KPMG

Indonesia's Supply Chain & Logistics Study

Final report

29 June 2018

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1 Executive Summary

KPMG was engaged to provide an overview of live export, cattle supply chains for the 'Indonesia-Australia Partnership on Food Security in the Red Meat and Cattle Sector' (the Partnership) which is a joint Australian and Indonesian Government initiative. The Partnership is a unique forum that brings together Indonesian and Australian decision makers from government and industry to foster enduring relations and to maximise the opportunities for development and collaboration amongst the Indonesian and Australian red meat and cattle sector. The Partnership is committed to examining, understanding and establishing a grounds upon which to improve the efficiency of the cattle industry within Indonesia to increase their competitive ability through improved handling, logistics and improved animal welfare through the end to end supply chain.

The two supply chains examined in detail throughout the study were the international supply chain between Australia and Lampung, Indonesia, and the domestic supply chain between Kupang, East Nusa Tenggara (NTT) and Jakarta (see Figure 1).

Figure 1: The international and domestic supply chains within the scope of this study

KPMG took an investigative approach to completing the work and engaged expert stakeholders to provide key insights and validate findings as required. The project was conducted over five distinct phases, including:

1) desktop research and stakeholder consultation to understand the fundamental issues being experienced in the international and domestic supply chains – this included conducting an in-depth literature review, a regulatory review, investigating macro supply chain considerations and mapping priority Indonesian ports;
2) understanding the key challenges in these supply chains that may present possible constraints, issues or bottle necks in the international and domestic supply chains;
3) undertaking on-the-ground observations of each of the supply chains (Australia to Lampung and Kupang to Jakarta) to understand the functional aspects and practicalities of cattle live export in Indonesia, and to gather requisite data – this included visiting and observing ports and their facilities, local feedlots, abattoirs and regulatory bodies (e.g. customs and quarantine);
4) documenting findings and proposed recommendations that have the ability to improve supply chain efficiency and productivity; and
5) reporting these, with the support of key stakeholders, into a clear and coherent findings document for the Department and Partnership stakeholders.

Background

Indonesia beef demand and food security

Red meat, and in particular beef is increasing in demand in Indonesia. As Indonesia experiences rapid economic growth, consumer demand for beef is highly likely to increase as the middle class, urban consumer market and their incomes grow. With increased demand however, comes the simultaneous issue of food security, a key Indonesian Government priority, who has set in motion steps to reduce Indonesia's reliance upon external markets for proteins. Measures such as managed import volumes, weight restrictions and local breeding policies (5:1) are in place to increase the nation's ability to be more self-sufficient. Despite these policies to improve domestic food security, and self-sufficiency, it is a challenge for Indonesia to meet current and near-future demand for meat and its by-products and thus Indonesia is still complementing domestic supply with the international live cattle trade to supply suitably priced beef.

Supply chain issues

There are a number of supply chain and logistics issues embedded in the international and domestic transport networks of the live cattle trade in Indonesia. Generally, it was noted that port and maritime performance and competitiveness is poor and appropriately skilled labor resources, infrastructure and facilities are lacking. Internationally, meeting supply expectations in Indonesia is a constant undertaking with regulatory burdens and potential supply shortages from Australia due to external factors, such as weather events. Additionally, Indonesia's strict import requirements, Australian national standards and the need to meet high animal welfare standards moderate live export trade. On a local level, the Indonesian Government is seeking to improve logistics (given it currently has a poor ranking on the globally recognised Logistics Performance Index completed by the World Bank which compares countries globally). This improvement to drive improved economic output through investment in ports and related infrastructure is affected by the geographical fragmentation of the country and competing with its south-east Asian counterparts competitive advantages in other high value industries.

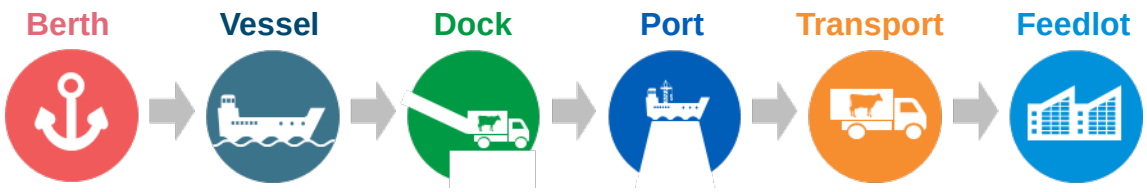
Assessing supply chains

International supply chain – 'Lampung'

Indonesia is importing *Bos Indicus* cattle from various northern regions of Australia, as they are suited to the tropical conditions of Indonesia. However these cattle have large flight zones and poor temperament thus do pose some transportation and handling challenges. The most consistent observation made during the supply chain assessment was significant deficiencies in suitable infrastructure. Current infrastructure can endanger cattle welfare and operator safety. All recommendations made in relation to the international supply chain need to pay credence to the fact that Indonesia is a developing country (e.g. low skilled, high quantity of available labour and poor road networks), and recommendations have been provided with this in mind.

The scope of the international supply chain study (Lampung) commences from the point of exit where the cattle discharge the vessel in Lampung onwards until the final destination at the feedlot or abattoir. Activities during the berthing process have also been examined because these can have a direct effect on the discharge and cause delays. That is, the scope excludes the Australia supply chain.

To examine, assess and provide recommendations on the supply chain, key drivers of constraints were examined, based on the following model:



The constraints and recommendations made in relation to the international supply chain have been summarised in Table 1. Within each recommendation listed in the table the effort to implement and the potential benefit of each recommendation was compared against each other in order to prioritise.

Recommendations with higher effort to implement include those where skilled or trained staff, high resource use and costs will be incurred, similarly recommendations with high potential benefits include those were there is a satisfactory amount of financial benefit, process improvement or operational improvement identified from the possible implementation of the recommendation. The information used to assess each constraint and recommendation's effort and benefit can be found in section 4.1 Results: Supply Chain Assessment - Lampung.

Table 1: Summary of constraints and recommendations identified in the international supply chain

Supply Chain Area	Constraints	Recommendations		Effort to implement	Potential benefit
Berth	Berth availability	A	Formalise regulations, to ensure that livestock vessels always receive priority berthing over other non-perishable freight	◕	◑
	Berth allocation	B	Formalise port standard operating procedure such that livestock vessels are always allocated the most suitable berth for truck loading	◔	◑
	Pilot on board process	C	Review port standard operating procedures to always utilise skiff (small, fast vessels) transportation to decrease any possible pilot-boarding delay	◔	◑
	Quarantine and customs process variation	D	Review quarantine and customs standard operating procedure to ensure processes are optimised	◑	◕
	Administration	E	Digitisation and simplification of administrative tasks to drive efficiencies	◔	◕
Vessel	Infrastructure of internal ship unload point, raceway and exit ramp width/height	F	Modify internal vessel load/unload point design	◕	◕
	Inconsistent discharge flow rate	G	Training of specialised Indonesian stock handlers with ship on-board experience to assist stock crew during discharge	◑	◕
Dock	Discharge platform redesign	H	A full design overhaul of the discharge platform from a specialised cattle facility design engineer is required	◑	●
	Operator positioning	I	Alter the design of the discharge platform so handling personnel cannot be seen by unloading cattle	◔	●
Port	Weighbridge delays and queuing due to non-functioning weighbridge	J	Formalise port Standard Operating Procedure that livestock trucks are given priority use of weighbridge	◑	◑

	Stationary trucks	K	Formalise port standard operating procedure that a single weighbridge can be booked/hired for exclusive use by livestock vessel trucks during a discharge	◔	◑
Transport	Road network quality, traffic and road congestion	L	Make ongoing improvements to road infrastructure to improve network quality and minimise traffic and road congestion as much as possible	●	◔
	Truck design	M	Apply permanent non slip flooring to drop doors to prevent cattle slipping upon entry and exit of truck	◔	●
	Truck size	N	Favour booking of higher capacity trucks (approximately 21 head capacity)	◔	◕
Feedlot	Poor unloading area design	O	Liaising with other members of the Partnership to collaborate with importers to improve facility design	◑	◕
	Quarantine handling inefficiencies	P	Avoid repetition of animal disease testing	◔	◑

The above recommendations can be grouped into three interrelated categories to enable improvements within the industry. These recommendations are operational improvement suggestions, capital expenditure (CAPEX) and regulation and compliance reinforcement.

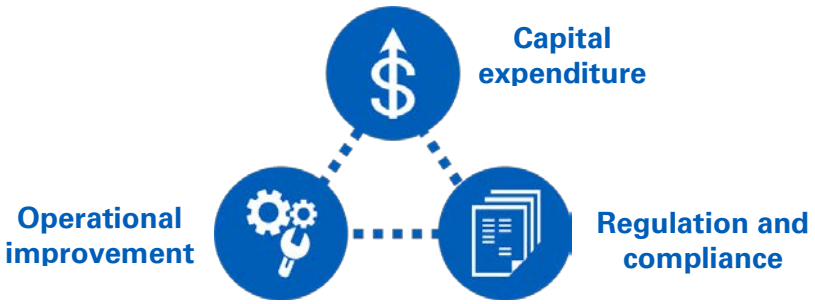
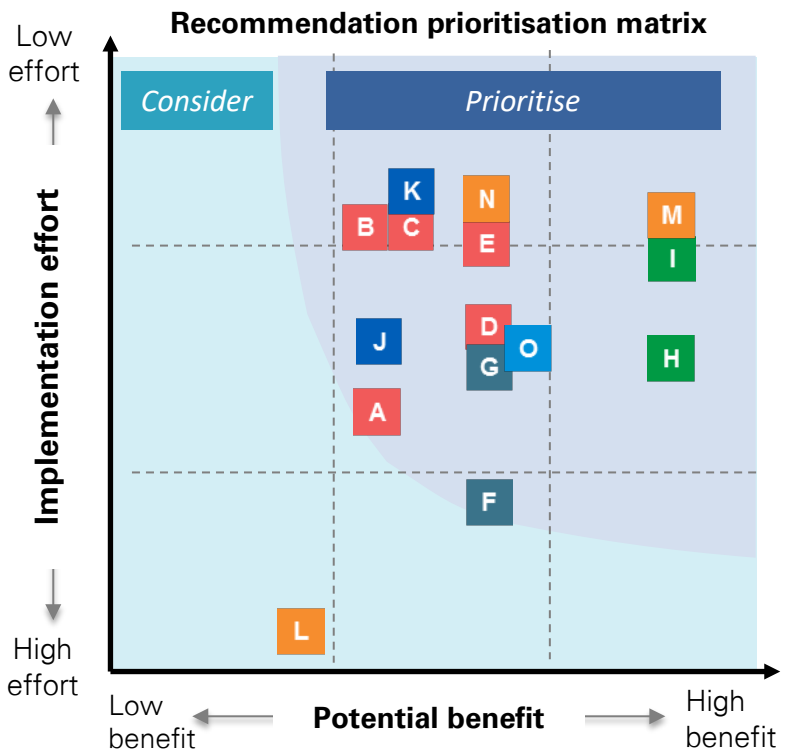


Table 2: Summary of recommendations from Lampung supply chain study.

Recommendation Type	Recommendations
Capital expenditure **Prioritise:** discharge platform re-design and construction (AUD $25,000-$40,000 per platform) and investment in non-slip mats for drop down doors on cattle trucks (AUD $14,240 for 120 truck mats). Refer to 4.1 for expected corresponding benefits to the industry.	H I L M *Recommendations that have a specific capital expenditure requirement associated with their implementation.*

Operational improvements **Prioritise:** favour high capacity truck use and training of specialised stock handling staff to assist during discharge.	C E F G N O P *Recommendations that suggest new training, improved design or changes in method.*
Regulation and compliance **Prioritise:** berthing of livestock vessels and standardise quarantine and customs procedures.	A B D J K *Recommendations that require encouraged regulation and improved compliance.*

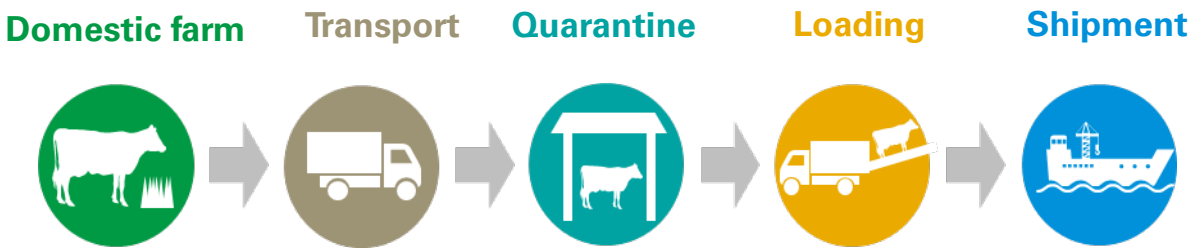
The recommendations, can thus be ranked to prioritise as follows:



Domestic supply chain – 'Kupang'

The Kupang domestic supply chain had a number of similar issues to the international supply chain in Lampung. In the domestic supply chain, cattle are sourced from eastern islands and shipped westward towards higher density populous cities. The biggest issue in the domestic supply chain is a lack of suitable land and maritime infrastructure to support the trade. While the Indonesian government is attempting to provide government support with the Camara vessels (government owned cattle transport vessels), there are issues with price, availability and timing with these vessels.

To examine, assess and provide recommendations on the supply chain being investigated, key drivers of constraints were examined, based on the following model:



The constraints and recommendations made in relation to the domestic supply chain have been summarised in Table 3 . Within each recommendation listed in the table the effort to implement and the potential benefit of each recommendation was compared against each other in order to prioritise. As was the case in the Lampung supply chain, recommendations with higher effort to implement include those where skilled or trained staff, high resource use and/or capital expenditure may be incurred. Similarly recommendations with high potential benefits include those were there is an expected satisfactory amount of financial benefit, process improvement or operational improvement from the possible implementation of the recommendation. The information used to assess each constraint and recommendation's effort and benefit can be found in section 5.1 Results: Supply Chain Assessment - Kupang.

Table 3: Summary of constraints and recommendations identified in the domestic supply chain

Supply Chain	Constraints		Recommendations	Effort to implement	Potential benefit
Domestic Farm	Nutrition	A B C D	Increase protein provision, improve grazing strategies, balanced vitamin/mineral provision, better engagement with farmers	◔	◑
	Lack of water provision	E	Water infrastructure investment	◔	◕
	Reproductive management and genetics.	F	Practical reproductive management	◕	◕
	Local farm breeding model	G	Review of the local farm breeding model	◕	◕
Transport	Cattle handling difficulty	H	Improve cattle handling	◑	◕
	High loading rates and poor design for cattle comfort	I	Loading rates and cattle comfort	◔	◕
Quarantine	Inadequately maintained handling and housing facilities	J	Quarantine facility upgrade or redevelopment	◑	◑
	Inadequate nutrition and water provision. Inadequate hygiene	K	Minimum standard housing	◔	◑

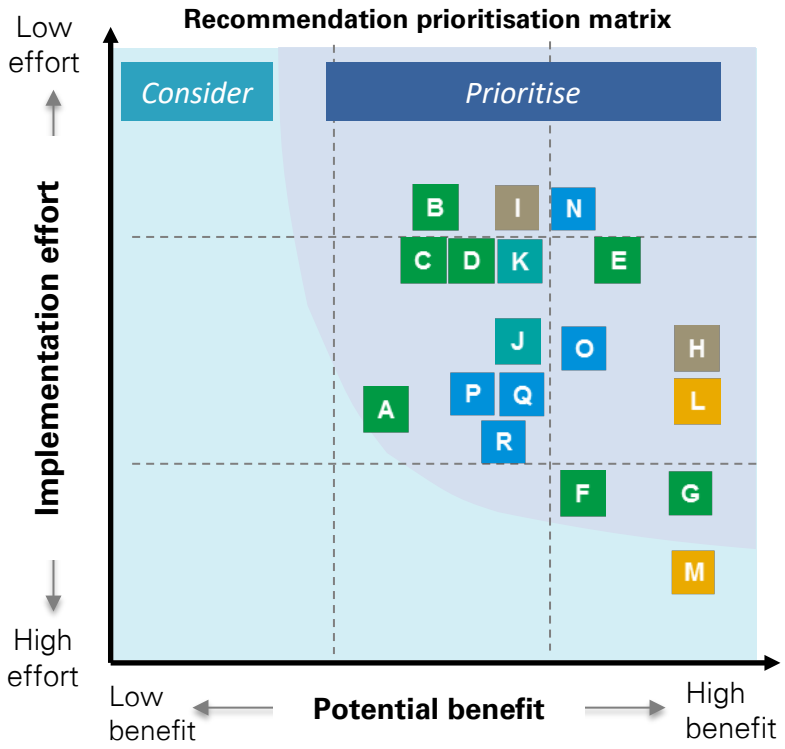
Loading	Loading ramp design	L	Mobile loading ramp, used for all truck unloading and loading	●	◔
	Dock dimensions	M	Dock redevelopment and expansion	◔	●
Shipment	Operation of the Camara Nusantara I	N	Adopt modern, efficient and publically accessible methods of booking cattle placements on vessels	◔	◕
	Weight loss and mortality	O	Appropriate provision of on board feed and water	◑	◕
	Key design shortfalls of vessels	P	Upgrade on-board infrastructure	◔	◑
	Documentation requirements	Q	Reduce unnecessary and duplicate documentation	◔	◑
	Unloading at destination port	R	Investment in unload infrastructure	◔	◑

As was the case in the Lampung supply chain, the recommendations for Kupang also fall into three distinct types: capital expenditure, operational improvements and regulation. While the recommendations have been separated here based on the primary effect, the recommendations are also interdependent and support each other.

Table 4: Summary of recommendations from Kupang supply chain study.

Recommendation Type	Recommendations
Capital expenditure **Prioritise:** invest in improved infrastructure of domestic cattle facilities and associated dock/ship infrastructure.	E J K L M P R *Recommendations that have a specific capital expenditure requirement associated with their implementation.*
Operational improvements **Prioritise:** improve cattle handling to increase liveweight size and breeding capabilities as well as on-board handling.	A B C D F G H I N O *Recommendations that suggest new training, improved design or changes in activity method.*
Regulation **Prioritise:** reduce duplication and simplify documentation processes.	Q *Recommendations that require encouraged regulation and improved compliance.*

The recommendations are ranked to prioritise as follows:



Next Steps

The key next steps will focus on delivering upon recommendations for each of the supply chains. To do this, there are many different mechanisms at both the government and industry levels that could be convened. The Partnership can play a role in assisting and facilitating solutions where Indonesian and Australian stakeholders have conducted prioritisation and feasibility assessments and see the ability to implement specific recommendations in relation to funding and skills available. Allowing an open assessment by the Indonesian Government and industry to assess the recommendations of the report will ensure that the most achievable, but also beneficial, recommendations are actioned as soon as possible to achieve efficiencies and productivity gain.

While the examination of supply chain constraints and the subsequent recommendations are designed to be able to alleviate a number of challenges as well as inefficiencies within both the domestic and international supply chain, it should be noted that the unique socio-economic constraints of Indonesia as a developing country should be taken into account.

The Kupang supply chain poses many challenges, beginning with the low socio-economic production base through to challenging marketing and procurement processes. This is not helped by the fact that the supply chain is long both geographically and organically with complex multi-party stakeholders. These challenges, coupled with the relatively low value end-product creates an intense environment with stakeholders working defensively and protectively to maintain available profit margin. As such, further, more detailed analysis of this domestic supply chain is required to focus on the micro issues that are causing operational and logistical challenges for operators in this market.

2 Method

2.1 Project background

The Indonesian and Australian Governments have committed to this study through the 'Indonesia-Australia Red Meat and Cattle Partnership'. The Partnership is committed to understanding and addressing constraints associated with logistics and processes along the cattle and red meat supply chain. The aim of the study is to improve the efficiency of the cattle industry within Indonesia to help the government and industry players become more competitive through efficient handling and logistics along the supply chain. This is an important initiative that will provide the necessary insights to drive both productivity but equally improve animal welfare outcomes.

Efficient logistics and processes will improve profitability and animal welfare throughout the supply chain. The study relates specifically to existing cattle supply chains and related logistic chain issues associated with the supply of cattle imported from Australia to Jakarta and domestically from Kupang (NTT) to Jakarta.

It is expected that lessons learned from the specific supply chains in this study will be relevant to additional cattle supply chains across Indonesia, thereby stimulating additional investment opportunities across Indonesia's provinces aspiring to become cattle production regions.

2.2 Our objectives

The objectives of this study are to:

- Map priority ports in Indonesia that handle live cattle (both major and minor) as well as those identified by the Indonesian Government and/or industry as future potential destinations.
- Identify, document and quantify the costs and constraints along the cattle and beef supply chain of cattle within Indonesia to their final destination.
- Compare the efficiency of Indonesia's cattle and beef supply chain, including facilities, infrastructure and logistics, to global best practices in order to benchmark competitiveness.
- Determine the most cost effective way to address bottlenecks, inefficiencies, infrastructure deficits and animal welfare issues along the supply chain to improve profitability and stimulate potential investment.

2.3 Scope

The study has examined two supply chains:

1. The international cattle supply chain from Australia to Lampung.
2. The domestic cattle supply chain from Kupang, East Nusa Tenggara (NTT) to Jakarta.

1 International supply chain scope

The international supply chain in scope is based around Australian cattle exported through to Lampung and onwards to their ultimate destination (feedlot, abattoir or breeding facility).

The scope of the study commences from the point of exit where the cattle discharge the vessel in Lampung onwards until the final destination at the feedlot or abattoir. Activities during the berthing process have also been examined because these can have a direct effect on the discharge and cause delays.

The key components of the supply chain analysis include:

- Infrastructure
- Bottlenecks
- Inefficiencies
- Time-lags

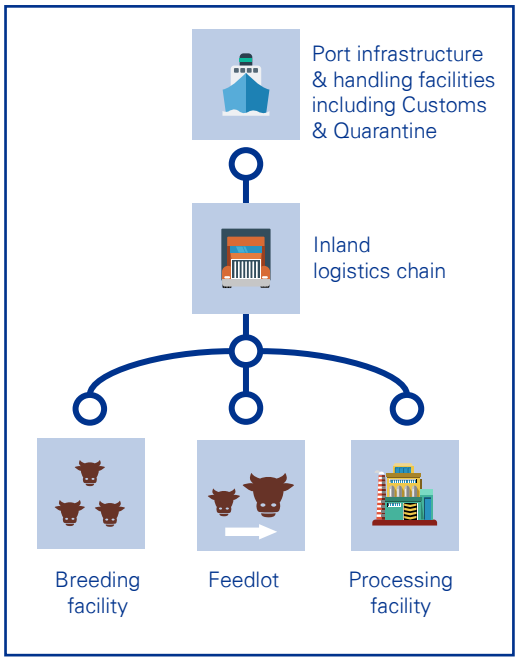


Figure 2: International supply chain in scope

2 Domestic supply chain scope

The domestic supply chain in scope is based around Indonesian cattle farmed in Kupang and then transported to a local abattoir in Kupang or onwards to Jakarta.

The key components of the supply chain analysis include:

- High level scoping study to determine value creation opportunities along the supply chain from Kupang (NTT) to Jakarta.
- Analysis of cost inefficiencies along the supply chain from Kupang (NTT) to Jakarta.
- The inclusion of NTT into this study brings the Camara Nusantara government owned vessel into part of this study. The KPMG project team has not audited, inspected or reviewed the Camara Nusantara. However, the vessel has been considered as it is a critical part of this supply chain.

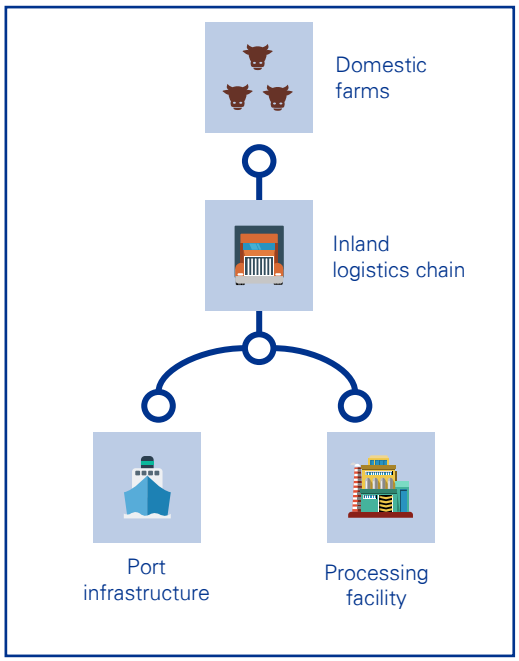
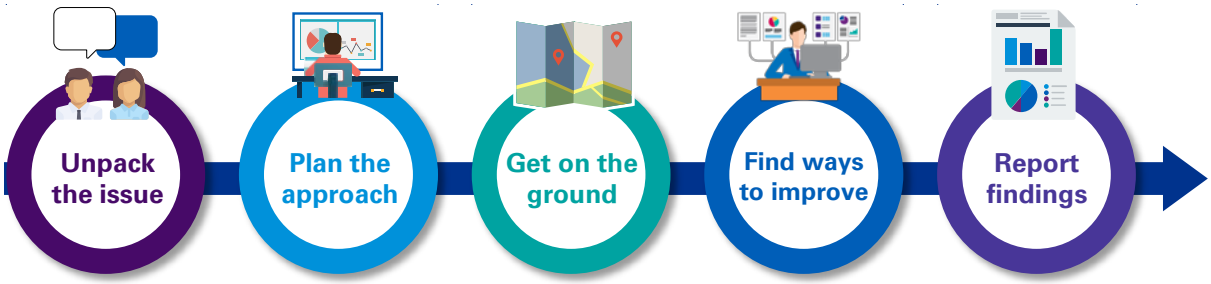


Figure 3: Domestic supply chain in scope

2.4 Approach

KPMG utilised a five-phased methodology focused on unpacking the issues, planning a hypothesis-based approach, getting on the ground to validate, developing improvement opportunities and reporting our findings.



