

MODELS OF HORIZONTAL COLLABORATION IN AGRIFOOD EXPORT SUPPLY CHAIN: THE CASE OF QUEENSLAND'S MANGO INDUSTRY

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ABSTRACT: The horticulture sector in Queensland, Australia, is highly diverse, producing tropical fruits, citrus, vegetables and nuts. However, domestic demand for many horticulture products is saturated in peak seasons, leading to a low farmgate price. Therefore, the export of high-value horticulture products to Asia may offer producers market diversification, which could contribute to the future growth of horticulture industries in Queensland. Yet, in situations where there are large numbers of small- and medium-scale producers, it is unclear how this could be achieved since supply consolidation is needed for product export. Hence, this study aims to assess which entities and links within the export supply chain are considered as important by stakeholders of Queensland's mango industry and to identify forms of potential horizontal collaborations between mango producers. This study uses a qualitative research approach consisting of a

stakeholder workshop which was designed based on a literature review and face-to-face scoping interviews with mango industry stakeholders. The study found that while there are already discrete collaborations existing among mango farmers in some regions of Queensland, cross-regional horizontal collaboration supported by producers, grading and packaging shed owners and wholesalers can improve the export supply chain. Factors identified as affecting the potential success of horizontal collaboration in export include product quality, access to market information, risk-sharing among supply chain actors, leadership, and management skills. However, improved vertical coordination or supply chain integration may also be required to increase the effectiveness of horizontal collaborations.

KEYWORDS: Australia, export, coordination, integration, horizontal, mango, supply chain

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1. INTRODUCTION

About 135,000 hectares of land is currently used in Queensland for perennial and annual horticulture production, with about 34.5 million hectares potentially available to increase production (Department of Agriculture and Fisheries (DAF), 2018). The state produces a large variety of tropical fruits, citrus, vegetables, and nuts. By production volume, bananas are the state's major horticultural product. While the bulk volume of horticulture products produced in Queensland is supplied to the domestic market, the state exports fruits, and vegetables at a value of about A\$300 million to Asian markets annually (Goodman, 2019). By volume, mangos, mandarins, macadamias, and melons are the state's main horticulture export products (Hort Innovation, 2019).

There are opportunities for the growth of Queensland's horticulture sector by developing improved export supply chains, particularly for high-value perishable commodities (Acil Allen Consulting, 2019; Regional Development Australia Darling Downs and South, 2016; Sun, 2016; Department of Agriculture, Fisheries and Forestry (DAFF), 2013; DAFF, 2014). Trade Investment Queensland (TIQ) predicted that the export volume of Queensland agriculture products could be doubled in future through enhanced supply chain collaboration, increased productivity,

product innovation, development of access to new markets, and provision of tax incentives for farmers and exporters (TIQ, 2019).

Yet, horticulture export will require product consolidation to ensure consistent supply in product volume and quality (Ash, 2017; Sun, 2016). This requires collaboration among small- and medium-sized producers across local and regional levels (Australian Mango Industry Association (AMIA), 2015). However, it is unclear which entities should be involved in a collaborative supply chain model and how enhanced collaboration among the high number of small- and medium-sized producers could be achieved. While some studies have explored the issues and challenges of export-oriented agricultural supply chains, highlighting a range of barriers associated with the production, processing, trade, transport and logistics (Ash *et al.*, 2017; Wegner, 2017; McCarthy, 2015), few have explored horizontal collaboration models in supply chains. In addition, supply chain features and processes that are required to improve the distribution networks to international markets have not been presented in the literature.

Hence, the aims of this study are to assess which entities and links within the export supply chain are considered as important by stakeholders and to identify forms of potential horizontal collaborations between producers. To achieve this, the mango supply chain in Queensland was selected as a case study.

The Queensland mango industry produces about 50,000 tonnes of fresh fruit annually (AMIA 2015), which accounts for 80% of Australia's total mango production (DAF, 2018). The majority of mangos is supplied to the domestic market as fresh fruit, canned or dried product. However, during bumper production years or during peak season, a large volume of mangos, mostly the non-premium grade mangos, is discarded due to market saturation (McKillop, 2015). The mango industry in Queensland already exports small volumes (about 12% of total production) of fresh fruits to Asian markets (DAF, 2018), predominantly by large-scale producers. Mango production in Queensland has the advantage of a staggered seasonal product supply because of the diversity of regions and climate zones (Figure 1), allowing supply from August to April (DAF, 2018), which is counter-seasonal to Asian mango producers. The industry has identified the potential to expand production and export volumes but grapples with the identification of supply chain models that offer small- and medium scale mango farmers the opportunity to integrate with export networks.

This study uses a qualitative research approach consisting of a stakeholder workshop which was designed based on a literature review and face-to-face scoping interviews with mango industry stakeholders. This

research work contributes to the literature as a case study about horticulture export supply features which are relevant for industries in Queensland but may also be of interest for horticulture industries in other regions of Australia or elsewhere.

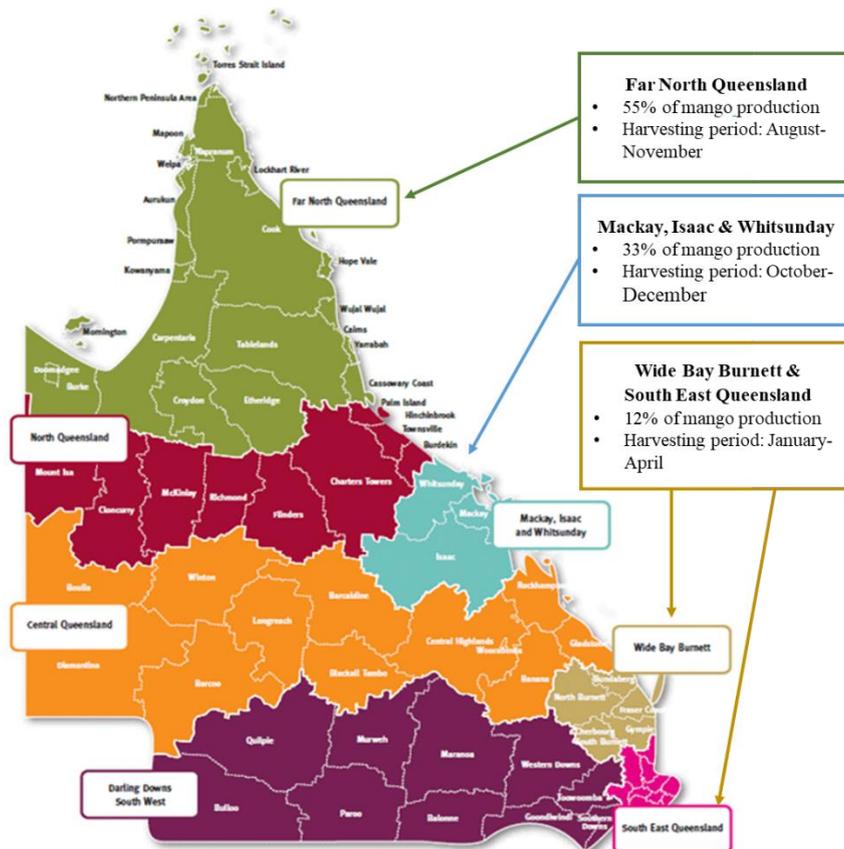


Figure 1. Mango Producing Regions and Harvesting Periods in Queensland. Source: Queensland Government (2017) and DAF (2018).

