits

- ▶ Enabler of transformational projects such as the expansion of the Ord River Irrigation Scheme, which will help facilitate additional land releases required for establishment of a sugar export industry.
- ▶ Enabler of transformational projects such as the establishment of a new export-scale aquaculture industry with reach across the northern region.
- ▶ Potential employment and training opportunities for many indigenous and non-indigenous residents that is transferrable across industries.

Indicative cost benefit ratio

- ▶ Not yet determined.

Funding and financing

The NT Government is seeking a co-contribution by the Commonwealth Government for their part of the project. DSD, as part of granting Project Sea Dragon major project status, has established a whole of government project implementation group to determine funding options.

³³ *White Paper on Developing Northern Australia*, Australian Government, http://industry.gov.au/ONA/WhitePaper/Documents/northern_australia_white_paper.pdf, (accessed 28 February 2016), p.25.

³⁴ M. McKenzie, 'Commodities Group buys land for \$1.5bn prawn farm project', *Business News*, 16 February 2015, <https://www.businessnews.com.au/article/Commodities-Group-buys-land-for-15bn-prawn-farm-project>, (accessed 28 February 2016).

³⁵ *ibid.*

Priority 2 recommendations

Support development of agrifood precincts

Development of agrifood precincts will generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding.

At a glance

Initiative	Support development of agrifood precincts
Priority	Priority 2
Region	Cross-region
Sector	Cross-sector
Infrastructure category	Transforming produce
Investment stage	Early stage
Indicative project cost	Costs for provision of supporting infrastructure for a facility as yet undetermined
Leverage opportunity	Medium
Potential WA Government funding contribution	Likely that WA Government would have to contribute majority of funds for supporting infrastructure
Potential co-contribution funding and financing sources	<ul style="list-style-type: none"> ▶ Private sector ▶ Local Government ▶ Potential for joint venture

Overview

A number of regional stakeholders put forward their concept plans for the establishment of WA agrifood processing precincts so as to extract greater value-add from the State's agrifood sector.

An agrifood precinct is a group of food processing industries that enable collaboration thus creating benefits from common use infrastructure, supply-chain proximity or shared environmental buffers.³⁶ Possible types of agribusinesses that could benefit from precincts include those involved in the food supply-chain production from primary produce through to

packaged, saleable and edible products.³⁷ Feed and fibre industries could also find synergies.

Purpose

Well-designed precincts can facilitate high value-add production and the linking of businesses, organisations and research institutions so as to generate economies of scale and scope. They also make it easier for businesses to access pools of skilled labour and establish mutually beneficial business relationships. This then helps to attract and retain businesses in the regions and generates sustained regional economic activity.

A recent example of the level of interest in agrifood precincts as export hubs comes from the deal between the South Australian and Chinese governments. The deal has resulted in plans to build a \$70 million agricultural park in Adelaide to supply China's Shandong province with food and wine.³⁸ As in the case of South Australia, there are opportunities for Western Australian agrifood businesses to service the needs of Asian markets as a result of rising demand for high-value food in developing economies.³⁹ Industries that may benefit from being part of a food-process precinct include abattoirs, milk processing and rendering works, and support industries and infrastructure.⁴⁰

In WA, Nambeelup and West Mundijong in the Peel region, and Waterloo in the South West

³⁶ *Comparative Due Diligence South West Food Processing Precinct*, Cardno WA Pty Ltd, September 2013, p. 3.

³⁷ *West Mundijong Agri-Industrial Precinct Concept Plan*, Cardno WA Pty Ltd, May 2014, p.1.

³⁸ 'Adelaide agricultural park to supply China', *In Daily*, 9 September 2015, <http://indaily.com.au/business/2015/09/09/adelaide-agricultural-park-to-supply-china/>, (accessed 16 February 2016).

³⁹ *West Mundijong Industrial Area*, Town Planning Management Engineering (TME), 14 May 2015, <http://www.sjshire.wa.gov.au/assets/Uploads/Planning/West-Mundijong-Industrial-Area-Feasibility-Assessment-Updated-May-2015.PDF>, (accessed 26 February 2016), p.15.

⁴⁰ *South-West Food Processing*, Department of Agriculture and Food Western Australian (DAFWA), 7 October 2015, <https://www.agric.wa.gov.au/land-use-planning/south-west-food-processing-precinct>, (accessed 26 February 2016).

region have been identified as potential precinct locations for future agri-industry investment. Other regions have been identified with the potential to expand or create new agrifood precincts through Water for Food, Ord, the Pilbara Hinterland Agricultural Development Initiative (PHADI) and Gascoyne Food Bowl initiatives. A range of factors such as zoning and proximity to supporting infrastructure will influence how the precincts will operate. Ultimately, this will influence the relative merits of the different sites.

Peel precincts

The Peel Business Park and Food Zone in Nambelup and the West Mundijong Agri-Food Precinct are potential investment opportunities that have been identified in the Peel Regional Investment Blueprint.⁴¹

Nambelup is a proposed combination of three projects – Peel Business Park, Peel Food Zone, and Peel Water Initiative.⁴² The Peel Food Zone is proposed as a high-value food production area that could service domestic and export markets.⁴³

A research report released in 2015 by the Property Council of Australia short-listed Nambelup as one of three initiatives in WA that had the potential to deliver the greatest economic and community benefit for the State.^{44 45}

In 2009, the Industrial Land Strategy stated that West Mundijong has the potential to become “a strategically important intermodal node, given its proximity to the intersection point of the rail

system and the primary road network”.^{46 47}

A feasibility study was conducted in 2012 to determine the suitability of West Mundijong as a site for future industrial use. Following this, a concept plan for the agri-industrial precinct (situated within the industrial area) was prepared for the Shire of Serpentine-Jarrahdale and DAFWA. This concept plan was endorsed by the Shire in 2014.

It is expected that the West Mundijong Agri-Industrial Precinct will contribute to the industrial development of the Shire of Serpentine-Jarrahdale. The development would create new opportunities for existing major industries (i.e. poultry and dairy farming), and encourage the establishment of other compatible businesses, generating jobs and income for the community.⁴⁸

South West precinct

A high proportion of WA's food processing is conducted in the South West.⁴⁹ Waterloo has been identified in the South West Food Processing Precinct report as the most suitable location for a food precinct in the region.⁵⁰ The site has access to key transport routes, including South West Highway and Bunbury Port, and is in close proximity to existing and planned industrial areas.⁵¹

Indicative costs

- ▶ For all three precincts, Government funding contribution would focus on comparative site studies and supporting infrastructure such as provision of land, power and water.

⁴¹ *Peel Regional Investment Blueprint*, Peel Development Commission, December 2015, http://www.peel.wa.gov.au/wp-content/uploads/2015/12/Peel-Blueprint-15_LR.pdf, (accessed 26 February), p.19.

⁴² *Keep WA Growing*, Urbis, August 2015, p.12

⁴³ Peel Development Commission, December 2015, op. cit., p.89.

⁴⁴ 'Infrastructure & Property Development Set To Keep WA Growing', *WA Property News*, 14 August 2015, <http://wapropertynews.ventura-id.com.au/infrastructure-property-development-set-to-keep-wa-growing/-4553#sthash.xhxYJwMl.dpuf>, (accessed 16 February 2016).

⁴⁵ K. Emery, 'New projects shot in arm for economy', 14 August 2015, *The West Australian*, <https://au.news.yahoo.com/thewest/wa/a/29256416/new-projects-shot-in-arm-for-economy/>, (accessed 16 February 2016).

⁴⁶ TME, loc. cit.

⁴⁷ *Economic and Employment Lands Strategy: non-heavy industrial*, Western Australia Department of Planning, April 2012, http://www.planning.wa.gov.au/dop_pub_pdf/EELS_Part10to12.pdf, (accessed 28 February 2016).

⁴⁸ L. Loder, 'West Mundijong Industrial Park Continues to Evolve', *Shire of Serpentine Jarrahdale*, 14 August 2014, <http://www.sjshire.wa.gov.au/west-mundijong-industrial-park-continues-to-evolve/>, (accessed 28 February 2016).

⁴⁹ K. Hitchens, 'Progress on agri-food processing site', *Shire of Dardanup*, 9 January 2015, <https://www.dardanup.wa.gov.au/progress-on-agri-food-processing-site/>, (accessed on 28 February 2015).

⁵⁰ DAFWA, 7 October 2015, loc. cit.

⁵¹ Cardno WA Pty Ltd, September 2013, op. cit., p.iv

- ▶ Indicative costs for provision of land, power and water infrastructure:
 - ▶ Nambeelup: \$45 million (for the development of the Peel Business Park; costs to be determined for the Peel Food Zone, and Peel Water Initiative).
 - ▶ West Mundijong: detailed costings not yet determined.
 - ▶ Waterloo: detailed costings not yet determined.

of the West Mundijong precinct will create over 4,000 jobs.⁵⁵

- ▶ Improved land use from low-intensity and low value rural land to high-intensity and high value agricultural and industrial use.⁵⁶
- ▶ Waterloo:
 - ▶ The creation of new jobs as a result of the establishment of specialist industries that would anchor a food processing hub.
 - ▶ Jobs would be created directly in the new industries, and also indirectly by the various economic activities required to support the industries – ranging from design and construction in the first instance, to various operational support and maintenance activities once the industries are established.⁵⁷

Indicative benefits

- ▶ Precincts in general:
 - ▶ Promotion of economic development and sustainability of food producing industries in the selected regions.
 - ▶ Improved supply chain efficiencies through synergies between industries, economies of scale, efficient use of transport facilities and common use infrastructure.
 - ▶ Promotion of research and innovation hubs.
- ▶ Nambeelup:
 - ▶ It is estimated that the development of the Nambeelup precinct will increase the population in the Shire of Murray to 58,000 by 2050.⁵²
 - ▶ It is estimated that the Nambeelup precinct has a NPV of \$8 billion over 20 year period and will create 9,500 full time jobs when operating at full capacity.^{53 54}
- ▶ West Mundijong
 - ▶ Increased employment opportunities for local residents – the construction

Indicative cost benefit ratio

- ▶ Not yet determined (or available) for all three precinct proposals.

Funding and financing

In this instance, the role for Government would be to develop and plan the precinct zone while the private sector would invest in establishing the various processing facilities. This presents an opportunity for government participation in a joint venture with the private sector.

The Nambeelup initiative is more advanced than the other two sites. More detailed investigation may be required for the West Mundijong and Waterloo precincts before they can be compared against the Nambeelup precinct.

⁵² Peel Development Commission, December 2015, op. cit., p.65.

⁵³ Urbis, op. cit., p.12.

⁵⁴ Peel Development Commission, December 2015, op. cit., p.73.

⁵⁵ *Bridging the job gap*, Local Government Focus, <http://www.lgfocus.com.au/editions/2014-11/bridging-the-job-gap.php>, (accessed 28 February 2016).

⁵⁶ *ibid.*

⁵⁷ Cardno WA Pty Ltd, September 2013, op. cit., p.60

Support development of an irradiation facility

Supporting investment in irradiation as an alternative disinfestation protocol will facilitate the export growth and value-add potential of Western Australian horticultural produce.

At a glance

Initiative	Support development of an irradiation facility
Priority	Priority 2
Region	Location pending
Sector	Irrigated agriculture
Infrastructure category	Transforming produce
Investment stage	Early stage
Indicative project cost	Costs for provision of supporting infrastructure for a facility as yet undetermined
Leverage opportunity	Medium
Potential WA Government funding contribution	Likely that WA Government would have to contribute majority of funds for supporting infrastructure
Potential co-contribution funding and financing sources	<ul style="list-style-type: none"> ▶ Private sector ▶ Local Government ▶ Potential for joint venture

approved in more than 50 countries.⁵⁸ Extensive research has been conducted by the World Health Organization; the United Nations Food and Agriculture Organization; the European Community Scientific Committee for Food; the United States Food and Drug Administration, a United Kingdom House of Lords committee and by scientists at Food Standards Australia New Zealand (FSANZ) and concluded that food irradiation is safe.⁵⁹

Irradiation reduces biosecurity risk, and will provide new interstate and international trade opportunities. It also helps to control food spoilage and extend the shelf-life of foods without detriment to health and with minimal effect on nutritional or sensory quality.⁶⁰

This initiative is aligned with DAFWA's strategic intent to boosting biosecurity and the strategic plan and vision to double the value of WA agriculture by 2025.⁶¹

Steritech is the leading sterilization processor in the Asia-Pacific Region⁶² and operates the only commercial irradiation plants in Australia (Melbourne, Sydney and Brisbane).⁶³

Overview

Western Australia does not currently have a large scale commercial irradiation facility. Irradiation will facilitate interstate trade and overseas export of WA produce, opening up new markets for horticultural producers. To attract investment for a facility, a study to determine the potential volume of products both agricultural and non-agricultural is required and the potential benefit to the State determined.

The proposed initiative is for government to facilitate the investment of a large scale commercial fresh food irradiation facility in WA. The role of government will be to provide common use utilities infrastructure for the facility.

Purpose

Irradiation, carried out under conditions of Good Manufacturing Practice, is an effective widely applicable food processing method. It is

⁵⁸ *Food irradiation*, Institute of Food Science and Technology (IFST), <http://www.ifst.org/knowledge-centre/information-statements/food-irradiation>, (accessed 12 February 2016).

⁵⁹ *Food irradiation*, Food Standards Australia New Zealand, <http://www.foodstandards.gov.au/consumer/foodtech/irradiation/Pages/default.aspx>, (accessed 25 February 2016).

⁶⁰ IFST, loc. cit.

⁶¹ *Strategic plan 2014-17*, Department of Agriculture and Food Western Australia (DAFWA), <https://www.agric.wa.gov.au/sites/gateway/files/Department%20of%20Agriculture%20and%20Food%20Western%20Australia%20Strategic%20Plan%202014-2017.pdf>, (accessed 12 February 2016).

⁶² *Background*, Steritech, <http://www.steritech.com.au/>, (accessed 25 February 2016).

⁶³ 'Pending changes to the use of patterns of certain insecticides in the postharvest phase of fruit and vegetable production and the potential for using irradiation as an alternative treatment', *Steritech*, <http://www.steritech.com.au/files/Irradiation%20as%20option%20for%20replacing%20chemicals%20technical%20paper.pdf>, (accessed 25 February 2016), p. 3.

In January 2015, the Brisbane facility was USDA approved for exporting irradiated mangoes and lychees from Australia into the US.⁶⁴

Indicative costs

- ▶ Government funding contribution would focus on supporting infrastructure for an irradiation facility such as provision of land, power and water. These costs have yet to be determined.
- ▶ For reference, an indicative estimate of the private sector cost of building a facility is in the order of \$12-15 million plus land value (assuming 3000 square metre warehouse).⁶⁵ Actual costs will depend on the size and processing capacity.

Indicative benefits

- ▶ Increased market access for producers through international and interstate trade opportunities especially in the horticultural industry. Between 2004 and 2010, the quantity of mango, papaya and litchi irradiated and exported to New Zealand increased from 256 to 1250 tonnes.⁶⁶
- ▶ Reduced biosecurity risk through reduced number of microorganism and control food spoilage, extended shelf life, control of insect infestation.
- ▶ Increased supply chain savings from reduced wastage.
- ▶ Improved environmental impacts from reduced usage of pesticides and storage.
- ▶ Improved quality of produce and choice for consumers.
- ▶ Other potential benefits include the ability to sterilise apiary, mining and medical equipment.