1) Unpack the issue:

Objective

To thoroughly understand the context and issues at hand through desktop research and stakeholder consultation to determine the methodology and support required.

Activities performed

- Performed a literature review to explore existing literature and studies already conducted in this space to develop a thorough understanding of the issues at hand (refer to section 3.1).
- Performed a review of Indonesian legislation and regulatory frameworks of beef and cattle regarding importation, transport, breeding, feedlotting and slaughter to understand the context of the regulatory environment (refer to section 3.2).

2) Plan the approach:

Objective

To perform detailed planning in order to shape the field work.

Activities performed

- Conducted desktop research and stakeholder consultation, to document our understanding of the current live cattle supply chain into Indonesia and domestically in order to identify the key activities at each stage.
- Identified possible constraints, issues and bottle necks at each stage of the supply chain and developed a series of improvement hypotheses to be tested during field work.

3) Get on the ground:

Objective

To conduct in-country site visits at each stage along the supply chain to test our improvement hypotheses and gather the requisite data.

Activities performed

- Jakarta (November and December 2017):
    - Consulted with stakeholders face to face (Refer to Appendix 6.1 Stakeholder consultation for a complete list of meetings held).
    - Toured Tanjung Priok port to view port facilities and supporting infrastructure.

- Lampung (November / December 2017) :
    - Observed the discharge of two shipments at Panjang Port, port facilities and supporting infrastructure.
        - Vessel 1: 1,800 head of cattle from Geraldton, Australia
        - Vessel 2: 4,500 head of cattle from Darwin, Australia
    - Viewed the operating supply chain in Lampung including transport routes to feedlots and abattoirs.
    - Toured feedlot facilities.
    - Toured an operating wet market.
- Kupang (November / December 2017) :
    - Viewed the operating supply chain in Kupang including transport routes to abattoirs and the port.
    - Toured Tenau Port and viewed port facilities and supporting infrastructure.
    - Toured a local abattoir.
    - Toured local farms.
    - Toured local cattle sale yards.
    - Toured the Kupang quarantine facility.
- Documented key activities operating in the supply chain to test and validate hypotheses.

4) Find ways to improve:

Objective

To document our findings and analyse the costs and benefits of improvement opportunities.

Activities performed

- Documented our findings and subjected these to a comparative analysis against examples of global best practice. We understand that Indonesia is still on a path as a developing nation and we need to ensure that our chosen comparators are cognisant of this fact and the comparisons are set in the right context. This will allow us to fully validate our improvement hypotheses.
- Developed a number of improvement opportunities, supported by indicative costings and expected benefits. We believe that more value can be derived from a few well scoped and evidenced improvement opportunities.

5) Report findings:

Objective

Produce a final report addressing the objectives.

Activities performed

- Distributed final report.
- Socialised findings with stakeholders.

2.5 Study limitations

Table 5: Listing of study limitations

#	Study limitations	Mitigants
1	KPMG observed the discharge of two vessels during the field work in Lampung, Indonesia. We note that this is a small sample size and while the constraints observed are valid there may be additional constraints not observed.	The observations provided first hand primary insights in the operating supply chain and this was supplemented by desktop research and stakeholder consultations to validate observations and discuss any gaps.
2	The field work observation was at a point in time and may not represent constraints occurring regularly over a long term functioning supply chain.	The observations provided first hand primary insights in the operating supply chain and this was supplemented by desktop research and stakeholder consultations to validate observations.
3	KPMG consulted a number of people in relation to the study however there may have been stakeholders that were not consulted that have different views on the study findings.	KPMG consulted a wide range of stakeholders that have experience in the domestic and international supply chains in scope. This included an appropriate cross section of commercial, industry and Government stakeholders with various perspectives.

2.6 Key contributors

KPMG subcontracted Scolexia Pty Ltd to assist with this study. Managing Director, Dr Peter C. Scott (B.Sc., B.V.Sc., PhD.) provided subject matter insights, supply chain analysis and review of key findings.

Peter Sutton (Scolexia staff) accompanied the KPMG project team on the ground in Indonesia during the site visits and vessel discharge observations. Peter Sutton has experience working in Northern Australia cattle stations in WA, NT and Queensland. He is an accredited Australian stockmen having completed live cattle voyages to the Middle East, Malaysia, Indonesia and China. He has lived abroad for 2 years working as a Supply Chain Manager in South East Asia for an exporter operating in Vietnam, Cambodia and Laos. He has experience in feedlot facility design in the tropics and a working background in Australian feedlots.

Dr Peter C. Scott (Managing Director, Scolexia), Peter Sutton (Scolexia staff) and Bronte Sutton (Scolexia staff) have contributed content to this report, utilising their extensive experience in cattle supply chain and logistics in South East Asia.

3 Research

3.1 Literature Review

A literature review was completed to identify existing ports being used in Indonesia and to provide high level information about them, and analyse previous research and writing to guide and inform specific aspects of the project. The comprehensive literature review has guided discussions with key stakeholders and has helped provide an overview of the Indonesian cattle supply chain and understand the current state of the country's domestic logistics. Additionally, the cattle supply chain between Australia and Indonesia was examined. Finally, the review assisted in the process of identifying current programs being pursued by the government, sources for benchmarking and leading practises.

At a high level, it was found that:

- **There are common international and domestic supply chain issues:**
  - current port and maritime supply chain performance is poor; and
  - key supply chain enablers, such as appropriately skilled human resources, infrastructure and facilities are lacking.
- **In the international supply chain between Australia and Indonesia:**
  - Australia faces a number of challenges to meet international supply expectations for cattle due to Australian domestic demand for beef, and potential supply shortages due to external factors, such as weather events;
  - Indonesia has strict import requirements for beef cattle and these have to be simultaneously maintained with Australia's own national standards for export of live animals; and
  - Indonesia's approach to beef trade is changing as Indian Buffalo import permits are introduced, self-sufficiency is endorsed and the use of chilled supply chains is increasing.
- **In the domestic supply chain in Indonesia:**
  - the Indonesian Government recognises the importance of logistics, and in particular ports, to improving economic output and is investing heavily in them; and
  - the geographical fragmentation of logistics in Indonesia needs to be overcome.

Based on the literature review there is significant scope to investigate the operating effectiveness of the live cattle supply chains. It is valuable to identify improvement opportunities and recommendations to rectify these issues and improve efficiency and effectiveness of the cattle trade (within the scope of regulations enforced by both the importing and exporting countries).

Refer to Appendix 6.2 Literature Review for the complete review.

Key insights:

Through the literature review, a number of key themes were identified in relation to both the domestic and international supply chains. Significantly, the lack of port infrastructure, the poor service logistics and operations (including roads and transporting to and from ports) and the lack of suitable skilled human resources are key issues in Indonesia.

3.2 Regulatory review

A review of the Indonesian legislative and regulatory frameworks was performed in order to understand the context of requirements in relation to animal welfare and ascertain the various Indonesian Government departments roles and responsibilities for implementing and regulating the legislation.

The insights from this review of regulatory frameworks relate to:

- the importation of beef into Indonesia;
- the transport of beef;
- the breeding of beef;
- feedlotting of beef; and
- slaughter of beef.

Refer to Appendix 6.3 Regulatory Review for the complete review of the above frameworks

3.3 Macro supply chain considerations

3.3.1 Logistics Performance Index

The Logistics Performance Index (LPI) is an international and domestic scoring system to benchmark countries against their own internal, and then against global, logistics performance across four to six key areas. The scorecard is designed to allow comparative assessment of logistics and supply chain functionality between countries and domestic regions; the LPI is a survey and uses a question based methodology whereby each assessed area is ranked from low (score of 1) to high (score of 5), and then statistically evaluated into weighted scores out of 5.

International LPI

The six areas included in the International LPI score are:

- efficiency of **clearance process** (i.e. speed, simplicity, and predictability of formalities) by border agencies (including customs);
- quality of trade and transport related **infrastructure** (e.g. ports, railroads, roads, IT);
- ease of arranging **competitively priced** shipments;
- competence and quality of **logistics services** (e.g. operators, brokers);
- ability to **track and trace** consignments; and
- **timeliness** of shipments in reaching destinations within the scheduled or expected delivery time.[1]

Indonesia scored in the mid-high range on the LPI for 2016, ranking 63rd of 160 countries assessed. In relation to the live export trade of beef from Australia, the LPI is a way in which suppliers can consider locations for export based on the total LPI score received by that country. In markets in which Australia trades, Indonesia ranks second last receiving the lowest scores compared to all comparators in every category except tracking and logistics services (Figure 4).

[1] World Bank, (2016) *Logistics Performance Indicator (International) – Country Scorecard Indonesia 2016*, The World Bank Group.

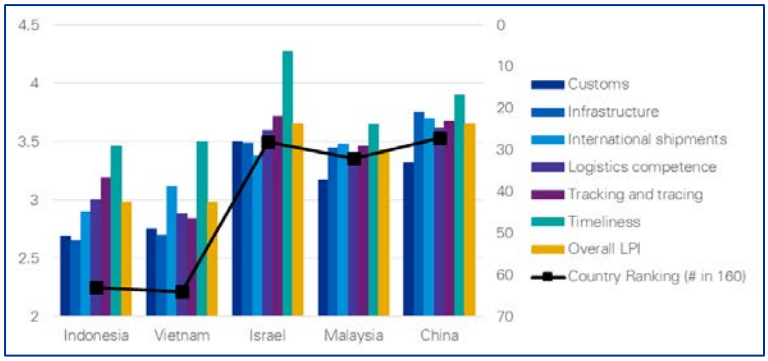


Figure 4: Australian Beef Live Export Markets: Comparison Logistics Performance Indicator (World Bank, 2016)

The international LPI is relevant to this study. Understanding the current baseline assessment of each reported category will dictate areas in which specific improvements can be made to the international supply chain and where there are potential opportunities for improving and expanding the beef supply chain between Indonesia and Australia. The relevant areas, their baseline score in the most recent International LPI and specific considerations are summarised in Table 6.

Table 6: International LPI for Indonesia (2016) and future supply chain considerations

Assessment area	Current score	Considerations
Clearance Process	2.69	This score states that just over 50 per cent of respondents said they had issues with clearance processes at port. This has significant impacts upon the live cattle trade, as delays in processing cargo at port can reduce the live weight and increase the stress of cattle on board; both of these can reduce the final price paid for beef products.
Infrastructure	2.65	Similar to the previous LPI area, this score notes that just over half the respondents stated that infrastructure at ports in Indonesia is inadequate. Without adequate infrastructure at ports, the unloading of cattle at ports can be dangerous, stressful and time consuming. There is significant scope within this category to improve supply chain logistics related to infrastructure.
Competitive prices	2.90	In relation to the six areas scored in the LPI, Indonesia has scored relatively well in this area. However, given Australia dominates the live export market to Indonesia, improving this LPI (while beneficial) will not necessarily reduce the overall price of shipping live cattle to Indonesia.
Logistics Services	3.00	This score indicates that more than half of survey respondents noted that logistics services in Indonesia were 'high', this says that product forwarding and port brokerage are adequate. There is still significant room for improvement against this area though, with the live cattle trade issues at port still consistently creating time delays (e.g. customs clearance).
Track and Trace	3.19	N/A to this study.

Timeliness	3.46	This is the highest rated assessment area, and thus is technically the area that needs the least improvement. This means to say that between port destinations, ships generally arrive on time more often than not, however this area does not take into account dwell time (where the clearance process and logistics process slow down supply chain consideration).

Source: World Bank International LPI and KPMG.

Domestic LPI

Similar areas are assessed in the domestic LPI as are assessed in the International LPI however, instead of reporting against the six areas, logistics employees are surveyed to ascertain their view on improvements or deficiencies of the country in question's domestic logistics. The areas examined in the survey are:

- the **level of fees and charges** related to logistics;
- the **quality of logistics** related infrastructure;
- the **competence and quality of service** delivered;
- the **efficiency of processes**;
- the main **sources of logistics delays**; and
- the **availability of qualified personnel**.[2]

The Indonesian domestic LPI is also relevant to this study, as intra-island live cattle trade is common in Indonesia. Understanding the current baseline assessment of each reported category will dictate areas in which specific improvements can be made to the domestic supply chain. The relevant areas, their baseline score in the most recent domestic LPI and specific considerations are summarised in Table 7.

Table 7: Domestic LPI for Indonesia (2016) and future supply chain considerations

Assessment area	Current reporting	Considerations
Fees and charges	30 per cent said these were high or very high	Across all six areas of the domestic supply chain and logistics, consistently poor responses were recorded for Indonesia. There is clear scope to improve and develop all key areas to facilitate improved domestic live cattle trade. The two categories that scored the best were the quality and competency of logistics services categories, however both still had more than half the survey respondents indicate that these were not effective or efficient. The areas where significant improvement is required, and where investment should be focused are sources of logistics delays and the availability of qualified personnel.
Quality of logistics	50 per cent said this was high or very high	
Competence and quality of service	Between 30-50 per cent said this was high or very high	
Efficiency of processes	30 per cent said often or nearly always	
Sources of logistics delays	< 30 per cent said often or always	
Availability of qualified personnel	< 30 per cent said low or very low	

Source: World Bank Domestic LPI and KPMG.

[2] World Bank, (2016) *Logistics Performance Indicator (Domestic)– Country Scorecard Indonesia 2016*, The World Bank Group.

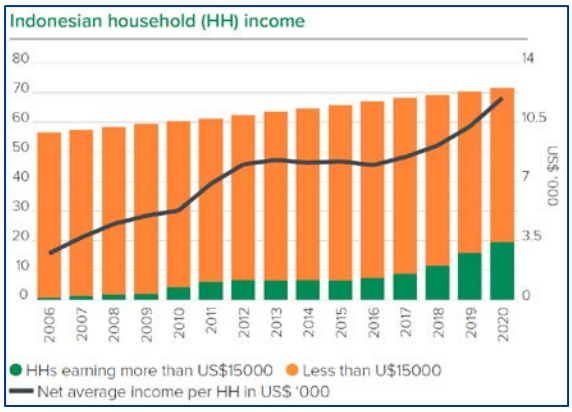
Key insights:

The analysis of the Logistics Performance Index during the research phase created an expectation that there will be numerous supply chain constraints and opportunities for development. Noting that these expectations are within the context of a developing nation with underdeveloped supply chain networks and infrastructure.

3.3.2 Supply and Demand

Indonesia is experiencing rapid economic growth which is driving demand for food

Like many nations in the South East Asia, Indonesia is experiencing rapid economic growth which is driving consumer demand for both traditional and new products (Figure 5). Indonesia currently has the 4th largest population in the world with a burgeoning middle class of urban consumers and this demographic is predicted to almost triple between from 7 million in 2016 and to 19.4 million in 2020.



Source: Industry Insights –Indonesia, February 2017 – Meat & Livestock Australia

Figure 5: Indonesian household income predictions

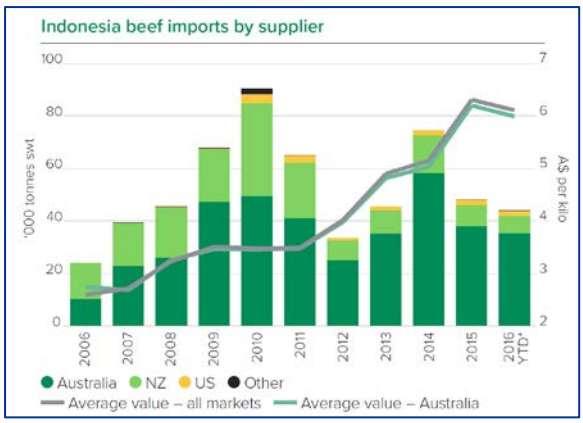
The majority of consumers in Indonesia are Muslims with beef and chicken being the proteins of choice amongst consumers. With religious adherence a key driver of consumer behaviour, the demand for beef that has been slaughtered and processed using Halal methods is likely to continue to increase.

Food security is a key priority for the Indonesian Government which is evidenced by recent Government initiatives

The Indonesian Government has made food security a key priority and aims to achieve this through self-sufficiency in a number of food commodities including beef.

Indonesia is addressing food security by:

- managing import volumes of beef and live cattle imports through an import permit system (Figure 6);
- seeking supply diversification of protein sources;
- applying weight restrictions limit on young, lighter animals destined for local feedlots; and
- trying to increase domestic herd numbers, such as introducing the "5:1 feeder-breeder" import policy.



Source: Industry Insights –Indonesia, February 2017 – Meat & Livestock Australia

Figure 6: Indonesian beef imports by supplier

Whilst self-sufficiency is a priority, projections show that this is a long-term aspiration

Indonesia is on a rapid economic growth trajectory, impacting the demand for beef and other forms of protein as its urban, middle class population is predicted to almost triple by 2020. The Indonesian Government has stated their desire for self-sufficiency in a number of commodities but projections in domestic production show that this remains a long-term aspiration and imports will continue to play a central role. For beef, this means that the government is offering special acceleration programs for artificial insemination ('Upsis Siwab'), however the effectiveness is reduced when there are limited cattle available to be inseminated and limited resources as part of the program.

A 2016 report by DBS Group Research states that by 2025, Indonesian beef demand will reach 1.045 million metric tonnes whilst domestic supply will provide just 437,675 metric tonnes.[3] Indonesia would still need to import 607,423 metric tonnes of beef or 58% of total demand.

In 2016, the majority of the country's beef imports were sourced from Australia (81%), which is a consistent trend over the past decade with Australia supplying the majority of Indonesian beef imports. The Government is looking to open up new supply chains from Mexico and sourcing buffalo meat from India. But an effective and efficient Australia to Indonesia red meat supply chain will likely continue to play a central role for some time to come.

With this context in mind, Indonesia's ability to import increasing volumes of red meat and cattle efficiently whilst striving to improve welfare standards will place pressure on the country's infrastructure and supply chain and improvements will need to be made.

Indian Buffalo has entered the market

Indonesian demand for meat protein food sources is only expected to increase, as average household incomes increase (and are doing so at an increasing rate). The most popular meats are chicken and beef (due to religious purposes) however given the price sensitivity and somewhat unpredictable supply, the frequency of consumption is intermittent.[4]

To reduce the high prices of beef, the Indonesian Government permitted ten Indian meat enterprises to import Indian Buffalo as an alternate red meat protein in August of 2016 (in frozen, boneless and de-glanded formats only).[5] Indian buffalo was intended to reduce the supply and demand gap for meat proteins, by lowering the price for red meat proteins and increasing the amount of meat available on

[3] Santoso, B. (2016) *Indonesia's Growing Appetite for Animal Protein – an overview of business models, opportunities and strategies*, DBS Asian Insights.

[4] Meat and Livestock Australia (2017) *Market Snapshot – Beef: Indonesia*, MLA Industry Insights; and Meat and Livestock Australia (2018) *Indonesia issues 100,000 tonnes of Indian buffalo meat permits*, MLA Media Release.

[5] Ainsworth, R. (2017) *SE Asia Report: Signs Indonesia is moving to cease imports of Indian Buffalo meat*, Beef Central (available online).

the market. Permits are still being issued to the market, however are capped at a total import weight 100,000 tonnes.[6]

The effect of the buffalo import permits has not been as effective as the government desired however, as red meat prices remain high across the country – middle-men are taking an additional cut and inflating the buffalo meat price to only just below that of beef (yet significantly higher than what it should be truly valued at in the market). Thus rendering the import of buffalo meat as ineffective at stabilising the price of beef.[7]

Finally, Indian buffalo comes with a heightened quarantine and health risk, as there is limited information on the drug withholding periods followed by producers in India.[8] India is also an endemic foot and mouth disease country, importing frozen products to Indonesia from India has a transmission risk associated with it (it should also be noted that the risk of transmitting the disease to Australia is also heightened by this trade).

There are significant reasons for Indonesia to continue to import, and even increase importing, cattle and beef from Australia. Not only will the produce help to facilitate a reduction in unmet demand for beef, it will also provide produce that is clean and fresh. Differentiating, and demonstrating, these qualitative aspects will be important to ensuring ongoing competiveness with Indian Buffalo.

Key insights:

While the supply of domestic beef produced in Indonesian is increasing, the rapid increase in demand accelerated by rising middle class household incomes means that self-sufficiency is a long term challenge. The importation of Indian Buffalo is an interim measure that has not had the desired effect on price. Thus the importation of Australian cattle remains a necessary and important supply chain to manage in order to supplement the supply of beef.

3.3.3 Regulation

The 5:1 feeder breeder policy is an Indonesian Government initiative

Domestically, Indonesia lacks a sufficient domestic supply of beef. This is attributed to a number of causes, including:

- rudimentary farming and agriculture techniques;
- lack of access to quality fodder and inputs;
- diseconomies of scale;
- poor logistics; and
- additional slaughter for religious purposes (e.g. Eid al-Adha).

These causes have all contributed to a decline in breeding cattle stock across the country. As the overarching, national agricultural regulatory body, the Indonesian administration implemented the 5:1 breeder policy in 2016. The policy states that for every live export permit awarded, that one female breeding cow must be imported with every 5 cows destined for feedlotting and slaughter.

However the policy has been met with negativity from some Indonesian feedlot operators because the ongoing management of Australian imported cattle has not been commercially viable. Furthermore, the

[6] Ainsworth, R. (2018) *SE Asia Report: Indo government changes mind, issues new buffalo import permits for 2018,* Beef Central (available online).

[7] Ainsworth, R. (2018) *SE Asia Report: Indo government changes mind, issues new buffalo import permits for 2018,* Beef Central (available online).

[8] Stakeholder Consultation conducted by KPMG.

economic cost of production for a feedlot steer in Australia is below the cost of production in Indonesia, where the cost of capital and operations is high and exposed to market fluctuations.[9]

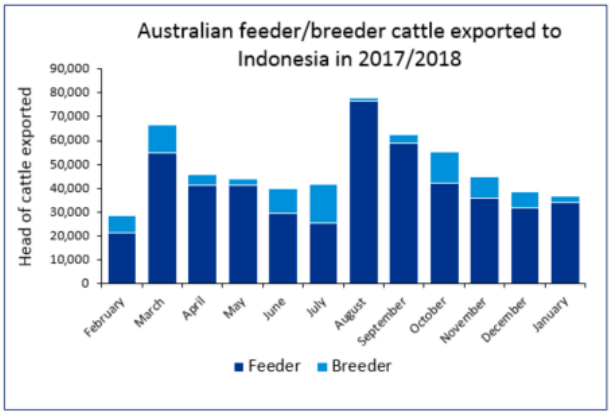


Figure 7: Australian feeder/breeder cattle exported to Indonesia in 2017/2018
Source: Industry Insights –Indonesia, February 2017 – Meat & Livestock Australia

The 5:1 policy will change the ratio of feeder and breeder cattle trading between Australia and Indonesia – as exporters have to comply with transporting additional, lower value goods as part of their cargo. At the time of writing, in the last twelve months breeder to feeder cattle have been exported to Indonesia at a ratio of 492,876 head to 15,852 head.[10] This means that for approximately every 31 feeder cattle transported, only one breeder cow has been shipped. There are implications associated with this deficit, as it may result that traders must send a ship with only breeding cattle, worth significantly less than feeders, before the 5:1 program is due to be audited for the first time at the end of 2018 to ensure compliance.

Key insights:

The 5:1 feeder breeder policy is placing pressure on feedlot operators to increase breeding stock of cattle which they are not equipped or trained to do, nor is it commercially viable from their perspective. This diminishes the effectiveness of their operations and reduces their ability to supply feeder cattle to market.

120 days feedlot

The Indonesian government requires that cattle from overseas must be kept in a local feedlot for a period of 120 days before being given leave-for-sale. The policy was introduced to ensure that the local Indonesian economy received the most benefit from the fattening of imported cattle. This however is an imposition upon the live cattle trade, as in numerous circumstances cattle are sold at discounted prices due to increased fat and carcass weight.[11]

The 120 day feedlot rule limits business opportunities to purchase heavier weighted cattle from Australia. The rule requires that animals that have already met their ideal weight for sale in the Indonesia market must still be held until the end of the 120 period. When cattle reach their ideal weight before the end of the 120 period, there are two distinct impacts. These are:

- the cattle must remain in the feedlot – and they grow too big for the Indonesian wet market; and
- the cattle are still required to be fed and watered (an unnecessary expense for prime weight cattle).[12]

[9] Stakeholder Consultation conducted by KPMG.

[10] Meat and Livestock Australia (2017), *Australian livestock exports – Monthly trade summary January 2018*, MLA Market Information.

[11] Stakeholder Consultation conducted by KPMG.

[12] Stakeholder Consultation conducted by KPMG.

Key insights:

The 120 day feedlot policy is a supply chain constraint that artificially puts heavier weighted cattle in the market place. Wet market operators find it more difficult to sell the larger carcass and it adds cost pressure in the supply chain for purchasers. Larger animals are also more difficult to transport from a logistics perspective and harder to sell due to carcass weight in the wet market.

ESCAS and LGAP

Exporter Supply Chain Assurance System (ESCAS)

The ESCAS works on the provision of four principles applied to exporters from arrival of livestock in the importing country up to point of slaughter.[13] The ESCAS system was brought in as a response to investigations and media reporting in 2011 on animal welfare and slaughter methods in the Australian live export industry.[14] The four areas covered are:

1. Animal welfare, including handling and slaughter;
2. Control through the supply chain, including transportation, management and supply;
3. Traceability; and
4. Independent audit of supply chain in the country of import is completed.[15]

The ESCAS system (as it applies to feeder cattle) needs to be in place prior to conducting live export trade; without an ESCAS, the Australian Government will not consider any other documentation that is required (including Notice of Intentions and Consignment Risk Management Plans – both of which are documents required to be approved prior to export).