2. AGRICULTURAL SUPPLY CHAIN COLLABORATION: CONCEPTUAL FRAMEWORK

Agricultural supply chain collaboration (ASCC) refers to a joint initiative of two or more organisations involved in a supply chain to work together with the aim to achieve shared goals through joint planning (Armayah *et*

al., 2019; Cao and Zhang, 2011). ASCC can be either strategic or opportunistic (Figure 2), depending on the inter-dependency between the collaborative enterprises and the mutual risk and uncertainty management capacity.

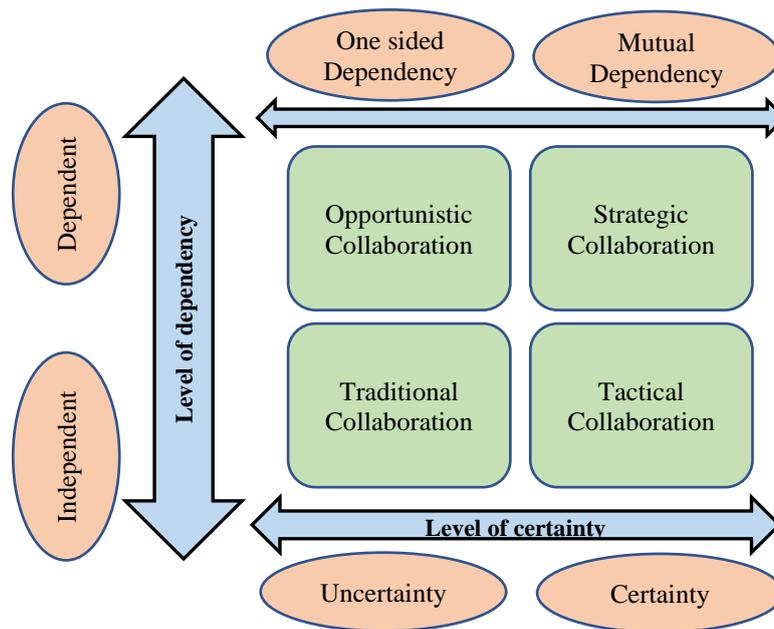


Figure 2. Purpose of Supply Chain Collaboration. Source: Adopted from Cousins (2002).

In the opportunistic case, the collaborators attempt to achieve short-term outcomes such as looking for a high return on investment but are unlikely to share risks and uncertainties. Traditional collaborations are typically based on informal trust and local leadership but under the current environment of corporate governance, liberalisation and movement of capital, market and technology, such type of collaboration does not work for a long term but can be short-lived (Cousins, 2002). Tactical collaboration follows opportunistic collaboration, but within a geopolitical context, some investors or entities require tactical collaborators. For example, to develop an export supply chain in certain countries, importers or investors require some tactical collaboration with the country of destination of certain products. Strategic collaboration is built upon mutual understanding and trust developed over time, where the focus is to gain

consistent and long-term returns. Sharing resources and information are common actions in strategic collaboration. This model leads to a better governance approach for the supply chain, but it usually takes time to establish. Strategic collaboration deals with both horizontal and vertical coordination and integration for a sustainable agricultural supply chain development (Matopoulos *et al.*, 2007; Dania *et al.*, 2016).

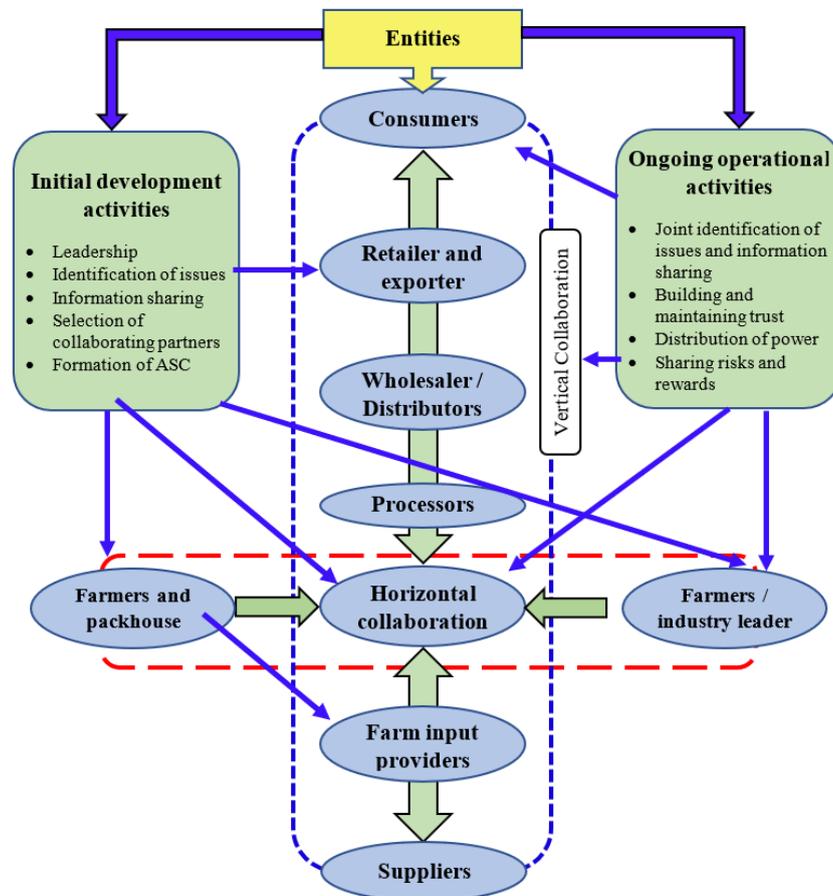


Figure 3. Conceptual Framework of Agricultural Supply Chain Collaboration. Source: Adapted from Barratt (2004), Matopoulos *et al.*, (2007) and Liao *et al.*, (2017).