Indicative cost benefit ratio

- ▶ Not yet determined.

Funding and financing

In this instance, the role for Government would be to develop and plan the zone while the private sector would invest in establishing the irradiation facilities. This presents an opportunity for government participation in a joint venture with the private sector.

⁶⁴ *Phyosanitary treatment for market access using irradiation*, Steritech, <http://www.steritech.com.au/content/phytosanitary-treatment>, (accessed 25 February 2016).

⁶⁵ V. McAllister (DAFWA), email, 23 February 2016.

⁶⁶ IFST, loc. cit.

Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure

A coordinated approach to building a feed mill will support growth in the Western Australian aquaculture industry and reduced reliance on interstate imports.

At a glance

Initiative	Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure
Priority	Priority 2
Region	(Most likely) Kimberley
Sector	Aquaculture
Infrastructure category	Transforming produce
Investment stage	Early stage
Indicative project cost	Costs for provision of supporting infrastructure for a facility as yet undetermined
Leverage opportunity	Medium
Potential WA Government funding contribution	Likely that WA Government would have to contribute majority of funds for supporting infrastructure
Potential co-contribution funding and financing sources	<ul style="list-style-type: none"> ▶ Commonwealth Government ▶ Private sector ▶ Local Government ▶ Potential for joint venture

Overview

A number of stakeholders stated that the establishment of a WA aquaculture feed mill would be the single biggest infrastructure investment that the aquaculture industry needs at this point in time. Other needs for aquaculture infrastructure have been highlighted including the need for a hatchery.

There are currently no feed manufacturers in WA. As a result, aquaculture producers currently import feed from the east coast.

A coordinated approach could ensure that feed is produced for multiple aquaculture sectors (e.g. finfish and crustaceans) and the feed that is produced could also be exported to other markets.

Purpose

Marine finfish species and marine prawn farms are anticipated to have strong growth prospects in WA.⁶⁷ However, a lack of feed production and processing facilities is a key impediment to growth of aquaculture production in northern WA.^{68 69}

Additional input costs and supply risks are associated with importing feed and places additional pressure on transport routes in the regions.

Project Sea Dragon has proposed to establish a feed mill and processing plant in Kununurra for their prawning operations. As the project develops, the feed requirement at full scale is approximately 200,000 tonnes per annum and ideally a dedicated feed mill would be built north of Kununurra. The feed mill is likely to be developed in 50,000 tonne capacity staged modules.⁷⁰

The proposed initiative is for Government to establish a coordinated approach with aquaculture producers to ensure that feed is produced for multiple aquaculture sectors.

Indicative costs

- ▶ Government funding contribution could focus on supporting infrastructure for a feed mill facility such as provision of land, power and water. These costs have yet to be determined.

⁶⁷ *Scaling Up Inquiry into the Opportunities for Expanding the Aquaculture Industry in Northern Australia*, The Parliament of the Commonwealth of Australia, February 2016, p.3.

⁶⁸ *Submission to the Joint Select Committee on Northern Australia – Inquiry into Opportunities for Expanding the Aquaculture Industry in Northern Australia*, Western Australian Department of Fisheries, May 2015, p. 1.

⁶⁹ *Submission to the Joint Select Committee Inquiry into Expanding the Aquaculture Industry in Northern Australia*, Aquaculture Council of Western Australia (ACWA), May 2015, p. 5.

⁷⁰ *Project Sea Dragon Project Definition Document – January 2016*, Seafarms Group Limited, 21 January 2016, p.13.

- ▶ For reference, an indicative estimate of the private sector cost of building a facility is in the order of \$15 million plus land value. Actual costs will depend on the size and processing capacity.

The Audit recommends that DRD commission a scoping study to investigate the merits of establishing a feed mill, and potential site options.

Indicative benefits

- ▶ Reduced input costs and supply risks associated with imported feed.
- ▶ Ability to capture the increasing global demand for high quality seafood, including increased market access and trade opportunities.
- ▶ There are potential cross-sector benefits if the proposed feed mill could also produce feed for other aquaculture sectors.
- ▶ Increase employment workforce and indigenous engagement through growth of the aquaculture sector. At full capacity, Project Sea Dragon will require a full time workforce of circa 1,600 personnel in NT and WA.⁷¹

Indicative cost benefit ratio

- ▶ Not yet determined.

Funding and financing

Government could explore co-investment or joint venture opportunities with global feed mill producers or aquaculture feed producers such as Nutreco or Skretting to set up a pilot plant in WA.⁷²

Another potential solution could be to ensure that currently proposed feed mills are able to cater for multiple aquaculture sub-sectors (e.g. prawns, finfish). DRD could work with DSD and private sector to explore the potential to produce feed for aquaculture and other sectors.

⁷¹ 'Commodities Group Signs Agreement for Legune Station to develop Project Sea Dragon', *Commodities Group Limited*, 16 February 2015, <http://www.co2australia.com.au/wp-content/uploads/2015/02/COZ-Agreement-for-Legune-Station-429.pdf>, (accessed 25 February 2015).

⁷² S. Nel (Department of Fisheries Western Australia), interview, 14 September 2015.

Priority 3 recommendations

Priority 3 initiatives

Priority 3 initiatives scored medium to high against the evaluation criteria with most requiring additional scoping or feasibility studies. It is recommended that these be progressed through the staged process set out in this Audit, contingent on available funding and in deference to Priority 1 and 2 initiatives.

Freight network

Build the necessary road infrastructure to enable unimpeded triple road train access to Muchea

Extending access for large road trains to and from Muchea will reduce transport times and the need for trucks destined for Muchea Livestock Centre to be broken up.

Overview: Key freight routes in and out of Muchea require operators to change vehicle configurations due to limitations of the road to handle long road trains lengths. Current restrictions on truck length drive up costs and make trucking one of the highest cost components in the supply chain. Government can assist by improving roads and easing legislated constraints on truck size.

Improvements to roads will also improve road safety, freight efficiency, and provide network reliability to allow a large truck volume to access the Muchea Livestock Centre.

Key access roads into Muchea include: Toodyay (Julimar and Chittering Roads); Brand Hwy from Reagans Ford into Muchea; and Carnarvon (Dongara to Northampton Strategic Corridor). The Audit acknowledges that the State's priority is to upgrade the Great Northern Highway from Wubin to Muchea to enable triple road trains. A detailed business case is being developed with the Commonwealth Government for this outcome.

International gateways

Upgrade facilities at Wyndham Port, including cattle holding yards, conveyor systems, and loading facilities

Upgrading facilities at Wyndham Port, including the cattle holding yards, conveyor systems, and loading facilities will facilitate private investment opportunities, supporting continued economic development in the East Kimberley.

Overview: The current port facilities require upgrading, for example the cattle holding yards which are rudimentary and have environmental issues.⁷³ Handling mechanisms are also old and slow and upgrading facilities such as a conveyor system will also enable handling of crops like sugarcane. Wyndham Port is also currently limited to 12,000 tonne vessels. A private sector proponent has approached the WA Government seeking approval to build a new 170m wharf to accommodate 50,000 tonne vessels.⁷⁴

This initiative requires a number of trigger events to achieve critical mass before it makes economic sense for it to go ahead. These include precursor initiatives such as Project Sea Dragon and development of a sugarcane mill.

⁷³ Indicative cost to upgrade Wyndham Port cattle holding yards is \$300,000

⁷⁴ T. Edwards, 'Farmers create infrastructure wish list for Western Australia's north', ABC, 21 October 2015, <http://www.abc.net.au/news/2015-10-20/northern-farmers-infrastructure-wishlist/6869910>, (accessed 29 February 2016)

Transforming produce

Develop a Department of Agriculture and Water Resources accredited wash down facility in Broome

Developing a Commonwealth Government accredited wash down facility in Broome will deliver biosecurity benefits including the ability to segregate cattle in the event of an outbreak. It will also provide the ability to accumulate cattle to meet requirements of exporters and trucking companies as well as help to reduce transport costs via improved flow of cattle.⁷⁵

Overview: Broome Port is a major conduit for the export of live cattle in the north of the State and a Commonwealth Government accredited wash down facility will help optimise throughput of cattle through the port. This initiative was also evaluated as part of DAFWA's Northern Beef Infrastructure Review. cursory findings indicate that this initiative could generate annual transport savings of \$1.37 million.^{76 77}

⁷⁵ T. Anderson (DAFWA), email, 01 December 2015.

⁷⁶ *Northern Beef Futures: Potential for increased exports from northern ports*, Department of Agriculture and Food Western Australia (DAFWA), July 2015, <https://agric.wa.gov.au/n/4654>, (accessed 10 March 2016).

⁷⁷ Indicative cost to upgrade cattle holding yards is \$2 million to \$2.5 million.

Transforming produce

Build supporting infrastructure for a Pilbara algae precinct

Provisioning primary level infrastructure for a 440ha Pilbara algae precinct will help foster economic diversity and growth in the region.

Overview: The Pilbara is ideally suited to the development of the algae sector due to the abundant sunshine and close proximity to sea water. The Pilbara Regional Investment Blueprint identified algae production as an important opportunity for economic diversity in the region. Potential markets include biofuels, health foods, pharmaceuticals and feedstock.

The Pilbara Development Commission recently commissioned a site assessment of potential precinct sites in the Pilbara.⁷⁸ The study provides preliminary cost estimates for the provision of land and primary level infrastructure.⁷⁹

In 2015, Plankton Farms began testing systems to grow algae in salt water ponds, to be harvested, dried and processed into health supplements. The company plans its first commercial harvest mid-2016.⁸⁰

⁷⁸ *Pilbara Algae Precinct Site Study*, Arup, 30 June 2015, www.pdc.wa.gov.au/download_file/force/244/284, (accessed 14 November 2015).

⁷⁹ Indicative cost to provide land access and primary level infrastructure is \$22.15 million.

⁸⁰ L. Bell, 'Pilbara farm harvests test algae crop for natural medicine market', *ABC*, 14 December 2015, <http://www.abc.net.au/news/2015-12-14/plankton-farms-plans-for-karratha-algae-plant/7016678>, (accessed 29 February 2016).

Transforming produce

Upgrade capacity of Port Hedland holding yards to 10,000 head of cattle

Upgrading the capacity of the Port Hedland holding yards to 10,000 head of cattle will facilitate accumulation of cattle in the Pilbara and allow improved flow of cattle through the port.

Overview: The Commonwealth accredited yards currently have the capacity to hold 6,000 head of cattle. Upgrading the capacity of the holding yards will support growth of the livestock industry in the immediate to short term as pastoralists build up cattle numbers. Larger yards will also help to improve the quality of stock delivered to port, enhance inventory turnover, reduce transport costs and improve animal welfare.⁸¹ Recent work undertaken as part of DAFWA's Northern Beef Infrastructure Review indicates that this initiative could generate annual transport savings of \$1.34 million.⁸²

⁸¹ Indicative cost to upgrade Port Hedland cattle holding yards is \$1.8 million.

⁸² T. Anderson (DAFWA), email, 01 December 2015.

Transforming produce

Build supporting infrastructure for dairy processing facilities

The construction of supporting infrastructure for dairy processing facilities (such as extended shelf life, infant formula, and/or free stall processing facilities) will facilitate the production of high-value milk products for export markets.

Overview: WA's dairy sector is focused on the production of fresh milk for the domestic market. Opportunities for growth are apparent as a result of the increasing demand of Asian markets for high quality dairy products.⁸³

Investment in dairy export manufacturing capacity will help WA develop a more cost-efficient, seasonal and product-diverse production profile.⁸⁴ It would also enable greater access in to global export markets where high-value dairy products are increasingly being sought.

Government could play a role in enabling the sector to transform and grow by providing the land, water and energy infrastructure required to establish processing facilities. Recognising the potential benefits, DAFWA has undertaken extensive analytical work on this matter.

⁸³ *Dairy cattle*, Department of Agriculture and Food, Western Australia, <https://www.agric.wa.gov.au/livestock-animals/livestock-species/dairy-cattle>, (accessed 29 February 2016).

⁸⁴ *Fresh opportunities*, Strategis Partners, February 2012, p.24.

Utilities

Extend height of the Lake Argyle Dam spillway

Extending the height of the Lake Argyle Dam spillway by 4 metres will increase its capacity ten-fold. This additional water could be used by the irrigated agriculture sector in the Kimberley.

Overview: Stage 4 of the Ord River Irrigation Expansion is in the planning stage and involves raising the Ord River Dam's main spillway and widening the main and auxiliary spillways so that they can safely handle extreme flood conditions. Raising the spillway would provide an additional 230 GL/year of water supply for high water crops such as sugarcane.⁸⁵ Some see the increased storage of water as the single most strategic investment that could occur in the State's north.⁸⁶

Potential investment partners include private sector, the Northern Territory Government, the Water Corporation and the Commonwealth Government via the National Water Infrastructure Development Fund.⁸⁷

Utilities

Extend M2 irrigation channel to service Ord Stage 3

Extending the M2 irrigation channel to service Ord Stage 3 will accommodate growth in the cropping area of the Ord Irrigation Scheme.

Overview: Currently the M2 channel is located 6km from the NT/WA border.⁸⁸ Ord Stage 3 will result in the extension of the Ord cropping area into NT. An extended irrigation channel will be required to provide the additional agricultural land with effective irrigation services. There is potential for this project to be funded by a single Ord Stage 3 developer.⁸⁹

⁸⁵ Indicative costs are \$80 million for the Stage 4 spillway raising and \$40 to \$70 million to increase the capacity of the auxiliary spillways.

⁸⁶ P. Stubbs (DRD), email 15 February 2016.

⁸⁷ T. Edwards, 'Federal funding for east Kimberley dam expansion tips Western Australia's Regional Development Minister Terry Redman', *ABC*, 9 July 2015, <http://www.abc.net.au/news/2015-07-08/wa-minister-tips-kimberley-dam-for-federal-funding/6603914>, (accessed 29 February 2016).

⁸⁸ *Ord Development Project*, Department of Primary Industry and Fisheries, 30 March 2015, http://www.nt.gov.au/d/Primary_Industry/?Header=Ord%20Development%20Project, (accessed 28 February 2016).

⁸⁹ Indicative project cost is \$50 million.

Utilities

Build 2-gigalitre dams in Southern Forests

The construction in Southern Forests of dams of up to two gigalitres in size will enable the provision of reticulated water systems to multiple properties in the South West. This will facilitate increased output from the irrigated agriculture sector.

Overview: Water for Food Southern Forests Water Futures project involves small scale community dams combined with an integrated delivery system to enhance distribution of water for existing irrigators and increase the current irrigation footprint. This project targets the storage of an additional 12 gigalitres of water per year, and will create industry expansion and productivity gains.

Water for Food is currently investigating the demand for, and feasibility of, an agricultural irrigation scheme in the Warren Donnelly and Southern Blackwood area.⁹⁰ The State and Commonwealth Government combined contribution to infrastructure is likely to be in the order of \$25 million.

