Supply chains and climate change

Southern Rock Lobster

Number 1

Supply chains represent the different components of the food production system from capture to consumption. To date, most climate change research on fisheries has been on the capture stage – the fishers. As climate change has the potential to impact on many components of the supply chain, opportunities for efficiencies and adaption may occur at different points along the supply chain. This project considered a number of Australian fishery and aquaculture sectors, to identify opportunities for increasing resilience to climate change, including development of adaptation options. The project defined supply chains and used them as a basis for identifying critical components and environmental footprints. Investigation of market conditions along with scenario analysis with stakeholders revealed additional options. These adaption options and efficiency suggestions can be implemented by supply chain actors, or by policy and management agencies.

Southern rock lobster (*Jasus edwardsii*) is commercially fished from the south of Western Australia through to New Zealand. Exports from Tasmania were worth $17.5 million in 2010-11.

Critical elements in the supply chain

The SCI provides one way of identifying critical elements based on large throughput rates and greater connectivity, but doesn't consider all factors such as economic efficiency or risk of being perturbed.

The critical elements identified for Tasmanian SRL are:

- Hobart and Burnie Airports – limited ability to shift and adapt; alternative routes should be maintained;
- Consumers – market access to consumers is an important component for supporting and building resilience

Tasmanian Southern Rock Lobster (SRL)

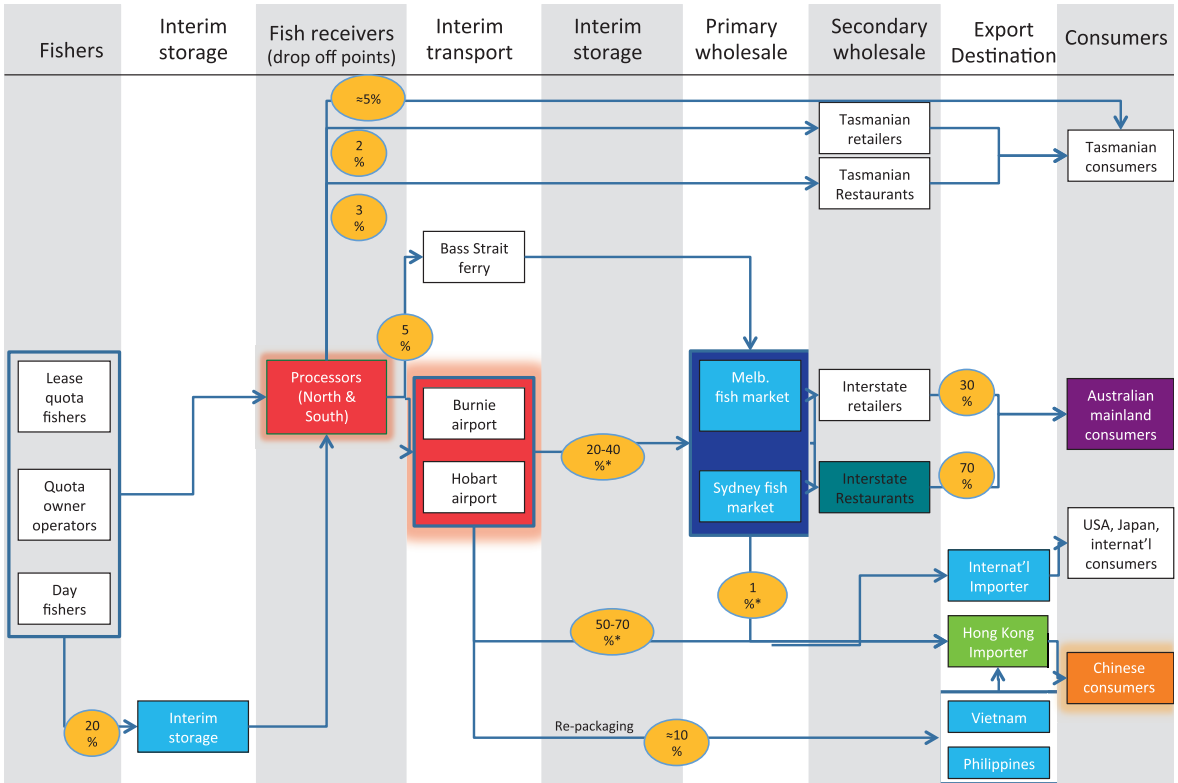

FIGURE 1 **SRL supply chain, showing the relative flow of product with colour coding to highlight critical elements. Individual Supply Chain Index (SCI) scores for each element in the supply chains are coloured when they represent 1% or more of the total score. From highest to lowest scores, the colour coding used is red (>20%)-orange-green-blue-purple. Additional highlights to the red and orange boxes emphasize the critical elements. The supply chain components are based on common templates used for consistency for all fisheries considered in this project.**

– adaptation efforts to enhance market access are important

- Processors – strengthening this component, for example by vertical integration with fishers, can increase the resilience of the chain.