A conceptual framework of agriculture supply chain collaboration based on the strategic supply chain development approach is presented in Figure

3. There are two major components in this framework, i.e., horizontal coordination and vertical integration. The same type of enterprises, such as mango farmers, can coordinate or collaborate themselves horizontally regarding the availability of supply volume and to gain market power. Horizontal collaboration amongst producers can be crucial to supply the right amount of produce at the right time in a scenario not otherwise possible for individual growers. Horizontal collaboration targets at growers and growers' associations who may be involved collectively in a supply chain (Figure 3). On the other hand, a top-down or bottom-up or a mix of top-down and bottom-up approaches requires supply chain entities to organise and distribute the product to the consumers via retailers. This is also known as vertical integration. Vertical collaboration engages growers, farm input service providers, processors, wholesalers, retailers, exporters and consumers who are directly involved with the supply chain (Figure 3). The success of vertical integration depends on profit, risk, information, and power-sharing among the direct stakeholder stakeholders, while the success of horizontal collaboration depends on consistent farm gate price and leadership among the producers, packhouse owners and extension workers (Matopoulos *et al.*, 2007; Akbar *et al.*, 2020).

3. METHODS AND MATERIALS

To identify desired entities and links within the mango export supply chain as well as forms of potential horizontal collaborations between mango producers a new supply chain collaboration model needed to be developed (Dania *et al.*, 2016). This was done using a qualitative research approach, which consisted of four steps. First, a literature review about the theory and practice of ASCC was undertaken to develop a conceptual model for identifying and testing the horizontal collaboration. The second step was comprised of scoping interviews with farmers, representatives of industry peak bodies, and other relevant stakeholders to understand past and present context and challenges of horizontal collaboration in Queensland's horticulture industries. This included the visit of five major horticulture regions in Queensland, i.e., Bundaberg, Emerald, Rockhampton, Bowen and Mareeba. Third, workshop tools and supply chain models were designed based on the first two steps. The research team conducted a pilot interview for developed workshop tasks via telephone and face-to-face conversation. The fourth step was a supply chain stakeholder workshop held in March 2019 to identify and analyse confirm features of the export supply chain model, potential issues in forming both

horizontal collaboration within this model and mechanism to implement such a model. The workshop focused on three fruit products, which are mangos, avocados, and lychees.

Furthermore, the workshop consisted of three segments, which comprised of expert presentations on policy, an individual task, and a group task (see Appendix 1). The expert presentations provided an overview about policies, standards, existing export models, opportunities, and mechanism of ASSC and the export of high-value perishable agriculture commodities to the Asian markets. This was intended to provide context for the workshop segments that followed. During the individual task, participants were asked to identify important export supply chain entities from the initially drafted models (see above) for each fruit product and to identify the most appropriate links among the entities. The same task was repeated in the group task (one group for each fruit) with the aim to discuss individual's perception about potential collaborative models and to achieve consensus among the participants of the group about the relevant supply chain entities, their role and links and suitable forms of collaborations among entities, and specifically the producers. The group for each group was comprised of stakeholders who are most familiar with the individual fruits, its industry, and its supply chain.

The written notes which participants made on the draft model during the individual and group tasks were collected and analysed. The group task discussion was recorded and assessed. The derived export supply chain models from the collected data were developed based on the individual and group tasks for the mango industry supported by thematic and narrative analysis. The key findings were summarised and discussed by triangulating the results from the individual and group tasks.

Ethical approval for primary data collection was provided by the author's research institution (approval number: 0000021380). To ensure the involvement of a cross-section of stakeholders, the research team invited about 50 participants representing Australian and Queensland government departments, local governments, regional economic development organizations, peak agricultural bodies (e.g., Growcom, Hort Innovation), Austrade, Trade and Investment Queensland (TIQ), local farmers' association(s), and exporters or forwarders.

The research team invited 50 potential participants for a six-hour workshop. Twenty-eight persons attended face-to-face on-site, and one stakeholder participated through a virtual platform. Most participants represented farmers groups or were state government officials or researchers. Most stakeholders have overarching interest across three

industries, however, mango farmers, a local exporter and a local economic development officer have a particular interest in the mango industry. Each stakeholder participated in the individual task and the group task. One-third of all workshop participants took part in the group task for the mango industry.

The group which represented the mango group was comprised of one producer, two government officers, one exporter, two researchers and one local business representative.

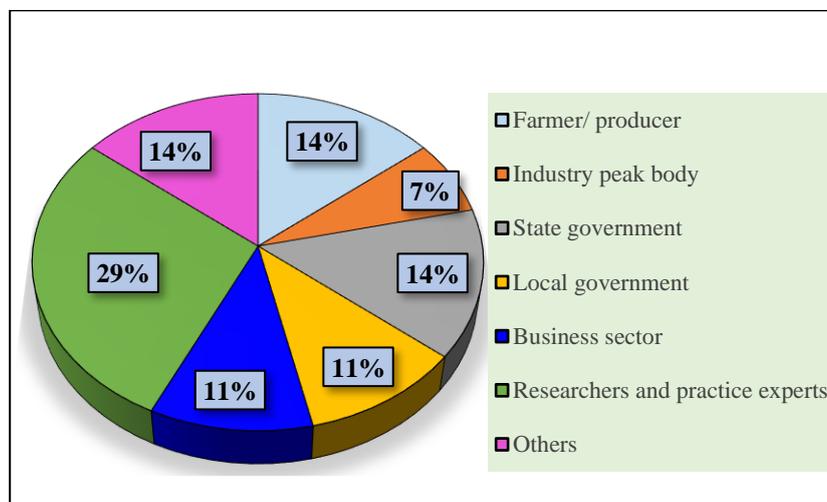


Figure 4. Workshop Participants and Stakeholder Group Representations.
Source: the Authors.

4. RESULTS AND DISCUSSION

Individual Task Results

The analysis of participant's notes from the individual task identified several critical issues that relate to the production stage. The most critical issues identified are water availability, cost of production and quality. Transportation and technologies were also identified as important issues. Interestingly, none of the participants thought that direct government support and foreign investment were very important challenges for the future growth of the horticulture sector. However, 48% of respondents believed that domestic investment is vital for this sector, and about 75% of respondents rated market access as the most critical issue.