⁹⁰ Indicative costs to State and Federal Government are in the order of \$25 million (T. Duncanson email, 28 February 2016).

Utilities

Develop supporting infrastructure to supply fit for purpose water from Wellington Dam

The supply of fit for purpose water from Wellington Dam will increase available water for irrigation in the South West and unlock increased activity in the irrigated agricultural sectors.

Overview: Wellington Dam is WA's second largest surface water storage facility. It has a capacity of 185 gigalitres. At present, 68 gigalitres per annum is licensed for use by agriculture and only approximately 43 gigalitres are actually used. The water in the Dam is too salty for most agriculture practices.

The Collie River Irrigation District and the Myalup Irrigated Agriculture Precinct are important agricultural areas for the State and are being limited by the lack of access to fresh water. This salinity issue has been highlighted in the Agricultural Competitiveness White Paper and requires significant Commonwealth and State funding for remediation. An infrastructure package that treats the water to reduce salinity and distribution through a piping network will increase the effective use of the water.

It has been estimated that a solution to the salinity problem would have the potential to provide \$29 billion of economic value and create 1500 jobs.⁹¹

The WA Government is working with a proponent to refine a solution to improve the water quality from the dam through the Water for food project led by the Department of Water.⁹² There is good potential to leverage private sector funds for this initiative.

⁹¹ T. Duncanson (DoW), email, 28 February 2016.

⁹² Indicative project costs are \$250 million.

Digital Infrastructure

Upgrade information and communications technology in regional WA

Improving the coverage, reliability and speed of mobile and internet services will deliver productivity, commercial and social benefits in agriculture. Further investigation of innovative telecommunications solutions should be undertaken.

Overview: Lack of adequate information and communication services was the number one issue raised by stakeholders during the Audit. Additional mobile towers are part of the solution, however further investigation of innovative telecommunications solutions should be undertaken. Examples of potential solutions include Project Loon, solar-powered drones, and Yawuru TelePods. Google's Project Loon uses high-flying balloons to deliver internet access to remote areas of the world. Testing of the balloons began in New Zealand in 2013 and will commence in Indonesia this year.⁹³ ⁹⁴ Facebook and Google have also both bought companies that make solar-powered drones with the aim of providing internet access to large rural areas.⁹⁵ A local and smaller scale solution could involve utilising the Yawuru TelePods. The business was founded in the Kimberley in 2010 and aims to improve ICT services in remote areas whilst also upskilling the indigenous labour force.⁹⁶

⁹³ I, Fried, 'After Nearly Going Pop, Google's Project Loon Heads Into Carrier Testing This Year', *Re/code*, 15 February 2016, <http://recode.net/2016/02/15/project-loon-rural-internet-effort-going-into-carrier-testing-this-year/>, (accessed 10 March 2016).

⁹⁴ A, Hern, 'Facebook launches Aquila solar-powered drone for internet access', *The Guardian*, 31 July 2015, <http://www.theguardian.com/technology/2015/jul/31/facebook-finishes-aquila-solar-powered-internet-drone-with-span-of-a-boeing-737>, (accessed 10 March 2016).

⁹⁵ Ibid.

⁹⁶ *The Yawuru Story*, Yawuru, <http://yawuruit.com.au/about-us/>, (accessed 10 March 2016).

Supporting recommendations

Supporting recommendations

The Audit has identified an additional five supporting recommendations. The aim of these recommendations is to provide guidance to ensure ongoing value is derived from the work undertaken during the Audit.

Maintain an active pipeline of infrastructure initiatives by adopting the frameworks developed as part of this Audit

Prior to the Audit, there was no systematic process for developing an agriculture infrastructure investment pipeline. A number of frameworks were developed as part of this Audit including an *Initiative Database*, screening and evaluation process and a *WA Agriculture Infrastructure Priority List*.

It will be useful to the State to keep these frameworks and the investment pipeline current. For example, following on from the Fund and delivery of the high priorities, active management and enhancement of the *Initiative Database* will ensure initiatives stay relevant and are managed through an appropriate investment pipeline process.

A multi-agency investment committee could be established to ensure robust and transparent investment decisions are made. The committee's primary task would be to regularly evaluate the overall investment portfolio to ensure alignment with the State's strategic infrastructure and agricultural priorities. It would also focus on the progression of early stage initiatives (e.g. by recommending the undertaking of a scoping or feasibility studies).

Investigate strategic and policy opportunities that will foster growth in the Western Australian agricultural industry

The Audit identified over 100 strategy and policy initiatives related to agricultural infrastructure and the industry in general. Whilst the focus of the Audit has been on hard infrastructure additional work could be undertaken to investigate the strategy and policy levers that optimise infrastructure investment. From a policy perspective, stakeholders frequently identified issues such as complication with land tenure, water allocations and energy pricing as constraining growth. From a strategic perspective, many stakeholders identified the need for a detailed strategy outlining the growth opportunities for agriculture.

On land tenure, prominent issues included:

- ▶ The need for better information on available parcels of land (and supporting infrastructure and resources) that are available for agricultural activities so as to facilitate investment decisions.
- ▶ The need to simplify the land planning approvals pathways to make it easier and cheaper to develop agricultural land. It is noted that the State Government has recently released policy principles to aid the land tenure change process for irrigated agriculture. In addition, the State Government has recently proposed legislative reform to drive investment and diversification in the Rangelands.
- ▶ Engagement with traditional owners around land tenure and Native Title negotiations.

On water allocations, prominent issues included:

- ▶ The need for more efficient use and allocation of scarce water resources, including an enhanced ability of licence holders to trade water so that it can be allocated to its highest and best use.
- ▶ The need to encourage expansion of mine-dewatering activities so that water that is currently wasted can be put to good use.
- ▶ The need to address high headworks and connection costs in regional areas.

On energy pricing, prominent issues included:

- ▶ The need to encourage and promote renewable energy initiatives in the regions for environmental reasons and also for cost reasons as servicing networks over long distances can be very costly, and being limited to network-supplied energy can be restrictive.
- ▶ As in the case of water, the need to address high headworks and connection costs in regional areas.

On other matters, prominent issues included:

- ▶ The need for the development of a fact-based agricultural strategy so as to identify areas of competitive advantage and enable decisions to be made around sectors of focus for the future.
- ▶ The need to expedite local export accreditation by permitting WA government officers (rather than Commonwealth officers) to approve export protocols.
- ▶ The need for provision of additional beef accreditation licences (to export to China) for beef producers to enable the industry to take advantage of growth opportunities.

Collaborate with other government bodies such as Infrastructure Australia to ensure Western Australian agricultural infrastructure priorities are made visible

The *WA Agriculture Infrastructure Priority List* was developed based on Infrastructure Australia's approach. Given major infrastructure projects are evaluated by Infrastructure Australia and assessed against other competing infrastructure investments it makes sense to share the State's priorities with them. A number of other Commonwealth Government agencies should also be made aware of the outcomes of this work, given the significant commitments to infrastructure made in a number of recent publications and announcements, including the \$5 billion Northern Australia Infrastructure Facility, the \$200 million for water infrastructure, \$100 million for roads used by northern Australia cattle supply chains, and \$600 million for other priority roads. This collaboration will help maximise co-funding opportunities.

Communicate outcomes to targeted stakeholders engaged as part of this Audit

Over 200 stakeholders across the State contributed valuable insights to this Audit. It is important for the development of good policy that strong relationships are maintained with the WA agricultural and regional communities. There is value in sustaining an appropriate level of connection with the many stakeholders and groups consulted during the course of the Audit. Communication and engagement opportunities could include regular updates on the DRD website and regular updates to Regional Development Commissions.

Identify mechanisms and processes to leverage *Royalties for Regions* investment to enable targeted engagement with potential funders and financiers

A core objective of the Audit is to leverage the Fund with other sources of public and private capital. This is desirable given the:

- ▶ Substantial capital required for infrastructure investments.
- ▶ Finite limits of State capital available for the program.
- ▶ Availability of alternative pools of capital that could be deployed.

As part of the preparation of future business cases, careful selection of funding and financing options, risk assessment and allocation, potential delivery models and targeted engagement with potential funders and financiers will help to leverage the Fund.

This is important given indicative costs for some of the initiatives are beyond the capacity of the Fund. This should also be undertaken with regard to existing WA Government procurement processes (such as the Strategic Asset Management Framework).

Appendix C contains summaries of options for project funding, financing and procurement.

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References and abbreviations

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Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
BoM	Bureau of Meteorology
CEDA	Committee for Economic Development of Australia
CRC	Cooperative Research Centre
DAFWA	Department of Agriculture and Food Western Australia
D&C	Design and construct
DCM	Design, construct, maintain
DoT	Department of Transport
DoW	Department of Water
DRD	Department of Regional Development
DSD	Department of State Development
FSANZ	Food Standards Australia New Zealand
GIWA	Grain Industry Association of Western Australia
ILC	Indigenous Land Council
KADZ	Kimberley Aquaculture Development Zone
NAIF	Northern Australia Infrastructure Facility
NARP	Northern Australia Roads Programme
NSRF	National Stronger Regions Fund
NT	Northern Territory
PHADI	Pilbara Hinterland Agricultural Development Initiative
PPMT	Precision Pastoral Management Tools
PPP	Public Private Partnership
RMCP	Regional Mobile Communications Project
RTP	Regional Telecommunications Project
US	United States of America
USDA	United States Department of Agriculture
VRT	Variable Rate Technology
WA	Western Australia

Appendices

Appendix A List of infrastructure initiatives evaluated

The desktop review and stakeholder consultations yielded almost 500 initiatives, incorporating a mix of hard and soft infrastructure. An *Initiative Database* was developed to collect and categorise the data so that potential initiatives could be easily filtered (e.g. by region, sector or infrastructure type). In consultation with the Steering Group, criteria were then developed to screen and evaluate the initiatives. The qualitative screen reduced the list of 500 initiatives to 139. The following tables provide the full list of 139 initiatives that have been evaluated. These initiatives have been collated for each of the nine regions to provide each region with a list of agriculture infrastructure initiatives. The tables indicate the initiative’s current stage of development, and priority level (only if it is in the WA Agriculture Infrastructure Priority List). The initiatives have been sorted by infrastructure category and priority level (if applicable). Priority initiatives will be listed at the top of each infrastructure category, but otherwise are in no particular order.

Cross-region

The following initiatives are cross-regional (i.e. the initiative involves more than one region). For ease of reference on the following pages, these initiatives have been copied in the “cross-region” tables for the relevant regions.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Build the necessary road infrastructure to enable unimpeded triple road train access to Muechea	Cross-sector	Early Stage	3
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Build an inland freight link between Esperance and Port Hedland (PortLink Inland Freight Corridor Development Plan) to facilitate freight efficiencies by building a more robust and flexible freight network	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure to support growth in the Western Australian aquaculture industry and reduce reliance on interstate imports	Aquaculture	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Build export quality regional processing facility for the finfish sector to directly supply export markets from local air and sea ports	Aquaculture	Early Stage	
Build high intensity greenhouses to grow the horticultural sector in WA	Irrigated Agriculture	Early Stage	

Utilities (energy, land, water)			
Extend the State Barrier Fence to help the Mid West, Goldfields-Esperance and Wheatbelt pastoral industries	Cross-sector	Early Stage	
Build low cost gas supply or renewable energy infrastructure to power pivot systems for irrigation	Irrigated Agriculture	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade existing weather radars to Doppler radar in Geraldton, Albany and Esperance to provide farmers with more accurate and timely weather information, supporting more informed decision making around farm management	Cross-sector	Real Potential	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Gascoyne

The following initiatives are specific to the Gascoyne region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Build bridge over Gascoyne River at Gascoyne Junction to improve wet season cattle movements	Cattle	Real Potential	
International gateways (port and airport)			
Upgrade Exmouth harbour facilities to improve access to cattle and horticultural export markets	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Build a multi-purpose food processing plant for horticulture in the Gascoyne	Irrigated Agriculture	Early Stage	
Build a regional abattoir in Carnarvon for processing sheep, goats and cattle	Cattle	Early Stage	
Build additional greenhouses to generate scale efficiencies for high value horticulture products in the Gascoyne	Irrigated Agriculture	Early Stage	
Utilities (energy, land, water)			
Upgrade Southern Borefield Line to improve access to water for horticulture in the Gascoyne region	Irrigated Agriculture	Early Stage	

Build sand dam water storage facilities for horticulture in the Gascoyne region	Irrigated Agriculture	Early Stage	
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The following initiatives are cross-regional initiatives that are, or could be, relevant to the Gascoyne region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Build high intensity greenhouses to grow the horticultural sector in WA	Irrigated Agriculture	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Goldfields-Esperance

The following initiatives are specific to the Goldfields-Esperance region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Upgrade the 300km road from Ravensthorpe to Albany Hwy to facilitate increased grain exports and reduce truck wear and tear and improve road safety	Grain	Early Stage	
Upgrade roads to handle over-sized and over-capacity loads to increase tonnage per vehicle on Goldfields-Esperance roads	Grain	Early Stage	
Upgrade local roads to facilitate transport of lime which is critical to soil health	Grain	Early Stage	

Upgrade road from Rawlinna to Eyre Highway to all weather to minimise Transline closures and retain year round access to markets	Cross-sector	Early Stage	
International gateways (port and airport)			
Upgrade freezer container handling at the Port of Esperance to increase exports to SE Asia where demand for red meat is growing	Cattle	Early Stage	
Transforming produce (production, processing, storage)			
Build a quarantine station at Laverton to allow access to WA from Central Australia removing the time and expense of transport to Kalgoorlie	Cross-sector	Early Stage	
Build storage facilities for niche grain products in Goldfields-Esperance	Grain	Early Stage	
Build high quality grain storage facilities in Goldfields-Esperance to store excess grain in high yield years	Grain	Early Stage	
Utilities (energy, land, water)			
Build a desalination facility for use in irrigated agriculture and industry, decreasing the reliance on existing groundwater supplies	Cross-sector	Early Stage	
Upgrade network to provide power feed from Katanning to Ravensthorpe to increase reliability and minimise outages which close bins	Grain	Early Stage	

The following initiatives are cross-regional initiatives that are, or could be, relevant to the Goldfields-Esperance region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Build an inland freight link between Esperance and Port Hedland (PortLink Inland Freight Corridor Development Plan) to facilitate freight efficiencies by building a more robust and flexible freight network	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Utilities (energy, land, water)			
Extend the State Barrier Fence to help the Mid West, Goldfields-Esperance and Wheatbelt pastoral industries	Cross-sector	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-	Threshold	1

	sector		
Upgrade existing weather radars to Doppler radar in Geraldton, Albany and Esperance to provide farmers with more accurate and timely weather information, supporting more informed decision making around farm management	Cross-sector	Real Potential	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Great Southern