The ESCAS system has limited the viability of a number of feedlots and abattoirs that have traditionally bought Australian cattle, as they do not have the scale to invest in an independent audit to certify for the Australian ESCAS.[16] The loss of these smaller facilities has not meant that economies of scale have been achieved through the larger, independently assured systems – instead the smaller abattoirs continue to function. These smaller abattoirs are less likely to invest in the ESCAS audit process, or to update their facilities, as they do not see the benefit in doing so. ESCAS has inherently created localised bottlenecks because feedlot operators cannot sell to as wider network of abbatoirs as they previously were able to which has reduced throughput of supply to market.[17]

Recent review of the ESCAS system noted that it has significantly improved welfare and traceability considerations in the live cattle supply chain, while simultaneously allowing the market to reopen quickly following the 2011 closure. However, the cost of compliance on both government and the industry is high and creates compliance costs upon the international trade of cattle costing approximately $17.6 million a year on the Australian Government and the industry.[18]

Livestock Global Assurance Program (LGAP)

LGAP is a voluntary, assurance tool used to encourage best welfare and animal handling practices that was developed in 2016 following the review of the ESCAS; it is an Australian industry led initiative and is designed to apply to livestock trade globally.

The LGAP has an additional 11 requirements on top of the four requirements of the Australian ESCAS, and is facility based - that is the regulations enforced by the program are independent of any unique

13 Department of Agriculture and Water Resources (2016), Exporter Supply Chain Assurance System – ESCAS, Australian Government, Canberra.

14 Commonwealth of Australia (2015) Exporter Supply Chain Assurance System Report, Department of Agriculture, Canberra.

15 Department of Agriculture and Water Resources (2016), Exporter Supply Chain Assurance System – ESCAS, Australian Government, Canberra.

16 Stakeholder Consultation conducted by KPMG.

17 Stakeholder Consultation conducted by KPMG.

18 Commonwealth of Australia (2015) Exporter Supply Chain Assurance System Report, Department of Agriculture, Canberra.

country-based or industry-based supply chain assessments. The LGAP draws upon global animal welfare standards, ISO standards and WTO standards.[19]

As it stands, the LGAP is not a fully functioning system to date and is still under development, however funding was committed to the project in the 2017/2018 federal budget to support future implementation.[20]

Key insights:

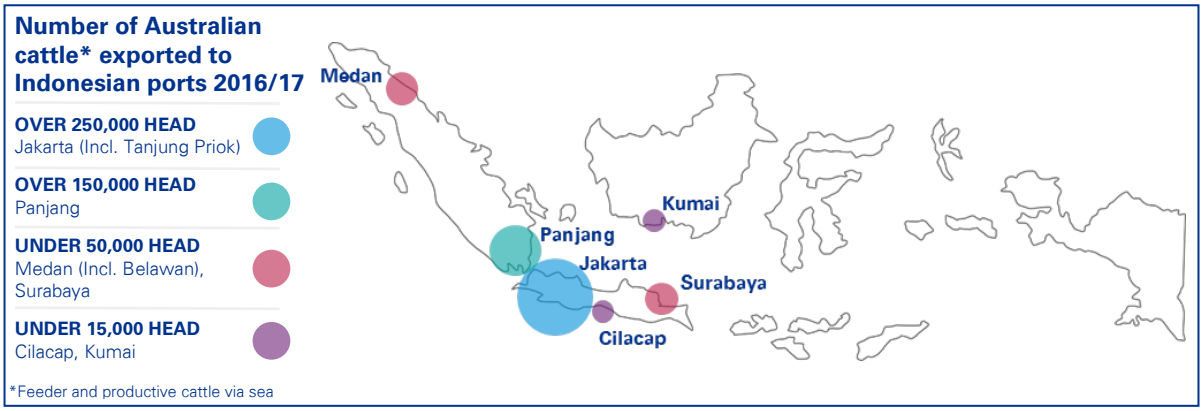
ESCAS is viewed by Indonesian feedlot operators as a "bottleneck in itself" because it has reduced the number of accredited abattoirs that feedlot operators can supply to. While the benefits for animal welfare outcomes are undisputed, compliance support needs to be given to operators within the supply chain of cattle to ensure the market can still operate effectively.

3.4 Indonesia Ports

3.4.1 Map of priority ports

A review of the current priority ports in Indonesia that handle live cattle reveals a mix of both planned and committed investment in the beef cattle market across the country. The previous Indonesian Government's 'Master Plan for the Acceleration and Expansion of Economic Development of Indonesia' (referred to as the MP3EI and to be deployed until the year 2025) and the National Logistics Blueprint (referred to as SISLOGNAS, and to be deployed until the year 2019) identified six local corridors for improvements that were designed to strengthen Indonesian market competitiveness and overall social welfare by generating a more connected and linked island logistics network. These corridors, still under development today and supported by the current government, include investments in a number of current ports (and their associated services) which are and identified future gateways for live cattle shipping.

The MP3EI and SISLOGNAS, and their identified economic corridors, represent the Government's intention to drive trade through investment in logistics infrastructure including ports. Although the number of cattle shipped could not be obtained, the cattle production regions of Indonesia are mainly located in the west of the Island archipelago. As such, those ports in western Indonesia that the MP3EI and SISLOGNAS identify in their scope as significant and requiring upgrade, will be key to overcoming the current limitations that poor facilities and high transaction costs impose upon live cattle movements and ultimately generate plausible increases in future domestic maritime cattle movement.



[19] Meat and Livestock Australia (2018) *Frequently Asked Questions – LGAP*, MLA Australia – Livestock Global Assurance Organisation.

[20] Dawkins, T (2017) *Livestock exporters welcome Federal Commitment to LGAP implementation*, Australian Live Export Council – Media Release.

In relation to the key Indonesian ports that currently handle live cattle from Australia two specific ports handled the majority of the cattle in 2016/17, located in West Java and Southern Sumatra, with smaller ports handling the remaining cattle. In this international market however, the overall lack of suitable and high quality ports and post-disembarkation infrastructure restricts the ability of cattle exporters (such as Australia) to ship to a wider variety of locations, and as such current ports used are limited. In 2016/17, the ports used for receipt of live cattle are: Belawan, Cilacap, Jakarta, Kumai, Medan, Panjang, Surabaya, Tanjung Priok. The MP3EI and SISLOGNAS, while focusing on domestic shipping for economic development do identify two specific ports that will be upgraded to receive more international goods: Kuala Tanjung and Bitung (these are detailed in Table 8). While these two ports have been identified specifically for their role in international trade there is no reason why any of the smaller ports that have been earmarked for upgrade could not also be future international receivables location too.

Overall, in reviewing the MP3EI and SISLOGNAS for ports in Indonesia that handle live cattle, both currently and possibly in the future, ports that were marked for 'food and agricultural production' were assessed only. Additionally, the current ports used by the Indonesian Government's live cattle ships (such as the Camara Nusentara and the Sabuk Nusanatara's) routes were also considered. These ports are detailed in Table 8.

Table 8: list of priority current and future ports for domestic and international cattle trade

Name of Port, Location	Comment on current use	Comment on suitability for domestic or international trade
Port of Tanjung Priok North Jakarta, Java	Currently the largest and most frequently used port for trading live cattle for both **domestic** and **international** purposes	**Exisiting Port – High Use** Should continue to be used for cattle trade, however could still benefit from efficiency and effectiveness improvements to build future trade.
Port of Tanjung Perak Surabaya, East Java	The port services the eastern parts of Indonesia and is accessed by the Madura Strait, this is a significant **domestic** and **international** port due to its centralised position and adequate cattle infrastructure	**Existing Port – High Use** Given this port acts as a gateway port already, connecting the East to the West this port will continue to be significantly used for cattle trade in the future.
Port of Panjang Lampung, Sumatra	Largest port in Sumatra, already used for the receipt and dispatch of **domestic** and **international** cattle.	**Existing Port – Moderate Use** Lampung is scoped for investment in infrastructure plans, given its central location this could be a significant port for higher trade in the future.
Kupang Port East Nusa Tenggara	A significant **domestic** exporter, currently sends stock to central and western Indonesia through Surabaya and Jakarta.	**Existing Port – Lower use** While Kupang port is used to export domestic cattle from NTT, there is a high possibility that the stated investments being made in the port will improve its ability to move cattle to the Jakarta wet markets or to high demand areas of Indonesia. It is unlikely this port will be used for international purposes due to its higher, relative, local cattle production.

Kuala Tanjung Port Sumatera	**Domestic** However, use is minimal only. Port is under construction and has been identified to open, (in stages, commencing at the end of March 2018) to be a gateway port to the rest of Indonesia and other SE Asian countries.	**Under Construction** The Indonesian government is hoping that the investment in the construction of this port is going to play a critical role in facilitating domestic cattle trade between the eastern and western Indonesia as well as for international export.
Port of Makassar Sulawesi	**Domestic** Largest seaport in Sulawesi, considered to be alongside Tanjung Prior and Tanjung Perak. Targeted expansion through the Indonesian Government's plan.	**Existing Port – Lower Use for cattle, high for other goods** Targeted as a port for development for food and agriculture, the port could be an additional hub for receiving and dispatching domestic cattle due to its central location. It is unlikely that future international cattle trade to this port will change.
Port of Bitung Sulawesi	**Domestic and International** Similar to Kuala Tanjung this port was highlighted for significant future investment and expansion. It should be noted however that its most significant trade routes are between Indonesia and the Philippines.	**Existing Port – Moderate Use** The Port of Bitung represents an international cattle trade opportunity in the future, however given its Northern location away from the Java market it is unlikely that this trade will be with Australia.
Medan, Sumatera	**Domestic and International** Currently receives a small amount of Australian cattle, and domestic trade.	**Existing Port – Low Use** It is unlikely that this port will be a major future port for international trade due to the significant investment and construction being undertaken at Kuala Tanjung domestic trade will likely remain stable.
Kumai, Central Kalimantan	**Domestic and International** Currently receives a small amount of Australian cattle, and domestic trade. Some minor works expected to be undertaken as part of the MP3EI.	**Existing Port – Low Use** Increased ship handling capacity at port may increase domestic and international trade, however it is not expected to be as significant as other ports where larger investments in upgrades are occurring. Additionally, these ports are focused on the export of palm oil as an agricultural commodity in the MP3EI, not animal trade.
Cilacap, Central Java	**Domestic and International** Small port that receives minor shipments of both domestic and international cattle. Often overlooked in favour of the larger ports on the northern side of Java that are closer to the wet markets at disembarkation.	**Existing Port – Low Use** Unlikely to be used any more or less than currently, as there are no plans for infrastructure upgrade.

Port of Lembar Lombok	**Domestic** This port is to be developed as part of the Indonesian Government's plans as an island connection point across the archipelago.	**Existing Port – Low Use** Currently, this port is not used for more than minor local stock transportation. The infrastructure upgrade may provide more scope for receipt of international cattle from Australia as well as growing the domestic market.
Marapokot Nagekeo, East Nusa Tenggara (ENT)	**Domestic** This port will be developed under the Master Plan, specifically to accommodate more animals and fish produce passing through the port.	**Existing Port – Lower Use** Given investments in this port, it is possible that international trade routes may open to this destination, however they are not expected to be high volume given the popularity of other ports and their proximity to high value wet markets. Domestically however, trade could increase significantly as farm production is high in ENT and demand for beef in other small scale neighboring island markets is still present.
Merauke, Ambon and Manokwari in West Papua	**Domestic** The Master Plan states that these ports will be significant for the movement of agricultural food products through the westernmost economic corridor of the country.	**Existing Port – Lower Use** Currently these ports do trade cattle domestically, however the volume is low. It is unlikely that investment in these ports will increase international trade within the region, due to the appeal of other ports proximal to large wet markets, however domestic trade may increase slightly.
Pelabuhan Bima, West Nusa Tenggara	**Domestic** The port at Bima is again targeted for improved flow of animals through the economic corridors by the Indonesian Government.	**Existing Port – Lower Use** Currently the port at Bima does trade cattle domestically, however the volume is low. It is unlikely that investment in these ports will increase international trade with the region, due to the appeal of other ports proximal to large wet markets, however domestic trade of cattle may increase slightly. The main purpose of the port upgrade is tourism; the increase in animal trade is only a byproduct of the increase in tourism trade.
Waingapu, Sumba, East Nusa Tenggara	**Domestic** Although not targeted for development in the Master Plan this port is used by the Indonesian Government's livestock ships currently.	**Existing Port – Lower Use** Future use is not likely to change significantly as no investments in the port infrastructure are being made.
Ende, East Nusa Tenggara	**Domestic** Although not targeted for development in the Master Plan this port is used by the Indonesian	**Existing Port – Lower Use** Future use is not likely to change

	Government's livestock ships currently.	significantly as no investments in the port infrastructure are being made.
Cirebon, Central Java	**Domestic** Although not targeted for development in the Master Plan this port is used by the Indonesian Government's livestock ships currently.	**Existing Port – Lower Use** Future use is not likely to change significantly as no investments in the port infrastructure are being made.

Key insights:

While there are several mature ports that receive large quantities of live cattle each year (internationally and domestically), there are alternative domestic ports that require consideration to expedite the domestic supply chain in Indonesia.

4 Results: Lampung

A smooth and efficient shipment arrival is a key driver of efficiency in the Australia-Indonesian cattle supply chain in regards to financial benefits, product quality, industry risk and animal welfare outcomes. KPMG assessed the supply chain between Australia and Lampung, Indonesia to examine these drivers.

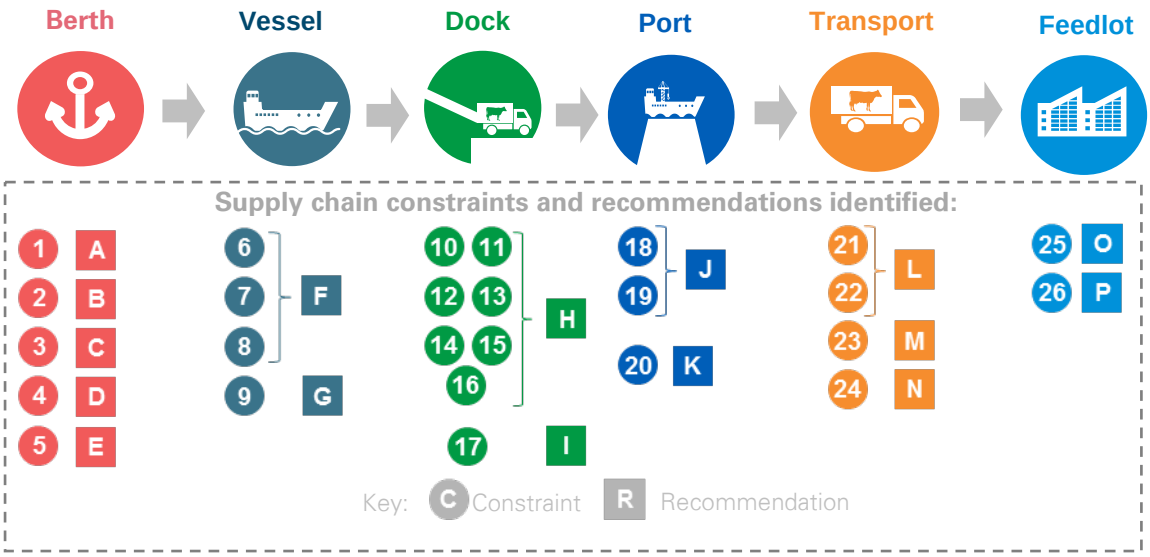
Each area has a specific set of constraints and operational challenges, a number of which have significant opportunities for improvement. The examination of these potential improvements however, needs to acknowledge the existence of fixed operational constraints, including cattle type and local resource availability.

Indonesia typically imports the *Bos Indicus* type cattle from northern Australia. This cattle type is well-suited to tropical Indonesian conditions, with a high heat and respiratory disease tolerance. However the cattle from northern Australia are typically bred on large isolated stations with minimal human contact. As such, these cattle pose unique challenges in the live cattle supply chain. The northern Australia cattle have a larger flight zone and generally a more sensitive temperament. Therefore these characteristics need to be compensated for in infrastructure design and construction quality as well as cattle management processes throughout the discharge process. Superior infrastructure would significantly benefit operator safety, and in some instances, compensate for reduced understanding of the impacts of cattle handling on product quality.

Bearing in mind shipment unloading occurs in the tropical conditions of a developing country, suggested improvements need to be compatible with what resources are feasibly available and maintained locally. Any infrastructure improvements, therefore need to be manual and simple. Incorporation of hydraulic, air-driven or motorised infrastructure, as is used through advanced cattle feedlot chains, or the general freight shipping industry are unlikely to be rewarding. In the same way, local traffic and roadways limit significant truck dimension or capacity increases.

4.1 Supply chain constraints, recommendations and costing

KPMG has assessed the supply chain and identified constraints, bottlenecks and associated opportunities in the following six key high level stages:



Berth

Berthing involves all activities regarding the arrival of a vessel into port, up until the point of discharge. The processes and activities that occur as the ship arrives at the berth point can impact the discharge of live cattle. The primary activities that have potential constraints that take place during this stage of the supply chain include:

- time spent waiting at anchor waiting for a berth;
- local pilot boarding to guide the ship to allocated berth;
- official exchange of documentation for immigration; and
- customs and quarantine.

Once these activities are complete the ship's captain can authorise the discharge to commence.

Benchmarking: Berth

- There is a well-established live cattle trade in Indonesia that imports large volumes each year. As such, the documentation and approval systems operate effectively at port; these are quicker and more cohesive than other similar local markets including Laos, Cambodia and Vietnam.
- At Panjang (the port located in Lampung), the small scale of the port simplifies berthing management compared to bigger ports which receive more international shipments.
- The lack of large tidal differences and extreme weather in Indonesia is advantageous, comparing Panjang to Australian ports.
- While documentation and approval systems are in place, and berthing management is adequate, compared to global best practice standards (see Figure 8), Indonesian ports generally fall short of expectations relating to berthing space and efficient port layout, as well as maintained roadways and supporting infrastructure.

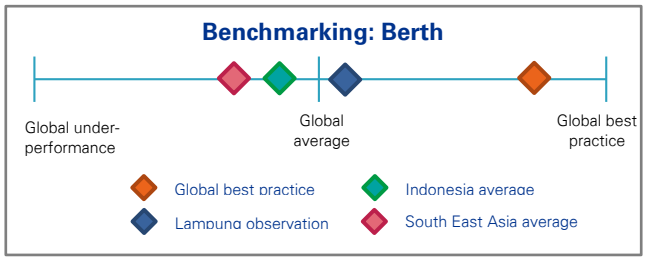


Figure 8: Berth Benchmarking, as per discussions with relevant industry subject-matter experts

Supply chain constraints and recommendations identified in relation to vessel arrival at berth are:

1 **Constraint:** Berth availability

KPMG discussed berthing delays with shipping agents, vessel operators, importers and exporters, all of whom indicated that there were rarely significant time delays encountered because "*there is an unwritten rule that livestock and passenger vessels get priority into port due to their sensitive cargo on board*".

Despite this, some delays are still encountered, due to 'unavoidable' congestion at port, leading to strains on on-board stores of feed, fresh water, ventilation and hygiene (as deck washing cannot occur). Normally, vessels make fresh water through osmosis while moving. Therefore if the vessel is at anchor for an extended period of time there is no ability to generate an

additional supply of fresh water for cattle. Additionally, the decks of the vessel cannot be cleaned to wash out soiled cattle pens due to proximity to land. Lastly, ventilation while at anchor is limited to mechanical air ventilation systems and even then, hot spots can occur due to the lack of natural air flow.

However it should be noted that KPMG observed the discharge of two vessels in Panjang Port and neither encountered berthing delays; at the time, congestion at the port appeared minimal.

Any delays that could have been encountered, due to limited berth availability, increase the time spent at anchor. While this is typically not an issue, it can still be encountered and relevant steps should be taken to minimise the effect of delays and monitor on-board conditions.

A **Recommendation:** Formalise regulations, to ensure that livestock vessels receive priority berthing over other non-perishable freight.

This recommendation will reduce any possible cattle weight loss (or mortality) associated with vessels sitting at anchor, unable to wash out soiled cattle pens and with ventilation running at sub-optimal capacity and the need to ration remaining feed. More importantly, establishing regulations will reduce the possibility of cattle trading vessels from incurring demurrages and any flow-on delays that restricts vessel turn-around time between voyages. Ships arriving could be rated on their infrastructure and holding compartments in regard to adequacy of ventilation to therefore provide a criteria for priority berthing for all possible scenarios.

Cost / benefit:

If livestock vessels are not allocated to berth as soon as they arrive at port, they may be required to anchor at sea and remain stagnant until a berth can be allocated. In these instances, the cattle require feed, mechanical ventilation will reduce and the ability to process clean water will be minimised, all of which can lead to production deficiencies and live weight losses on board. Additionally, delays at sea may incur demurrage charges for the exporter and excess feeding costs.

The below example indicates the avoided costs that can be incurred by exporters if there is a one day delay in berthing:

Ship at anchor cost for demurrage and excess feeding ($/head/day as per consultation with industry stakeholders)	**$5.75 AUD**
Ship carrying capacity (head)	**4,000**
Total cost	**$23,000 AUD**
Avoided costs if delays prevented (if 24 hour delay for a vessel)	**$23,000 AUD**

2 **Constraint:** Berth design.

Ideally livestock vessels at berth require a specific, and substantial, dock space to accommodate the full extension of the cattle discharge ramp, the discharge platform itself and to facilitate dual truck reversing. The approach to unloading cattle is different from other non-livestock freight vessels that are unloaded by crane, requiring significantly less dock width.

During the two Panjang discharges observed by KPMG, a relatively poorly spaced berth was allocated each time (less than 30m width, as can be seen in Photo 1 and Photo 2 below). This can generate problems for other vessels unloading or loading at the same port at other berths who are required to manipulate their trucks past the trucks of the current discharging cattle vessel requiring excessive manoeuvring. It should be noted though, that this process did not appear to delay total overall discharge time, it does however generate hazards.

On the other hand, there is a risk that if the speed of discharge is improved due to better berth design, that the smaller cattle trucks, and overall availability of them, may not have the requisite capacity to keep up with this discharge.

Photo 1: KPMG 2017, Panjang Port, congested dock space at discharge area

Photo 2: KPMG 2017, Panjang Port, tight turning area and congested dock space at discharge area

B

Recommendation: Formalise port Standard Operating Procedure such that livestock vessels are always allocated the most suitable berth for truck loading.

The ideal berth provides the best possible dock width to facilitate ship ramp extension, discharge platform placement and multiple truck access. Although in KPMG's observations, this may not be significantly delaying overall discharge time, it eases congestion and simplifies port traffic management.

KPMG recommends that livestock shipping companies make requests to occupy berths with more suitable truck loading facilities especially if it is known that allocated berths are typically full.

Cost / benefit:

This recommendation would decrease any direct costs related to berthing as it ensures that ships have a suitable allocation to minimise any delays caused by lack of truck maneuverability or inability to access the ship due to other loading or unloading vessels also in port. These delays can result in cattle being stuck on-board the non-moving vessel where they may be losing, not-maintaining or not improving their liveweight due to lack of food, appropriate water availability and poor ventilation.

While absolute berthing time is not a true key driver of discharge cost, given berth allocations are generally booked in 24 hour increments (i.e. an efficiency improvement from an 18 to 16 hour discharge is not a significant cost reduction motivator to exporter and importer parties), in an extreme circumstance, a discharge running past an allotted 24 hour berth time and incurring a significant demurrage charge, should generate concern.

The opportunity cost of having excessive personnel labour requirements for cattle management, to compensate for deficiencies in infrastructure at the berthing port, is relevant. Throughout discharge, the ship's crewmen work in eight hour shifts to discharge cattle; and when there is truck delays or shift change over time, they use this time to feed and water the animals still on board. If infrastructure at the berthing port were improved, man-power requirements to discharge cattle and load trucks decreases, and operator safety improves; thus it can be suggested that the crew would be better able to cater for cattle still on board and facilitate ongoing gains to (or at least maintenance of) discharge weight.

The below example indicates the avoided costs of cattle liveweight loss caused by a longer discharge process where crew would be unable to prevent losses:

Ship carrying capacity (head)	**4,000**
Number of cattle discharged (head)	**2,000**
Cattle remaining on board (head); feed and water required to maintain live-weight	**2,000**
Liveweight loss while on vessel (KG/head/12hours as per consultation with industry stakeholders)	**4kg**
Total liveweight lost (kg/remaining cattle)	**8,000**
Cattle valuation ($/kg)	**$ 3.00 AUD**
Avoided costs in liveweight loss per shipment	**$24,000 AUD**

Assumption: 50% of cattle will wait 12 hours during the discharge with limited access to feed and water, therefore subject to a conservative estimate of 1-2% liveweight loss. KPMG notes that realisation of multiple recommendations may not compound the benefits in totality.

Source: Futurebeef, Liveweight loss and recovery

3

Constraint: Pilot on board

Through discussion with shipping agents, it was anecdotally portrayed that the form of vessel used to the transport the pilot out to the anchored ship is sometimes a tug boat (a relatively slow form of transport).

In addition, KPMG was also informed that in some cases the ship owner is charged for the cost of a pilot boat, even in cases where one isn't used, as a measure of cost savings for the port authority.

In other South East Asian ports, dedicated pilot boats are utilised. These are smaller, faster boats. These are available in Panjang Port and are supposed to be used as part of standardised process, this is not always adhered to.

C

Recommendation: Review port Standard Operating Procedures to always utilise skiff (small, fast vessels) transportation to decrease any possible pilot-to-boarding delay.

The strict implementation of this standard operating procedure would eliminate process variation and ensure that pilots are transported in the most suitable vessel in the fastest possible time.

As per recommendation A and B, this will reduce any 'costs' that are incurred in relation to the ship remaining stagnant at sea longer than required (i.e. the ship can continue to produce fresh water, conduct cleaning processes and have adequate ventilation).

Cost / benefit:

There are no direct avoided costs as a result of this recommendation, however the standardisation of operating procedures, and adherence to them, will be improved.

Any cost savings attributable to reduced vessel stagnation at sea, and inability to unload cattle, has been provided for previous recommendations.

4 **Constraint:** Quarantine and customs process variation

The process of customs approval to allow unloading of shipments has historically been an issue in Indonesian ports. KPMG observed no issues with this process during the observation of the two discharges at Lampung though.