The findings for the mango-specific data are illustrated in Figure 5, which reveals two major preferences among the participants. The solid lines in the figure indicate a strong relationship, while the dotted lines indicate a moderate relationship. Most participants identified producers, selling agents, exporters, and retailers as the key actors within the export supply chain. About 41% of respondents indicated that selling agents would be vital to draw a linkage among the producers and exporter and/or retailer (Figure 5a). They also stated that selling agents could act as an exporter to supply the product to consumers via retailers. However, 27% of participants acknowledged a similar relationship, but unlike the first group, they saw selling agents as not being essential actors in the horizontal collaboration model (Figure 5b). Both groups recognized the importance of genetics companies (input providers) and technology providers in the supply chain. About 31% of the participants either chose only producers or none of the supply chain entities for horizontal collaboration.

An interesting outcome of the individual exercise was the addition of packhouses into the distribution model, which was not initially included in the draft collaboration model diagram. The research team assumed that processors would be more appropriate actors for the export supply chain; however, the participants thought differently. Most participants specified that packhouse facilities should be linked with the producers and act as a single actor within the horizontal collaboration (Figure 5a). This exercise also revealed the preference of participants to avoid wholesalers and distributors in the supply chain.

Group Task Results

The findings from the group task are shown in Figure 6. This collaborative export supply chain model was developed based on the agreement of all or most of the participants within the group. During the group discussion, the example of Manbulloo mangos was mentioned repeatedly, which is a mango producing business that produces fruit on a relatively large scale and exports mangos to Asian markets. This company established a vertically integrated supply chain model. Participants highlighted that this model is not appropriate in the context of small- and medium- scale mango producers in Queensland. The derived export model is comprised of key entities which include genetics companies, technology providers, producers, packing houses, processors, selling agents, exporters, retailers, domestic and international customers (Figure 6).

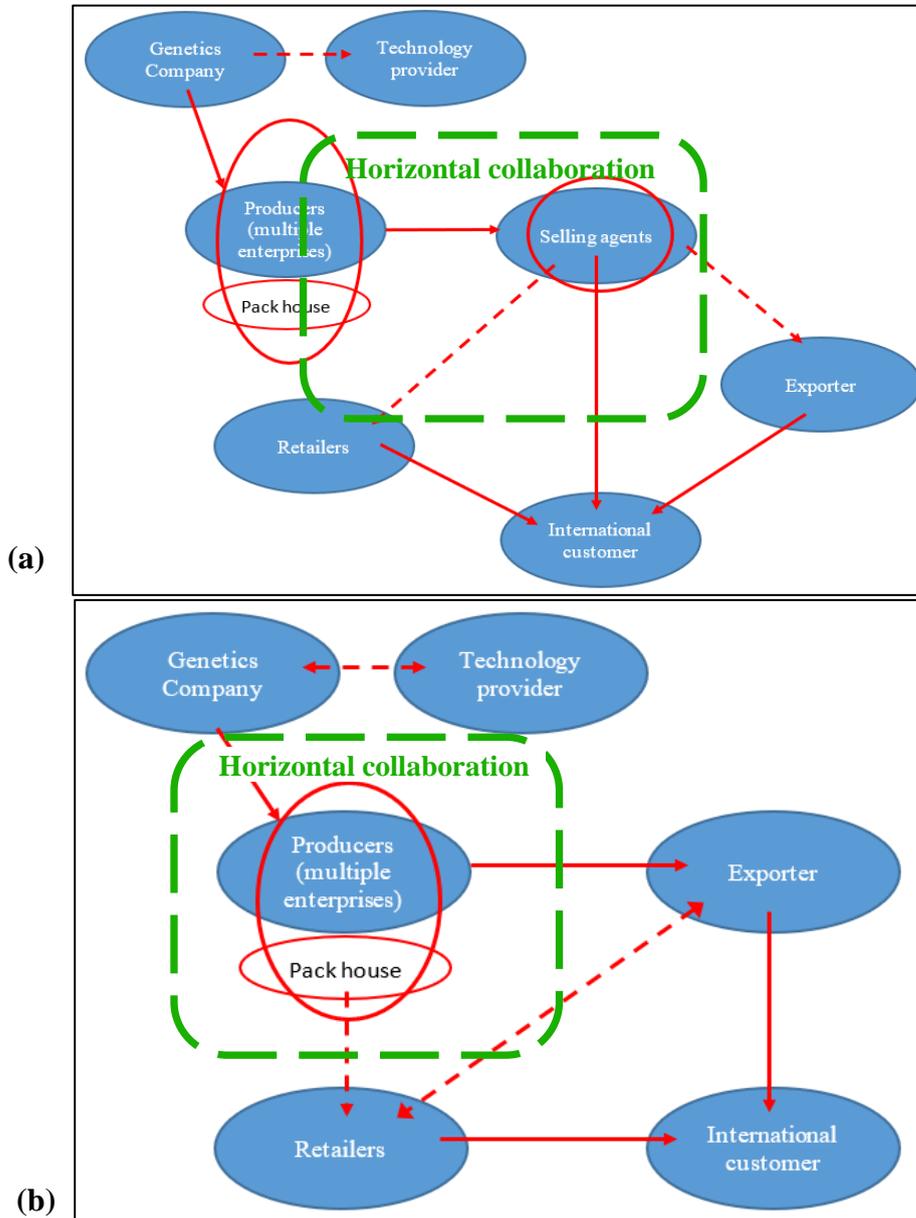


Figure 5. Agricultural Supply Chain Collaborations for Mangos. Source: the Authors. Notes: For a) the supply chain diagram represents 42% of workshop participants, for b) the diagram represents 27% of participants. Here firm line refers to all stakeholder's consensus, and dotted lines refer to most stakeholder's consensus about collaboration.

Group members suggested horizontal collaboration among small- and medium-scale farmers for maintaining adequate, consistent, and quality produce for international markets (Figure 6). However, these farmers need a strong partnership or collaboration with the fruit grading and packaging sheds because many farmers cannot afford this farming infrastructure (Figure 6). The mango producers in this group particularly wanted to bypass wholesalers to avoid unnecessary costs or sharing of profits. However, they need to form a group that can manage supply, transport and marketing mechanism in order to deal with the international importers and or retailers. Unfortunately, the research team was unable to identify, based on the collected data, why stakeholders saw domestic customers as part of the export supply chain. This finding could perhaps mean that stakeholders would remain vigilant about domestic demand for mangos in their decision about product export. Yet, further consultation is needed to clarify this finding. Furthermore, it is still not quite clear from the workshop findings whether a horizontal collaboration can actually leverage for a better farmgate price and consistent value for the producers compared to the existing export model.