The following initiatives are specific to the Great Southern region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Upgrade (widen and introduce passing lanes at seven locations) South Coast Highway between Albany and Jerramungup to improve safety for users and efficiency of the road network	Cross-sector	Early Stage	
Upgrade Albany Ring Road (stages 2, 3 and 4) to provide efficiencies for grain and timber transport to port	Grain	Real Potential	
Upgrade South Coast Hwy / Chester Pass Road / East-West links / Ring Road to Albany Port / Passing lanes on Albany Hwy and South Coast	Grain	Real Potential	
Upgrade east-west links between Katanning, Kojonup and Collie to enable livestock transport	Cattle	Early Stage	
Upgrade arterial roads in the Great Southern to improve the regional and inter-regional road network, to accommodate an expected increase in grain freight	Grain	Early Stage	
Extend the railway from Mirambeena and Yerriminup to the Port of Albany to assist in shifting freight transport off roads and onto the rail system via the use of intermodal transfer facilities	Grain	Early Stage	
Extend the railway to Mirambeena strategic industrial site at Albany to support secondary and downstream agricultural processing industries in the Great Southern	Cross-sector	Early Stage	
International gateways (port and airport)			
Build container facilities at Albany port to facilitate agricultural exports in the Great Southern	Cross-sector	Early Stage	
Upgrade Berths 1 and 2 and expand Albany Port to capitalise on potential export opportunities in the agricultural sector	Cross-sector	Early Stage	
Improve the Bremer Bay Airfield in the Great Southern to support agricultural activities including export of produce and import of services, materials and expertise	Irrigated Agriculture	Early Stage	
Transforming produce (production, processing, storage)			

Build an inland intermodal terminal with rail and road links in Mirambeena or Cranbrook for agri-processing	Cross-sector	Early Stage	
Build cold storage facilities in the Great Southern to facilitate export of small goods (cold / frozen / cheese)	Cross-sector	Early Stage	
Utilities (energy, land, water)			
Provision of suitable land in Albany to develop a "high rainfall" managed environment facility for targeted grains research (as part of the Western Regional Centre of Applied RD&E)	Grain	Early Stage	
Provision of water infrastructure to access potential sources of fresh groundwater in the Albany hinterland that will provide diversification options for industry and agriculture for the long term	Cross-sector	Early Stage	
Provision of water infrastructure for existing strategic industry sites at Albany (Mirambeena) and Mount Barker (Yerriminup) to support secondary and downstream agricultural processing industries in the Great Southern	Cross-sector	Early Stage	
Build connections between central and lower great southern water supplies	Cross-sector	Early Stage	
Upgrade network to extend power to existing strategic industry sites at Albany (Mirambeena) and Mount Barker (Yerriminup) to support secondary and downstream agricultural processing industries in the Great Southern	Cross-sector	Early Stage	

The following initiatives are cross-regional initiatives that are, or could be, relevant to the Great Southern region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Build high intensity greenhouses to grow the horticultural sector in WA	Irrigated Agriculture	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1

Upgrade existing weather radars to Doppler radar in Geraldton, Albany and Esperance to provide farmers with more accurate and timely weather information, supporting more informed decision making around farm management	Cross-sector	Real Potential	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Kimberley

The following initiatives are specific to the Kimberley region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Upgrade Moonamang Road to provide the transport infrastructure required to support the development and ongoing operations of Project Sea Dragon and facilitate the expansion of the Ord Irrigated Agriculture Development into the Northern Territory	Cross-sector	Real Potential	1
Upgrade Great Northern Hwy from Kununurra to Wyndham Port to improve road safety and access (include bypass around Wyndham)	Cross-sector	Early Stage	
Build a high level bridge over the Ord River to provide an alternative transportation route (Kununurra Heavy Vehicle Route Stage 1)	Cross-sector	Threshold	
Build a new bridge over the D4 drain to service Ord Stage 3 and Project Sea Dragon	Cross-sector	Real Potential	
Build a low level crossing over the Ord River to provide an alternative transportation route	Cross-sector	Early Stage	
Upgrade (seal) secondary road infrastructure in the Kimberley (especially 45km of road between Derby and the main highway) to get cattle to market during the December to April wet season	Cattle	Early Stage	
Upgrade Ord Stage 1 roads to reduce damage to vehicles and produce	Irrigated Agriculture	Early Stage	
Upgrade flood-prone arterial road sections in the Kimberley (Great Northern Hwy: Derby to Fitzroy Crossing, Halls Creek to Victoria Hwy) including constructing new bridges across flood-prone sections of the highway and reconstructing existing bridges in the Fitzroy Crossing, Gogo and Bow River areas	Cross-sector	Early Stage	
Build a rail link between Katherine and Kununurra to support the Ord Stage 3 development	Cross-sector	Real Potential	
International gateways (port and airport)			
Upgrade facilities at Wyndham Port, such as cattle holding yards, conveyor systems, and loading facilities	Cross-sector	Early Stage	3
Build an all tide multi user marina facility on Dampier Peninsula located close to the Kimberley Aquaculture Development Zone (KADZ) to enable efficient transport of outbound product and inbound fish feed and ice to the production farm and open up the Peninsula and Buccaneer	Aquaculture	Early Stage	

Archipelago to significant tourism and fishing opportunities			
Upgrade Derby Port to an all weather, all tide port to address time constraints brought about by very high tidal variations, and interruptions caused by weather	Cross-sector	Early Stage	
Upgrade Kununurra Airport to support larger planes so as to provide trade opportunities for fresh produce, either with Eastern Australia or Asia	Irrigated Agriculture	Early Stage	
Transforming produce (production, processing, storage)			
Develop a Department of Agriculture and Water Resources accredited wash down facility at Broome	Cross-sector	Early Stage	3
Build sugar processing facility in the Ord	Irrigated Agriculture	Real Potential	
Build a fish processing plant in the Kimberley to reduce transport costs and add value locally	Aquaculture	Early Stage	
Build a processing facility for grains (e.g. chia, quinoa) to provide regional value-add, lower freight costs and create jobs in the Kimberley	Irrigated Agriculture	Early Stage	
Build a transport hub on Dampier Peninsula for despatch, receipt and storage of large volumes of inbound goods required for the Kimberley Aquaculture Development Zone (KADZ)	Aquaculture	Early Stage	
Build an Ord processing facility for fruit and vegetables (e.g. sweet corn)	Irrigated Agriculture	Early Stage	
Build a Derby-based multi-species fish hatchery and nursery to support the aquaculture industry in the Kimberley	Aquaculture	Early Stage	
Build stockyards / feedlots in collaboration with Indigenous Land Council (ILC) to utilise land and provide indigenous employment opportunities	Cattle	Early Stage	
Build a cooperative cold storage facility for fisheries / aquaculture in Broome	Aquaculture	Early Stage	
Build a multi-user cold storage facility in Kununurra	Irrigated Agriculture	Early Stage	
Utilities (energy, land, water)			
Extend height of the Lake Argyle Dam spillway	Irrigated Agriculture	Real Potential	3
Extend M2 irrigation channel to service Ord Stage 3	Irrigated Agriculture	Real Potential	3
Develop light industrial land on Dampier Peninsula to service a (potential) multi user marina facility located close to the Kimberley Aquaculture Development Zone (KADZ)	Aquaculture	Early Stage	
Develop irrigated agriculture across the Kimberley and Pilbara to provide opportunities to develop the growing of pasture and fodder crops, extending the ability to fatten cattle through the dry season, as well as diversifying into other high value horticultural activities	Cattle	Threshold	
Build gravity-fed water distribution infrastructure to minimise water pumping, reduce costs and increase utilisation of existing assets such as the Ord Diversion Dam	Irrigated Agriculture	Early Stage	

Digital infrastructure (telecommunications)			
Upgrade micro link phone towers with mobile repeaters to improve mobile reception in the Kimberley	Cross-sector	Early Stage	
Build Yawuru TelePods as a remote communications and mobile communications solution to improve ICT services in remote areas and upskill indigenous labour force	Cross-sector	Real Potential	

The following initiatives are cross-regional initiatives that are, or could be, relevant to the Kimberley.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure to support growth in the Western Australian aquaculture industry and reduce reliance on interstate imports	Aquaculture	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Build export quality regional processing facility for the finfish sector to directly supply export markets from local air and sea ports	Aquaculture	Early Stage	
Utilities (energy, land, water)			
Build low cost gas supply or renewable energy infrastructure to power pivot systems for irrigation	Irrigated Agriculture	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Mid West

The following initiatives are specific to the Mid West region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Upgrade roads in the Mid West including the Mt Magnet Road to Mullewa (build passing lanes and upgrade single lane or under width roads) to increase transport efficiency	Irrigated Agriculture	Early Stage	
Expand the capacity of the Southern Transport Corridor (the main access into the Geraldton Port) as at present there is only a single rail line and the Corridor is unable to accommodate transport infrastructure such as conveyors	Irrigated Agriculture	Early Stage	
International gateways (port and airport)			
Commission a study into container handling facilities at Geraldton Port (port had one previously but could not support regular service) to enable a range of higher value exports such as hay and noodles and also reduce costs for producers	Cross-sector	Early Stage	
Commission study into the viability of the Oakajee transport and logistics hub to facilitate the export of high value produce (in containers)	Cross-sector	Early Stage	
Expand Geraldton Airport to enable international freight of high value products such as lobsters, flowers and fresh fruit and vegetables	Irrigated Agriculture	Early Stage	
Transforming produce (production, processing, storage)			
Build a finfish hatchery and unit for studying fish health as part of post pilot research into Yellow Tail Kingfish trials	Aquaculture	Early Stage	
Build abattoir and robotic facilities to encourage movement away from volatile livestock trade and towards boxed-beef trade	Cattle	Early Stage	

The following initiatives are cross-regional initiatives that are, or could be, relevant to the Mid West region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Build the necessary road infrastructure to enable unimpeded triple road train access to Muehea	Cross-sector	Early Stage	3
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Build an inland freight link between Esperance and Port Hedland (PortLink Inland Freight Corridor Development Plan) to facilitate freight efficiencies by building a more robust and flexible freight network	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained	Cross-	Early Stage	2

regional economic activity through greater value-adding	sector		
Support development of a multi-purpose aquaculture feed mill and aquaculture infrastructure to support growth in the Western Australian aquaculture industry and reduce reliance on interstate imports	Aquaculture	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Build export quality regional processing facility for the finfish sector to directly supply export markets from local air and sea ports	Aquaculture	Early Stage	
Build high intensity greenhouses to grow the horticultural sector in WA	Irrigated Agriculture	Early Stage	
Utilities (energy, land, water)			
Extend the State Barrier Fence to help the Mid West, Goldfields-Esperance and Wheatbelt pastoral industries	Cross-sector	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade existing weather radars to Doppler radar in Geraldton, Albany and Esperance to provide farmers with more accurate and timely weather information, supporting more informed decision making around farm management	Cross-sector	Real Potential	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Peel

The following initiatives are specific to the Peel region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Build Tonkin Highway extension	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Reopen Lakes Road abattoir for use by pork and beef farmers	Cross-sector	Early Stage	
Develop processing facilities for cattle and sheep within 70km of the ports (say at Pinjarra or Kwinana) to increase local processing	Cross-sector	Early Stage	

Utilities (energy, land, water)			
Build underground dams (managed aquifer recharge) to build climate reliance for horticulture in the peel	Irrigated Agriculture	Real Potential	

The following seven initiatives are cross-regional initiatives that are, or could be, relevant to the Peel region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Build high intensity greenhouses to grow the horticultural sector in WA	Irrigated Agriculture	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Pilbara

The following initiatives are specific to the Pilbara region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains heading south from Pilbara to reduce logistics costs and the need to break down trucks	Cattle	Early Stage	
Upgrade (seal) the Marble Bar Road from Newman through Nullagine to improve cattle movement and safety	Cross-sector	Real Potential	

Upgrade (seal) the Karratha-Tom Price access road to improve transport efficiency	Cross-sector	Early Stage	
Upgrade access roads into Port Hedland to facilitate freight movements	Cross-sector	Early Stage	
International gateways (port and airport)			
Build a general cargo handling and marine services facility at Lumsden Point to significantly increase the Ports livestock export capacity, alleviate future bottle necks in increasing beef production in the Pilbara and Northern WA and create a potential economy wide benefit to Western Australia of \$4.6 billion over 25 years	Cattle	Real Potential	
Transforming produce (production, processing, storage)			
Build supporting infrastructure for a Pilbara algae precinct	Cross-sector	Real Potential	3
Upgrade Port Hedland holding yards to hold 10,000 head of cattle	Cattle	Early Stage	3
Build large scale feedlot facility to increase supply chain capacity and reduce seasonal constraints for beef sector in the Pilbara	Cattle	Early Stage	
Develop feedlots near hay production centres to improve the efficiency of transport and handling, while leveraging fodder production	Cattle	Early Stage	
Build cold storage and freight hubs at Newman, Carnarvon and associated ports to facilitate exports of value-added products	Cross-sector	Early Stage	
Develop common-use processing facilities for aquaculture	Aquaculture	Early Stage	

The following initiatives are cross-regional initiatives that are, or could be, relevant to the Pilbara region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Build an inland freight link between Esperance and Port Hedland (PortLink Inland Freight Corridor Development Plan) to facilitate freight efficiencies by building a more robust and flexible freight network	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Utilities (energy, land, water)			

Build low cost gas supply or renewable energy infrastructure to power pivot systems for irrigation	Irrigated Agriculture	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

South West

The following initiatives are specific to the South West region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Upgrade Busselton-Bunbury single carriageway to dual carriageway to improve transport efficiency, reduce the cost of freight and improve safety for the agricultural sector	Cross-sector	Real Potential	
Upgrade Forrest Hwy to Fwy standard to improve transport efficiency for the agricultural sector	Cross-sector	Early Stage	
Upgrade South West Hwy (e.g. Donnybrook - Manjimup passing lanes) to improve productivity for the agricultural sector	Cross-sector	Early Stage	
Improve road access to the Bunbury Port	Cross-sector	Early Stage	
Build Pinjarra bypass and Tonkin Highway extension to support the freight network to Bunbury Port	Cross-sector	Early Stage	
Upgrade (width and weight capacity) Johnston Road drainage bridge in Harvey (plus other drainage bridges) to relieve traffic congestion and allow heavy vehicle access along these routes	Cross-sector	Early Stage	
Upgrade road access to Busselton Airport to improve transport efficiency for the agricultural sector	Cross-sector	Early Stage	
Upgrade roads between Manjimup and Busselton Airport to increase road safety and lower transport costs for South West producers	Cross-sector	Early Stage	
Upgrade Scott River roads to improve access and lower transport costs	Cross-sector	Early Stage	
Upgrade the rail line to standard gauge from Bunbury Port to Perth to provide direct freight access to the South West from the Eastern States	Cross-sector	Early Stage	