Environmental footprint for the supply chain

Life cycle assessment (LCA) takes into account the environmental footprint of the supply chain. It includes the environmental consequences of the inputs such as the production of the fishing gear, the production of fuel and transportation.

The main LCA categories for Tasmanian SRL are:

- Global warming – international airfreight and fuel are the major contributors
- Cumulative energy demand (CED) – bait and international transport are major contributors
- Water use – bait packaging and the production of diesel and steel traps are the major uses in the capture phase; in the processing phase the wash down of the processing facility contributes to the majority of water use.

Market analyses

Market analyses consider the relationships between domestic and international markets, volume of product and price and completion from other producers.

The main market analyses results for SRL are:

- Consumers in the Hong Kong market see Australian SRL as close substitutes to other Australian rock lobster species; and prices of the different species follow similar trends over time. Links between prices of different rock lobster species in the Hong Kong market suggests that coordinating fisheries management and development strategies across species and States will be advantageous.

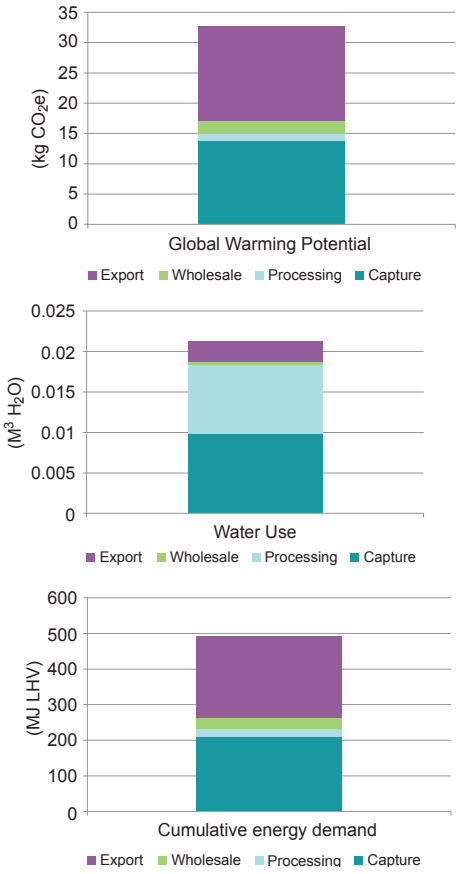

FIGURE 2 **Contribution by category to the life cycle impacts of 1 kg of SRL exported live from Tasmania.**

- The adaptive capacity of Australia's rock lobster industry is dependent on allocating product between different markets. For the different scenarios considered, the industry was able to minimise losses or increase revenues by allocating supply between the Hong Kong (China) and the domestic markets. When the scenario restricted supply to the Hong Kong market major losses resulted. Future adaptation strategies should concentrate on reducing this risk by both reducing the likelihood of access to the Chinese market being restricted (e.g. via stronger trade agreements), and by attempting to diversify the markets they supply, to mitigate the potential impact.

Future adaptation options

Two potential future scenarios based on literature reviews, expert opinion, stakeholder interviews and related projects were presented to stakeholders.

Scenario one
Potential supply change

> Continued large scale declines in recruitment across south eastern Australia leading to further stock size reduction in north and northeast Tasmania in particular, but also in west and southwest Tasmania.

Scenario two
Potential demand change

> Sudden and prolonged export market closure due to any of the following reasons: access routes closed; quality controls; import restrictions; health issues.

The perceived adaptation options of stakeholders, who considered their industry to be adaptable, were generally short term in nature and targeted at the capture (fisher) end of the chain. Managing catch rates was seen as a first point of action for both scenarios, largely because it is a strategy that is currently used to manage short term supply and demand disruptions. Longer-term adaptation options were also put forward, such as shifting fishing areas (Scenario 1) and diversifying markets and building collaborative relationships with customers (Scenario 2), but additional work to explore these options with integrated modelling is warranted.

FURTHER INFORMATION

Alistair Hobday
alistair.hobday@csiro.au

Rodrigo Bustamante
rodrigo.bustamante@csiro.au

IMAS INSTITUTE FOR MARINE AND ANTARCTIC STUDIES

FRDC FISHERIES RESEARCH & DEVELOPMENT CORPORATION

CONTACT US
t 1300 363 400
+61 3 9545 2176
e enquiries@csiro.au
w www.csiro.au

Alistair Hobday, Rodrigo Bustamante, Anna Farmery, Aysha Fleming, Stewart Frusher, Bridget Green, Sarah Jennings, Lilly Lim-Camacho, Ana Norman-Lopez, Sean Pascoe, Gretta Pecl, Eva Plaganyi, Ingrid van Putten, Peggy Schrobback, Olivier Thebaud, Linda Thomas. ***Growth opportunities & critical elements in the supply chain for wild fisheries & aquaculture in a changing climate***; FRDC-DCCEE 2011/233

Further information contact: Alistair Hobday (alistair.hobday@csiro.au); Rodrigo Bustamante (rodrigo.bustamante@csiro.au)

This project was funded by the Australian Government.