The group emphasized that a large-scale producer that can afford to operate grading and processing infrastructure could potentially share their facilities with smaller producers on a fee basis. As such, the producers could work together and communicate with the exporter or export fruit processors (e.g., where heat treatment or radiation treatment is applied). This would allow producers to avoid unnecessary commission costs that are commonly paid to the wholesalers. The group suggested that leadership is required to initiate this type of horizontal collaboration among small, medium and large-scale mango farmers. All group participants agreed that the producers should initiate any supply chain collaboration. However, they added that producers should also have direct access to the exporter and not through other ‘middlemen’ (Box 1). It was also argued that the collaboration model could be multiple leaders led to avoid reliance on an individual to initiate partnerships (Box 1).

Box 1: Stakeholder comments

Researcher: “[...] either it goes on the corporate systems or any corporate governance systems whatever the system is, but we really need to link them (producers and processors), so the processor can directly access to the exporters”.

Government officer: “[...] I think the question is not who's going to lead it because at different points everyone has a different leadership role. It's not one leader. It's multiple leaders. But when do you rise to be the leader at this point?”.

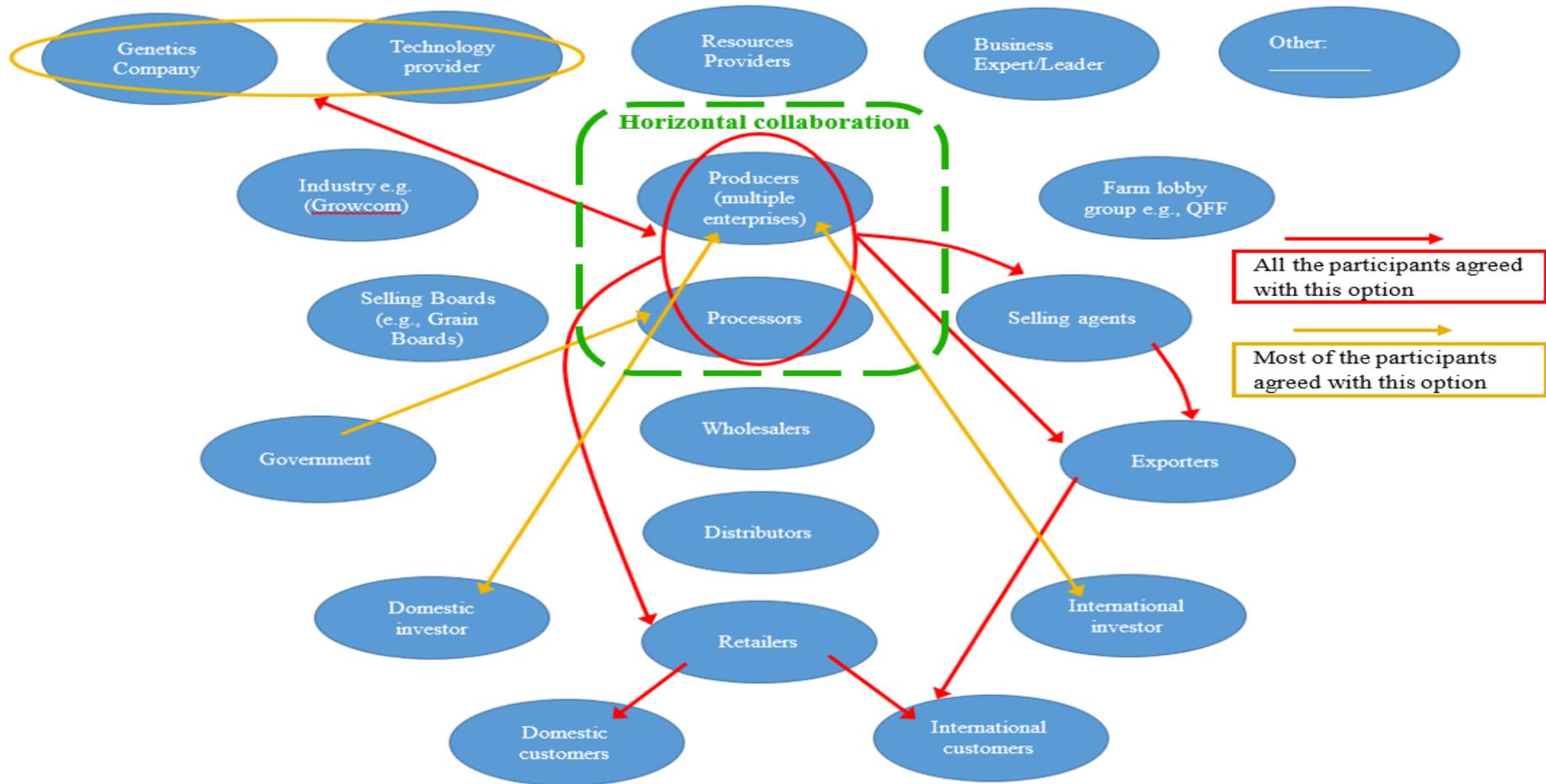


Figure 6. Prospective or Existing Links amongst Actors Involved in a Collaborative Supply Chain for the Mango Industry (as identified during the workshop activity). Source: the Authors. Notes: Green dashed box indicates horizontal collaboration. Red and yellow arrows are the identified desirable links among supply chain entities.

The participants also agreed that collaboration needs to be developed amongst like-minded mango producers even if they operate in different regions. Emphasis was put on the need for transparency within the collaboration model in terms of pricing, information sharing, power, and risk-sharing. The stakeholders argued that achieving better prices for non-premium graded mangos should be a key feature of the future supply and value chain development.

Issues and Mechanisms for Horizontal Collaboration

A further purpose of the group discussion was to identify potential issues and mechanisms to achieve collaboration with the mango distribution network. Key findings from the group discussion regarding possible issues are presented in Table 1. The challenges can be categorised into product quality, resources, collaboration, market access, infrastructure, risk and support. Each of these categories includes a subset of challenges. For example, appearance, taste, shelf life, the volume of high-quality fruits, diseases and quality control were all seen as potential issues affecting product quality.