Build Waterloo intermodal transport hub	Cross-sector	Early Stage	
Upgrade Tier 1 and selected Tier 2 lines serving the South West's grain silo network	Grain	Early Stage	
Build a rail link between Collie and Wagin to allow grain and containerised hay to be transported on rail from the Wagin - Arthur River area	Cross-sector	Early Stage	
International gateways (port and airport)			
Expand Bunbury Port (inner harbour) with more berths and a dedicated food grade container handling facility to increase exports through the port, reduce transport costs as well as the level of heavy traffic on Forrest Hwy	Cross-sector	Real Potential	
Realign Preston River in order to expand Bunbury Port (inner harbour) with more berths and consolidate port land holdings	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Build supporting infrastructure for dairy processing facilities (e.g. ESL, infant formula, free stall)	Dairy	Early Stage	3
Build a dedicated air freight terminal at the Busselton Regional Airport providing freight and logistics warehousing facilities (cold chain) to facilitate market access	Cross-sector	Early Stage	
Build sheep feedlots to help increase sheep exports	Sheep	Early Stage	
Build new covered South West cattle saleyards (replace existing at Boyanup where lease is due to expire in 2022) to provide ongoing market access and minimise the risk of increased transport costs associated with longer journeys	Cattle	Early Stage	
Build low cost temporary accommodation to meet seasonal labour demands during peak periods in the South West	Cross-sector	Early Stage	
Utilities (energy, land, water)			
Build 2-gigalitre dams in Southern Forests	Irrigated Agriculture	Real Potential	3
Develop supporting infrastructure to supply fit for purpose water from Wellington Dam	Irrigated Agriculture	Early Stage	3
Upgrade network from single-phase power to three-phase power in the South West to improve energy reliability and efficiency in the dairy sector	Dairy	Early Stage	
Upgrade network to extend three-phase power access to Scott River to help expand agriculture in the region	Cross-sector	Early Stage	
Expand Bunbury-Albany gas pipeline reticulation access for regional towns and cities including Collie generation network	Cross-sector	Early Stage	

The following initiatives are cross-regional initiatives that are, or could be, relevant to the South West region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2
Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Build marine mollusc hatchery in Western Australia to provide reliable supply of spat for edible oysters, pearl oysters, scallops etc.	Aquaculture	Early Stage	
Build high intensity greenhouses to grow the horticultural sector in WA	Irrigated Agriculture	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Wheatbelt

The following initiatives are specific to the South West region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Upgrade regional roads from RAV3 to RAV4 to improve transport efficiency for road trains carrying grain	Grain	Early Stage	
Extend access for Restricted Access Vehicles (Network 10 road trains) with Accredited Mass Management Scheme (Level 3) from Calingiri and Piawanning into Great Northern Hwy as current Miling Rail line economics proposed by Brookfield to keep Miling line open is unfeasible and grain would need to be efficiently roaded to the Midlands line to be railed into Kwinana	Grain	Early Stage	
Extend access for Restricted Access Vehicles (Network 7 road trains) with Accredited Mass Management Scheme (Level 3) from Brand, Great Northern, Great Eastern, Brookton and Albany highways into Kwinana, to keep supply chain competitive with other ports (where such vehicles are allowed) and also to keep rail access competitive in the Kwinana zone	Grain	Early Stage	
Upgrade road on Greenmount Hill including widening and timing of traffic lights so that larger capacity trucks can utilise the road without having	Cross-	Early Stage	

to separate loads	sector		
Upgrade road on Rollins Hill including widening and timing of traffic lights so that larger capacity trucks can utilise the road without having to separate loads	Cross-sector	Early Stage	
Access additional funding to maintain Wheatbelt shire roads to required standards given increased haulage of grain on road	Grain	Early Stage	
Upgrade road links between Perth and Geraldton (e.g. Northam-Pithara Road) to ease traffic congestion due to cessation of Tier 3 Rail services and also improve safety	Cross-sector	Early Stage	
Build Bindoon town bypass and reroute Great Northern Hwy around Bindoon Hill to reduce transport times and the need for trucks destined for Muchea Livestock Centre to be broken up	Cross-sector	Early Stage	
Upgrade road links between York and Merredin (e.g. Great Eastern Hwy or Toodyay) to ease traffic congestion due to cessation of Tier 3 Rail services and also improve safety	Cross-sector	Early Stage	
Upgrade Wanneroo Road and Indian Ocean Drive to increase accessibility for large trucks	Cross-sector	Early Stage	
Build more truck wash bays to reduce biosecurity risks and minimise cross-contamination between grain, livestock and fertiliser	Cross-sector	Early Stage	
Build roads and/or optimise road networks to provide access to main highways from farms in the Wheatbelt to reduce transport times (by upwards of 50% in some instances)	Cross-sector	Early Stage	
Upgrade (and identify) key lime routes through coastal shires north of Perth (Lancelin) and south of Geraldton to reduce congestion and minimise interference with tourism	Grain	Early Stage	
Transforming produce (production, processing, storage)			
Build a horticulture processing hub facility (e.g. cannery) in the north Wheatbelt	Irrigated Agriculture	Early Stage	

The following initiatives are cross-regional initiatives that are, or could be, relevant to the Wheatbelt region.

Initiative	Sector	Stage	Priority
Freight network (road and rail)			
Build the necessary road infrastructure to enable unimpeded triple road train access to Muchea	Cross-sector	Early Stage	3
Extend access for large road trains on shire roads to increase road transport productivity	Cross-sector	Early Stage	
Transforming produce (production, processing, storage)			
Support development of agrifood precincts to generate economies of scale and scope, facilitate industry collaboration and support sustained regional economic activity through greater value-adding	Cross-sector	Early Stage	2

Support irradiation as an alternative disinfestation protocol to facilitate the export growth and value-add potential of Western Australian horticultural produce	Irrigated Agriculture	Early Stage	2
Utilities (energy, land, water)			
Extend the State Barrier Fence to help the Mid West, Goldfields-Esperance and Wheatbelt pastoral industries	Cross-sector	Early Stage	
Digital infrastructure (telecommunications)			
Invest in mobile towers to improve the quality, speed and reliability of telecommunications in regional Western Australia	Cross-sector	Threshold	1
Upgrade information and communications technology in regional WA	Cross-sector	Early Stage	3

Appendix B List of strategy / policy / research and development initiatives

Our research identified over 100 strategy and policy initiatives related to agricultural infrastructure and the industry in general. Whilst the focus of the Audit has been on hard infrastructure additional work could be undertaken to investigate the strategy and policy levers that optimise infrastructure investment. The following tables provide the full list of 118 policy, strategy, and research and development initiatives that were identified. The initiatives have been collated through key themes including energy, land, water, workforce, and other. The applicable region and sector for each initiative has also been provided in the table for reference. Initiatives within each theme have been sorted by region but otherwise are in no particular order.

Policy

The following initiatives are policy initiatives. From a policy perspective, stakeholders frequently identified issues such as complication with land tenure, water allocations and energy pricing as constraining growth.

Initiative	Region	Sector
Energy		
Subsidise Ord energy costs to reflect the lower cost of locally produced hydroelectricity to reduce water pumping, production and post-harvest processing costs	Kimberley	Cross-sector
Expand access to the natural gas pipelines for small scale projects to decrease energy costs in the Pilbara	Pilbara	Cross-sector
Maintain access and use of power infrastructure for agriculture when mines close in the Pilbara	Pilbara	Cross-sector
Subsidise projects to utilise biofuel to produce energy in the Pilbara	Pilbara	Cross-sector
Subsidise the up-front capital costs for energy infrastructure in the Wheatbelt	Wheatbelt	Cross-sector
Facilitate transparent pricing of three-phase power infrastructure to increase certainty and reduce energy costs for pork producers	Cross-region	Pork
Develop regional renewable energy initiatives, for example by relaxing conditions for energy grants (e.g. renewable energy fund) to broaden the application base	Cross-region	Cross-sector
Subsidise new energy options (such as battery storage in rural feeder lines, biomass, solar and wind) to increase the reliability and power quality in the regions	Cross-region	Cross-sector
Land		
Subsidise low interest loans to allow pastoralists to build wild dog cell fencing to allow livestock producers to run small stock without animal welfare issues	Goldfields-Esperance	Sheep
Ease bureaucratic hurdles and clarify native title on Crown land to improve access to gravel for road building and maintenance in Goldfields-Esperance	Goldfields-Esperance	Cross-sector

Facilitate streamlining of bureaucratic process and reduce time delays associated with accessing land for new communication infrastructure	Goldfields-Esperance	Cross-sector
Access suitable land for common-use processing, package and storage facilities in gateway locations in the Pilbara	Pilbara	Cross-sector
Facilitate corporate investment in agricultural land to expand agricultural operations	Pilbara	Cross-sector
Provide access to agricultural land on mining tenements	Pilbara	Cross-sector
Access suitable land for agricultural production and processing in the South West, particularly around the Collie area	South West	Cross-sector
Improve access to, and availability of, commercial and industrial land (e.g. combine business / residential zoning) with access to power, water and roads in the Shire of Chittering to help grow regional agribusiness	Wheatbelt	Irrigated Agriculture
Facilitate reform in planning approvals process to reduce land use conflicts and speed up growth in the agricultural sector, provide investment certainty and reduce costs for farmers	Cross-region	Cross-sector
Release more crown land and private land for agriculture	Cross-region	Cross-sector
Simplify land tenure pathway to provide investment certainty and make it faster and cheaper to develop agriculture sector	Cross-region	Cross-sector
Water		
Subsidise cost of water for horticulture in the Gascoyne region	Gascoyne	Irrigated Agriculture
Subsidise regional headworks to reduce costs	Great Southern	Cross-sector
Develop water trading mechanism where Ord Stage 1 growers are allocated 17ML/ha (5ML/ha of which is tradeable) to promote flexibility of growing crops with higher water requirements such as hay, sugarcane and bananas	Kimberley	Irrigated Agriculture
Expand water allocations for the Ord River Irrigation Area to provide water security for growers and promote investment certainty	Kimberley	Irrigated Agriculture
Commission study to understand the economic benefits of a water trading system where tenders or auctions of water entitlements are used to raise sufficient funds to pay the full capital costs of dams and other irrigation infrastructure	Cross-region	Cross-sector
Remove legislative restrictions and simplify water allocation approvals pathway to provide investment certainty and make it faster and cheaper to develop agriculture sector in the South West	Cross-region	Cross-sector
Workforce		
Commission a study to investigate the reasons for high labour turnover in the agriculture sector in the Pilbara	Pilbara	Cross-sector
Develop a remote school attendance scheme to improve education levels in the Pilbara population and develop skilled labour resources	Pilbara	Cross-sector
Establish a Regional Education Hub at Newman TAFE to provide training in agriculture	Pilbara	Cross-sector
Expand Northam R&D hub to attract and retain skilled labour and thereby reduce turnover, retain skills and reduce training costs for farmers	Wheatbelt	Cross-sector
Expand Seasonal Worker Program to help growers increase food production and capitalise on new export markets	Cross-region	Irrigated Agriculture

Offer employment and tax incentives and review wage and employment conditions (e.g. remove visa constraints on accessing overseas labour for more than 2 years in a row) to attract and retain skilled labour and thereby reduce turnover, retain skills and reduce training costs for farmers	Cross-region	Cross-sector
Promote education and agribusiness to attract and retain labour to reduce turnover, retain skills and reduce training costs for farmers	Cross-region	Cross-sector
Subsidise regional town services (e.g. internet, schools, housing and hospitals) to attract and retain skilled labour in regional areas and thereby reduce turnover, retain skills and reduce training costs for farmers	Cross-region	Cross-sector
Other		
Develop an aquaculture zone for the emerging abalone industry in Goldfields-Esperance	Goldfields-Esperance	Aquaculture
Offer incentives for investment in grains processing plants to add value to agriculture produce in the Goldfields-Esperance region	Goldfields-Esperance	Grain
Incentivise research and development in agronomy technology (climate, soil structure, crops, rainfall) to promote innovation	Goldfields-Esperance	Cross-sector
Subsidise farmers who volunteer in community service (e.g. emergency services) to help balance community needs with business needs	Goldfields-Esperance	Cross-sector
Develop aquaculture zone in the Great Southern	Great Southern	Aquaculture
Provision funding via a Great Southern Innovation Fund to provide financial assistance to innovation projects that are collaborative in nature in order to encourage and facilitate innovation within the region	Great Southern	Cross-sector
Offer grants to drive increased participation in fisheries / aquaculture sectors in the Kimberley	Kimberley	Aquaculture
Subsidise high freight costs in the Kimberley	Kimberley	Aquaculture
Expedite local export accreditation by permitting local DAFWA staff to once again complete import / export protocols	Kimberley	Irrigated Agriculture
Subsidise unmetered access to government websites to reduce data costs in the Kimberley	Kimberley	Cross-sector
Establish Mid West aquaculture zone for a large scale marine fin fish farm to front end environmental approvals and provide investment ready business opportunities	Mid West	Aquaculture
Incentivise investment in technology to reduce labour requirements such as driverless tractors to save costs while improving efficiency	Pilbara	Cross-sector
Provision of additional export beef accreditation licences (to export to China) for South West beef processors to help expand processing capacity and grow the industry	South West	Cattle
Develop gross mass distance charging scheme for freight transport to significantly reduce implementation and operational costs by targeting the heaviest contributors to road damage	South West	Cross-sector
Implement and maintain transport and industry corridors and buffers in the South West to ensure that future development does not constrain access to key transport infrastructure such as Bunbury Port	South West	Cross-sector
Require grain pool operators to comply with product disclosure requirements to provide growers with clarity around estimated and final returns of grain pools	Cross-region	Grain

Require information on wheat stocks held in storage to be released to growers so they are able to obtain a clear view of existing supply and market prices	Cross-region	Grain
Expedite Department of Environment Regulation environmental approvals timeframe to speed up growth in the pork sector, provide investment certainty and reduce costs for farmers	Cross-region	Pork
Consider policy settings / incentives (such as tax policy) to support greater collaboration / aggregation across the supply chain to drive greater scale / cost efficiencies	Cross-region	Cross-sector
Develop the right cost and funding mix in infrastructure decisions (e.g. co-investment model between state, federal and industry or a charging mechanism that sends the right price signals for demand driven utilisation of the assets)	Cross-region	Cross-sector
Reform pricing for State roads to provide incentives to better manage movement across the State in terms of travel demand and behaviour	Cross-region	Cross-sector

Strategy

The following initiatives are strategy initiatives. From a strategic perspective, many stakeholders identified the need for a detailed strategy outlining the growth opportunities for agriculture.