As per discussion with shipping agents that have extensive experience with the customs process, KPMG was informed that overall there is no indication whether the customs process will be "easy" or "difficult". It was also noted that in some instances 'easy customs clearance' is allowed when officers do not even board the vessel and instead provide automatic clearance. Other factors which may influence officer decisions include the time of day or even their mood.

Custom officials classify vessels as "red line" or "green line" upon port entry which dictates the level of documentation that is to be provided and inspections to be performed. Red line classifications are generally reserved for vessels new to the country, or are importing new products. Only two vessels had been classified as red line in 2017 (at the time of writing) so the frequency is low.

However it should be noted, that given the unpredictability of customs officers noted in the anecdotal evidence, it is possible that future livestock ships are classified as 'red line'. Accordingly all precautions need to be made to ensure that the processes undertaken upon red line classification do not take an excessive amount of time and do not impact on the liveweight maintenance of cattle on board or their welfare.

Photo 3: KPMG 2017, Quarantine and Customs process

D **Recommendation:** Review the quarantine and customs Standard Operating Procedure to ensure processes are consistent and optimised

Importers and exporters with strong local contacts and experience report few issues with obtaining customs and quarantine approval; rather this recommendation relates to ensuring standardisation of these procedures to limit possible variation between ports and individuals involved (i.e. ensuring that personal relationships, time of day, and the character of the officers presiding over the procedure are not affecting decisions).

This will eliminate any variations in decision making and give greater transparency to the importer and exporter about standard, required documentation and preferred presentation methods and thus aid in obtaining customs approval and allowing unloading of vessels to commence as quickly as possible.

It is recommended that to mitigate any delays caused by quarantine and customs that digitally enabled standard operating procedures be introduced. Technology that automatically approves port access based on the ship being able ably to digitally demonstrate all requirements will ensure that the process of obtaining clearance to access the port is smooth and hasty. This could be in the form of tech-enabled data monitoring (e.g. using data loggers to verify temperatures on board for air quality assessment) and over-the-internet information transfer and submission where possible. This would reduce the amount of physical inspection required and minimise the need to complete literal paperwork.

Cost / benefit:

Avoiding delays caused by customs and quarantine processes can reduce any stagnation of the vessel at sea, and the associated issues presented in recommendation B related to delays at berth where there is direct cost savings from introducing standardised procedures and can lead to expedition in unloading of cattle.

The use of technology to transfer requisite information to port facilitates a ship's ability to obtain customs and quarantine approval and would increase the speed at which vessels are permitted port access, mitigating the associated costs related to inability to berth.

5 **Constraint:** Administration

The paper work required for each shipment is excessive and needs manual processing before livestock cargo can enter and leave a port. This is typically a slow process due to the multitude of languages, laws and organisations involved.

KPMG observed what appeared to be an excess of administrative procedures undertaken to obtain berth access at port. In an observed situation, a total of 22 documents were required during the customs clearance process before discharge was granted (see Photo 4); each of these documents had to be sighted by port authority officials in either original format or as a copy.

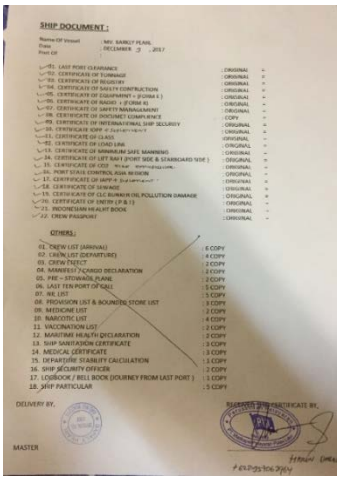


Photo 4: KPMG 2017, checklist of documents required

E **Recommendation:** Digitisation and simplification of administrative tasks to drive efficiencies

The digitisation and storage of records, particularly information that remains unchanged between port visits, should be adopted. For example, the 'class' of a vessel will not change throughout the vessel's life, so there should be no need for this information to be sighted manually at every attempt to gain berth access in port.

For information that does change with each port access request, this data could be provided to port officials digitally and significantly prior to the vessels arrival at port. This would allow the vessel, if cleared, immediate access to an available berth at port upon arrival instead of requiring it to be anchored at sea and the hard original and copy versions of documents provided to port officials. If any issues were identified from this digitally-provided information, they could be addressed prior to the ships arrival at sea, reducing any possible delays and the chance of the vessel incurring demurrage. One viable option to enable the digital processing of documentation is blockchain. Blockchain is the electronic ledger system that allows transactions to be verified autonomously. As per the World Economic Forum, blockchain will

benefit shipping, together with improving communications and border administration, and feasibly generate an additional USD $1 trillion (AUD $1.3 trillion) in global trade.

Cost / benefit:

Reducing delays caused by paper-based customs and quarantine processes can reduce stagnation of the vessel at sea, and the associated costings presented in previous recommendations (i.e. cattle weight loss due to delays), and can lead to expedition of berth and eventual unloading of cattle.

Vessel

During discharge, internal and external unloading infrastructure (internal gates, the ship's unload ramp and port-side structures) are set-up and cattle unloading commences, truck by truck. If there are any delays in this set-up process, or the infrastructure underperforms, this can have a significant impact on the discharging process.

Whilst observing this process KPMG found minor inefficiencies in this setup with informal, ad hoc procedures in place; staff both on-board the vessel and port-side worked together to establish the infrastructure setup as efficiently as possible, however design functionality, manoeuvrability and operation of equipment could still be improved.

Benchmarking: Vessel

Australia is the major cattle supplier to South East Asia and as such Australian Maritime Safety Authority (AMSA) laws largely govern the standard for livestock shipping in the region. Australia's strict requirements mean that international shipments originating from Australian ports have significantly higher benchmarks in terms of on-board cattle density, on-board morbidity experienced, on-board mortality rates and overall cattle performance upon arrival, (especially in comparison to ships operating in South America or the Middle East).

Even AMSA accredited vessels have potential for improvement, particularly in regards to movement infrastructure, where a significant gap in design and functionality exists. If an ideal best practice for handling facilities in livestock vessels is compared to global best practice cattle processing yards (see Figure 9), livestock vessels significantly underperform. Lack of purpose-designed cattle throughput facilities is the key issue, crews are consistently forced to compensate for design shortfalls with ad-hoc panels and ropes and excessive persuasion methods.

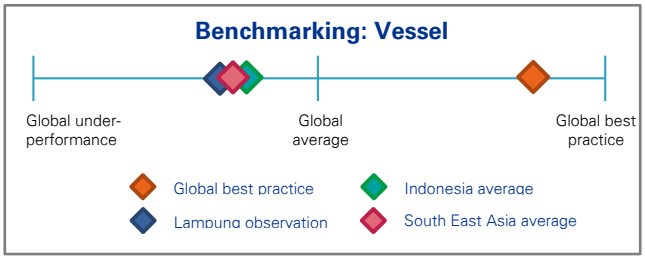


Figure 9: Vessel benchmarking, as per discussions with relevant industry subject-matter experts.

The major supply chain constraints and recommendations identified during the discharge in relation to the vessel are:

6 **Constraint:** Infrastructure of internal ship unload point

The infrastructure at the ship's internal unload point is a key driver of end-product quality as every animal moves through this central area. Although the unload point is structured purposefully, KPMG observed a reliance on make-shift wood, ropes and panels to compensate for deficiencies in ship design and facility short-comings (see Photo 7, Photo 8 and Photo 9). While this adequately allowed the unloading of the vessel (or loading when collecting cattle, assuming the same structures are used) in acceptable timeframes, few measures were in place to minimise cattle stress or injury risks which can impact upon the quality of the final delivered meat product following slaughter where a sub-clinical injury has occurred.

It is well known in the industry that cattle move best through obtuse angles or curved facilities. On vessels however, square and right angles are used across deck pens to maximise the use of available space (see Photo 5 and Photo 6). The current designs do not provide cattle with clear direction to use their natural instincts to follow one another. This leads to stress, baulking, slips and attempts to turn around which can cause injury to the cattle. Also, should the flow of cattle cease, it is difficult to restart cattle movement due to excessive physical and visual distractions. These facilities need to be designed with an ability to modify or move these pen and gate structures once at port to allow for better load/unload that facilitates cattle flow and minimise stress.

KPMG does acknowledge that this infrastructure is supplied and operated by the vessel owner.

Photo 5: KPMG 2017, internal ship raceway with insufficient shrouding

Photo 6: KPMG 2017, internal ship raceway with ad-hoc joinery rope use

Photo 7: KPMG 2017, internal ship raceway with temporary barrier joined by rope

Photo 8: KPMG 2017, internal ship raceway with sharp protruding hinges

Photo 9: KPMG 2017, internal ship raceway with insufficient shrouding and angled design

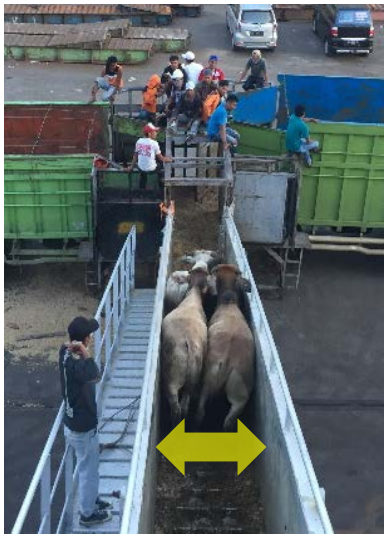


Photo 10: KPMG 2017, excessive width of vessel exit ramp

7 **Constraint:** Raceway and exit ramp width

As with the internal ship load-out point, the ship ramp is a key efficiency driver, as every animal moves over through this point. It is also where cattle are first faced with completely new surrounds and can be easily distracted by excessive stimulation.

The raceway and ramp width were observed to be too wide, allowing distracted cattle to baulk, turn and at times fall. Once an animal has turned, their natural instincts lead them to burrow back into oncoming cattle causing unload delays, stress and potential injury. The excessively wide ramps on the two observed vessels allowed cattle to forcefully push past one another during the discharge at Lampung, this can cause increased muscle bruising, injury and at times momentary jams (see Photo 10, above).

Throughout Australia and the US, cattle raceways range between 630mm - 760mm wide, with the average approximately 700mm. On the majority of livestock vessels, cattle ramps and raceways range from 760mm -1000 mm allowing for unwanted turning space.

Again, KPMG notes that this infrastructure is supplied by the vessel owner and operated by the importer and exporter.

8 **Constraint:** Ramp wall height

Inadequate ramp wall height allows cattle to view surrounding operational activity and become easily distracted (see Photo 11). The exposure to surrounding activity increases the likelihood of baulks, turns and the associated risk of a fractious animal attempting to jump over the ramp wall itself, this can cause the animal serious and significant injury.

Photo 11: KPMG 2017, ramp wall height allow cattle to see over

KPMG observed two discharge ramps in operation. While neither ramp compared to the taller and narrower design configurations used in Australia, Vessel A's discharge ramp did have a better flow rate of cattle and considerably less stress was observed in the cattle due to the more suitable specifications (see Figure 10).

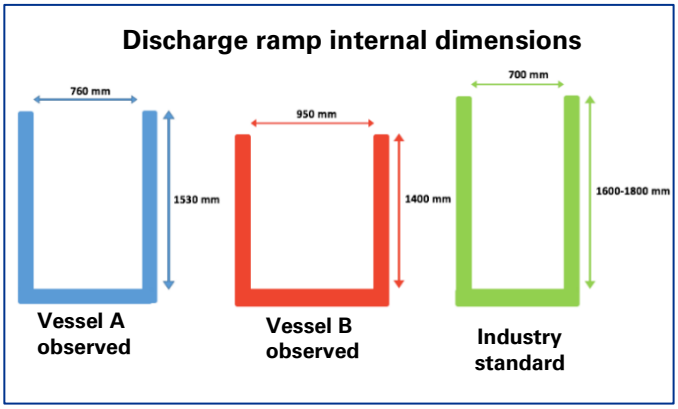


Figure 10: Dimensions of the discharge ramp used for the two Panjang discharges and comparable industry standard

As per Figure 11, KPMG observed and recorded a sample of 100 cattle at three different times on the raceway ramp during the discharge process. Issues recorded in this observation included slips, falls, turn arounds and baulks.

The data indicated that during night time conditions with minimal light to draw the attention of cattle to distractions, the rate of issues encountered was low. The samples recorded during daylight hours indicate an increased rate of 24 per cent of cattle experiencing issues during the discharge process down the raceway. These findings demonstrate that with reduced distractions (i.e. less visual stimulus at night) and with the right visual stimulation prevention methods, cattle slip, fall, turn around and baulks will reduce.

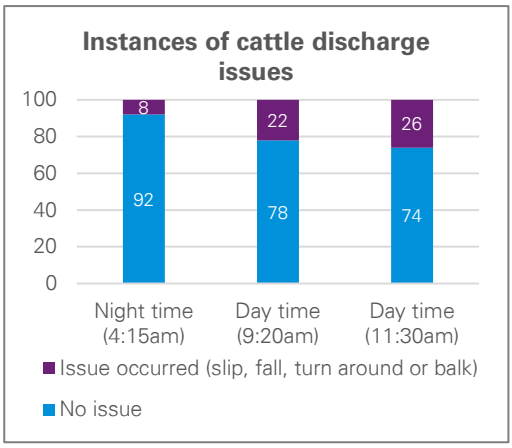


Figure 11: KPMG data recording discharge issues encountered by cattle

F

Recommendation: Modify internal vessel load/unload point design

KPMG recommends a specialised livestock consultant be engaged to overhaul cattle ship design and in particular the internal load and unload points on the vessel. Their focus would be on facilitating natural cattle flow, shrouding, appropriate race and ramp width (maximum of 700mm), customised fittings and finally, portability so as to not lose pen space during travel. These design improvements should also focus on the ship ramp way including customised junction fittings, adequate dimensions (internal wall height of at least 1600-1800mm and internal width 700mm) and shrouding.

To best capture the advancements in cattle handling infrastructure from leading global feedlots and working yards, it will be important to capitalise upon quality and innovation expertise from the feedlotting sector, to successfully adapt their key design sentiments to the unique shipboard environment. This recommendation should aim to produce a series of design standards appropriate for implementation across all livestock vessels. Lobbying of the Australian Government to modify the AMSA regulations to specifically include and mandate the above design standards is essential. At the time of writing a government review of ASEL was in progress.

The 'Best practice guide for the transport of cattle in Indonesia' (pg.26, July 2017, DAWR) outlines additional detail regarding best practice design standards.

Cost / benefit:

The below example indicates the avoided costs of cattle liveweight loss if there is a more effective discharge process supported by improved infrastructure:

Ship carrying capacity (head)	**4,000**
Number of cattle discharged (head)	**2,000**
Cattle remaining on board (head); feed and water required to maintain live-weight	***2,000***
Liveweight loss while on vessel (KG/head/12hours as per consultation with industry stakeholders)	**4kg**
Total liveweight lost (kg/remaining cattle)	**8,000**
Cattle valuation ($/kg)	**$ 3.00 AUD**
Avoided costs in liveweight loss per shipment	**$24,000 AUD**

Assumption: 50% of cattle will wait 12 hours during the discharge with limited access to feed and water, therefore subject to a conservative estimate of 1-2% liveweight loss. KPMG notes that realisation of multiple recommendations may not compound the benefits in totality.

Source: Futurebeef, Liveweight loss and recovery

9 **Constraint:** Inconsistent discharge flow rate

Infrastructure deficiencies, at unloading, reduced the flow rate of cattle to a point that the crew were required to use excessive persuasion measures to move cattle out of the vessel, this can cause cattle stress and overwork the limited stock crew. The inconsistencies in flow rate and the additional cattle handling required is demonstrated in Figure 12- which shows the number of cattle discharged at 30 minute intervals - there was variation ranging from 245 head to 40 head per 30 minute period.

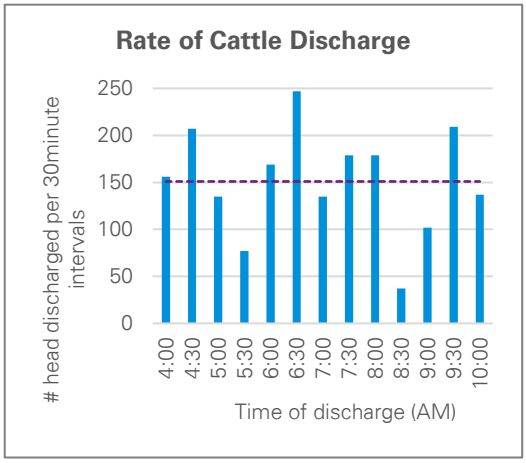


Figure 12: Flow rate of cattle discharge during KPMG observation in Panjang

Discussion with stockmen on board the vessel confirmed that assistance (in the form of additional labour) would enable greater efficiency during discharge, reducing stockman fatigue during the 8-24 hour unloading and improve consistency of cattle flow rates per hour.

G **Recommendation:** Training of specialised Indonesian stock handlers with ship-board experience to assist stock crew during discharge.

KPMG recommends the training of specialised Indonesian stock handlers with ship-board experience to board vessels during discharge and aid the stock crew with unloading cattle at a consistent and high cattle unloading rate.

This recommendation aims to ease the currently high labour demands on the limited ship crew, and free up vessel personnel to continue feeding processes throughout discharge, improving subsequent cattle performance and minimising liveweight losses.

This recommendation would also assist in easing communication barriers that exist between the predominately Philippine vessel crews and Indonesian importer staff and stevedores.

Cost / benefit:

If improvements can be made to the average discharge rate per hour, and any additional demurrage charges avoided at port, savings are possible.

Ship at berth cost for demurrage and excess feeding ($/head/day as per consultation with industry stakeholders)	**$5.75 AUD**
Ship carrying capacity (head)	**4,000**
Total cost	**$23,000 AUD**
Avoided costs if delays prevented (if 24 hour delay for a vessel which exceeds its allocated berthing time)	**$23,000 AUD**

KPMG notes that realisation of multiple recommendations may not compound the benefits in totality.

KPMG has not assessed the cost of training but notes that significant financial and non-financial benefits exist from improved cattle handling, i.e. reduced labour costs.

Dock

Once approval to discharge is granted by the Captain (following the passing of customs and quarantine procedures, the allocation of a berth and the setup of unload infrastructure such as the ramp and discharge platform) cattle unloading commences to trucks waiting on the dock. The design and infrastructure of facilities and the process used to unload cattle onto the dock is important to ensure that discharge is efficient and animal welfare considerations are adhered to.

Benchmarking: Dock

In Lampung, the discharge infrastructure (mainly the discharge platform itself) and process is superior to other comparable South East Asian markets (see Figure 13); it has moderately better functionality and structural quality.

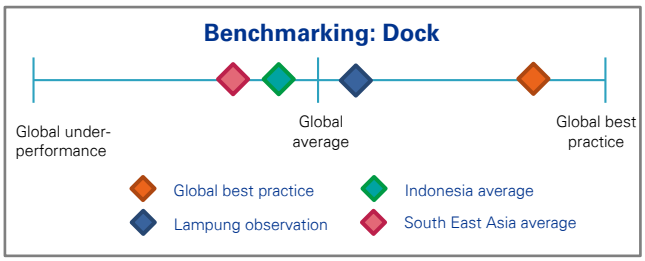


Figure 13: Dock benchmarking, as per discussions with relevant industry subject-matter experts

Yet, compared to other major ports and global best practice there are still some key shortfalls in Lampung, including:

- poor human-use of discharge platform due to design flaws (personnel operating in inappropriate locations, directly in cattle line-of-sight);
- poor infrastructure fabrication and ongoing maintenance (including steel gauge, finish and lack of regular maintenance); and
- the skillset of the personnel cattle handling through the raceway, onto the discharge platform and onto the unload trucks, is potentially causing downstream impacts, due to cattle handling, on overall product quality.

Other platforms that are used globally can be seen in Photo 12, Photo 13 and Photo 14)

Photo 12: KPMG 2016, discharge platform in Vietnam

Photo 13: KPMG 2016, discharge platform in China

Photo 14: In stark comparison, the discharge platform used to load livestock vessels in Australia are large scale, well-maintained and designed around operator position, safety and cattle flow.

The major supply chain constraints identified during the discharge in relation to the dock infrastructure are:

10 **Constraint:** Discharge platform shrouding

Inadequate internal shrouding (metal sheeting) allows cattle to see out of the discharge platform and become distracted; distractions can cause cattle to injure themselves by banging against the shrouding resulting in increased bruising. Additionally, the fence-like structure of the platform creates holes for the cattle's legs to protrude through, possibly causing injury.

The poor shrouding and the risk of leg bruising was observed to be overcome with saw dust cushioning to minimise the ability of cattle legs to slide through the shrouding (see Photo 15, Photo 16.and Photo 17)

Photo 15: KPMG 2017, inadequate shrouding on the discharge platform

Photo 16: KPMG 2017, inadequate shrouding on the discharge platform

Photo 17: KPMG 2017, inadequate shrouding on the discharge platform

11 **Constraint:** Discharge platform junction fitting.

Poor junction fittings between the ship ramp and discharge platform and between the discharge platform and the unloading truck. To compensate, gate panels and plywood were seen to be roped into place (Photo 18 and Photo 19). Additionally, inconsistency between the surface areas on the ship, down the race and onto the discharge platform creates visual distractions for cattle, as well as the gaps in the shrouding. Additionally, the strength and integrity of the discharge platform is also reduced with the increased risk of cattle or personnel injury (Photo 19).

Due to changes in ramp height as a result of tidal movements, the ramp needs to be adjusted at regular intervals throughout the discharge. However, KPMG note that the discharge platform is supplied by the port or importer and operated by stevedores.

Photo 18: KPMG 2017, lack of discharge platform junction fitting and ad-hoc rope use allowing potential leg gaps

Photo 19: KPMG 2017, lack of discharge platform junction fitting allowing potential leg gaps

Photo 20: KPMG 2017, lack of discharge platform junction fitting and ad-hoc rope use allowing potential gaps in discharge platform structure through which legs may slip

12 **Constraint:** Truck positioning

The discharge platform is a key piece of equipment in the discharge process, providing the function of filtering and directing the desired number of cattle from the ships' ramp onto the two trucks awaiting discharge. The ability of the ramp to accommodate two trucks does generate some efficiencies.

The angle of the trucks at the bottom of the ramp is at 90 degrees to the offloading ramp. This positioning forces cattle to navigate tighter corners and increases the likelihood of slips and falls, causing injury that can damage meat quality.

Additionally, the trucks lower their back doors onto the discharge platform to accept cattle; however the doors are often slippery and this can create a trip hazard for cattle.

KPMG notes that the discharge platform is supplied by the port authority operated by the stevedores; so the ship's personnel may not have much control over the discharge ramps' positioning alongside the trucks.

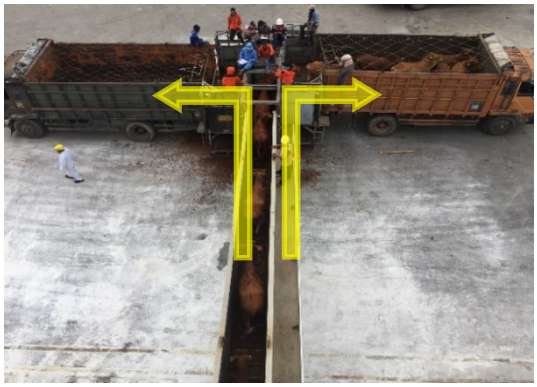


Photo 21: KPMG 2017, truck position at discharge platform

13 **Constraint:** Poor manoeuvrability of discharge platform

The discharge platform is a large, metal structure that has significant evidence of wear and tear from use. This combined with the lack of wheels on the platform means a forklift is required to alter its position, which can create time delays when forklifts are in high demand across the various berths at the dock and is compounded due to tidal changes requiring regular platform adjustments. The lack of wheels on the platform means that it cannot be shifted small distances as the tide changes (see Photo 21).

KPMG observed, that during one of the discharge events, a 42 minute delay where unloading of cattle was paused temporarily to await a repositioning of the platform by a forklift.

KPMG note that the discharge platform is supplied by the port and operated by stevedores.

Photo 22: KPMG 2017, discharge platform being moved by a forklift during setup

14 **Constraint:** Ad-hoc wooden panel and rope was used to 'modify' the platform structure.

It was observed that a number of ad hoc modifications have been made to the discharge platform using wooden panels and ropes; these reduce the structure's integrity and also add to cattle distraction, cause baulking or making cattle u-turn (Photo 23 and Photo 24). The modifications also reduce the functionality of any moving parts on the platform.

Photo 23: KPMG 2017, ad-hoc rope use and wooden modifications on the discharge platform

Photo 24: KPMG 2017, ad-hoc rope use and wooden modifications on the discharge platform

Photo 25: KPMG 2017, ad-hoc rope use and wooden modifications on the discharge platform

15 **Constraint:** Lack of non-slip flooring.

There was a lack of non-slip flooring along a majority of the discharge infrastructure – attempts to minimise slipperiness with saw dust have been ineffective with cattle still being observed to trip or slip.

Photo 26 shows evidence of how substitute non-slip flooring has been used in attempts to provide some grip for oncoming cattle; as discharge progresses however, the saw dust had largely leaked through the shrouding on the edge of the platform creating an inadequate floor for suitable footholds. The slippery flooring can cause falls, resulting in unloading delays and can cause sub-clinical injuries that may reduce market prices received.

Photo 26: KPMG 2017, lack of non-slip flooring

16 **Constraint:** Truck height in comparison to discharge platform.

KPMG observed that operators could not adjust the height of the discharge platform to be compatible to the height of the various types of trucks being loaded. This issue was observed irregularly however (one percent of trucks observed), and was rectified by chocking the tyres of the smaller trucks to lift the height to match the discharge platform being used (Photo 27).

This constraint could be remedied by having a small ramp board or causeway structure, hinged to the discharge platform, which could meet any unique height of a truck allowing any variations between the two structures to be overcome.

Photo 27: KPMG 2017, truck height adjustment using wood under tyres

H

Recommendation: a full design overhaul of the discharge platform designed by a specialised cattle facility engineer is required.