Five mechanisms for developing and maintaining collaboration among supply chain entities were identified from the group discussion. These include initiating collaborations, collaborative activities, coordination, governance, marketing, and knowledge acquisition and dissemination (see Table 2). These broad tasks were sub-categorised into more specific tasks. For example, to initiate collaborations, initiators and potential partners may need to be identified, a framework for collaboration on regional level will need to be established and ideas need to be collected on how cross-regional collaborations could be developed (Table 2). Importantly, each of the identified broader tasks (e.g., coordination, governance, marketing, and knowledge acquisition) need to integrate with each other to develop effective partnerships. This may require support from governments and industry peak bodies for collaboration initiators to ensure effective partnerships among producers and other supply chain entities can be developed and subsequently maintained.

Drivers that can affect mechanisms of horizontal collaboration include government and industry engagement and initiative, counter seasonal advantages in Asian markets as well as domestic and foreign investments.

Majority of the stakeholders saw government incentives and industry engagement with the farmers as most important in network development, training and developing enabling infrastructure for supporting horizontal

collaboration. Domestic and international investors, particularly in the mango packaging, processing, and transporting sectors, could play important roles in the success of horizontal collaboration.

Table 1. Stakeholders' Perception of Key Issues in Agricultural Supply Chains. Source: the Authors.

Key issues	Specific issues
Product quality	Appearance (colour and size)
	Taste
	Combination of appearance and taste
	Consistent yield
	Shelf life
	Disease
	Quality control
Resources	Water
	Information and training
	Labour (sourcing)
Collaboration	Selecting partners
	Leadership
	Management role
Market access	Export readiness
	Domestic vs. international
	Market exposure / Premium market
	Market power
Infrastructure	Facility sharing
	Fruit treatment facility
Risk	Investment
	Price
	Cost of production
	Market saturation
	Extreme weather
	Disruption in supply chain
	Conflict management
Support	Long term business plan
	Financial stability

Table 2. Tasks and Mechanisms to Achieve Horizontal Collaboration for the Identified Models. Source: the Authors.

Tasks	Specific mechanism
Collaborative initiations	Initiator to lead and partner selection
	Framework for collaboration
	Cross-regional collaboration
Collaborative activities	Communication among the collaborators
	Information sharing: production inputs and standard
	Information sharing: market access and demand
	Price setting
	Risk sharing
	Profit sharing among growers
Coordination	Business network among growers
	Role of industry (or government) in horizontal collaboration
Governance	Government supported Research and Development program
	Equity in power distribution
	Joint venture
	Corporate governance
Marketing	Clean, green and fresh slogan
	Global brand for Australian produce
	Regional brand
	Trademark property rights and brand security
	Traceability and quality control
Dissemination	Lesson learned from the existing models of other horticulture industry
	Commercial behaviour of producers

Discussion and Recommendations

The findings from this study suggest that the desired mango export supply chain does not include wholesalers and distributors as they are perceived as adding limited value to the network. Instead, a packing house is seen as important within the chain (Figure 5). The core entities within the desired export supply chain appear to be the input providers (e.g., genetics companies, technology providers), producers, packing houses, processors, selling agents, exporters, retailers, and international customers (Figure 5). The results also highlight that vertical collaboration, e.g., between farmers and selling agents or exporters, would also be a desirable feature of the mango export supply chain.

While this study identified issue categories that may affect the development of a collaborative export supply chain, the identified specific issues (Table 1) could be analysed in more detail. For example, within the market access category, barriers to access could be explored in more detail. Furthermore, the mango industry could be consulted to a further extent regarding their perception on leadership approaches to facilitate collaboration. These areas may offer scope for future research.

The results indicate that there is a general agreement that improved horizontal collaboration among small- and medium-scale producers would be essential for increased mango export. Yet, to address the identified issues and tasks, support from industry bodies and the government (state and/local) is needed. This will include as an initial step that producers will be informed about the developed export supply chain model and perhaps also to seek further comments on it. Industry bodies together with government departments could also assist farmers to engage more with each other, for example, through networking events or seminars about export opportunities and requirements. Government and industry bodies should also offer support in initiating regional and cross-regional partnerships and provide support for leaders in developing and maintaining partnerships. Furthermore, these stakeholders should also be involved in developing product standards, market access and conflict resolutions. Research and Development institutions may assist in facilitating short courses on specific tasks such as the importance of supply chain collaboration, governance, and marketing.

It is important to note that the export supply chain of mangos and other horticulture products in other countries may require different features, may face differing issues, and require other mechanisms to establish supply chain collaborations. This may be explained by factors such as culture,

traditions, infrastructure availability, standards, and regulations, among others.

A limitation of this study is the relatively small number of stakeholders involved in the data collection, which may affect the robustness of the findings.

5. CONCLUSION

The aims of this study were to assess which entities and links within the export supply chain are considered as important by stakeholders of Queensland's mango industry and to identify forms of potential horizontal collaborations between mango producers.

Using scoping interviews and a workshop, an export supply chain model was developed, which focusses on horizontal collaborations among farmers. The findings of the study suggest seven key issues that may affect this collaborative export approach, which include the quality of the produce, information and resource availability, collaboration and risk-sharing, market access, leadership development, and government and industry support. The study also identified tasks and mechanisms for developing collaboration among farmers for exporting perishable commodities from Queensland. These tasks include initiating the collaboration, developing and enhancing collaboration, establishing coordination and governance mechanisms, targeted marketing, and knowledge acquisition and dissemination. The study also highlighted that improved vertical collaboration within the supply chain is needed.

While this study has identified the factors that growers perceived to be important, identifying who should be responsible and the steps involved are topics for future work. It is likely that the government and industry bodies could have leading roles in addressing the identified issues and tasks. What is currently unclear is which sector should take the lead on particular tasks, whether the mechanisms have to be developed concurrently as a package or improved incrementally as a new export industry is developed, and how the support of small and medium-scale producers can be locked into new export ventures. Although these gaps in knowledge remain, the project findings about the derived export supply chain model, potential issues and tasks to develop horizontal collaboration within the mango industry in Queensland are likely to be relevant for other agri-food producing industries Australia and elsewhere.