Initiative	Region	Sector
Energy		
Develop on-farm or wave power sources to improve access to reliable energy and reduce supply costs in the Great Southern	Great Southern	X-sector
Land		
Convert high quality agricultural land in the Mid West from broadacre cropping to high yield food production	Mid West	Irrigated agriculture
Facilitate availability of land with suitable soil and water supplies, to ease what is otherwise a critical obstacle to agricultural development	Pilbara	Cross-sector
Aggregation of several mixed grain and sheep meat farms	South West	Sheep
Establish a sheep meat contract farming company (concept)	South West	Sheep
Identify suitable sites for agri-processing and develop a grains processing industry in the Wheatbelt to export value-added product rather than bulk commodities	Wheatbelt	Cross-sector
Commission a project to develop a prospectus that the State can use to promote details what land and infrastructure is available to potential investors in the agriculture sector	Cross-region	Cross-sector
Water		
Develop La Grange for irrigated agriculture to capitalise on high quality pindan soils, fresh water aquifer and work undertaken in the Regional Economic Development Water Opportunities project	Kimberley	Irrigated Agriculture
Develop irrigation precincts in the Mid West	Mid West	Irrigated agriculture

Provide information on the availability of land and water in the Mid West so that potential investors can form a clear view about the resources that are available	Mid West	Irrigated Agriculture
Investigate use of sub-surface drip irrigation to save water in the Pilbara	Pilbara	Irrigated Agriculture
Subsidise groundwater data management systems for optimal planning and investment decision making, as large irrigation developments utilising groundwater generally require numerical groundwater modelling to define the resource and predict impacts as part of groundwater licencing	Pilbara	Irrigated Agriculture
Facilitate development of mine dewatering for use in irrigated agriculture in the areas like the Mid West and Pilbara	Pilbara	Cross-sector
Increase the quantity and quality of available water for agriculture in the South West to reduce the impact of increasingly variable rainfall patterns and develop various agrifood industries	South West	Irrigated Agriculture
Workforce		
Provide indigenous training and employment opportunities to increase workforce participation in agriculture in the Pilbara	Pilbara	Cross-sector
Develop leadership capacity at an overall industry and sector level to support stronger industry association representation and collaboration to drive scale efficiencies and competitiveness	Cross-region	Cross-sector
Other		
Commission an aquaculture expansion feasibility study to investigate expansion of the aquaculture industry in the Gascoyne	Gascoyne	Aquaculture
Introduce new horticultural crops in the Gascoyne	Gascoyne	Irrigated agriculture
Develop poultry sector in the Great Southern	Great Southern	Poultry
Establish additional plantations of high value bush food species within areas of natural vegetation resulting in managed 'woodlands' to help traditional owner communities develop new skills, horticulture infrastructure and community governance models in the region	Kimberley	Emerging
Commission study to examine market development of netted hay or bagged dryland sweet sorghum silage products to Asia (ex Wyndham)	Kimberley	Irrigated Agriculture
Develop a seed funding pool to support feasibility studies. At present there is a gap between an idea and implementation	Mid West	Irrigated Agriculture
Commission a study to understand target market needs for Pilbara producers to better match supply with demand	Pilbara	Cross-sector
Seed potato cultivation	South West	Irrigated agriculture
Establishing a syndicated sheep meat venture (concept)	South West	Sheep
Facilitate investment in plantation timber in the South West to reduce salinity and support various industries (e.g. housing industry and as a source of energy from biomass by products)	South West	Cross-sector
Implement a paddock to plate traceability scheme (as per the NLIS) to strengthen the South West's clean and green and food safety reputation	South West	Cross-sector
Develop an alternative live export port away from Fremantle and Perth to address animal right concerns and increase market access	Wheatbelt	Cattle

Develop grain grower co-operatives to facilitate utilisation of equipment not in continuous use to create economies of scale	Wheatbelt	Grain
Commission study to benchmark the Wheatbelt against climatic peers to identify potential new products suited to region	Wheatbelt	Cross-sector
Facilitate partnerships with traditional owners by investors in aquaculture development to reduce risk of native title disputes, support project development and the wellbeing of the local indigenous community by providing education, training, employment and direct ownership opportunities	Cross-region	Aquaculture
Commission study to understand market needs with regards to specific products so beef producers can target consumers with a better quality product	Cross-region	Cattle
Develop innovative routes to market e.g. Sanger Australia's partnership with one of China's largest online direct sales companies to sell chilled box beef direct to Chinese consumers	Cross-region	Cattle
Facilitate commercial innovation and coordination within beef sector to develop required productivity gains	Cross-region	Cattle
Promote industry collaboration in the horticulture industry to share infrastructure and to achieve better buying power and coordinated marketing	Cross-region	Irrigated Agriculture
Provision of processor information on throughput, processing costs, carcass or profitability to enable farmers to improve their performance and to adapt to changing international markets/customer demands	Cross-region	Sheep
Build a common user infrastructure online digital platform / portal to bring sellers and investors together to facilitate greater information sharing / awareness and ultimately investment in WA agriculture	Cross-region	Cross-sector
Commission a holistic study to capture collective opportunities to develop and understand the true capability and capacity of agriculture in the north of WA	Cross-region	Cross-sector
Commission a study into building a common user freight accumulation facility (near a port or airport) for smaller sectors (e.g. aquaculture) to export high value / small volume niche products to key markets at lower cost	Cross-region	Cross-sector
Commission a study to develop a fact-based agricultural strategy for WA including sources of our competitive advantage and strategic planning	Cross-region	Cross-sector
Develop a holistic port strategy to ensure port investment decisions are the right ones aligned to the sector growth strategies	Cross-region	Cross-sector
Develop a systematic approach to data collection and analysis for the east-west corridor to improve ability to predict freight volumes	Cross-region	Cross-sector
Develop a targeted model for funding remote regional infrastructure (as opposed to urban infrastructure) to widen analysis beyond just CBA	Cross-region	Cross-sector
Facilitate cooperative bulk warehousing in the Pilbara so that producers can utilise on-line (paddock to plate) mechanisms to sell direct to end consumers	Cross-region	Cross-sector
Promote WA brand profile in the agribusiness sector amongst key target markets / potential trade and investment partners	Cross-region	Cross-sector

Research and Development

The following initiatives are research and development initiatives.

Initiative	Region	Sector
Energy		
Commission a study to explore distributed renewable and alternative power generation to reduce costs and increase the reliability and power quality in Goldfields-Esperance	Goldfields-Esperance	Cross-sector

Promote transportation of grain by rail or by other means powered by renewable fuel	Wheatbelt	Grain
Commission a study to further explore technology around biomass processing of waste into bioenergy to provide opportunities to improve the environmental impact of agricultural and food businesses and better enable the sector to maintain its clean and green marketing advantage	Cross-region	Cross-sector
Commission solar energy pilot studies to examine ways to increase use of distributed solar energy / power generation and storage to support agriculture	Cross-region	Cross-sector
Land		
Commission a study to undertake high resolution mapping of land and soil types in the Mid West to enable farmers to match land requirements with fertiliser, insecticides and water	Mid West	Irrigated Agriculture
Other		
Build a research facility in Shark Bay incorporating marine flora and fauna to support research into sustainable fishing	Gascoyne	Aquaculture
Reopen DAFWA research station in Carnarvon to trial localised horticulture technologies and products	Gascoyne	Irrigated Agriculture
Commission studies into soil health to minimise pests, diseases and biosecurity risks in Goldfields-Esperance	Goldfields-Esperance	Grain
Build or upgrade research facilities in the Great Southern (e.g. Katanning Sheep Research Institute, Institute for Biodiversity and Natural Resource Management, Denmark College of Agriculture)	Great Southern	Cross-sector
Develop and access long term funding for a sub-tropical agronomic research facility in the Kimberley to attract high calibre scientists and develop an exportable knowledge economy	Kimberley	Irrigated Agriculture
Commission trials of cover cropping technologies	Peel	Irrigated Agriculture
Develop intensive agricultural projects in the north as Research and Development projects so government can partner with business and assist in maximising R&D tax rebates	Pilbara	Irrigated Agriculture
Develop and promote innovative solutions (e.g. walk over weighing, low stress handling technology) to reduce costs and provide flexibility in the beef production system to access different market niches	Cross-region	Cattle
Commission study to determine alternatives to lime which can replenish soil health for broad acre farmers in Goldfields-Esperance	Cross-region	Grain
Develop a Plant Breeding Institute in WA to expand research capability and promote links to both research providers like GRDC and collaborative projects with local companies	Cross-region	Grain
Commission pilot projects to demonstrate the technologies that can be applied using existing telecommunications infrastructure and networks	Cross-region	Cross-sector
Commission a study to understand the economic benefits of driverless tractors for agriculture	Cross-region	Cross-sector
Expand proof-of-concept GIS scenario modelling tool to de-risk development opportunities for potential investors in the agriculture industry	Cross-region	Cross-sector
Facilitate the development of a governance institute (similar to SARDI in South Australia) to coordinate the strategic basic and applied science needed to address agriculture and food challenges in WA	Cross-region	Cross-sector

Appendix C Funding, financing and procurement

The sections below contain summaries of the options that could be available to DRD for project funding and financing to support project delivery. Careful selection of infrastructure delivery models, encompassing both consideration of funding options and financing models, will help to maximise the reach of the Fund.

Importantly, the choices available regarding funding, financing and delivery models will be influenced by the risk profile of specific infrastructure projects and the allocation of risk between the State, other government sources and the private sector. The ability to leverage the Fund of DRD will therefore require careful consideration of the risks so as to maximise the opportunity for such investment.

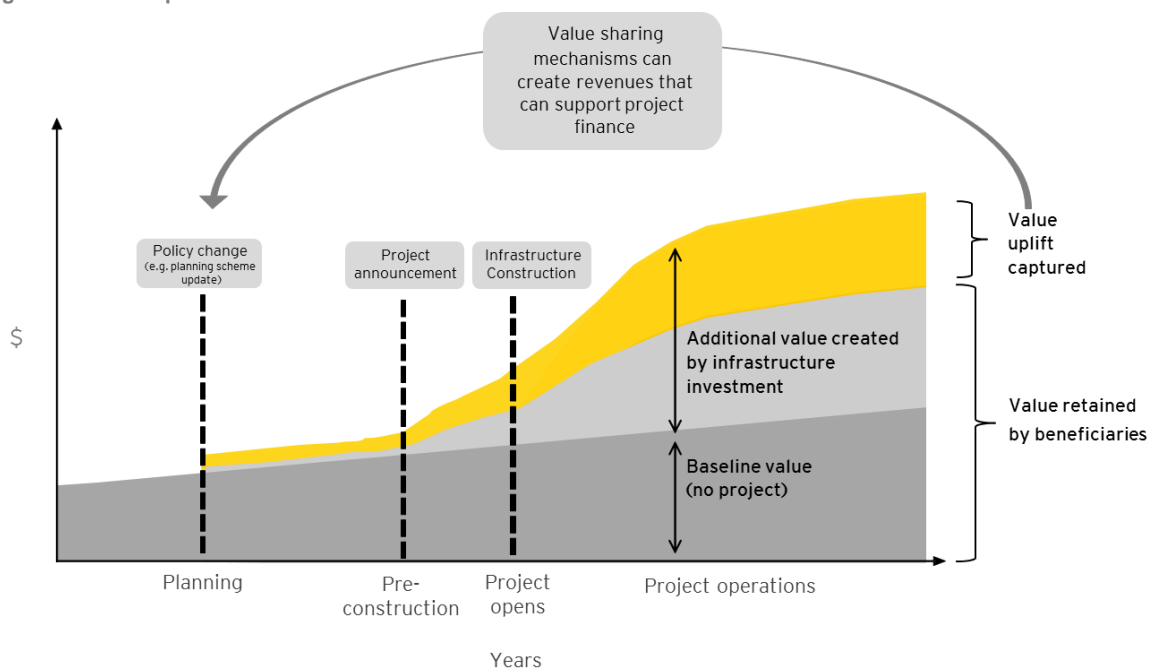
Funding sources

Funding sources refer to financial resources that are used to pay for an investment in infrastructure. The Government can maximise the value of the Fund by using it to leverage other sources of funds such as those earned through value capture mechanisms and other government grants and private contributions.

Value capture (or value sharing) mechanisms

Value capture is where potential beneficiaries of a piece of infrastructure contribute to the funding of that infrastructure. Value capture mechanisms enable governments to leverage future revenue streams from the uplift in value and economic activity that occur as a direct result of infrastructure investment. The value of these future revenues can be capitalised and applied to project funding, illustrated in the figure below.

Figure 6: Value capture



Beneficiaries of infrastructure might include parties such as:

- ▶ Users and operators: The most direct beneficiaries of infrastructure are the users themselves. These benefits can be financial (for example, savings in fuel consumption as a result of road projects) as well as non-financial (for example, reduced times spent travelling), and can be of significant value to beneficiaries.
- ▶ Businesses and employees: Some businesses benefit directly from improved infrastructure, for example if it enables them to move goods more quickly and reliably to market. Additionally, infrastructure can generate agglomeration benefits. This in turn creates benefits through better access to supplier, customer and employee catchments.

- ▶ Governments: Government at different levels can benefit financially from new infrastructure, depending on how it is funded and the value created at the local, regional and national level.

Value capture techniques are most commonly used for transport infrastructure but can also be used in instances such as the funding of infrastructure with significant direct private benefits such as manufacturing precincts.

Government grants

This Audit has identified a number of potential Commonwealth Government funding sources that could conceivably be used in conjunction with the Fund to deliver improved infrastructure to regional WA. Details of these sources of funds are provided in Appendix D.

From a State perspective, it should be considered a priority to explore ways to obtain Commonwealth contributions for projects, given the established investment frameworks in place, the comparatively lower cost of funds and risk appetite compared to non-government sources.

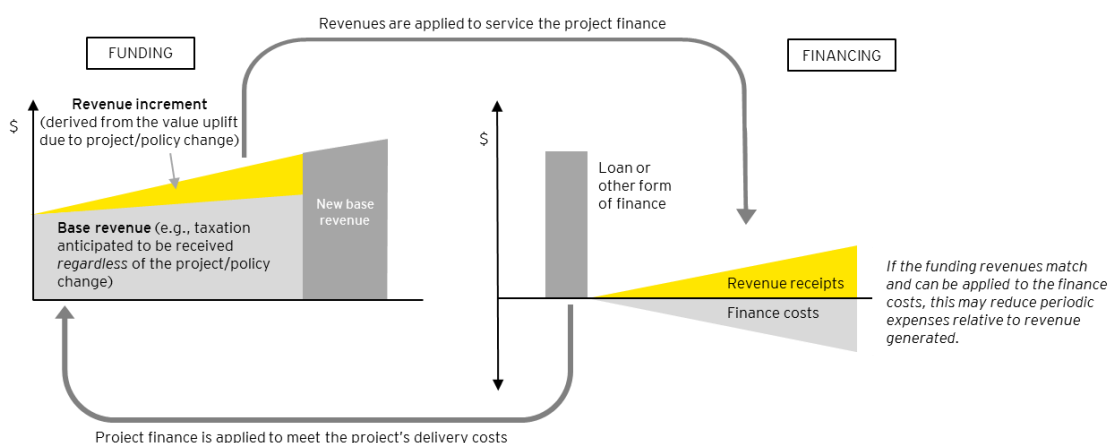
An extension of a direct Commonwealth grant is a supported availability payment, which is a Commonwealth Government contribution to pay a fixed percentage of a defined periodic cash outflow incurred by a State in procuring infrastructure. This is aimed at supporting an availability public private partnership (PPP) structure.

Government also has the option to raise additional, or increase existing, taxes or levies to fund infrastructure needs.

Financing models

Financing models reallocate the timing of the future funding streams to enable current investments in infrastructure projects. The interaction between funding and financing is demonstrated in the figure below.

Figure 7: Funding and financing interactions



Financing is repaid through project funding sources. Infrastructure financing sources include commercial banks, pension funds, private equity, development banks and export credit agencies. Large infrastructure delivery companies are also capable of providing financing. Financing mechanisms can be deployed on public infrastructure by government on its own, or by the private sector or by a combination of the two.