In the case of dock operations, design overhaul should focus on both operation and functionality. The inappropriate positioning of staff on or adjacent to the platform is a key deterrent to cattle flowing smoothly down the ramp raceway during discharge. Measures to ensure that cattle cannot see operational staff throughout this process will significantly increase cattle flow and decrease overall discharge time.

The structure of the platform itself was observed to pose safety risks, is unsafe and not designed to meet the specific needs of cattle as they move down the ramp race. Cattle are distracted by poor shrouding, rope and metal ties used to adjust and modify the platform and finally, are exposed to slip risks due to uneven or shiny surfaces not being adequately accounted for. The resulting effect of this non-suitable structure is delayed unloading and the possibility of both clinical and sub-clinical injuries.

KPMG recommends that an external advisor be appointed to help design and build a more suitable, functional and safe structure that meets international standards for both port function and animal welfare. There is a risk of poor industry perception of poor animal welfare outcomes, in conjunction with high levels of reported personnel injury that is linked to poor infrastructure and cattle handling; these need to be addressed to ensure that the economic value of the industry is not deflated.

In addition to engaging an advisor, KPMG recommends that design standards be specified to ensure that there is a consistent baseline standard for live cattle discharging platforms that ensures both quality and longevity of use.

Finally, KPMG recommends that the optimised discharge platform should be constructed from heavy-duty, high alloy materials and by skilled labourers to ensure that the output is appropriate. In the case of the Lampung port, it may be required that the discharge platform be made 'off-site' by a more suitable provider.

Cost / benefit:

The major supply chain risks identified at Lampung all focus on poor infrastructure affecting cattle movement. Stress and sub-clinical injury all significantly impact on adaption periods, future handling ability and individual weight gain performance as well as end-product quality. When considering this across large scale shipments of cattle, losses can be of significant dollar value.

Broad minor level injuries (bruising, scrapes, strains) that effect immediate future performance but are not significant enough to require veterinary intervention are still significant contributors to economic loss.

Ship carrying capacity (head)	**4,000**
Handling incidents (16 per cent of all cattle)	**640**
Recovery days required	**10**
Total recovery days	**6,400**
Average daily weight gain (500 grams)	**0.5**
Cattle Valuation ($/kg)	**3.00 AUD**
Avoided liveweight gain per shipment	**$ 9,600 AUD**

For more significant injuries, requiring veterinary treatment, this equates to not only a loss of daily liveweight gain but also is a cost in relation to the veterinary care that is required; and in severe incidents, death.

KPMG has consulted with Australian rural industry metal fabricators about the design specifications and the cost of a new cattle discharge platform with a focus on increased operator safety, operator position, cattle flow and cattle welfare.

The discharge platform concept:

- To provide a safe mobile facility to direct cattle from a single file ramp onto awaiting trucks;
- To allow for cattle to be blocked before entry;
- To allow any truck doors to be fully closed before pulling away;
- To allow line of sight of the cattle for counting;
- To limit cattle's vision of outside operations;
- To eliminate leg traps;
- To provide non slip flooring in conjunction with sawdust;
- To position operators away from directly in front of cattle;
- To give the ability to remotely switch between trucks; and
- To operate manually.

Mobility:

- Ability to be moved with tow hitch / tow ball;
- Ability to be lifted by forklift;
- Ability to be lifted by crane; and
- Wheels that allow mobility to allow for movement with tides during discharge.

Truck Fitting:

- Must accommodate any rear truck door configuration;
- Adjustable to range in truck loading heights (1000-1400mm);
- Adjustable to a range of truck rear widths; and
- Must have self-aligning bumpers.

Ramp Attachment:

- Attach to a range of ramp widths and heights; and
- Provide least amount of gaps possible at ramp junction and allow for tide changes at junction points.

Lighting:

- Mounting for lighting for both operator and cattle visibility.

Weight and Size:

- Consideration in design to achieve a strong but low weight facility; and
- Ability to fold or reduce size is an advantage for storage.

Operator Position:

- Designated area designated for operators of gates and counters (4 people);
- Positioning that does not distract cattle;
- Give good vision of cattle to allow counting; and
- Have seating and shade for operators.

Construction:

- Be constructed to with-stand some abuse;
- Galvanised to withstand salt (Costal conditions);
- Provide a safe mobile facility to direct cattle from a single file rampway onto awaiting trucks;

- Allow for cattle to be blocked before entry;
- Allow any truck doors to be fully closed before pulling away;
- Give good vision of the cattle for counting;
- Limit cattle's vision of outside operations;
- Eliminate leg traps;
- Provide non slip flooring in conjunction with sawdust;
- Position operators out from directly in front of cattle;
- Ability to remotely switch between trucks; and
- Be of manual nature entirely.

Mobility:
- Ability to be moved with tow hitch / tow ball
- Ability to be lifted by forklift
- Ability to be lifted by crane
- Wheels / mobility to allow for movement with tides

Truck Fitting:
- Accommodate any rear truck door configuration;
- Adjustable to range in truck loading heights (~1000-1400);
- Adjustable to a range of truck rear widths; and
- Have self-aligning bumpers.

Ramp Attachment:
- Fasten to a range of ramp widths and heights; and
- Provide least amount of gaps possible at ramp junction and allow for tide changes to junction.

Lighting:
- Mounting for lighting for both operator and cattle.

Weight and Size:
- Consideration in design to achieve a strong but weight conscious facility; and
- Ability to fold or reduce size an advantage for storage.

Operator Position:
- Area designated for operators of gates and counters (4 people);
- Be positioned to not distract cattle;
- Give good vision of cattle to allow counting; and
- Have seating and shade for operators.

Construction:
- Be constructed to withstand some abuse; and
- Galvanised to withstand effect of salt corrosion (costal conditions).

KPMG has discussed the production of existing unloading ramps which have a similar degree of engineering and purpose to what is required to achieve the scope of the above discharge platform. As per discussion, it can be estimated that a discharge platform would cost approximately $25,000-40,000 AUD to design, engineer and manufacture. It would also be appropriate for there to be two discharge platforms available at the port for when there are multiple discharges occurring at the same time.

17 **Constraint:** operator positioning

KPMG observed that at the bottom of the major control point in front of oncoming cattle it was common for discharge personnel to sit atop the discharge platform to count cattle being loaded into trucks. This count was being performed by the importer, a representative of the exporter and the shipping agent to ensure that the count was equated across all three parties and to control the number of cattle being loaded into each truck. During one unloading, a total of 14 people were situated atop and around the platform (see Photo 30) in the direct line of sight of the cattle exiting the vessel.

Photo 28: KPMG 2017, poor operator positioning at discharge point

Additionally, KPMG observed poor operator working positions; the discharge platform consisted of single wood planks wired into place for truck drivers and doormen to stand on, as well as acting as an emergency exit step should animal become fractious (see Photo 28 and Photo 29).

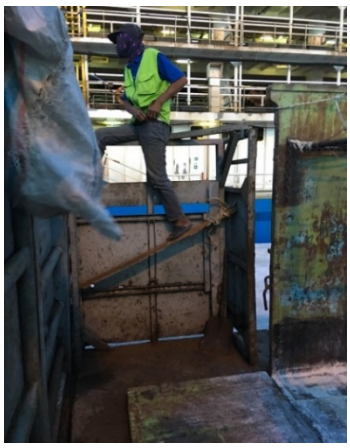


Photo 29: KPMG 2017, poor operator working positioning at discharge point

Photo 30: KPMG 2017, poor operator positioning at discharge point

I **Recommendation:** alter the design of the discharge platform so handling personnel cannot be seen by unloading cattle.

It is common knowledge within industry that cattle have a flight zone which is activated by human interaction; sitting in front of this flight zone causes cattle to baulk, flow intermittently or attempt to u-turn in the race; this causes cattle stress and in some instances can be injurious. A visual barrier separating these people from the line of sight of the cattle is a simple method of prevention that can be adopted to minimise cattle flow disruption.

KPMG note that this recommendation would be incorporated in the redesigned discharge platform in recommendation H.

Cost / benefit:

As per the costing for constraints 10 - 17, clinical and subclinical injuries can result in both delayed liveweight gain and in decreased price paid at the wet-market. Additional veterinary costs, or in severe cases - death, may be incurred for more significant injuries as a result of poor operations at the discharge platform. No additional costs have been provided given these have already been accounted for in previous recommendations.

Port

Infrastructure at the port facility itself is not directly related to the vessel discharge infrastructure at the dock and berthing point. Similar to the dock and berth infrastructure causing delays, poor port infrastructure (in both type and quality) can also cause delays or inefficiencies in the transportation of cattle to their final destination (see Photo 31). Once cattle are loaded onto each truck, it is protocol that trucks are weighed before exiting the port. The weighbridge operates as 'tare in' on truck entry to the port and 'tare out' on truck departure. The weighbridge is a shared facility however weighing is not restricted to live animals, the majority of commodities coming on and off ships are weighed both into and out of the port.

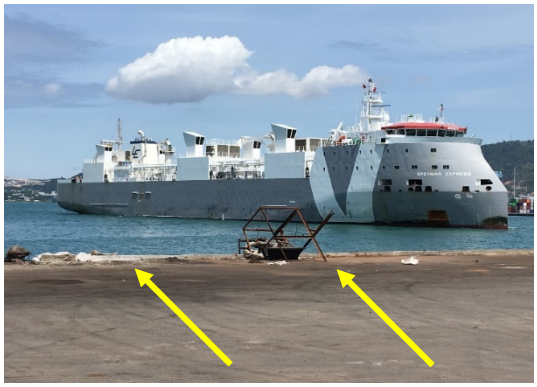


Photo 31: KPMG 2017, vessel entering Lampung port, note poor port quality and infrastructure, debris left on port from previous unloading

Benchmarking: Port

The port facilities and weighbridge functionality at Lamping is similar to other South East Asian markets. Key shortfalls common across all these destinations however, including Indonesia, are efficiency, overall construction quality and a poor record of minimal ongoing maintenance to road surfaces, machinery and equipment.

In comparison to the organisation and repair of developed ports internationally, for example Australia, the port weighbridge capacity and efficiency is significantly more suited to the port (e.g. in Australia the weighbridges can handle unloading from road-trains).

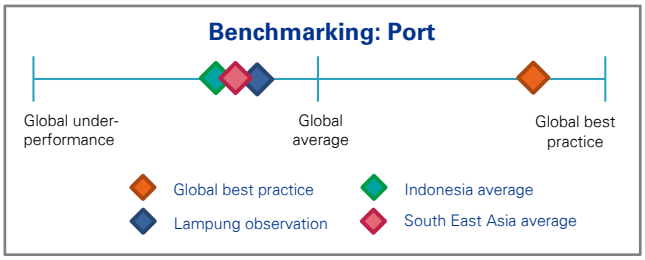


Figure 14: Port benchmarking, as per discussions with relevant industry subject-matter experts

The major supply chain constraints identified in relation to the port are:

18 **Constraint:** Weighbridge delays and queuing

KPMG observed a high demand for the use of the two weighbridges at the port of Lampung. During discharge a queue time of up to 40 minutes for loaded cattle trucks was common.

KPMG spoke with a number of truck drivers who commented that the current 45 minute average delay was only moderate and in other instances the drivers were made to wait up to two hours to use the weighbridge during peak periods.

Photo 32: KPMG 2017, Trucks loaded with cattle in queue waiting for use of the weigh bridge

19 **Constraint:** Non-functioning weighbridge

While there were two weighbridges at Lampung, only one of those weighbridges was seen to be working; and the broken bridge had been reported as damaged more than three months ago. This is a high risk situation, as there is no additional back-up weighbridge should this facility break down too or require maintenance (see Photo 33). Having only one facility concentrates use on that particular weighbridge, increasing wear and tear on the machine itself and on the roadway infrastructure (e.g. may create more potholes, cracks in the road and cause traffic build up).

Photo 33: KPMG 2017, two weigh bridges in Panjang Port, only one is operational at the time of writing (left side)

J **Recommendation:** Formalise port Standard Operating Procedure so that livestock trucks are given priority use of weighbridge

This recommendation builds on Recommendations B and C and should encourage a paradigm shift in local port authorities' view that livestock is a high-need good that should be given queuing priority over non-perishable freight. This recommendation is contingent upon the use of both weighbridges in easing the backlog and wait times for trucks to exit the port facility. Stationary trucks can leave cattle exposed to the elements, without food and water, and add to the already lengthy timeframe which they are off feed and water (contributing to a potential increase in liveweight loss).

Cost / benefit:

A reduction in the ability of trucks to swiftly utilise the weighbridge causes time delays in moving cattle from the ship to port and leaves them without food or water for extended periods of time. Their exposure to the elements can cause shrinkage and result in lost value.

Ship carrying capacity (head)	**4,000**
Average delay time (minutes)	**45min**
Rate of liveweight loss / 45 minutes / head	**0.3%**
Liveweight total loss (250kg / head)	**2,960**
Cattle valuation ($/kg)	**$ 3.00 AUD**
Avoided liveweight loss costs if weighbridge queue was eliminated per shipment	**$ 8,881 AUD**

KPMG notes that realisation of multiple recommendations may not compound the benefits in totality.

Source: Futurebeef, Liveweight loss and recovery

20 **Constraint:** stationary trucks

Stationary loaded cattle trucks may be detrimental to the overall health of cattle due to exposure to the elements; this is particularly escalated in the Indonesian tropical environment. A lack of cross-ventilation in the multi-purpose trucks (the trucks are not specifically customised for cattle), combined with the excessive humidity, can culminate in them experiencing heat stress.

As KPMG was observing the discharge of the vessel and loading of the trucks at port, the temperature observed was 36 degrees Celsius with a humidity of 62 per cent. The industry acknowledges that cattle do not have a particularly high level of heat tolerance.

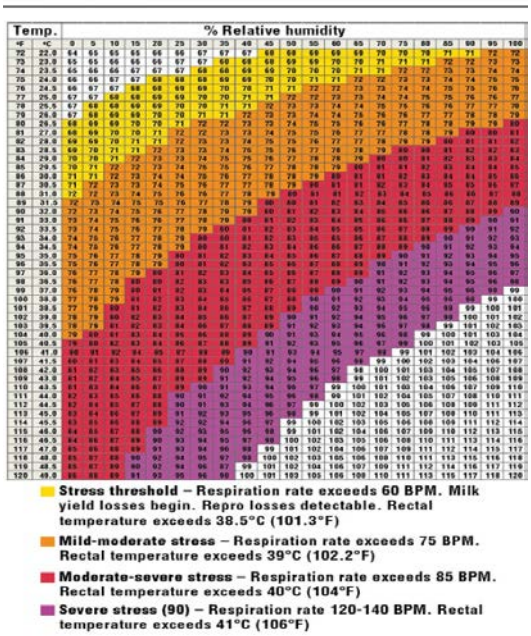


Figure 15: As per the index, the conditions recorded result in conditions that can cause moderate-severe heat stress that may result in loss of meat quality and muscle shrinkage due to excessive dehydration (Lecler 2014)

K **Recommendation:** Formalise port Standard Operating Procedure that a single weighbridge can be booked/hired for exclusive use by livestock trucks during a discharge.

This recommendation builds upon the requirements outlined previously and aims to reduce livestock exposure to heat, caused by lengthy wait times at weighbridge facilities. To ensure that production outcomes are maximised, heat stress situations that may cause shrinkage or in dire circumstance death, need to be reduced. When a facility has two functional weighbridges, Standard Operating Procedure should allow an unloading vessel to book a weighbridge for use throughout discharge operations; this would ensure that there is no

additional port-side wait times as a result of non-functioning or high-use of the weighbridge by other unloading vessels that are also in port.

KPMG notes that this recommendation is contingent upon the availability and functionality of at least two weighbridges at the port facility.

Cost / benefit:

A reduction in the ability of trucks to swiftly utilise the weighbridge, as it is now booked for the sole purpose of cattle trucks, will reduce any delays in getting cattle to the feedlot due to stationery vehicles and thus reduce exposure and associated heat stress. This recommendation has the same cost avoidance as recommendation J.

No additional cost has been provided given the savings already accounted for in the previous recommendation.

Transport

Once trucks exit the port, road transportation time to either the feedlot and/or the breeding facility varies from between one and eight hours dependent on both the traffic conditions at the time and the distance to the facility in question. The crowded road network and local topography of Indonesia, means road transport of livestock is challenging, with high variability in time taken and cattle comfort. Additionally, the nature of the transportation industry in Indonesia varies, given this, there is currently no specific allotment of vehicles designed specifically for the transportation of live cattle, instead trucks are multi-purpose, vary in size and are not designed with high standards of cattle comfort in mind (e.g. lack ventilation and shade protection).

Benchmarking: Transport

Transport logistics in Indonesia are challenging due to their complex and crowded road network. Due to the relatively undeveloped roads, Indonesian trucks are typically smaller than their Vietnamese and Chinese counterparts (Photo 34, Photo 35), and very few are customised cattle-only trucks (and those that are, are in high demand). Best practices (as occurs in Australia or the United States of America; Photo 36 and Photo 37) are set by the use of custom designed cattle trucks that have optimised capacity and are designed to accommodate local climatic conditions (Figure 16).

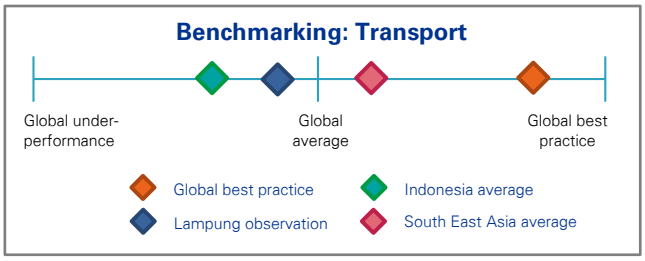


Figure 16: Transport benchmarking, as per discussions with relevant industry subject-matter experts

Photo 34: KPMG 2017, multipurpose live cattle truck in Lampung, Indonesia

Photo 35: KPMG 2017, live cattle truck in Vietnam

Photo 36: Ndstockmen, custom built live cattle truck in America providing protection from the elements and ventilation

Photo 37: Arendstrailers, Australian road train providing high capacity cattle cartage over long distances

The major supply chain constraints identified in relation to transport are:

21

Constraint: Road network quality

The quality of internal port roads is a challenge for heavily loaded cattle trucks, as they are already significantly degraded and increasing future shipments will only be hindered by these poor networks (see Photo 38 and Photo 39). The poor state of roads may lead to excessive bumping and jolting throughout the transportation journey and result in cattle slips and falls causing superficial, clinical and sub-clinical injuries. This can translate to high cattle stress, and result in a reduction of feed and water intake in the days following the injury and reduce liveweight (as per other constraints that also cause stress related liveweight loss).

Photo 38: KPMG 2017, Poor quality road leading from Panjang Port

Photo 39: KPMG 2017,Poor quality road leading from Panjang Port

22 **Constraint:** Traffic and road congestion

Following a truck's exit from port, trucks have to negotiate the narrow, traffic congested roads to either the feedlot or the breeding facility. This journey can vary from one hour to up to eight hours – dependent upon traffic conditions and distance travelled. The longer transit time increases the period of time that the cow is off food and water, leading to lost liveweight (which may be coupled with injury stress).

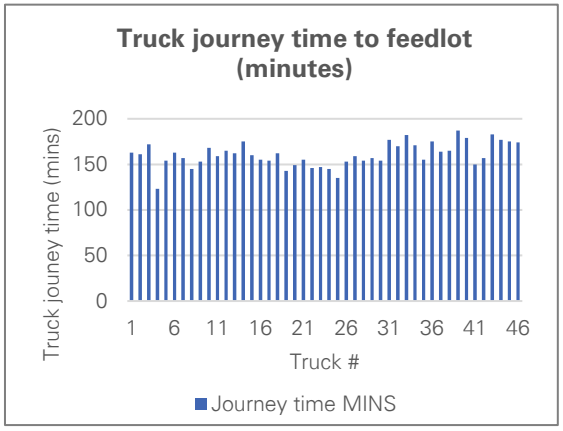


Figure 17: Journey time of 46 trucks during the discharge observed by KPMG

L **Recommendation:** Make ongoing improvements to road infrastructure to improve network quality and minimise traffic and road congestion as much as possible

Improvements to the existing road networks and minimising traffic congestion is an ongoing national challenge for Indonesia itself and is not restricted to Lampung area. Although reduced transport times would be beneficial to cattle maintaining their liveweight throughout transportation, the current average transport time of 4-5 hours is not significantly extended enough to cause significant production loss. The key difference in transport times compared to truck wait times at the port is that mobile trucks pose reduced risk of cattle heat stress as ventilation is improved during movement.

Cost / benefit:

It is unlikely that this recommendation will provide any direct benefits, or cost savings, realistically. The internal port roadways could be upgraded to rectify the pot holes and degraded state of the road way surface; this would reduce injuries that may be caused at the initial transit point. The financial investment required to improve the national road network system is beyond the scope of this engagement to consider.

23 **Constraint:** Truck design

Truck design appeared inconsistent throughout KPMG's observation of cattle unloading. While the trucks did have sufficient internal bedding and were loading with the correct amount of cattle, the loading platform and rear door designs varied between trucks. The most common door design was the single horizontal door, however vertical split doors and combination doors (upper opening swing panels with lower backward dropping door) were also used. Given the variety in doors, all trucks had to reverse to the discharge platform in different ways, creating inefficiencies.

i) Horizontal doors:

The single drop door allows for the truck to be backed into place with small toleration for variations in discharge platform heights and shapes; a lack of non-slip flooring on the back door also creates a hazard during discharge.

Photo 40: KPMG 2017, single horizontal door truck in Lampung

ii) Vertical doors:

It was observed that the vertical doors were easier to close once a truck was loaded by the operators however, the driver was required to reverse back exactly in line with the discharge platform to avoid any hazardous gaps.

Photo 41: KPMG 2017, dual vertical door truck in Lampung

iii) Combination door (vertical and horizontal doors)

The combination doors are a half and half set-up, similar in function to the vertical drop door but providing added security with the higher horizontal doors added above.

Photo 42: KPMG 2017, dual vertical and horizontal door truck in Lampung

It was also observed that a number of trucks had completely smooth metal surfaces on their drop-down doors (see Photo 43). As this is the first platform that the cattle step upon when boarding the truck there is a high risk of slipping as they move over the door and onto the vehicle.

KPMG notes that while a method of reducing slip risks is spreading saw dust over a slippery surface this would be too time consuming if it was undertaken on every truck and may create difficulties when it comes to closing the door after loading.

Photo 43: KPMG 2017, dropdown door of live cattle truck in Lampung

M

Recommendation: Apply permanent non slip flooring to drop doors to prevent cattle slipping upon entry and exit of truck

A permanent non-slip flooring that is economical, replaceable and effective (such as a rubber mat), would reduce cattle experiencing slip risks that may impede loading or cause injuries to the cattle. Additionally, this non-slip flooring should be designed to not impede other commodities being loaded into or out of the trucks as these are used in a multipurpose fashion in Indonesia.

The 'Best practice guide for the transport of cattle in Indonesia' (pg.27, July 2017, DAWR) outlines additional detail regarding best practice design standards.

Cost / benefit:

The proposed cost of installing rubberised (or similar) mats on the drop down loading doors of trucks that carry cattle is low relative to potential benefits that may be obtained by minimising clinical and sub-clinical injuries caused from slips and falls.

Trucks used for cattle transportation	**120**
Animal Welfare Non-slip Rubber Mat (1800mm x 1200mm)	**$119.50 AUD**
CAPEX (excluding installation cost)	**$14,240 AUD**

While KPMG acknowledges that implementing this recommendation has a small financial cost and will require some coordination of transportation trucks to complete installation, the benefits of reducing slips and falls has already been demonstrated in other costing to be beneficial through minimising subclinical injuries and ensuring time on feed and weight gain is maximised.

24 Constraint: Truck size

Significant increases in capacity and/or size of trucks are unlikely to be compatible with local traffic conditions. Data recorded showed no significant difference in truck turnaround times when comparing the smaller capacity trucks with ~14 head capacity to the larger ~21 head capacity trucks. KPMG observed that there was no correlation between truck size and total journey time between the smaller and large capacity trucks (see Figure 18)

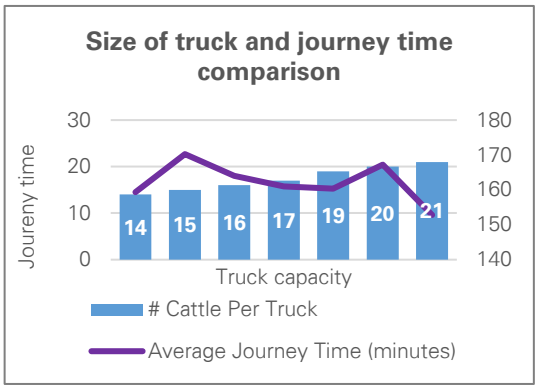


Figure 18: KPMG recorded data, return journey time compared to the capacity of the truck

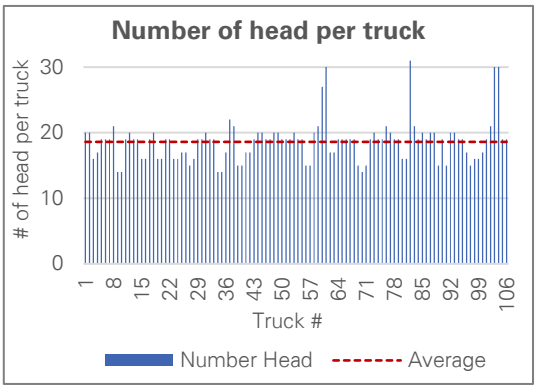


Figure 19: KPMG recorded data, number of head per truck

N **Recommendation:** favour booking of higher capacity trucks (~ 21 head capacity)

KPMG recommends that the larger capacity trucks be favoured over the smaller capacity vehicles, to increase discharge efficiency especially given that there was no correlation between the size of trucks, the number of cattle they took and the journey time taken. If larger trucks are favoured, total discharge and transport to breed or feedlot could occur much more quickly requiring less labour, fewer trucks, reduced time of feed and generating an opportunity cost for the trucks if they were being used elsewhere.