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Appendix 1: Workshop schedule and tools

A.1.1718097 EXPORTING PERISHABLE COMMODITIES TO ASIA: DEVELOPING A STAKEHOLDER COLLABORATION MODEL

WORKSHOP 1: Tuesday 26 March 2019, Building 34, Room G.08, CQUniversity Rockhampton North Campus, Bruce Highway, Qld

Session	Description
From 8:30am	Coffee
9am-9:15am	Welcome, acknowledgement of the traditional owners of the land, safety & housekeeping Introductions to project; including stakeholders participating in the workshop & sectors they represent, etc.
9:15am-10:30am	Expert Presentation 1: An overview of the agricultural supply chain priorities and collaborations in Northern Australia (15 minutes with questions & discussion) Expert Presentation 2: Collaboration with Chinese investors/importers: Opportunities, expectation/antecedents and barriers (20 minutes with questions & discussion) Expert Presentation 3: Market development in China for agricultural commodities (20 minutes with questions & discussion) Expert Presentation 4: Market access (20 minutes with questions & discussion)
10:30am-10:45am	Morning tea
10:45am-10:55am	A framework of collaboration
10:55am-1:15am	Individual task: Priority mapping
11:15am-12:30pm	Group work: Developing collaboration model for exporting perishable commodities: Purpose, power, process & outcome
12:30pm-1:00pm	Summary, next steps, thanks & close
1:00pm-2:00pm	Lunch, networking & close

**EXPORTING PERISHABLE COMMODITIES TO ASIA:
DEVELOPING A STAKEHOLDER COLLABORATION
MODEL**

Collaboration is a process in which autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions (Thomson and Perry 2006).

Please think about mango, lychee and avocado in relation to supply chain development for exporting these commodities to Asian markets, particularly to China, Hong Kong, Singapore, South Korea, Japan, Malaysia, Vietnam, Thailand and Indonesia while you are completing the tasks below.

INDIVIDUAL TASKS (20 MINUTES)

A/Q1. Which stakeholder group do you most closely identify with? (Please tick one)

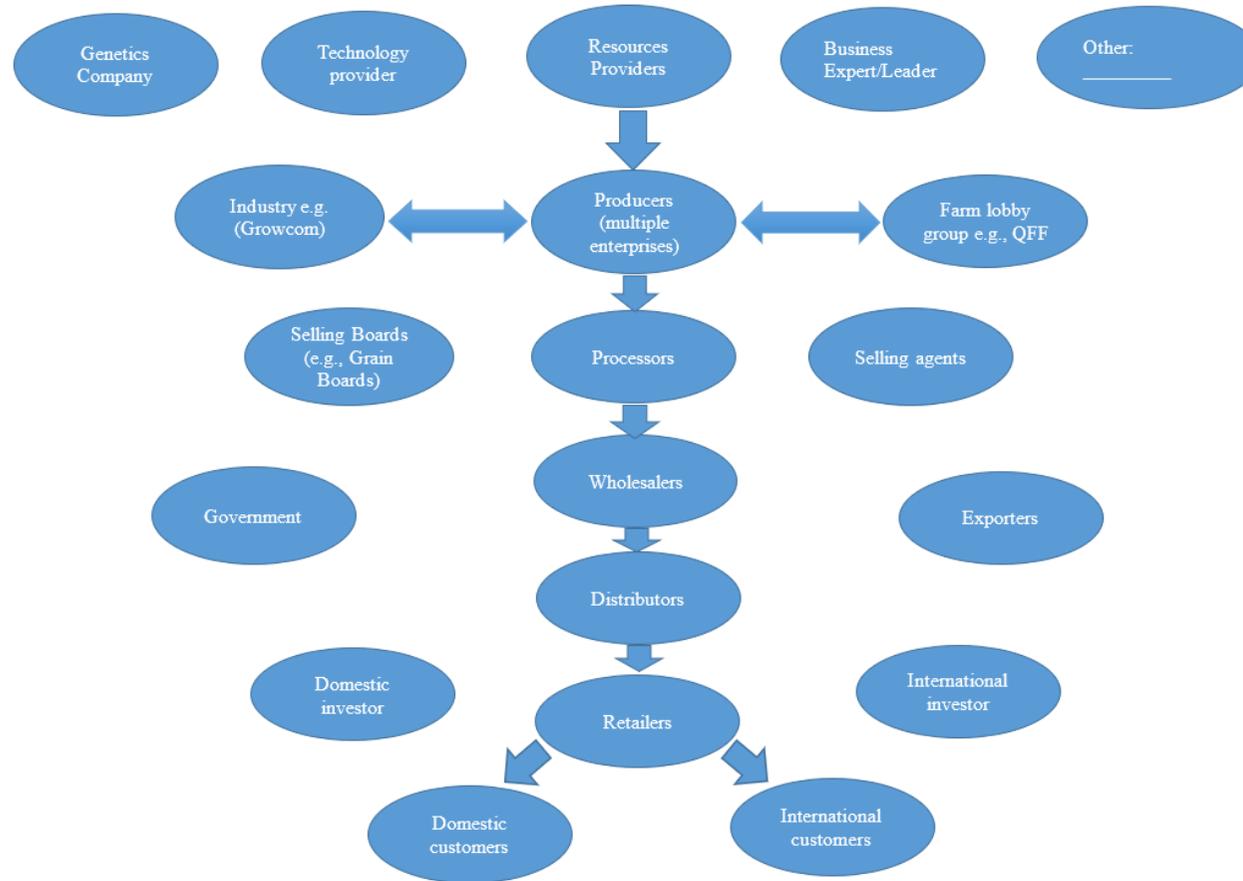
- a. Farmer/primary producer
- b. Industry peak body
- c. National government
- d. State government
- e. Local government
- f. Business sector
- g. Regional planning group
- h. Researcher
- i. Other (please mention):

A/Q2. How important are the following issues of supply chain development for international markets, in relation to CQ's perishable commodities (e.g., mango, avocado and lychee)?

Scale: 1= not at all important; 2= slightly important; 3= fairly important; 4= important and 5= very important.

Stages	Issues	Mango	Lychees	Avocado
Production	Land availability			
	Water supply availability			
	Capital investment			
	Cost of production			
	Quality produce			
	Environmental footprint, green production system/regulation			
Logistics and processing	Processing facilities			
	Transport and logistics			
	Direct government support			
	Foreign direct investment			
	Domestic investment			
	Technology and innovation			
Marketing and export	Market access			
	Market discovery			
	Brand and traceability			
Coordination	Coordination among actors at different levels in the supply chain (such as growers, processors, exporters, investors etc.)			
	Coordination among growers (same level in the supply chain)			
Other	Other (Please specify)			