Public sector financing sources

Sources of public sector financing which could potentially be accessed to leverage the Fund include:

- ▶ Commonwealth Government debt: direct lending to projects is a potential source, but is not commonly used by the Commonwealth Government. Doing so represents a significant intervention in capital market processes and presupposes that private sector debt will not be available on terms that are acceptable to the transaction risk profile.
- ▶ Commonwealth Government equity: governments at all levels in Australia have developed operating entities through which economically viable business activities have been prosecuted. These businesses are typically funded through notional equity and debt, typically as wholly owned government entities. We do not consider there to be similar experience in the implications of sharing control in a co-investment situation with the private sector. However, co-investment across multiple government entities has been

undertaken, Snowy Hydro Limited being an example, with shared ownership between the Commonwealth, New South Wales and Victorian governments.

- ▶ State Government debt: the State Government has the option to utilise debt financing of discrete projects through increased borrowing through WA Treasury Corporation. In the current constrained fiscal environment, this may not be seen as attractive. It also raises similar issues to those identified in the commentary on use of Commonwealth Government sourced debt.
- ▶ State Government equity: the Fund could be deployed as equity rather than as direct grant in the appropriate circumstances. This will need to be evaluated on a case by case basis, considering the risk profile, return characteristics and control required. Joint venture arrangements with the private sector may be suited to some specific opportunities.

Private sector financing

Private sector financing takes the form of both equity investments and debt financing. Owners' equity is typically geared (or leveraged) through the use of debt financing, the extent of gearing a function of the risk profile of the project and debt market return requirements.

Debt financing can be provided from a variety of sources including commercial lenders (banks) and the capital markets (bonds). Debt finance can be full recourse (corporate debt) or limited recourse (project finance debt). The absence of a corporate bond market in Australia means that debt financing is typically provided by commercial lenders. In the context of Australian infrastructure projects, bank debt finance is typically deployed within a project finance structure.

In some contexts, debt financing can be provided from offshore sources, and may include that provided by export credit agencies and development banks that may be aligned to equity providers and/or construction/asset providers.

Equity can be provided from a range of sources institutional investors including infrastructure funds, pension funds, sovereign wealth funds and insurance firms. Infrastructure is an established asset class and there are investors seeking comparatively stable, longer term yields. Institutional investors may also provide debt and subordinated debt facilities.

Some projects have a higher risk profile than more conventional infrastructure projects and may have access to trade buyers/investors and private equity markets. The risk and return requirements are substantially different to longer term infrastructure investors. However, for certain types of projects, there is evidence of demand for this kind of investment.

Project delivery models (procurement)

A project delivery model is the contractual arrangement which delivers the assets/project including the provision of financing for its construction. By their nature, delivery models define the roles of the public and private sectors in delivering infrastructure and they also define the allocation of risk between the parties. They also define the sources of funds that will be used to pay for infrastructure. Commonly-used delivery models are profiled below:

Traditional models (D&C [design & construct], DCM [design, construct, maintain])

- ▶ Government contracts with a single private sector entity that manages all design and construction activities and subcontractors. May extend to maintenance and operation functions depending upon the procurement model.
- ▶ D&C: used for medium to large scale projects where there is a high degree of complexity and can be useful in encouraging innovation in meeting a specified performance requirement. Commonly used for assets owned and maintained by the government, for example, roads and railways. Funding, operations and maintenance risks are retained by government but completion risk (design and construction to specification) is transferred to the D&C contractor.
- ▶ DCM: used in situations where there is significant value from transferring accountability for long term performance of the facility to the entity that designed and constructed it. Commonly used for technical infrastructure that requires ongoing specialist maintenance, for example, specialist equipment on radar towers. Funding and operations risks are retained by government.
- ▶ Relevant funding source: Government grants/general Government revenues.
- ▶ Relevant financing model: Public sector financing.

Availability Public Private Partnership

- ▶ Government contracts with a single private sector entity to design, build, finance, operate and maintain a facility in accordance with a performance specification. A substantial amount of completion, financing and maintenance risks is transferred to the private sector entity; however government retains accountability for the funding of the availability payments. The model may be used for projects that have a revenue stream (such as user charges) but government retains the risk that revenues are below requirements and has to fund any shortfall from other sources.
- ▶ Used in instances where government wants to defer funding to the operating phase instead of build phase of a piece of infrastructure.⁹⁷ A key advantage is the inclusion of a contract payment mechanism that provides a strong incentive for infrastructure to be delivered and operated in accordance with specification.
- ▶ Commonly used for large and complex public infrastructure, for example schools, hospitals and non-tolled roads.
- ▶ Relevant funding source: Government grants/general Government revenues.
- ▶ Relevant financing model: Private sector financing (commercial debt & institutional equity).

Build and sell

- ▶ Government constructs the asset and then sells it to the private sector once an operating revenue history is established. A range of delivery models are available to government to design and construct the asset so risk allocation will depend on which one is selected.
- ▶ Used for projects that have the potential to be privately financed but for which the initial risks are too high to encourage private sector involvement and hence government bears the upfront risks to get the project established.
- ▶ Commonly used for income generating infrastructure, for example, ports.
- ▶ Relevant funding source: Government funding – mix of grants, debt and equity; on sale funding transfers to the private sector through user charges.
- ▶ Relevant financing model: Public sector financing for construction.

Public private partnership – concession agreement

- ▶ Government contracts with a single private sector entity to design, build, finance and operate a facility. Government retains ownership but transfers right to operate and generate revenue to the private sector, e.g. under a long term lease agreement. In this model the majority of completion, financing, operations and maintenance risks are transferred to the private sector entity. The private sector has a strong incentive to operate the asset effectively to ensure that it generates sufficient revenue to repay project investment.
- ▶ Used in circumstances where there is a secure revenue stream that is sufficiently robust to provide comfort to private sector proponents that they will achieve the required rate of return.
- ▶ Commonly used for large and complex public infrastructure from which a revenue stream can be generated, for example toll roads and ports.
- ▶ Relevant funding source: User charges.
- ▶ Relevant financing model: Private sector financing (commercial debt & institutional equity).

Private development

- ▶ Entirely privately developed, funded and financed. A private sector consortium is formed to contract with delivery organisations for the design, construction, operation and maintenance of the facility over the long term. The principle difference between this and a concessional PPP is that the private entity owns the infrastructure that it builds and operates. This model represents the highest level of risk with the private sector developer.
- ▶ Used in circumstances where there is a secure revenue stream that is sufficiently robust to provide comfort to private sector proponents that they will achieve the required rate of return.

⁹⁷ In this model, government pays a revenue stream to the infrastructure operator over the course of the operation of the infrastructure.

- ▶ Commonly used for large and complex infrastructure from which a commercial revenue stream can be generated, for example, power stations and water treatment plants. There may also be a degree of economic regulation which governs the setting of prices to provide some parameters around user charges, e.g. regulated utilities.
- ▶ Relevant funding source: User charges.
- ▶ Relevant financing model: Private sector financing (commercial debt & institutional or private equity).

Appendix D Potential Commonwealth Government funds

Commonwealth Government funds

- ▶ Black Spot Programme
- ▶ Bridges Renewal Programme
- ▶ Commonwealth On-Farm Further Irrigation Efficiency Program
- ▶ Community Development Grants Programme
- ▶ Cooperative Research Centre (CRC) for Developing Northern Australia
- ▶ Funding for Native Title Corporations
- ▶ Heavy Vehicle Safety and Productivity Programme
- ▶ Industry Skills Fund
- ▶ Infrastructure Australia
- ▶ Investment Road and Rail Programme
- ▶ Mobile Black Spot Programme
- ▶ Murray-Darling Basin Regional Economic Diversification Programme
- ▶ National Highway Upgrade Programme
- ▶ National Smart Managed Motorways Programme
- ▶ National Stronger Regions Fund (NSRF)
- ▶ National Water Infrastructure Development Fund
- ▶ Nation-building Funds
- ▶ Northern Australia Beef Roads Programme
- ▶ Northern Australia Infrastructure Facility (NAIF)
- ▶ Northern Australia Roads Programme (NARP)
- ▶ Regional Aviation Access Program and Remote Airstrip Upgrade Programme
- ▶ Roads to Recovery Programme
- ▶ Stronger Communities Programme
- ▶ Transport Development and Innovation Projects
- ▶ Water for the Future

Appendix E Documents reviewed

Commonwealth Government reports

- ▶ *Agricultural Competitiveness White Paper*, Commonwealth of Australia, 2015
- ▶ *An inquiry into wheat export quality management practices*, Wheat Industry Advisory Taskforce, 2014
- ▶ *An inquiry into wheat stocks information*, Wheat Industry Advisory Taskforce, 2013
- ▶ *Australia in Asian Century White Paper*, Commonwealth of Australia, 2015
- ▶ *Australian Infrastructure Audit: Our Infrastructure Challenges - Executive Summary*, Infrastructure Australia, 2015
- ▶ *Australian Infrastructure Audit: Our Infrastructure Challenges - Key Findings*, Infrastructure Australia, 2015
- ▶ *Business Case - Northern Agriculture CRC*, AgNorth CRC Ltd, 2014
- ▶ *Draft National Remote and Regional Transport Strategy*, Department of Infrastructure and Regional Development (Australia), 2015
- ▶ *Final report*, Wheat Industry Advisory Taskforce, 2014
- ▶ *Food demand to 2050: Opportunities for Australian agriculture*, ABARES, 2012
- ▶ *Grain export networks, including the on- and off-farm storage, transport, handling and export of Australian grain*, Senate Rural and Regional Affairs and Transport References Committee, 2015
- ▶ *Grain pools as financial products*, Wheat Industry Advisory Taskforce, 2013
- ▶ *Mosaic Irrigation for the northern Australian beef industry: Synthesis Report*, A. C. Grice, Ian Watson and Peter Stone, CSIRO, 2013
- ▶ *Northern Australia Audit: Infrastructure for a Developing North*, Infrastructure Australia, 2015
- ▶ *Northern Australia Food and Fibre Supply Chains Study Synthesis Report*, Andrew Ash and Trish Gleeson, CSIRO/ABARES, 2014
- ▶ *Our North, Our Future: White Paper on developing Northern Australia*, Commonwealth of Australia, 2015
- ▶ *WA Grain Freight Review Report*, KPMG/SAHA, 2009

WA Government reports

- ▶ *Bright future for WA's aquaculture industry*, Media Statement, Government of Western Australia, 2015
- ▶ *Capturing new value in sheep supply chains*, InvestWest Agribusiness Alliance, 2015
- ▶ *Comparative Due Diligence - South West Food Processing Precinct*, Cardno WA Pty. Ltd., 2013
- ▶ *DRAFT Western Australian State Biosecurity Strategy*, DAFWA, 2014
- ▶ *Flagship sheep project - Value Chains to Support Growth*, Flagship Sheep Project: Value Chains to Support Growth - Presentation to V&V Walsh, Gattorna Alignment and Greenleaf Consulting, 2015
- ▶ *Infrastructure boost for key Kimberley highway*, Media Statement, Government of Western Australia, 2015
- ▶ *Investment opportunities in seed potato production in Western Australia*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's grains industry: cereal hay for feed*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's grains industry: grain producing capacity*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's Beef industry*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's Dairy industry*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's Gourmet Food industry*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's Northern Horticulture industry*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's Sheep Meat industry*, DAFWA, 2014
- ▶ *Investment opportunities in Western Australia's Wine industry*, DAFWA, 2014
- ▶ *Kimberley Aquaculture Development Zone: Management Policy DRAFT*, Department of Fisheries Western Australia, 2014
- ▶ *Kimberley aquaculture zone*, Department of Fisheries Western Australia, 2015
(URL: <http://www.fish.wa.gov.au/Fishing-and-Aquaculture/Aquaculture/Aquaculture%20Zones/Pages/Kimberley-Aquaculture-Zone.aspx>)
- ▶ *Licensed Abattoirs in WA*, Western Australia Meat Industry Authority, 2015
(URL: http://wamia.wa.gov.au/licensed_abattoirs/view)
- ▶ *Management of the Rail Freight Network Lease: Twelve Years Down the Track*, Office of the Auditor General Western Australia, 2013

- ▶ *Mid West aquaculture zone*, Department of Fisheries Western Australia, 2015
(URL: <http://www.fish.wa.gov.au/Fishing-and-Aquaculture/Aquaculture/Aquaculture%20Zones/Pages/Mid-West-Aquaculture-Zone.aspx>)
- ▶ *Report prepared for Freight and Logistics Council of WA on behalf of the Strategic Grain Network Committee*, Strategic design + Development Pty. Ltd., 2009
- ▶ *\$24.15 million for Broome Wharf upgrade*, Media Statement, Government of Western Australia, 2015
- ▶ *Seizing the Opportunity Agriculture - Program Overview*, Government of Western Australia, 2015
- ▶ *Sheep Industry Business Innovation*, Bruce Mullan, DAFWA 2015
- ▶ *Sheep numbers 2011*, DAFWA, 2011
- ▶ *State Planning Strategy 2050 - Executive Summary*, Western Australian Planning Commission, 2012
- ▶ *State Planning Strategy 2050*, Western Australian Planning Commission, 2012
- ▶ *Strategic Plan 2014-17*, DAFWA, 2014
- ▶ *The Economic Importance to Western Australia of Live Animal Export*, DAFWA, 2011
- ▶ *The Management of Western Australia's Freight Rail Network*, Economics and Industry Standing Committee - Legislative Assembly Parliament of Western Australia, 2014
- ▶ *WA takes the lead in national quinoa crop trials*, Media Statement, Government of Western Australia, 2015
- ▶ *WA Water Investment Priorities*, Department of Water Western Australia, 2015
- ▶ *West Mundijong Agri-Industrial Precinct - Concept Plan*, Cardno WA Pty. Ltd., 2014
- ▶ *Western Australian Regional Freight Transport Network Plan*, Department of Transport Western Australia, 2013

Regional planning documents

- ▶ *2036 and Beyond: A Regional Blueprint for the Kimberley*, Kimberley Development Commission, 2014
- ▶ *An Overview of the Agricultural and Pastoral Sectors in the Kimberley*, Kimberley Development Commission, 2014
- ▶ *Gascoyne Regional Investment Blueprint*, Gascoyne Development Commission, 2015
- ▶ *Gascoyne Regional Planning and Infrastructure Framework Part A: Regional Strategic Planning*, Western Australian Planning Commission, 2015
- ▶ *Gascoyne Regional Planning and Infrastructure Framework Part B: Regional Infrastructure Planning*, Western Australian Planning Commission, 2015
- ▶ *Goldfields-Esperance Regional Planning and Infrastructure Framework Part A: Regional Strategic Planning*, Western Australian Planning Commission, 2015
- ▶ *Goldfields-Esperance Regional Planning and Infrastructure Framework Part B: Regional Planning & Infrastructure Framework*, Western Australian Planning Commission, 2015
- ▶ *Great Southern Regional Blueprint*, Great Southern Development Commission, 2015
- ▶ *Great Southern Regional Planning and Infrastructure Framework - Appendices*, Western Australian Planning Commission, 2015
- ▶ *Great Southern Regional Planning and Infrastructure Framework*, Western Australian Planning Commission, 2015
- ▶ *Kimberley Regional Planning & Infrastructure Framework*, Western Australian Planning Commission, 2015
- ▶ *Mid West Regional Investment Blueprint*, Mid West Development Commission, 2014
- ▶ *Mid West Regional Planning & Infrastructure Framework Part A: Regional Strategic Planning*, Western Australian Planning Commission, 2015
- ▶ *Mid West Regional Planning & Infrastructure Framework Part B: Regional Infrastructure Planning*, Western Australian Planning Commission, 2015
- ▶ *Peel Regional Investment Blueprint*, Peel Development Commission, 2014
- ▶ *Pilbara Planning and Infrastructure Framework*, Western Australian Planning Commission, 2012
- ▶ *Regional Investment Blueprint: Technical Report - Executive Summary*, Pilbara Development Commission, 2015
- ▶ *Regional Investment Blueprint: Technical Report*, Pilbara Development Commission, 2015
- ▶ *South West Regional Blueprint*, South West Development Commission, 2014
- ▶ *South West Regional Planning and Infrastructure Framework*, Western Australian Planning Commission, 2014