Cost / benefit:

If larger trucks were used to unload and transport cattle to their feedlot or breeding facility destination at a faster rate than currently, there is an associated operating cost saving. This is representative of savings in relation to the cattle getting to their destination faster, reduced labour costs, as well as the ability of trucks to be able to be used less, or for alternative journeys.

Ship carrying capacity (head)	**4,000**
Cattle per 'large' truck	**21**
Total trips required	***190***
Cattle per 'small' truck (head)	**17**
Total trips required	***235***
Difference in trips taken	**45**
Savings per trip including labour, trucks costs, cattle weight ($/ return trip as per consultation with industry stakeholders)	**$250 AUD**
Avoided costs per shipment	**$11,204 AUD**

Feedlot

Once cattle arrive at the destination facility they are unloaded into arrival pens to await 'induction'. Induction is the process during which cattle are checked for health (checking for diseases or infections) and welfare requirements (meeting growth expectations, not stressed, etc.) and to transition them onto new feed sources at the feedlot. The following minor inefficiencies were identified at the two feedlots visited following the discharge of the vessels at Lampung port.

Benchmarking: Feedlot entry systems.

Compared to similar South East Asian markets, Indonesia excels in construction quality and attention to detail at cattle facilities receiving Australian exported cattle (Figure 20). Compared to premier feedlots in the USA and Australia as a best practice standard, the Indonesian unloading facility viewed was comparable in functionality, however anecdotally the Indonesian feedlots lack key cattle flow designs elements and overall build (see Photo 44, Photo 45, Photo 46 and Photo 47).

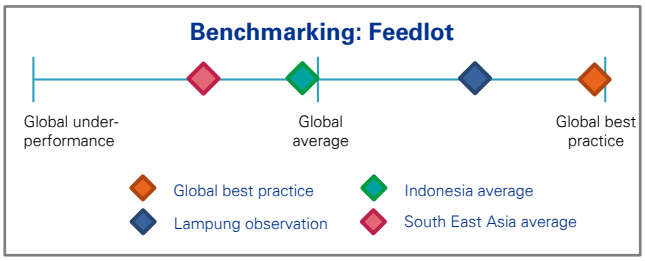


Figure 20: Feedlot benchmarking, as per discussions with relevant industry subject-matter experts

Photo 44: KPMG 2017, feedlot entry in Lampung

Photo 45: KPMG 2017, feedlot entry in Lampung

Photo 46: KPMG 2017, feedlot entry in Cambodia

Photo 47: KPMG 2017, feedlot entry in Vietnam

The major supply chain constraints identified in relation to point of entry at the feedlot are:

25 **Constraint:** Poor unloading area design

As was observed at the port, the issue of having trucks with smooth drop down doors caused cattle to slip while unloading at the feedlot facility. Generally, the same principles of appropriate width, adequate height, well shrouded fences, race and ramp ways as was observed to be lacking at the port should also apply to feedlot unload facilities and working yards; ultimately this was not observed to be of sufficient standard. Although the facility viewed by KPMG was in relatively good condition and was well designed, this is not consistent across feedlots receiving cattle in other parts of Indonesia (see Photo 48 and Photo 49).

Photo 48: KPMG 2017, feedlot entry in Lampung

Photo 49: KPMG 2017, feedlot entry in Lampung

Recommendation: Liaising with other members of 'the Partnership' to collaborate with importers to improve facility design

By working more collaboratively with other members of 'the Partnership', importers can encourage increased production capabilities in cattle by ensuring that feedlot design adopts the best handling facilities, maintains ESCAS guidelines and meets all minimum cattle and handler welfare and safety requirements. This should include focusing on:

- improving processing efficiency to reduce cattle time off feed, water and aid in catering for increased cattle processing requirements upon receiving new shipments; and
- increased shrouding and use of updated yard facility designs aimed at reducing stress on cattle and increasing operators safely and efficiency.

Cost / benefit:

There is a high likelihood that improving handling procedures and facility design at feedlots and breedlots will reduce stress and liveweight losses associated with time off food and water, handling by operators and poor facility design, and avoid additional costs.

Ship carrying capacity (head)	**4,000**
Livestock experiencing stress at feedlot (percentage)	**15%**
Livestock experiencing performance issues due to stress	**600**
Total recovery days (as per consultation with industry stakeholders)	**10**
Average daily weight gain (500 grams/day as per consultation with industry stakeholders)	**0.5kg**
Total weight reduction (kg)	**3000**
Cattle Valuation ($/kg)	**5**
Avoided costs per shipment	**$ 15,000 AUD**

26 **Constraint:** Quarantine handling inefficiencies

Through stakeholder consultation, KPMG was informed of inefficiencies in the quarantine cattle sampling procedures throughout the supply chain and into the feedlot. Upon arrival at the facility, cattle were required to have their blood tested for multiple diseases.

For cattle, samples requires intensive livestock handling, minor and major injury risks to both the cattle and the handlers and can cause stress in cattle that results in sub-clinical injuries and degradation of meat quality. These inefficiencies and dangers are compounded in sub-par facilities.

Additionally, it was reported to KPMG that some facilities were conducting blood tests for diseases that have never been present in Australia or have been completely eradicated previously. Testing for these diseases is costly, and unnecessary. Cattle should be tested as per normal pre-exit Australian standards for prescriptive diseases as required by Indonesia.

P **Recommendation:** Avoid unnecessary disease testing

Quarantine requirements upon entry to a breeding facility or feedlot facility should aim to avoid repetition of laboratory animal disease tests completed in Australian pre-export facilities and testing for diseases Australia is known to be free of. This will minimise the number of large scale blood samples required and reduces intensive livestock handling that has associated risks.

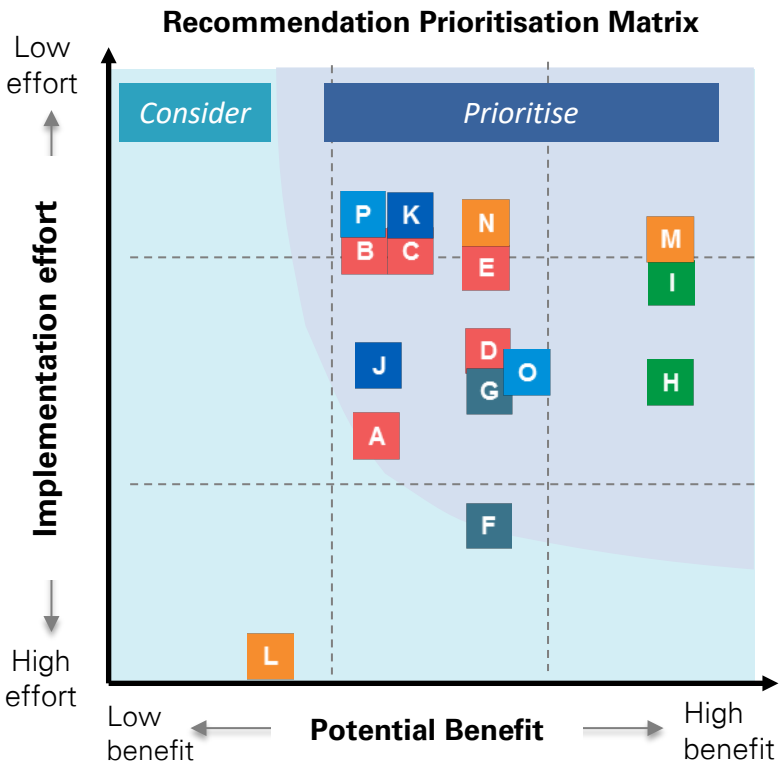
Cost / benefit:

It is reasonable to suggest that 10 per cent of tests being completed upon cattle as part of their induction into the feedlot or breedlot facility are duplicative or unnecessary. Ceasing the conducting of these tests is a possible cost saving for the feedlot and thus the importer.

Ship carrying capacity (head)	**4,000**
Average cost of blood tests ($AUD)	**$ 51.75**
Tests completed unnecessarily (per cent)	**10%**
Avoided costs per shipment	**$ 20,700 AUD**

Source Department of Primary Industries, Veterinary test list

4.2 Results summary



◔ Low effort/low benefit
◑ Moderate effort/moderate benefit
◕ High effort/high benefit
● Very high effort/ very high benefit

Table 9: Associated implementation effort compared to potential benefit to assess prioritisation of recommendations

Supply Chain Area	Constraints		Recommendations	Effort to implement	Potential benefit
Berth	Berth availability	A	Formalise regulations, to ensure that livestock vessels always receive priority berthing over other non-perishable freight	◕	◑
	Berth allocation	B	Formalise port standard operating procedure such that livestock vessels are always allocated the most suitable berth for truck loading	◔	◑
	Pilot on board process	C	Review port standard operating procedures to always utilise skiff (small, fast vessels) transportation to decrease any possible pilot-boarding delay	◔	◑
	Quarantine and customs process variation	D	Review quarantine and customs standard operating procedure to ensure processes are optimised	◑	◕

	Administration	E	Digitisation and simplification of administrative tasks to drive efficiencies	◔	◕
Vessel	Infrastructure of internal ship unload point, raceway and exit ramp width/height	F	Modify internal vessel load/unload point design	◕	◕
	Inconsistent discharge flow rate	G	Training of specialised Indonesian stock handlers with ship on-board experience to assist stock crew during discharge	◑	◕
Dock	Discharge platform redesign	H	A full design overhaul of the discharge platform from a specialised cattle facility design engineer is required	◑	●
	Operator positioning	I	Alter the design of the discharge platform so handling personnel cannot be seen by unloading cattle	◔	●
Port	Weighbridge delays and queuing due to non-functioning weighbridge	J	Formalise port Standard Operating Procedure that livestock trucks are given priority use of weighbridge	◑	◑
	Stationary trucks	K	Formalise port standard operating procedure that a single weighbridge can be booked/hired for exclusive use by livestock vessel trucks during a discharge	◔	◑
Transport	Road network quality, traffic and road congestion	L	Make ongoing improvements to road infrastructure to improve network quality and minimise traffic and road congestion as much as possible	●	◔
	Truck design	M	Apply permanent non slip flooring to drop doors to prevent cattle slipping upon entry and exit of truck	◔	●
	Truck size	N	Favour booking of higher capacity trucks (approximately 21 head capacity)	◔	◕
Feedlot	Poor unloading area design	O	Liaising with other members of the Partnership to collaborate with importers to improve facility design	◑	◕
	Quarantine handling inefficiencies	P	Avoid repetition of animal disease testing	◔	◑

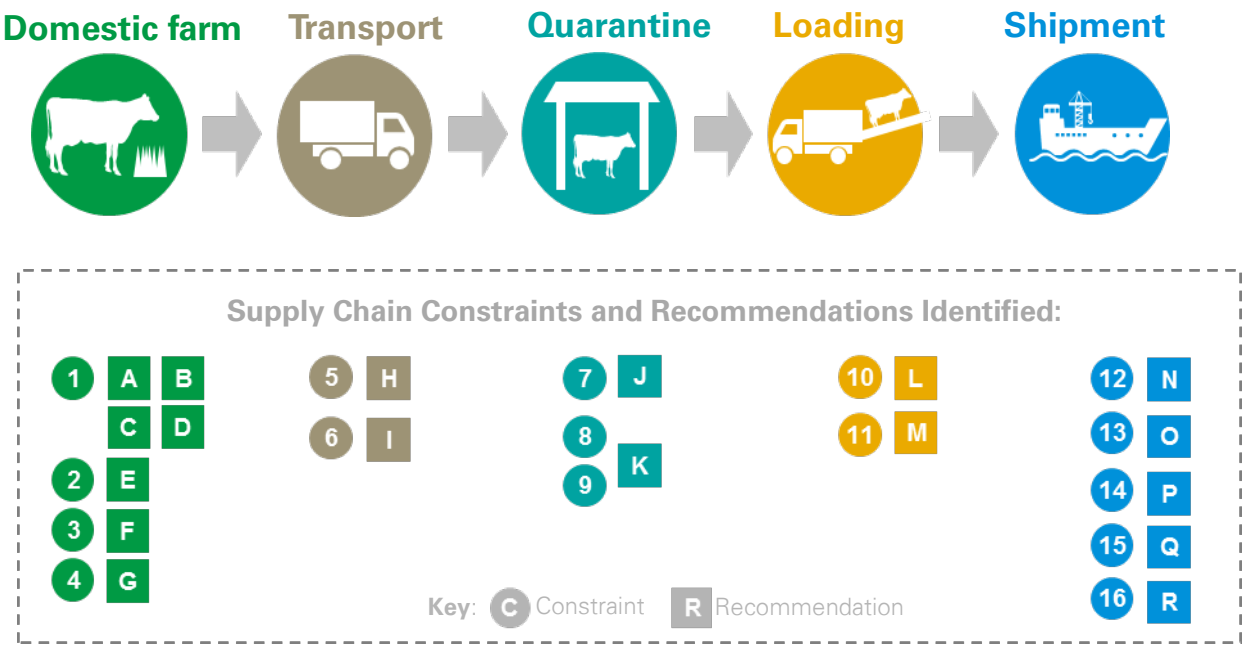
5 Results: Kupang

The Kupang supply chain is based on cattle sourced from Indonesian producers in NTT and other eastern domestic islands, and grouping and quarantining these animals prior to shipment to key customer markets in Java. As a developing protein supply chain there a unique set of supply chain constraints that need to be addressed to improve the overall efficiency and effectiveness of the system. At present existing infrastructure is unlikely to meet the growth in the region.

The volumes of cattle traded are limited in comparison to international supply chains. The herd size in NTT is circa 1 million head and there is a 60,000 head quota target for cattle exported from NNT to Kalimantan and Jakarta. This quota is calculated by the Government based on its perception of a sustainable cattle population in NTT. This volume is transported either via the Camara vessel with around 500 head per voyage to Java and/or private cargo vessels with around 200-300 head per voyage. Stakeholders operating within the supply chain reported that 20 per cent of all supply in the region is transported via the Camara vessels. The other 80 per cent is transported by cargo vessels and other small vessels on a very small scale. The ease of transport is complex due to the fact that producers are geographically dispersed across multiple islands.

5.1 Supply chain constraints and recommendations

Below is the high level operating supply chain where constraints and recommendations have been identified:



Domestic Farm

Cattle in NTT are bred and grown in small family-run, private enterprises ranging from one to ten breeding cows. In some cases these herds are hand fed, while others are resourcefully grazed on public grounds and community communes. Nutrition and reproductive management of these herds is often opportunistic, particularly in herds with less than five breeders. The communes are often challenging to manage with multiple interested parties; especially when profits need to be split following a joint production venture.

Local farmers either grow out their bull calf progeny to shipping weight, or sell weaner calves at 12-18 months old to traders who grow the bull calves out themselves. Female progeny are often retained or traded privately for breeding use on the island. Cattle are often sold up to four times in their life before they leave Kupang onwards to Java.

Benchmarking

Compared to other small beef holder farming in South East Asia, the Indonesian NTT and eastern islands enterprises are of similar grazing and herd management style to many parts of Vietnam, Thailand, Laos and Cambodia. Kupang however, appears to have reduced reproduction and stock growth performance rates, likely from a combination of less productive soils and pastures and thus poor feed availability.

Compared to northern Australian production of *Bos Indicus* cattle, weaning and calf growth rates are significantly lower. Local sources in Kupang report 40 per cent calf weaning rates with pre-weaning growth rates 0.1-0.3kg/head/day, compared to 50-55 per cent and 0.5-0.7kg/head/day respective average in northern Australia. The slow growth can be attributed to genetic deficiencies (inbreeding and selection) as well as poor water supply, nutrition and management.

1 **Constraint:** Nutrition.

There is currently inadequate provision of nutrition for reproducing females and the production of weaner cattle. Feed consists of mainly cut grass, rice straw or shrubbery cut by hand from surrounds.

A **Recommendation:** Increase protein provision

Additional protein can be provided through novel plant and pasture use and supplementary feeding (e.g. through the provision of stock 'licks').

Leucaena for example, a high protein tropical shrub, (see Photo 50) grown in plantations has been successfully trialled in Kupang where it increased weaner weight gain by 0.8kg/head/day. The use of these high protein crops needs to become widespread. Development of a seed stock farm for increased production and distribution of Leucaena, in combination with an education program on production and harvest techniques for local producers, is key.

Similarly increasing the protein obtained from local grasses during the dry period could be aided with by-pass protein, such as urea based licks (see Photo 51). These are a cheap and accessible way to increase non-protein nitrogen delivery and improve ruminant digestive function. There is an opportunity for local manufacturers of these licks (or other similar products) and/or encouraging homemade batch recipes, provided this is encouraged with corresponding education and extension on the safe use of urea licks and portion control.

Photo 50: DAF QLD, Leucaena Plantation

Photo 51: StocklickTrading, Loose lick urea supplement

B **Recommendation:** Improve grazing strategies.

The tethering of cattle to yard fences (see Photo 52) means that more husbandry is required to effectively provide cattle with adequate nutrition. Instead, this method of feeding should be replaced by organised rotational grazing.

This is already done in other South East Asian countries such as Vietnam where small private herds are grouped for the day and grazed out on pasture; this method of feeding increases nutrition consumption but also allows pasture 'rest times', reduces labour and minimises the need to cart feed to cattle yards.

Photo 52: KPMG 2017, tethering and carting forest chop for local cattle is inefficient and often lacks adequate nutrition supply

C **Recommendation:** Balanced vitamin/mineral provision

To compensate for nutritionally deficient tropical grasses, a more balanced provision of vitamins and minerals is required with substitutes. This has already been successfully trialled in Kupang, achieving growth rates of up to 0.8kg/head/day, and needs to be more widely adopted.

Alternatively, commercially available mineral licks or blocks, or recipes for self-made loose licks specially designed for the Indonesian cattle, would significantly improve this provision of concentrates and premixes.

D **Recommendation:** Better engagement with farmers

It is recommended that more engagement and education opportunities are provided to Indonesian cattle farmers, particularly on the nutritional requirements of breeding cattle. This needs to include a focus on more effectively and efficiently meeting the protein and energy demands of females with advancing gestation and of young growing cattle, to ensure that cattle are well nourished for future breeding or sale.

2

Constraint: Lack of water provision

The current cattle production systems have minimal automated water systems and a heavy reliance on manual water carting. This means that cattle do not have on-demand access to water as required, and may not be obtaining sufficient daily supply.

E

Recommendation: Water infrastructure investment

Investment into semi-automated water systems to routinely pump ground water instead of relying on manual water carting (see Photo 53) would be a significant improvement to cattle production. Lactating cows require 50-60 litres of water per day, with ad libitum access to ensure that the cattle can ruminate to support milk production and provide sufficient energy to the cow itself. Providing this amount of water manually is not necessarily feasible, and it is not known if the quantity of water being provided is actually satisfying the cow (as permanent water sources can be accessed as often as the cow desires).

In addition to the lack of water infrastructure that supports direct access to water 24 hours a day, encouraging farmers to invest in solar water pumps for bore holes (see Photo 54) would be a significant management improvement by reducing manual labour, and providing a more permanent source of clean water.

Photo 53: KPMG 2017, manual watering in Kupang

Photo 54: Sun driven, solar cattle watering infrastructure

3

Constraint: Reproductive management and genetics

The mating of cattle in the local supply chain is unregulated and only semi-planned. There is no selection for specific attributes, to minimise disease or to increase fertility. Instead, mating is ad hoc.

Breeding programs currently in place are having limited success with calf survival rate reportedly only 30 per cent because a large percentage of calves die shortly after birth.

Bulls and steers are the preferred fattening animal in the region. There is currently a female preservation law in place to prevent the slaughter of reproductive females. If an owner is found to slaughter a productive female (particularly if in foetus) it can carry a 1-3 year prison sentence and a 300 million Rp fine. During consultation with staff at the local Kupang abattoir, it was evident that this law is not being adhered to and regular breaches are taking place.

F **Recommendation:** Practical reproductive management

More practical, informed reproductive management should be encouraged to drive better breeding outcomes in the local supply chain.

Unfortunately across the South East Asian region, artificial breeding techniques are costly and require specific skills unavailable to small-holder, traditional enterprises. It is recommended that, as a minimum, there needs to be a focus placed on controlled natural mating utilising shared community bulls. Well-selected, polled, red, early-maturing, high fertility, moderate framed sires would be most beneficial for local genetic improvements. Examples of appropriate Australian breeds, which fit these specifications would include moderate framed Senepol X Brahmans or Droughtmaster cross types (see Photo 55).

Any imported sires would need to be introduced to the supply chain and breeding program at twelve months of age; this allows for sufficient adaption time and will allow for some reduction in frame size in line with the already small dam size. Ideally, the overall goal for reproductive efficiency should be to wean one calf per cow every twelve month period, with calving and early lactation timed with the Indonesian wet season to match peak cow nutritional demand with peak fodder availability.

Photo 55: Namoonatrig Senepols, exemplar appropriate outcross bull type

4 **Constraint:** Local farm breeding model

Through consultation with local farm operators in Kupang it was evident that the supply chain holds little margin for primary producers. Despite this, cattle production is common on the island because other local employment opportunities are limited. Most breeding businesses and/or the breeding population in the NTT is privately owned family farms who sell:

- weaned young stock through the sale yards;
- privately to other breeding families; and
- fattened cattle to traders for export.

It was added, that farmers in attendance at cattle sales also lack the skills to value cows, and the purchasers have more power in the negotiation. Farmers also mentioned to KPMG that some traders distort market forces and use collusive practices. For example, when buying feeder cattle for fattening from breeding farming families three different traders all buying for the one investor may approach the one farming family selling their young stock and all offer below market price (which is slightly higher than each other) creating a false market perception of price.

The supply chain of locally produced cattle is restricted due to the nature of the model that exists. Local cattle farmers struggle to breed effectively and earn a sufficient income from their work. This impacts the ability for these producers to invest in improving their management practices because they have little or no surplus funds.

G

Recommendation: Review of the local farm breeding model

Stakeholders operating in the supply chain believe more transparency is required for the model to work and to be fairer. There is an imbalance of power between local cattle farmers and cattle traders in the region. Sellers usually sell at a time where money is required for personal reasons, i.e. a wedding or education fees, and as such the price received may not reflect the true market price.

Money cannot just be allocated to farmers to assist in purchasing cattle because they are likely to spend the money on cheaper cattle and then allocate the remaining money to other personal requirements.

A measure of value has been created by the local University in Kupang which is a metrics table that predicts weights and other values from specific raw measurements of the animal such as length, height and circumference. This should be used to assist local farmer during the sales process.

Ultimately, an overhaul of the local breeding model needs to be performed. This would assess the current state and then design a future state operating model that will support growth and future-proof the operations in the region.

Transport

A large range of trucks are used for the transport of cattle in the Kupang area typically either for internal transportation purposes to move cattle from yards, to quarantine facilities and/or to ports. These trucks range from a very small three to five head capacity, to the more common five to seven head capacity, up to the large ten to twelve head carrying trucks.

Benchmarking

Compared to small-holder cattle cartage across other South East Asian countries, the use of freight trucks for cattle cartage in Kupang is similar to that of Vietnam, Laos and Cambodia. The local cattle are however, according to KPMG's experience, halter broken and this can in some instances assist in making handling and loading far easier on both operators and cattle.

Alternatively, in developed supply chains in Australia and Europe, small custom livestock crates are used both commercially and privately to transport small numbers of cattle (see Photo 56). These crates provide superior cattle comfort, and can reduce stress related, transport weight-loss.

Photo 56: GW Manufacturing, custom small truck cattle crate

5 **Constraint:** Cattle handling difficulty

Cattle that are only semi halter-trained can be difficult to load. Cattle are halter-led onto trucks and have their heads tied to increase the trucks carrying capacity (see Photo 57 and Photo 58). This process is labour intensive as well as stressful to livestock, likely increasing transport associated weight-loss. Additionally, poor loading ramp infrastructure is common and varied. Families on local farms stated that they must use a pile of sticks or logs to load their cows to take them to market.

Photo 57: KPMG 2017, truck loading Kupang

Photo 58: KPMG 2017, truck loading Kupang

H **Recommendation:** Cattle handling

Dedicated time spent training young stock to be led with limited force is essential if trucking is to rely on haltered-cattle transport. Livestock handling education on this would increase the overall performance of cattle throughout the animal's life, as many situations will be less stressful on both the animal and operator, and transport induced weight loss will be minimised.

If the Kupang supply chain is to move to a mob based cattle handling (non-led) approach, different infrastructure including working yards and loading ramps and races will need to be developed to operate effectively. Likewise, young stock need to be properly familiarised with these facilities and 'learn' to respond to operator directions.

6 **Constraint:** High loading rates and poor design for cattle comfort

Tethering cattle on trucks increases carrying capacity but reduces cattle comfort and immediate post trucking performance (see Photo 59). The use of substitute vehicles (e.g.: taxi's and mini-freight vehicles) for livestock cartage, likewise increases loading issues and decreases cattle comfort further (see Photo 60) all of which results in transport induced weight-loss.

Photo 59: KPMG 2017, head tethered for cartage

Photo 60: KPMG 2017, converted taxi temporarily used for small head cartage in Kupang

I **Recommendation:** Loading rates and cattle comfort

Education of livestock transporters on the impacts of cattle comfort and subsequent performance is important to drive change in Kupang cattle cartage. The production and distribution of simple descriptive posters would facilitate the education process. Limiting the use of small substitute vehicles, and focusing on the larger freight trucks, in combination with improving tethering height are small changes that can be made with immediate benefits. Ideally moving towards more customised cattle crates that provide more adequate space and comfort, is important as the supply chain grows.

Quarantine

The Kupang Quarantine, established in 1975, is used for all consignments of cattle prior to shipping for Java. At the site, they are quarantined for seven to seventeen days and tested for Brucellosis and Anthrax, the tests are processed on site in the quarantines own lab. The capacity of the Quarantine was reported to be 2,000 tethered cattle.