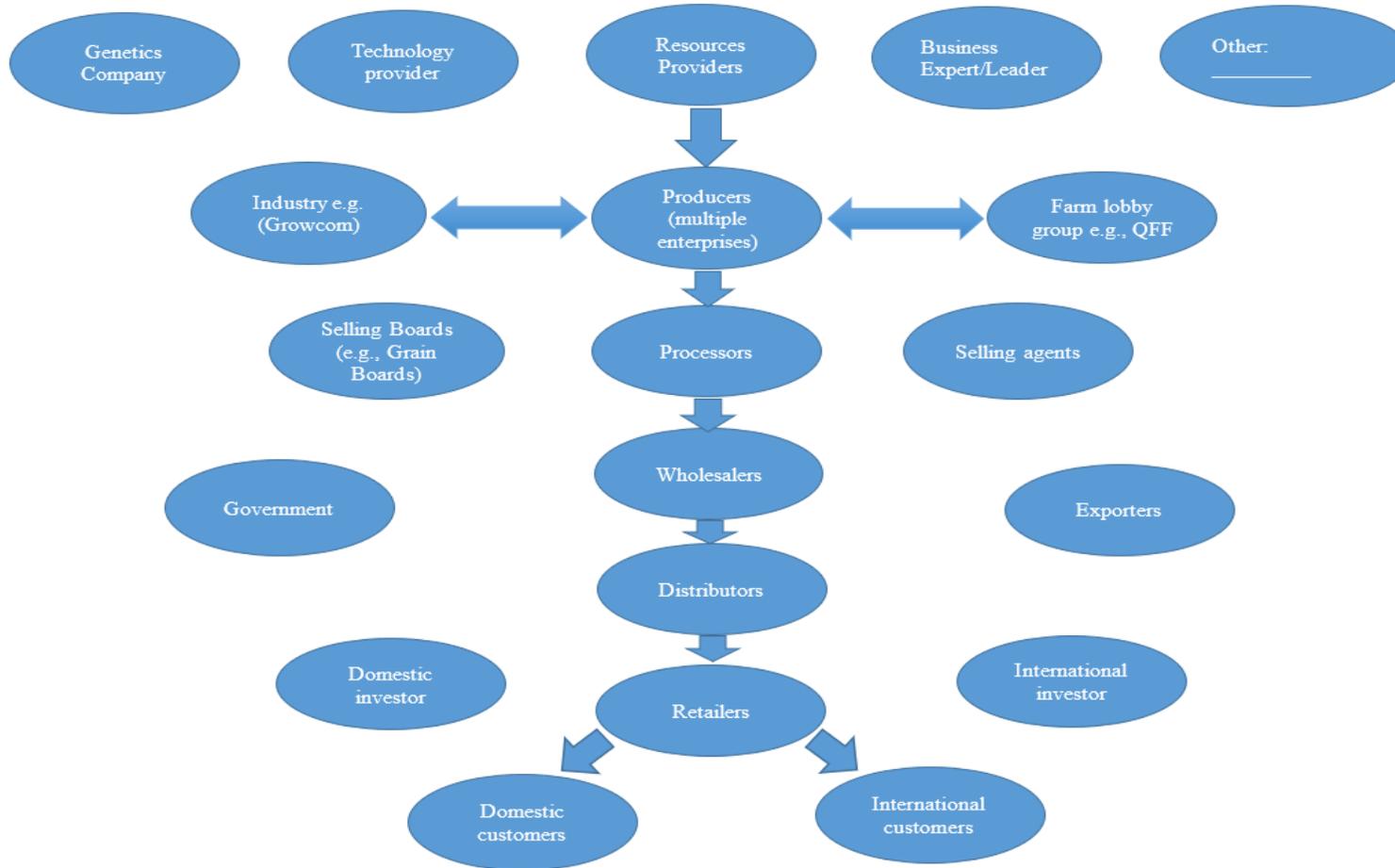
A/Q3. The below diagram shows the system of different actors (or groups of actors) in the CQ supply chain. Please circle the actor that has the **most** ability to form or develop a supply chain between central Queensland and domestic/international markets for **MANGOES** and draw the most important linkages to other actors.



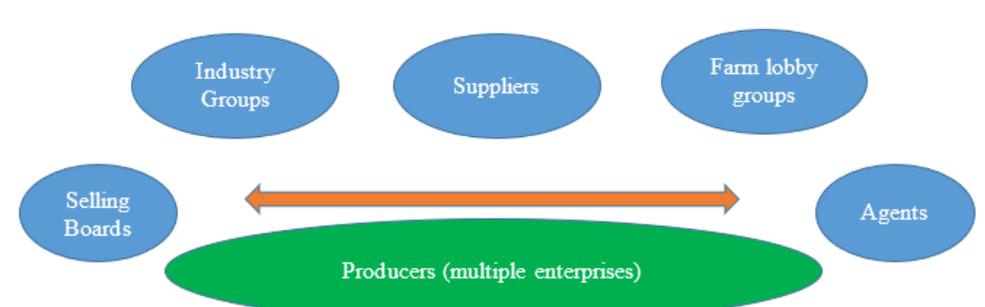
GROUP TASKS: 1 HOUR AND 15 MINUTES.

We now want to identify a group consensus on the way to develop supply chains for one fruit. FRUIT for this exercise:

B/Q1. Which group(s) could best coordinate/lead the supply chain? Please use a pen or pencil to circle a group (s) and also draw lines to illustrate the key relationships between the leader and other groups.



B/Q2. An export supply chain typically requires reliable and continuous production of large quantities to meet demand. In the CQ context, this means that some farmers (particularly small and medium scale growers) need to work together to produce such volume. Can you please tell us how multiple growers could be coordinated into such a supply chain? (**Horizontal coordination**)

<p>What is the right structure needed? <i>E.g. cooperative, commercial market?</i></p>						<p>What else should be considered?</p>
<p>What are the incentives needed to coordinate growers to supply a market? <i>E.g. Prices, contracts?</i></p>						<p>What are the risks to consider?</p>
<p>What are the mechanisms needed? <i>E.g. Electronic markets, market information?</i></p>	<p>What actors/groups can help most to coordinate production?</p>	<p>What are the key relationships needed to link producers together?</p>	<p>What are the activities needed to get horizontal cooperation?</p>	<p>What governance mechanisms are needed to link producers together?</p>		

B/Q3. Now please consider how small and medium size growers in central Queensland should be best linked into a **vertical** supply chain (**Vertical Coordination**).

<p>How many steps of the supply chain should producers be linked to?</p>					<p>What else should be considered?</p>
<p>What are the incentives needed to involve producers into different parts of supply chain? E.g. Prices, contracts?</p>					<p>What are the risks to consider?</p>
<p>What are the mechanisms needed? E.g. Electronic markets, market information?</p>	<p>What groups/stages are most important to link to?</p>	<p>What are the key relationships needed to link producers to supply chain?</p>	<p>What are the activities needed to get vertical cooperation?</p>	<p>What governance mechanisms are needed to link producers to supply chains?</p>	