- ▶ *Wheatbelt Blueprint*, Wheatbelt Development Commission, 2015
- ▶ *Wheatbelt Regional Planning and Infrastructure Framework*, Western Australian Planning Commission, 2014

Reports from industry bodies

- ▶ *Australian livestock export industry statistical review 2013-14*, Livecorp/Meat and Livestock Australia, 2014
- ▶ *Findings from a survey of farmers in the Esperance Port Zone current internet data connection status*, South East Premium Wheat Growers Association/Council of Grain Grower Organisations Ltd., 2015
- ▶ *Regional data access: Connection to our economic future*, South East Premium Wheat Growers Association/Council of Grain Grower Organisations Ltd., 2015
- ▶ *Sheepmeat demand in China and consumer insight*, Meat and Livestock Australia, 2015
- ▶ *The Cost of Australia's bulk grain export supply chains: An information paper*, AEGIC, 2014
- ▶ *The Puck Stops Here - Canada challenges Australia's grain supply chains*, AEGIC, 2015
- ▶ *WA Grains Industry Strategy 2025+*, Grain Industry Association of Western Australia, 2015
- ▶ *WA Grains Industry Strategy 2025+: Commodity Specific Strategies*, Grain Industry Association of Western Australia, 2015
- ▶ *WA Sheep Industry Strategic Plan 2025+*, The Sheep Industry Leadership Council, 2015

Reports from consultancies and other private organisations

- ▶ *Agriculture in Focus: Australian Grains - Competitive Strains*, Rabobank, 2013
- ▶ *An Investors Guide to emerging growth opportunities in New Zealand food & beverage exports*, Coriolis, August 2012
- ▶ *Australia's Agricultural Future*, Australian Council of Learned Academies, 2015
- ▶ *Australian Agriculture - A New Investment Story*, Strategis Partners, 2015
- ▶ *DRD Government Levers*, Coriolis, 2014
- ▶ *Finding the road forward - Opportunities to increase WA Agrifoods Exports - Supplementary*, Coriolis, May 2015
- ▶ *Finding the road forward - Opportunities to increase WA Agrifoods Exports*, Coriolis, March 2015
- ▶ *Fresh Opportunities - Report sponsored by Wesfarmers Limited on building a sustainable dairy industry in WA - Executive Summary*, Strategis Partners, February 2012
- ▶ *Fresh Opportunities - Report sponsored by Wesfarmers Limited on building a sustainable dairy industry in Western Australia*, Strategis Partners, February 2012
- ▶ *From Vicious to Virtuous Cycles: A sustainable future for Australian agriculture*, Centre for Policy Development, 2015
- ▶ *Increasing Irrigation investment in WA*, Coriolis, June 2015
- ▶ *Maintaining our share of the lamb meat pie*, Kelly Manton-Pearce, Nuffield, 2013
- ▶ *Realignment of National Supply Chains*, Tim Hoffman Advisory, 2015
- ▶ *Red Meat Industry - Pathways to long term sustainability*, Meat Industry Excellence, 2015
- ▶ *The New Industry Transformation. How to Redesign New Zealand's Red Meat and Wool Supply Chains*, James Parsons, New Zealand Nuffield Farming Scholarship Trust, 2009
- ▶ *What does Asia want for dinner? - Emerging Market opportunities for New Zealand food and beverages in East & South East Asia*, Coriolis, July 2014

Reports from media organisations

- ▶ *Billion dollar prawn farm Project Sea Dragon tackles land tenure*, ABC Rural, 2015
- ▶ *NT cattle station signed over to prawn developers for Project Sea Dragon*, ABC Rural, 2015
- ▶ *NT station in prawn farm deal*, The West Australian, 16th February, 2015

Appendix F Stakeholders engaged

Stakeholders interviewed

- ▶ CBH Group: David Capper, Brianna Peake
- ▶ CBRE: Phil Melville
- ▶ Commercial Egg Producers Association: Peter Bell
- ▶ Committee for Economic Development of Australia (CEDA): Nathan Taylor
- ▶ Coriolis: Tim Morris
- ▶ Craig Mostyn Group: David Lock
- ▶ Dairy farmer: Andrew Jenkins
- ▶ Department of Agriculture and Food WA: Christopher Ham, John Ruprecht, Kevin Chennell, Mark Sweetingham, Peter Metcalfe, Rob Delane
- ▶ Department of Commerce: Penny Griffin
- ▶ Department of Fisheries Western Australia: Heather Brayford, Steve Nel
- ▶ Department of Infrastructure and Regional Development (including Regional Development Australia): Andrew Johnson, Mike Mrdak
- ▶ Department of Lands: Colin Slattery
- ▶ Department of Planning: Lance Glare, Gail McGowan
- ▶ Department of Premier and Cabinet: David Smith, Paul Tzaikos
- ▶ Department of Regional Development: Jenni Collard, Melissa Murphy, Ralph Addis, Andrew Mann
- ▶ Department of Treasury: Kaylene Gulich
- ▶ Department of Water: Simon Skevington, Mike Rowe
- ▶ Goldfields-Esperance Development Commission: Shayne Flanagan
- ▶ Grain Industry Association of WA: Ian Longson
- ▶ Grains Research Development Council: Peter Roberts
- ▶ Harvey Beef (Minderoo Investments): John Hartman, Kim McDougall
- ▶ Horizon Power: Laurie Curro, Ziggy Wilk
- ▶ Indigenous Lands Council: Peter Cunningham
- ▶ Infrastructure Australia: Stephen Alchin
- ▶ Kimberley Development Commission: Jeff Gooding
- ▶ Kimberley Ports: Kevin Schellack
- ▶ Land Corp: John Clifton
- ▶ Main Roads Western Australia: Bernie Miller
- ▶ Marleys Transport Merredin: Stephen Marley
- ▶ Mid West Development Commission: Mike Kendall
- ▶ Northern Advisory Beef Research Council: Ralph Shannon
- ▶ Northern Australia Development Office: Luke Bowen
- ▶ Office of Northern Australia: James Collett
- ▶ Pilbara Development Commission: Terry Hill
- ▶ Rural Industries Research and Development Corporation: Craig Burns
- ▶ Shire of Gingin: Michael Aspinall, Jeremy Edwards
- ▶ South West Development Commission: Don Punch
- ▶ Southern Ports Authority: Simon Fretton
- ▶ WA China Business Council: Adam Handley
- ▶ WA Lot Feeders Association (Beef Council): Ivan Rogers
- ▶ WA Pork Producers Association, Livestock and Rural Transport Association: Jan Cooper
- ▶ WA Regional Development Trust: Sue Middleton
- ▶ Water Corporation: Ashley Vincent
- ▶ Wellard Group: Mauro Balzarini
- ▶ Western Australian Farmers Federation: Dale Park
- ▶ Western Australian Local Government Association: Ian Duncan
- ▶ Western Dairy: Victor Rodwell
- ▶ Wheatbelt Development Commission: Wendy Newman
- ▶ Wine Industry Association of Western Australia: Larry Jorgensen

Workshop attendees

Gascoyne

- ▶ Carnarvon Growers Association: Bruce Miller
- ▶ Department of Water: Darryl Abbott
- ▶ Gascoyne Development Corp: Tony Beard, Jill Dwyer
- ▶ Gascoyne Food: Doriana Mangiu
- ▶ Loveapple: Rob Kuzmilich
- ▶ Shire of Upper Gascoyne: Bruce Walker
- ▶ Shire of Carnarvon: John Nuttall, Karl Brandenburg
- ▶ Solex (Carnarvon Solar Farm): Alexander Fullarton
- ▶ Water Corporation: Gavin Dunlop
- ▶ Other: Michael Nixon (Farmer), Bill Hopkinson (Pastoralist)

Goldfields-Esperance

- ▶ Esperance Organised Primary Producers Co-operative: Leon Bowman
- ▶ Goldfields-Esperance Development Commission: Shane Liddelow
- ▶ Main Roads WA: Shane Power, Ammar Abdul
- ▶ Northern Mallee Declared Species Group: Basil Parker
- ▶ Port of Esperance: Matt Devenish
- ▶ Shire of Esperance: Natalie Bowman, Matthew Scott
- ▶ Shire of Ravensthorpe: Ian Fitzgerald,
- ▶ South Coast Natural Resource Management: Kylie Bishop
- ▶ South East Premium Wheatgrowers Association: Nigel Metz, Niki Curtis

Great Southern

- ▶ A O'Meehan & Co: Paul O'Meehan
- ▶ Albany Plantation Export Company: Neil Worrell
- ▶ Albany Port: Simon Fretton
- ▶ City of Albany: Jan van der Mescht, Andrew Sharpe
- ▶ Department of Agriculture and Food WA: Lucy Anderton
- ▶ Main Roads WA: Andrew Duffield
- ▶ Milne Agrigroup: David Plant
- ▶ Regional Development Australia Great Southern: Simon Lyas
- ▶ Shire of Katanning: Alan McFarland, Julian Murphy
- ▶ Water Corporation: Ken Pearce
- ▶ Western Power: Ross Young

Kimberley (3 workshops)

- ▶ Barradale Farm: David Menzel, Karen Menzel
- ▶ Bothkamp Australia Farm: Gabi Bloecker, Christian Bloecker
- ▶ Cambridge Gulf Limited: Tony Chafer
- ▶ Ceres Farm: Matt Gray
- ▶ Clipper Pearls: Patrick Moase
- ▶ Department of Agriculture and Food WA: Noel Wilson
- ▶ Department of Fisheries: Peter Godfrey
- ▶ Desert Seed: Raymond Dessert
- ▶ Kimberley Cattlemen's Association: Peter Camp
- ▶ Kimberley Development Commission: Liz Kirkby
- ▶ Oasis Farm: Fritz Bolten
- ▶ Ord Irrigation Co-operative: Matthew Dear
- ▶ Ordco: David Cross
- ▶ Oria Orchards: Chris Robinson
- ▶ Shire of Broome: Daniel High
- ▶ Shire of Halls Creek: Matt Hobson
- ▶ Other: Torben Sass-Nielsen (farmer), Robert Boshammer (farmer)

Mid West

- ▶ Great Northern Rural Services: Tony Rosser
- ▶ Mid West Development Commission: Anne Finlay, Mike Kendall, Rob Jefferies
- ▶ MLA Member for Geraldton: Ian Blayney
- ▶ Regional Development Australia Mid West: Alan Bradley
- ▶ Water Corporation: Con Novatscou, Gavin Dunlop

Peel

- ▶ City of Mandurah: Allan Claydon
- ▶ C-Wise: Craig Salt
- ▶ C. Y. O'Connor Village Pub: Roger Dawkins
- ▶ Peel Development Commission: Adam Denniss, Dave Albwright
- ▶ Shire of Murray: Brett Flugge
- ▶ Shire of Serpentine Jarrahdale: Robert Casella

Pilbara (2 workshops)

- ▶ AECOM: Fabiana Tessele
- ▶ AgGrow Energy Resources: Craig Palmer
- ▶ Ashburton Aboriginal Corporation: Stuart Gunzburg
- ▶ Department of Agriculture and Food WA: Trina Anderson
- ▶ Department of Lands: Renata Paliskis
- ▶ Eastern Guruma Pastoral Company: Richard Paterson
- ▶ Main Roads WA: Maria Drysdale
- ▶ Pilbara Development Commission: Chris Gilmour, Felicity Gilbert, Gus Tampalini
- ▶ Pilbara Ports Authority: Jon Giles, Peter King, Roger Johnson
- ▶ Rio Tinto: Simon Mathwin, Mike Harold

South West

- ▶ Brookfield Rail: Geoff Brook
- ▶ Bunbury Chamber: Ray Philp
- ▶ Busselton Chamber: Ray McMillan
- ▶ Department of Industry: Rohan Clarke
- ▶ Department of Water: Bev Thurlow, Adam Maskew
- ▶ Harvey Industries Group: Wayne Shaw
- ▶ Harvey Water: Geoff Calder
- ▶ Main Roads WA: Brett Belstead
- ▶ Margaret River Wine Association: Nick Power
- ▶ Regional Development Australia South West: Charles Jenkinson
- ▶ Southern Forests Food Council: Jayme Hatcher
- ▶ South West Development Commission: Patrick Warrant, Simon Taylor
- ▶ South West Express: Mark Mazza
- ▶ Water Corporation: John Janssen
- ▶ Western Power: Douglas Thomson, Ishaan Khanna, Ross Young

Wheatbelt (2 workshops)

- ▶ Department of Agriculture and Food WA: Ainslie Madden, Greg Doncon, Helen Slater, Jaron Leask, Kari-Lee Falconer
- ▶ Loose Leaf Lettuce Co: Maureen Dobra
- ▶ Main Roads WA: Janet Hartley-West
- ▶ MLA Member for Moore: Shane Love
- ▶ Pastoralists and Graziers Association of Western Australia: Gary Peacock
- ▶ Shire of Chittering: Karen Dore
- ▶ Western Power: Dave Shelton
- ▶ West Midlands Group: Anne Wilkins
- ▶ WA Meat Industry Authority: Dave Saunders
- ▶ Water Corporation: Con Novatsccou
- ▶ Wheatbelt Development Commission: Carmel Ross, Daniel Waterhouse, Rebecca Kelly, Steven Pollard

Stakeholders from whom written submissions were received

- ▶ Department of Agriculture and Food WA: Rohan Prince
- ▶ Department of Planning Albany: Mark Jendrzeczak
- ▶ Global Groundwater: Richard Nixon
- ▶ GNRBA Inc.: Ross Wood
- ▶ Marine Produce Australia: Steven Davies
- ▶ Maxima: Steven Gill
- ▶ Mininer Station: Wendy Harvey
- ▶ Monochorum Limited T/A New Norcia Services: David Bedbrook
- ▶ Office of Science: Fiona Roche
- ▶ Pilbara Ports Authority: Peter King
- ▶ Shire of Broome: Daniel High
- ▶ Shire of Chittering / Anspach Ag.: Karen Dore
- ▶ Shire of Jerramungup: Craig Pursey

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