The quarantine period for privately traded cattle is reported to be less than the average testing time, at seven to fourteen days. The increase in government sourced cattle and government traded cattle are reported to have accelerated the quarantine processing times and in some instances totally eliminating the need to pass through the facility.

Benchmarking

Compared to other intensive holding facilities throughout Indonesia, including the Lampung feedlot viewed by KPMG during this project, the Kupang quarantine is of significantly lower standard. This is reflected in the deteriorating weight-gain rates of cattle in the facility.

It was reported that cattle lost on average more than five per cent of live weight during the quarantining period. Although some of this may be attributed to transit to and from the facility and the stress of adapting to new surrounds and diet. The quarantine facility was seen to lack in key infrastructure and management, likely contributing significantly to production loss.

7 **Constraint:** Inadequately maintained handling and housing facilities

The facilities viewed by KPMG for the operation of loading and unloading cattle prior to shipment as well as the handling facilities in general was poor and inadequately maintained. This also included the area used for the efficient collection of blood for quarantine sampling (see Photo 61).

Photo 61: KPMG 2017, limited load facilities at Quarantine

J **Recommendation:** Facility upgrade or redevelopment

It is recommended that this facility should be completely rebuilt; including the refitting of handling facilities, the refit of internal housing and the addition of automated water and fodder storage and distributions systems.

The complete overhaul and redesign could be staged in increments, targeting the most damaged and inadequate parts of the facility. In addition, KPMG recommends investigating the use of technology to automate procedures undertaken at the quarantine facility as part of the facility upgrade.

8 **Constraint:** inadequate nutrition and water provision

Cattle are fed rice straw at the quarantine site with some variable amounts of corn chop added to the straw. All feeding and water supply is manual.

Overall the nutritional value of this food is low, particularly in relation to protein provision (see Photo 62).

The inadequate nutrition and water provision result in cattle losing on average 5% body weight while in Quarantine according to a stakeholder who operates in the supply chain.

Photo 62: KPMG 2017, rice straw feeding lacks adequate protein and energy provision, Kupang quarantine

9 **Constraint:** Inadequate hygiene

Large amounts of manure were viewed mixed with old bedding, creating poor environments not conducive to performance (see Photo 63).

Photo 63: KPMG 2017, poor pen hygiene, Kupang quarantine

K **Recommendation:** Minimum standard housing

Adoption of a minimum standard for clean, frequently changed, bedding provision, the removal of manure and providing adequate nutrition would also greatly assist with stabilising traded cattle weight-losses during the quarantine period.

In addition, KPMG recommends that the use of technology in relation to feed and water supply could be automated as part of improving minimum standards in the quarantine facility.

Loading

Cattle are transported by truck, a short distance (less than two kilometres) from Kupang Quarantine into the Port of Tenau for loading onto vessels for the five to seven day voyage to Java (see Photo 64). There are several cargo ships and one specialised livestock vessel, 'The Camara Nusantara 1', which are utilised for inter-island transport (at the time of writing).

Distance between Quarantine site (right) and Port (left) is approximately two kilometres via road.

Photo 64: KPMG 2017, port (left) and quarantine (right) location

Benchmarking

Compared to the unloading infrastructure of Australian origin cattle vessels throughout Indonesia, load facilities for 'Camara Nusantara 1' are poor and below acceptable standard. This includes inadequate vessel access infrastructure (e.g. use of adequate, if any, ramp structures), poor dock dimensions and aged facilities.

Loading infrastructure should be in good condition, to prevent injury to cattle, designed to encourage ease of cattle movement, taking into account their flight or fight tendencies, and be narrow in width to facilitate single file, follow-the-leader style movement that is efficient when loading.

10 **Constraint:** Loading ramp design

The current ramp design, if used at all, requires manual lifting to transfer the ramp between each truck. The length and strength of the ramp can also be key deficits depending on tides, which forces the ship higher or lower in the water and requires different ramp heights. Stability and safety of the ramp is required as currently it does not fix securely to the truck or ship and does not have side rails.

In addition to the poor ramp facilities, it is highly common that ramps are not used at all, instead the cattle trucks are reversed up to the ships loading door and cattle transferred directly to the ship using the ramp of the truck.

The depth of port at Kupang is reported to be adequate for both 'Camara Nusantara 1' and cargo vessels. However the 'Camara Nusantara 1' has difficulty loading due to tidal fluctuations with a short ramp. This can result in the vessel being below the dock or far above.

This is unsafe for the cattle as tidal variations mean that the truck may not be directly meeting the door height of the vessel and cattle may be required to step up or down (see Photo 65 and Figure 21).

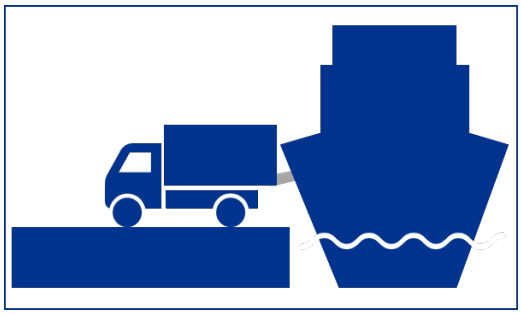


Figure 21: current Kupang Camara vessel ramp design schematic

Photo 65: Media Indonesia, Camara loading noting that the cattle truck door height is below the vessel entry point

L **Recommendation:** Mobile loading ramp, used for all truck unloading and loading

Investment in a mobile loading ramp by the port operators will offer significant improvements to the facilities at the Port of Tenau and would be a simple and low cost solution; the mobile loading ramp would be able to be used for all varieties of trucks and vessels.

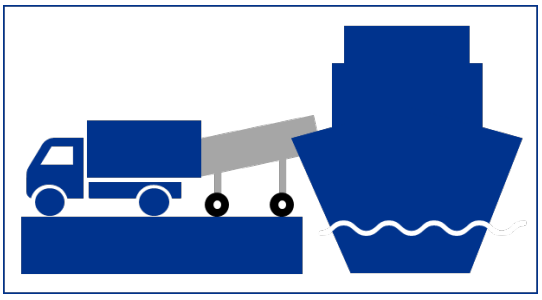


Figure 22: schematic of recommended ramp design improvements

Construction and use of a mobile loading ramp should:

a) Be able to attach securely onto the ship throughout vessel loading, but have simple systems to allow for tidal variations (see Figure 22);
b) Have wheels on the port side of ramp, to also allow for the rise and fall of the vessel dependent on tides; and
c) Have side rails or shrouding to a minimum of 1.6m to limit the risk of cattle escaping and aid in directing cattle either to or from the vessel.

11 **Constraint:** Dock dimensions

Currently the width of the loading and unloading facilities at the dock is inhibitive; this applies to both the current use of the dock for high capacity vessels and any future expansion of the inter-island or international trade (as seen in Figure 23).

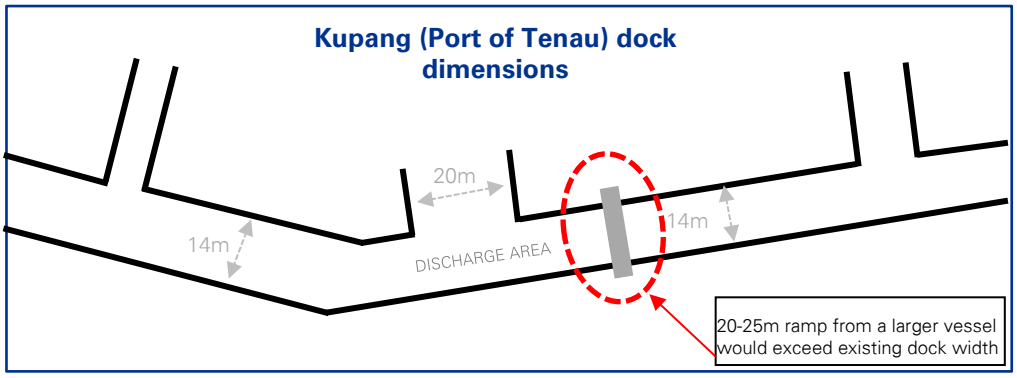


Figure 23: Diagram of Kupang livestock vessel dock at the Port of Tenau

M

Recommendation: Dock redevelopment and expansion

The loading platform and discharge area requires multiple trucks to be able to access the dock with adequate room for truck manoeuvring; the current facilities are only just managing to meet reasonable vessel load and unload times with the space available for truck movement. If vessels are to be loaded and unloaded more efficiently then the dock needs to be at least 20 to 25 metres in width.

If the Kupang supply chain grew significantly and larger livestock vessels were intended to be used (e.g. G-class vessels), significant increases to the Tenau port dock dimensions will be required to accommodate effective loading of these higher capacity vessels. To determine the feasibility of this expansion KPMG recommends further investigation into the cost benefit of expanding the dock, in relation to the ability to accept larger vessels and the associated value obtainable.

Shipment

There are two primary shipping options that exist for exporting cattle from Kupang to the larger markets of Jakarta and Kalimantan. They are cargo ships and the newer Government owned Camara Nusantara I vessel.

The KPMG project team has not audited, inspected or reviewed the Camara Nusantara I (see Figure 24) or any of the other Camara vessels currently in use by the Indonesian Government, however thorough stakeholder consultation was completed in regards to the use, effectiveness and efficiencies of these vessels. In particular, KPMG has referenced and endorses the findings of, the 'Indonesia-Australia Commercial Cattle Breeding Program (IACCB) Rapid Assessment of the Camara Nusantara I' as written by Australia-Indonesia cattle trade expert Richard Slaney (IACCB, 2016).

Figure 24: Vessel Finder, the Camara Nusantara I

Benchmarking: Shipment

Comparing Australia-Indonesian sea voyages, which are less than eight days, export cattle maintained live weights at sea and mortality rates of less than 0.02 per cent as noted in the Livestock Mortalities at sea Report to Parliament from the Department of Agriculture, Water and Resources; on the other hand the Camara vessel has significant potential for improvement upon these rates.

Cattle management on board the Camara Nusantara I has not been adequately assessed by any party, but anecdotal evidence of excessive cattle weight-loss demonstrates the requirement for further education and training in regards to on-board management of livestock.

12 **Constraint:** Operation of the Camara Nusantara I

The Camara Nusantara I offers increased shipping capacity with the capability of carrying 500 head, while most cargo vessels carried 250-300 head of cattle. This is only of benefit however when enough cattle have been supplied for shipping with reports of the Camara Nusantara I running under capacity on a number of voyages. It was found that procurement of 500 head of market ready cattle for the Camara Nusantara I has been a challenge for traders which can be attributed to large

increases in cattle required compared to previous private cargo shipping options and the irregular scheduling of the Camara Nusantara I voyages.

Sending cattle on the Camara Nusantara I has only become possible to private traders in the past twelve months, prior to this the Government held this for their own use only with supply for their farms and other local producers. In Kupang there are 11-12 traders who ship cattle to Jakarta. KPMG was told that this creates high demand for space and traders with space on the Camara hold a lot of power when negotiating.

There are three key players in the domestic Indonesian cattle industry in the NTT who have permanent booking space on the Camara Nusantara I, even if they do not have sufficient cattle to fulfil that space for each trip undertaken. This blocks other parties from using the vessels, and has created a secondary market whereby these three key players re-sell their space on the vessel at a mark-up.

The unpredictable availability of the Camara Nusantara I vessel, and the poor booking systems, make it difficult for domestic beef producers to know when the vessel is available in port (and to allow farmers sufficient time to prepare cattle for transportation). The current system is based on 'ideal' and not on the reality of local Indonesian business, where timeframes to get cattle to port are delayed.

The Camara Nusantara I vessel requires ~500 head to sail which is above what many traders logistically can put together in a two week space of time, leaving the cargo ship as preferred option with shipments of 100-200 head being feasible. One traded stated, "there are not enough cows to fill the Camara regularly, it's impossible".

There has not been any significant change in sale price of cattle over past few years, however famers reported if the cargo and Camara vessels are not running it is not good for their price as it leaves too many cattle in the local market and prices decrease. Since opening to private traders the Government vessel offers a male purchase price often less than that of cargo ships; 38,000 per kg Camara Nusantara I vs 40,000 per kg cargo traders.

One buyer for export vessels sending cattle to Jakarta had purchased 40 head at the sale the day KPMG was present, but often he purchases many more. The cattle were being sent to quarantine and will either go on cargo or Camara Nusantara I if it is in operation. He did not have a specific date that he was aiming for to have complied cattle ready to go because the ship schedule had not been booked. This causes a risk that cattle will be kept for extended periods of time in quarantine.
The quota system in NTT also creates issues with sales from November through to March the following year because often the quota has been exhausted by November. This creates uncertainty at the end of the year because the new quota is developed in January and not released until March. Therefore there is a gap in the market for a period of time where no price certainty exist and operators are cautious.

N

Recommendation: Adopt an improved modern and efficient method of booking cattle placements on Camara vessels with improved scheduling

To encourage better use of the Indonesian Government's cattle vessels it is recommended that a more user-friendly vessel arrival and departure guide be introduced that clearly states arrival and departure times (and the period throughout which all other prior checks must be completed, such as quarantine practices).

In addition to a well organised schedule, a simplified booking system, that is open access for each trip taken (and not pre-booked by three larger players who dominate the license booking system) would facilitate greater use of ships and reduce the number of ships that are travelling at reduced capacity.

Further detailed analysis is required to determine the quantity and frequency of bookings and the associated economic benefits, i.e. breakeven point for the vessel to operate.

13 **Constraint:** Weight loss and mortality

A lack of back-up or emergency water supply and commentary on inconsistent and poor feed management adequacy on board the Camara was observed by stakeholders, resulting in anecdotal live-weight losses of more than five percent of cattle body weight during domestic voyages.

Stakeholders reported that the Camara vessel has far superior shipping outcomes than other privately operated cargo vessels (see **Error! Reference source not found.** and **Error! Reference source not found.**) with cattle averaging ~5 per cent weight loss while being shipped when compared to the privately owned cargo vessels whose losses range from ~8-15 per cent. Mortalities on the cargo ships were also reported to be frequent and when stakeholders took into considerations the extra cost of shipping via the Camara it still remained the preferred option, given the decreased risk of mortality and reduced weight loss.

Photo 66:: Jakarta Post, on-board the Camara

Photo 67: Kupang Antara News, loaded cargo vessel (note extreme stock density

O **Recommendation:** Appropriate provision of on board feed and water

KPMG recommends that the Camara vessels, and any other vessels to be introduced by the Indonesian Government, should be fitted with a secondary piping and hose system to support back-up, clean water to animals during transportation. Additionally, on-board management of feed times, feed storage and dispense systems and available pen size improvements will ensure that body weight loss due to lack of or inability to access adequate nutrition is minimised.

This recommendation was noted in the IACCB Rapid Assessment.

14 **Constraint:** Key design shortfalls of vessel and on board operations

Direct adaptation of the AMSA, ASEL and international guidelines for livestock shipping by the Camara Nusantara I, and its sister vessels, would be of immediate benefit to livestock shipping from Kupang. Adaptation of the guidelines into enforceable Indonesian Government guidelines may bring some of the direction and standardisation the supply chain requires for a base level of operation. Voyage reporting may deliver some of the accountability and attention to detail required when shipping livestock. As an example the ASEL guidelines require daily and end of voyage reporting of all shipments and define a reportable mortality incidence threshold, where on-board cattle mortalities of greater than 0.5 per cent of short-haul voyages (<10 days) require both an exporter and government investigation (ASEL 2011).

Overall, the Rapid Assessment used to identify these constraints and recommendations, additionally recognises that there is scope to conduct additional feasibility on the handling of cattle

while at sea in regards to the management of cattle (feeding, watering, airing and sewerage disposal). KPMG was not able to make judgements or assessments on this at sea management as it was not possible to travel on board the Camara Nusantara I throughout the site visits.

Vessels used in the domestic supply chain lack design features suitable for cattle transportation such as non-slip flooring, and were observed to have poor and damaged infrastructure including protruding pipes, metal, sharp corners and electrical boxes in passage ways and pens.

These observations were noted in the IACCB Rapid Assessment.

P **Recommendation:** Upgrade on board infrastructure

The Camara vessels should be fitted with an on-board Delta ramp with a loading capacity of more than 3 tonnes to more safely load cattle onto the vessels (see Photo 68).

It is also recommended that pens and ramps are introduced on all decks to more smoothly facilitate the flow of cattle during loading and unloading of the vessel. No exposed flooring or walls should be installed; non-slip flooring is required to prevent cattle sliding or tripping as they move around the vessel.

Finally, all exposed equipment, electricity and services should be covered or housed in special containers to ensure that cattle are not exposed to danger throughout loading, shipment and unloading.

These recommendation was noted in the IACCB Rapid Assessment.

Photo 68: Beritatrans, unloading the Camara in Java - note: the truck delta, recommended to be carried on the vessel in the future

15 **Constraint:** Documentation requirements

As per discussion with operators within the supply chain in Kupang, there are complex documentation requirements and approvals in order to send cattle inter-island.

Documentation required from each level to send cattle inter-island include:

1) Documents from the agency level (Mayor's office in Kupang)
   a) Recommendation from agency (Mayor in Kupang) document
   b) Health certificate
2) Documents from the province level
   a) Recommendation from province (same as above but for province level)
   b) Health certificate (a second blood sample is obtained)
3) Documents from the Governor of NTT level
   a) License to export documentation. This is free but can be a difficult process to attain

The bureaucracy of administrative requirements causes delays in processing. It was reported that 2-3 day delays are normal for signatures to individual documents above. Furthermore, it can take two weeks for the administrative paperwork to be completed whilst cattle are stuck in the quarantine facility.

Q **Recommendation:** Reduce unnecessary and duplicate documentation

Reduce the bureaucracy that has evolved to complicate the trade of cattle that causes delays processing cattle and increasing the likelihood that cattle are kept in quarantine for extended periods of time. Documentation that is produced at each level should be integrated to avoid duplicated processing and ensure only necessary administration is performed.

16 **Constraint:** Unloading at destination port

As per the international supply chain constraints observed in Lampung, the unloading of domestically traded cattle in Jakarta faces similar issues. These include, discharge platform inadequacy (see Photo 69 and Photo 70), poor port design and infrastructure (see Photo 72) and high traffic congestion (see Photo 71).

Photo 69: KPMG 2017, poor discharge platform infrastructure

Photo 70: KPMG 2017, poor discharge platform infrastructure

Photo 71: KPMG 2017, traffic at the port in Jakarta

Photo 72: KPMG 2017, poor infrastructure at the port in Jakarta

R **Recommendation:** Investment in unload infrastructure (Jakarta)

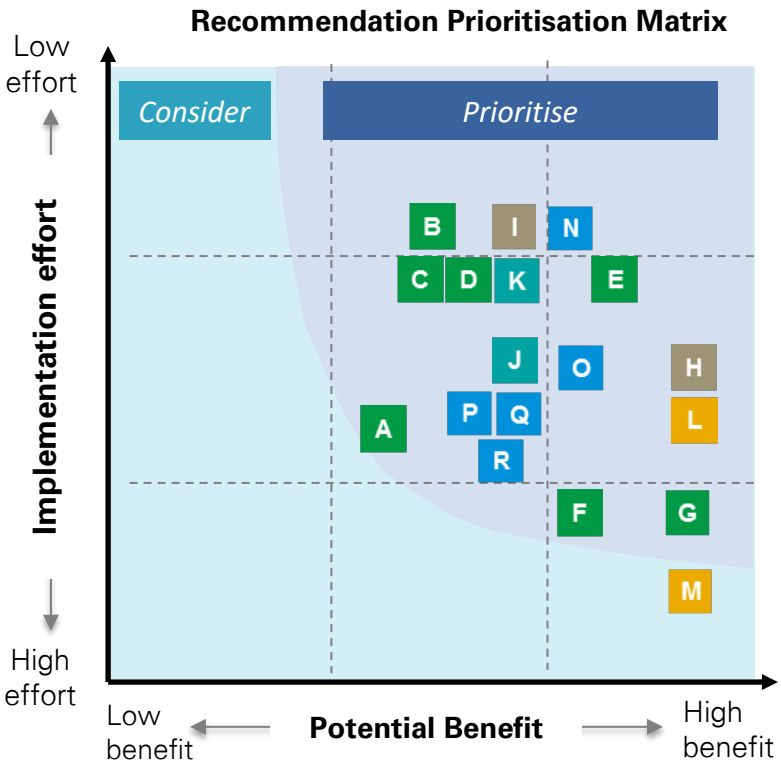
As per the recommendations for the Lampung supply chain, investments made at the receiving end of the supply chain (Jakarta) will facilitate smooth unloading and transport of cattle direct to the abattoirs or feedlots and will minimise any additional weight-loss that is currently caused by port delays, injury and stress during unloading and traffic at disembarkation.

7.2 Additional analysis and recommendations

Additional recommendations to improve the domestic supply chain include:

- a need to invest in all aspects of the supply chain, either publically or privately, to drive benefits for all stakeholders, minimise any of the hindrances currently experienced and to improve overall efficiency;
- further investigation and feasibility studies are required for a number of recommendations to generate a proposed implementation plan based on the scope of improvement required and the priority of improvements necessary;
- the supply chain recommendations made above need to be considered within the context of a traditional, immature and domestic supply chain that does not have well-established baseline qualities, and will not likely reach global standards in the near future, but does have capacity to improve in a stepwise approach;
- NTT farmers and enterprises should consider the establishment of a local slaughtering facility and manufacture products for local consumption directly and to produce finished goods (e.g. Bakso Balls). This would reduce the length of the supply chain and generate value add, economic and employment opportunities in the domestic market simultaneously removing issues related to quarantine and shipping induced weight-loss incurred when transporting via sea;
- further analysis is required to understand the rules of foreign ownership for vessels operated domestically - this could lead to more efficient operations, run by the private sector; and
- additional economic analysis is required to what financial impact the Government subsidy (~1.4 million rupiah / head or 750 million per shipment) is having in order to ensure the operation of the Camara vessel/s are economically viable.

5.2 Results summary



◔ Low effort/low benefit

◑ Moderate effort/moderate benefit

◕ High effort/high benefit

● Very high effort/very high benefit

Table 10: Associated implementation effort compared to potential benefit to assess prioritisation of recommendations

Supply Chain	Constraints		Recommendations	Effort to implement	Potential benefit
Domestic Farm	Nutrition	A B C D	Increase protein provision, improve grazing strategies, balanced vitamin/mineral provision, better engagement with farmers	◔	◑
	Lack of water provision	E	Water infrastructure investment	◔	◕
	Reproductive management and genetics.	F	Practical reproductive management	◕	◕
	Local farm breeding model	G	Review of the local farm breeding model	◕	◕
Transport	Cattle handling difficulty	H	Improve cattle handling	◑	◕

	High loading rates and poor design for cattle comfort	I	Loading rates and cattle comfort	◔	◕
Quarantine	Inadequately maintained handling and housing facilities	J	Quarantine facility upgrade or redevelopment	◑	◑
	Inadequate nutrition and water provision. Inadequate hygiene	K	Minimum standard housing	◔	◑
Loading	Loading ramp design	L	Mobile loading ramp, used for all truck unloading and loading	●	◔
	Dock dimensions	M	Dock redevelopment and expansion	◔	●
Shipment	Operation of the Camara Nusantara I	N	Adopt modern, efficient and publically accessible methods of booking cattle placements on vessels	◔	◕
	Weight loss and mortality	O	Appropriate provision of on board feed and water	◑	◕
	Key design shortfalls of vessels	P	Upgrade on-board infrastructure	◔	◑
	Documentation requirements	Q	Reduce unnecessary and duplicate documentation	◔	◑
	Unloading at destination port	R	Investment in unload infrastructure	◔	◑

6 Appendices

6.1 Stakeholder consultation

Table 11: Stakeholders consulted through the study

Attendees	Date	Location
Dr Himawan Hariyoga and BKPM representatives	19/09/2017	Jakarta
Gary Ashton (Austrex commercial manager - Australia)	20/11/2017	Phone
Daniel Pitts (Country Manager - Ben Line Shipping Agents)	28/11/2017	Jakarta
Jody Koesmendro (Logistics Working Group)	28/11/2017	Jakarta
Dr John Akerman (Industry expert)	28/11/2017	Jakarta
Dick Slaney (Programme Director, Indonesia-Australia Commercial Cattle Breeding Program), Muhammad Isradi Alireja (Programme Manager, Advisory and Support Group - ASG) and Ben Mullen (Strategic Adviser, ASG)	29/11/2017	Jakarta
Trish Gleeson (DAWR - Jakarta)	29/11/2017	Jakarta
General Buyang (Special Advisor to the Minister for transport – Ministry of Transport)	29/11/2017	Jakarta
Rocky Maza (Austrex Indonesia)	30/11/2017	Jakarta
Joni Liano (Indonesia Feedlot association)	30/11/2017	Phone
Andrew Simpson and Dr Valeska (MLA)	30/11/2017	Jakarta
Brooke Barkla (CPC - Lampung)	31/11/2017	Lampung
William Bullo (General Manager JJAA - Lampung)	04/12/2017	Lampung
Mrs. B Harpini (Quarantine Division - Ministry of Agriculture)	06/12/2017	Jakarta
Mr. Dinal Rifqi (Directorate General of Livestock and Veterinary, Ministry of Agriculture)	06/12/2017	Jakarta
Daniel Go (NTT cattle trader)	06/12/2017	Kupang
Martin Mullik (Faculty of Animal Science, Nusa Cendana University Jl. Adisucipto, Kupang, NTT)	07/12/2017	Kupang
Mark Odgers (Frontiers Australia Commercial Manger)	16/01/2018	Phone
Jody Koesmendro (Logistics Working Group)	16/04/2018	Jakarta
Douglas Wilson (Department of Agriculture and Water Resources)	30/04/2018	Canberra

**Various other informal discussions were held with other stakeholders during the field work process*

6.2 Literature Review

6.2.1 Introduction & summary

The purpose of this literature review is to identify existing ports being used in Indonesia and provide high level information about them, and analyse previous research and writing that will guide and inform us throughout each stage of the project. A comprehensive literature review will guide us in our discussions with key stakeholders and provide an overview of the Indonesian cattle supply chain and current state of the country's logistics. Further, it will assist us in identifying current programs being pursued by the government, potential sites to analyse and lastly, sources for benchmarking and leading practises.

6.2.2 Literature in scope

Table 12: Documents in scope, and additional documents sourced by KPMG

	Title	Author / Publisher	Year
A	Relevant Australian standards & regulations (e.g. ASEL Handbook, ESCAS)	Various	Various
B	Relevant Indonesian standards & regulations	Various	Various
1	Closing the Gap: Tackling Indonesia's Supply Chain Skills Challenge	Royal Melbourne Institute of Technology	2017
2	Cattle and beef Market Study	Australian Competition and Consumer Commission	2017
3	Indonesia First Logistics	The World Bank	2016
4	Indonesians Infrastructure: Stable foundations for growth	PricewaterhouseCoopers	2016
5	Logistics Challenges in Indonesia	The World Bank	2016
6	Indonesia Logistics – Fast Track or Derail?	Jones Lang LaSalle	2016
7	The Global Competitiveness Report	World Economic Form	2015 (and 2017-2018)
8	Indonesia's Connectivity and Logistics Challenges: Findings from World Bank advisory work for IPC	Connectivity and Logistics	2015
9	Economy-wide Impact of a More Efficient Tanjung Priok Port	Asia Development Bank	2015
10	Open for business? Investing in Indonesia's new era	The Economist	2015
11	State of Logistics, Indonesia	Center of Logistics and Supply Chain Studies, Institut Teknologi Bandung (ITB), Asosiasi Logistik Indonesia, Panteia/NEA, STC-Group and the World Bank	2015, 2013

	Title	Author / Publisher	Year
12	Maximising the potential for joint opportunities between Australia and Indonesia	The Australia-Indonesia Centre, ANZ & PWC	2015
13	Indonesia Maritime Hotspot	Maritime by Holland	2015
14	Challenges of Regional Connectivity in Indonesia	The World Bank	2013
15	Market Study: The Indonesian Cattle and Beef Industries	Australian Centre for International Agricultural Research	2011
16	Benchmarking the beef supply chain in Eastern Indonesia	Australian Centre for International Agricultural Research	2011
17	Value Chain Analysis for the NTT Beef Industry (2007)	Nimmo-Bell and Company LTD. & Indonesian Center for Agriculture Socio Economic and Policy Studies	2007
18	Indonesia's live cattle reforms strengthen trade relationship	Australian Live Export Council	2017
19	Supply chain performance of the Australian beef industry	Department of Agriculture and Food	2011
20	Supply chain performance Indicators for the Australian beef industry	UTS Scholars	2007
21	Guidelines on assessing port development priorities	JICA (Japan International Cooperation Agency)	2010
22	Indian buffalo meat in Indonesia: initial impacts on livestock exports	Meat and Livestock Australia	2017

6.2.3 Methodology

KPMG undertook a desktop and literature review and engaged with the Indonesia-Australia Partnership on Food Security in the Red Meat and Cattle Sector (The Partnership) to identify and compile previous research and writing regarding the Indonesian cattle supply chain.

This literature was then assessed and key and common themes identified. These key insights are summarised in the ensuing section of this report.

6.2.4 Results and key insights

International Australia-Indonesian supply chain

Meeting beef supply expectations is a constant undertaking

Australia has been the biggest player in the live import market for Indonesia for numerous years, with more than 60 per cent of Australia's live exported beef going to Indonesia.[21] Australia currently has a herd size of 29.3 million head of cattle of which less than 8 million are adults for slaughter, however of this number, even less cattle are suitable for the Indonesia live export market. Indonesians prefer *Bos Indicus* cattle that have slightly smaller carcass sizes and are suited to tropical climates. These cattle are bred and grown out

[21] 2 (refer to table 10)

across northern Australia, proximal to feedlot and port facilities. Despite this however, local beef prices in Australia are high – due to the low supply across the country.

Additionally, the seasonality of farming in northern Australia impacts the availability of cattle at certain times of the year. Stockmen typically source, transport and prepare cattle for shipping throughout the dry season, and not the wet season. This limits the availability of cattle to between November and May, and means that feedlots, ships and port facilities are in high demand over this same period. If the Indonesian market requires cattle outside of this period they can be hard to source and transportation costs from farm to port are significantly higher.[22] Additionally, the Indonesian quota system that stipulates cattle import limits is unpredictable and results in a pressures on the Australian supply chain to move cattle to ships quickly once permits have been granted – which can be costly.

Indonesia has strict import requirements for beef cattle, and Australia has to maintain its own national standards at all times.

Following investigations by the Australian Broadcasting Commission *Four Corners* television program and directives from the Indonesian and Australian Governments, stricter import requirements on live cattle for export were introduced. These include:

- A maximum live weight of 350kg at the date of shipping (Indonesian directive);[23]
- An annual quota of cattle that can be imported yearly (determined from the local price of beef), assigned through a permit system to a small group of importer/exporters (Indonesian directive);[24]
- The 5:1 breeder policy, whereby for every five cattle imported for slaughter one breeding cattle must also be imported to help reduce local supply issues, accelerate internal herd size increases and improve overall genetics of Indonesian cattle (Indonesian directive);[25]
- Compliance with ESCAS regulations (Australian directive);[26] and
- Compliance with animal welfare considerations (Indonesian and Australia direction).

Indonesia's approach to beef trade is changing – with Indian buffalo, self-sufficiency and the increased use of the cool supply chain all impacting the number of cattle entering

While Australia has a comparative advantage on beef, both live and boxed, to Indonesia – shifting demographics, socioeconomic conditions and local Indonesian government directives are shifting the typical beef trade between the two countries.

Indian Buffalo

There has been an influx of Indian Buffalo meat into the meat market in Indonesia, designed to reduce the high price of beef. Meat and Livestock Australia (2017) reported on how this has impacted upon demand for Australian cattle; however it should be noted that buffalo meat is largely purchased in the Jakarta wet markets, at only a fraction less than the price of fresh beef (with middlemen and traders taking the difference).[27] The Australian Government is working closely alongside their Indonesian counterparts to confirm the Australian commitment to providing high quality cattle, to keep this supply chain open.

Self-sufficiency

While Indonesia has in certain years imported up to 700,000 head of Australian live cattle, recent 'Jokowi' government direction to drive self-sufficiency in beef supply across the country is designed to reduce the number of cattle required year-on-year. Despite this, reports by the Australian Centre for International Agricultural Research (2011) state that Indonesia can currently only satisfy approximately two thirds of local

[22] 2, 12 (refer to table10)

[23] 2 (refer to table 10)

[24] 12 (refer to table 10)

[25] 18 (refer to table 10)

[26] A (refer to table 10)

[27] 22 (refer to table 10)

beef demand, so will continue to rely on imports in the near future.[28] Especially when herd productivity is restricted when female cattle are slaughtered in times of unmet supply.[29]

Refrigeration

There is almost no demand for processed, chilled beef products from Australia to Indonesia, at this point in time, due to a lack of cool supply chain infrastructure in Indonesia.[30] Were this to be improved, it is possible that slaughter and preparation of beef could be conducted in Australia and packaged produce sent direct to ports across Indonesia, in this way local demand could be directly fulfilled without the need for abattoirs and handling in Indonesia.

Despite these shifting policies, the Indonesian and Australian governments are looking for opportunities to better coordinate agribusiness development – designed to improve local production and capacity.[31]

Common themes across domestic and international supply chains

Current port and maritime supply chain performance is poor

While the Indonesian government is committed to addressing local logistics infrastructure, the growth rate of the industry itself is slow; a more competitive business environment for logistics providers is required.[32] Enhancing port performance will drive increases in maritime supply chain productivity, encourage private sector investment and better coordinate domestic and international shipping with trade (minimising low backhaul – where ships return with limited to no cargo).[33] Overcoming inefficiencies across the sector, e.g. through foreign investment which is currently limited, through public and private coordination of business or through centralisation of regulatory clearance, will ensure that the cost of shipping is reduced, as acknowledged by The World Bank (2013).[34]

Current cattle supply chains across existing international and domestic maritime routes have significant associated costs; in response to this the Indonesian government released a 'Logistics Blueprint' to initiate systems to improve domestic self-sufficiency in cattle production reducing the need for local or international beef shipping.[35] Port 'performance' is also limited by burdensome regulation– this includes varied central and localised governance systems, tariffs and tolls and overall port visitation costs (e.g. attributed to inspections, customs, permit fees and non-pick up).

The Australian Centre for International Agricultural Research in its 2011 benchmarking report notes that many port facilities are not around-the-clock functioning logistics hubs, this leaves ships with either live cattle or chilled products with long periods of 'dwell' time.[36] Furthermore, the majority of beef processing occurs through Jakarta or Lampung, both large cities – but isolated from a number of domestic demand hotspots. This can result in loss of cattle live weight due to long dwell time, over handling, poor management and reliance on centralised feedlots and abattoirs.[37]

Key supply chain enablers, such as good human resources, infrastructure and facilities are lacking

There are a number of acknowledged operational and capital investments lacking across the Indonesian supply chain that would significantly enable improved maritime logistics, including the trade of beef. Most notably, infrastructure – both soft and hard – is poor. Port facilities are often in meagre condition, or not serviced by adequate road and warehousing networks, leading to bottlenecks at the site of the port and

[28] 15 (refer to table 10)

[29] 15 (refer to table 10)

[30] 2, 15 (refer to table 10)

[31] 15 (refer to table 10)

[32] 1, 3 (refer to table 10)

[33] 1, 3, 5, 10 (refer to table 10)

[34] 14 (refer to table 10)

[35] 15 (refer to table 10)

[36] 4, 5, 6, 9 14 (refer to table 10)

[37] 17 (refer to table 10)

increases unreliability along the supply chain (not to mention the degraded loading and unloading equipment used at port sites).[38]

Additionally, despite Indonesia having an excess of labour resources, ports are not serviced by qualified or skilled people. In relation to the beef in particular the quality and quantity obtained from a carcass after slaughter can be influenced by the handling of the cattle both at port and at sea.[39] Furthermore, Jie *et al.* (2007) note that soft skills, such as ICT abilities are low – Indonesians still manually record, process and transact a significant portion of their business, which typically leads to delays as port approvals procedures are sequenced methodically rather than simultaneously processed digitally.[40] In some instances the current system of clearance steps means cattle are left on-board losing live weight.[41]

Finally, nearly all Indonesian ports, and the majority of domestic Indonesian businesses themselves, do not have cold chain storage facilities, requiring feedlots and abattoirs to be located close to ports or abundant transport to move beef to wet market sites.[42]

Indonesian domestic supply chains

The Indonesian Government recognises the importance of logistics, and in particular ports, to improving economic output

The Indonesian Government, led by the 'Jokowi' administration, has laid down a clear legislative and policy guideline on the need to lift Indonesia's economy; through which logistics networks and supply chain functionality is a vital building block.[43] Indonesia's unique demographics and geography however have historically, and in many capacities still do, limit the ability of the businesses to derive and generate value across the country though. The 'Jokowi' administration has set a long term goal, off the back of the Global Financial Crisis' economic downturn, to improve the movement of goods across the country, to improve development and rectify the downturn in poverty reduction.[44] One such way in which this has been flagged, is through confirmed (or intended) procedural and infrastructure improvements in port efficiencies and transparencies, through promotion of maritime logistics to linking local supply chains and through tackling costs.[45] Inter-island shipping is said to cost in some instances as much as 24 per cent of the total final sale value of goods.[46]

Additionally, regulatory burdens imposed by the Indonesian Government are acknowledged by the leadership itself as being burdensome and expensive. Measures are being taken by the government to remove unnecessary port processing requirements where possible.[47] In totality, the government has allocated a significant portion of money, and received loans from the World Bank, to invest in maritime logistics and supply chains.

The geographical fragmentation of logistics in Indonesia needs to be overcome

The geographic formation of Indonesia as itself is an inherent limitation in generating efficiencies across supply chains for the country. As an archipelago, maritime logistics is a necessity – especially if Indonesia is going to grow its economy significantly in the near future.[48] Better linking both the main islands and their ports (e.g. Tanjung Priok in Java) with smaller localised facilities will help reduce the pressure of local Indonesian socioeconomic demands for goods, and drive an increase in international trading viability.[49] Within the government's 'logistics blueprint' plan, 24 ports have been identified for significant upgrades to

[38] 3, 5, 6, 12, 17 (refer to table 10)

[39] 1 (refer to table 10)

[40] 7 (refer to table 10)

[41] 17 (refer to table 10)

[42] 10 (refer to table 10)

[43] 1 (refer to table 10)

[44] 2, 3 (refer to table 10)

[45] 3, 5 (refer to table 10)

[46] 1, 6, 15 (refer to table 10)

[47] 9, 10 (refer to table 10)

[48] 1, 3, 6, 12 (refer to table 10)

[49] 1 (refer to table 10)

both port and supporting infrastructure to reduce the fragmentation of supply chains and inter-island bottlenecking that is caused by current port facilities high dwell time and inefficient processing.[50]

For the beef inter and intra-island supply chains in particular, the archipelagic geography is also an issue. The lack of, poor quality and variation of port facilities and supporting infrastructure across the country is limiting the ability of beef, both live and processed, to be shipped to high demand, low supply destinations. The overall process of moving cattle between islands is costly – Sandee (2013) reports that nearly 40 per cent of the final price of beef can be attributed to the fees, levies, port taxes and poor infrastructure of the logistics in the supply chain – this is even higher for boxed or processed meat due to the cost and facilities required for refrigeration.[51] Additionally, the variation in administration at the local and central government level impedes cattle trade between islands further.[52]This has resulted in a key government direction introducing self-sufficiency regulation to encourage local beef production and reduce the need for inter and intra-island trade.

Conclusion

Through the literature review, a number of key themes were identified in relation to both the domestic and international supply chains. Significantly, the lack of port infrastructure, the poor service logistics and operations (including roads and transporting to and from ports) and the lack of suitable human resources are key issues in Indonesia. There is significant scope to improve the ability of the live cattle supply chains. A number of improvement opportunities have been identified and recommendations made to rectify these issues to improve the efficiency and effectiveness of the cattle trade (within the scope of regulations enforced by both the importing and exporting countries).

[50] 3, 4, 10 (refer to table 10)

[51] 14, 17 (refer to table 10)

[52] 14 (refer to table 10)

6.2.5 Bibliography

Table 13: Literature review bibliography

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6.3 Regulatory Review

6.3.1 Importation to Indonesia:

Brief summary

Import procedures require meticulous attention to detail. Insignificant documentary omissions or errors can result in considerable delays enforced at sea. The number of requirements that are imposed are numerous, see Table 14.

Table 14: Summary of regulatory review findings

Import Requirements	Beef	Cattle
General Considerations	The most recent regulation relating to beef products refers to fresh, chilled and frozen carcasses, half carcasses, bone-in and boneless beef and offal (Ministry of Trade Regulation No. 13/M-DAG/PER/2/2017).	Cattle imports into Indonesia have been strictly regulated by the Indonesian Government via weight limits per head of cattle and cattle ratios for each importer (exclusive of breed or herd size).
	In early 2017, Indonesia lifted average weights and cattle ratios for each importer. **Weight limits:** • For large ruminants: — Feeder cattle : 450kg with maximum age of 48 months for feeder cattle (min 4 months fattening is required); — Breeding cattle: age ranging between 18-36 months for cow and 36-60 months for buffalo; and — Productive Bulls: age ranging between 24-36 months for bull and 24-48 months for buffalo. • For small ruminants, no specific weight limits. **Ratio of breeder** For all feeder cattle, breeder cattle are also required in the ratio of 5:1, feeders to breeders.	
Who are eligible importers?	• Private companies; • Government or regional government-owned enterprises; • Social institutions which have a legal entity and a local presences; and • Foreign countries/international organisation representative which has a local presence.	• Corporations; • Cooperatives; and • Groups of farmers.

Import Requirements	Beef	Cattle
Licensing & permits and other requirements	Australia has received permission to export beef subject to cattle being pre-cleared of Foot and Mouth Disease, Rift Valley Fever, bovine pleuropnemonia and bovine spongiform encephalopathy (mad cow disease). Beef is also required to have records of its transportation duration, evidence of halal slaughter (if required), packaged within standards and have an import report permit.	Where cattle have originated in Australia, there must be evidence of freedom from Foot and Mouth Disease, Rift Valley Fever, bovine pleuropneumonia and any plague (carried by animals). Cattle must be from farms or premises that are registered and approved, have an import permit and be sourced and supplied by an importer who can submit a realisation report at least seven days after import.
Regulations in relation to import processes	Beef import process involves: 1. Recommendation letter from Ministry of Agriculture; and an 2. Import Permit from Ministry of Trade.	Cattle import process involves: 1. Recommendation letter from Directorate General of Agriculture – specifically the Directorate General of Livestock; and an 2. Import Permit from Minister of Trade.
Chargeable sanctions	If regulations are not followed, there are a number of sanctions that can be incurred: 1. One year suspension of import recommendation for: a. import without having an import permit and/or a recommendation letter approval; b. disobeying requirements related to transportation duration; c. import without having Business License or Registration in livestock and animal health business; and d. disobeying requirements on cold storage availability. 2. Sanctions imposed in relation to providing any invalid information: a. a first warning is followed with a year suspension of import recommendation for the second interdisciplinary action in relation to disobeying reporting procedures; and b. the first warning is followed with a six month suspension of import	If regulations are not followed, there are a number of sanctions that can be incurred: 1. One year suspension subject for: a. Providing any un-truthful information; and/or b. Failure to comply with requirements on importation: i. cattle ratio; ii. cattle weight (a sanction is applied if the importer fails on the second import); iii. to hand-over the recommendation letter; iv. compliance related to import realisation; and v. mandatory reporting.

Import Requirements	Beef	Cattle
	recommendation for the second interdisciplinary action in relation to any changes on the recommendation letter which has been issued.	

6.3.2 Transportation

Brief summary

General guidelines on beef and cattle transportation issued mostly by the Ministry of Agriculture include:

Table 15: Summary of transportation requirements

	Beef	Cattle
General Considerations	1. Transportation used for beef shall not be used for other products (non-beef); 2. Vehicles must have a maximum temperature during travel (greater than two hours) 3. Beef must be properly covered; 4. Beef must be transported directly from the origin country to Indonesia; 5. Beef must follow the quarantine procedures in the country of origin and in Indonesia; 6. Cold storage facility is required during shipment; and 7. Products of Halal and Non Halal slaughter should not be mixed in one container.	1. Must be transported directly from the origin country to Indonesia; 2. Must follow a quarantine process; 3. Unhealthy cattle must be separated; and 4. Standards of animal welfare must be maintained during transportation (including freedom from hunger and thirst, freedom from pain, injury and disease, freedom from discomfort, harassment, exploitation, freedom from fear and stress and freedom to express their normal behaviour).

Specific, key regulations

Regulations for beef and cattle transportation requirements are included in:

- Government of Indonesia Regulation No. 95 Year 2012 - regarding Animal Health and Veterinary Public Health;
- Ministry of Agriculture Regulation number 34/PERMENTAN/PK.210/7/2016 - regarding the importation and supervision of carcasses, meat and edible offal;
- Minister of Agriculture Regulation No 49/PERMENTAN/PK.440/10/2016 (amended by Ministry of Agriculture Regulation No.2/PERMENTAN/PK.440/2017) - regarding cattle importation; and
- Minister of Agriculture Decree Number 413/Kpts/TN.3110/7/1992 – regarding cattle slaughter and meat (as well as the handling of its by-products).

6.3.3 Quarantine procedures

Brief summary

Quarantine requirements for importation into Indonesia apply for both beef and cattle:

1. Must be distributed through authorised ports/locations;
2. Must be reported to the official quarantine officer;
3. Meet the following administrative requirements:
   - b) beef:
     - requires a sanitary certificate to be issued by the official veterinary body of the origin and transit countries; and
     - routine documentary requirements including shipping documents and declaration statement of disease free status.
   - a) cattle:
     - requires a health certificates issued by official veterinary body of the country of origin and transit countries.
4. Technical requirements include:
   - steps to be taken by quarantine officers during inspection; and
   - temperature records.

Note: there are some exceptions permitted under certain qualifying conditions.

Quarantine Procedures for importation into Indonesia:

1. Document submission;
2. Technical and physical inspections, including:
   a. Clinical inspection;
   b. Organoleptic inspection of samples; and
   c. Laboratory, pathology, biological testing, diagnostic testing or other methods of ensuring imported products are disease free.

Specific, key regulations;

Regulations for beef and cattle quarantine requirements are included in:

- The Republic of Indonesia Law Number 16 Year 1992 on Animal Quarantine;
- The Government Regulation of RI No. 82/2000 on Animal Quarantine;
- The MOA Regulation No 94/Permentan/ OT.140/12/2011 on Place of Entry and Exit of Animal Quarantine Disease and Plant Quarantine Pest Carrier; and
- The Minister of Agriculture Regulation No 113/Permentan/PD.410/10/2013 regarding Quarantine Measures for the import calves, breeding cattle and cattle for slaughter into the Territory of Indonesia (this regulation implements article 59 of Government Regulation no 82 of 2000 regarding quarantine measures to prevent the spread of pests and other animal disease).

6.3.4 Feeding

Brief summary

The Indonesian Government has set national guidelines for expected cattle feedlot practice, including for:

1) Infrastructure, including:

a) location;
b) land; and
c) adequate water and electricity supply.

2) Input and facilities, for:
   a) breeding cows and bulls;
   b) animal feed;
   c) equipment and machinery;
   d) medicines and additives (pre-mix and natural); and
   e) buildings – including size and construction.
3) Standard procedures, for:
   a) intensive farm system – a production approach to maximise production output by keeping cattle in a pen with sufficient feed and water, this is commonly used for calves, after weaning different production requirements need to be met;
   b) semi-intensive farm system – a mixed system between intensive (raised in pen) and extensive (raised outside pen), note that cattle need to have a mixed feed supply; and
   c) extensive farm system – typically managed outdoors, cattle are free to graze and able to move around at will, this system also includes provisions for:
      i) young cattle/calves;
      ii) calves after weaning period;
      iii) productive cattle;
      iv) pregnant cattle; and
      v) bulls.
4) Breeding for:
   a) use of natural breading and artificial insemination, with standard procedures including natural breed ratio; and
   b) non in-breeding.
5) Record management, to list specific records to be maintained by farm operators; and
6) Animal health and welfare standards.

Specific, key regulations

Regulations for beef and cattle feeding requirements are included in:

— The Minister of Agriculture Regulation number 46/Permentan/PK.210/8/2015 (the amendment of the Minister of Agriculture Regulation number 05/Kpts/OT.210/1/2002 and 419/Kpts/OT.210/7/2001)

6.3.5 Breeding

Brief summary

The Indonesian Government has set national guidelines for expected cattle breeding practice, either for extensive or intensive systems, including for:

1) Infrastructure, including:
   a) location and land shall follow spatial layout plan,
   b) specification for environmental management and monitoring effort;
   c) consider topographical relief and environmental functions;
   d) presence of zoonotic/animal disease;
   e) transportation access; and

f) adequate feed, water and electricity supply.

2) Input and facilities, including:
   a) Buildings shall include at least pens, a warehouse, and water-waste drainage system (and shall have good quality standards, be easy to clean and have adequate facilities to support farm operations) and shall follow specific guidelines on administrative and office spaces, pen layout and design and cage construction (and standards);
   b) Equipment to provide feed, water supply and storage, health and cleaning utilities and identification signs (including breeding equipment, which is only required for corporate and state owned/regional government companies); and
   c) Feed and medicine standards, including:
      i) farmers shall provide adequate and good quality, either shelf mixed or registered, prepared feed from green feed, horticulture sources and concentrate; and
      ii) be supplied with registered medicines which contain premix and natural medicine based on prescribed standards.
3) Breeding and handling procedures, including:
   a) Breeding procedures shall follow government standards on breed cattle breeding and handling, including:
      i) Feeding procedures will consider nutrition which depends on the cattle's physiology and extensive or intensive systems in place;
      ii) Handling procedures are prescribed based on extensive or intensive systems and are specific for calf, teen cattle, breeder pregnant cattle, breeding and productive bulls; and
      iii) Breeding procedures are prescribed and followed, including for:
         (1) mating/breeding;
         (2) recording;
         (3) breed cattle selection and
         (4) replacement stock and cutting.

Specific, key regulations

Regulations for beef and cattle breeding requirements are included in:

- The Minister of Agriculture Regulation number 42/Permentan/OT.140/3/2014 regarding Production and Distribution of Breeding Cattle

6.3.6 Other specific regulations regarding animal welfare

Brief summary

The farm must implement appropriate animal welfare practices during transportation, and throughout subsequent breeding and slaughtering stages. This includes:

- *following standards on hygiene and sanitation;*
- guaranteeing freedom from other animal products; and
- guaranteeing freedom from zoonotic and other animal contagious diseases control.

Additionally, all stakeholders in the value chain to obtain a Veterinary Control Number ("NKV").

<u>Animal welfare standards in feedlots:</u>

- Every stage of a cows production process shall not cause injury, pain and stress;

- Infrastructure condition, equipment and tools shall be kept clean and ensure that they do not cause pain, injury and discomfort/stress;
- Pens should provide adequate areas for movement and prevent any outside predation or threats;
- Adequate feed and water must be provided at all times; and
- inferior and superior cattle shall be separated as required.

Animal welfare standards during transportation:

Freedom from:

- hunger and thirst;
- pain, injury and disease;
- discomfort, harassment, exploitation;
- fear and stress; and
- an inability to express their normal behaviour

Specific, key regulations

Regulations for beef and cattle animal welfare requirements are included in:

- The Government of Republic of Indonesia Regulation Number 95 Year 2012 concerning Veterinary Public Health and Animal Welfare (as amendment of the Government of Republic of Indonesia Regulation Number 22 Year 1983 concerning Veterinary Public Health).

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