

Supply chains and climate change

Wild (banana) prawns

| Number 2

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.



The Northern Prawn Fishery (NPF) is located off Australia’s northern coast, between Cape York (QLD) and Cape Londonderry (WA), occupying 771,000 square kilometres. In 2010-2011 the Northern Prawn Fishery had a gross

value of production of \$94.8 million (Skirtun *et al*). The value of the fishery fluctuates widely, and is subject to a number of external factors including environmental drivers, foreign exchange rates and export market conditions.

Banana Prawn (Northern Prawn Fishery)

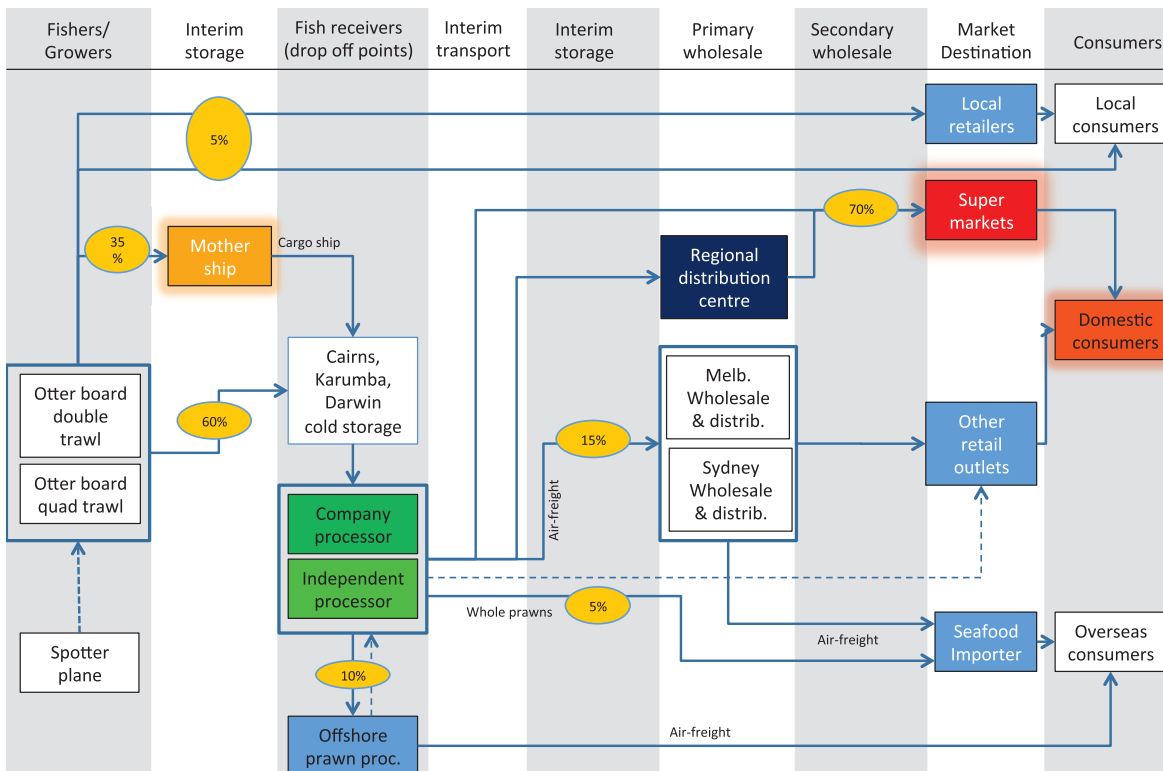


FIGURE 1 NPF supply chain, showing the relative flow of product with colour coding to highlight critical elements. Individual Supply Chain Index (SCI) scores for each element in the supply chains are coloured when they represent 1% or more of the total score. From highest to lowest scores, the colour 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.



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.

For Northern Prawn Fishery banana prawns, the supermarkets and the domestic consumers they supply were the identified as critical elements. This highlights that it is important to secure a good working arrangement with the supermarkets. For example, the stability of the supply chain can be improved by focussing effort on determining what factors (e.g. steady supply minimum volumes of product) are necessary to maintain this as a successful link. In general the banana prawn supply chain showed a spread of key elements across the chain, and hence an ability to change and adapt connection in response to exogenous shocks.

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 components for NPF are:

- ♦ Global warming potential – diesel at the capture stage;
- ♦ Cumulative energy demand (CED) – diesel at the capture stage;
- ♦ Water use – the wash down of the processing facility.

The capture stage was the main overall contributor accounting for 80% of impacts.

Market analyses

Market analyses consider the relationships between domestic and international markets,

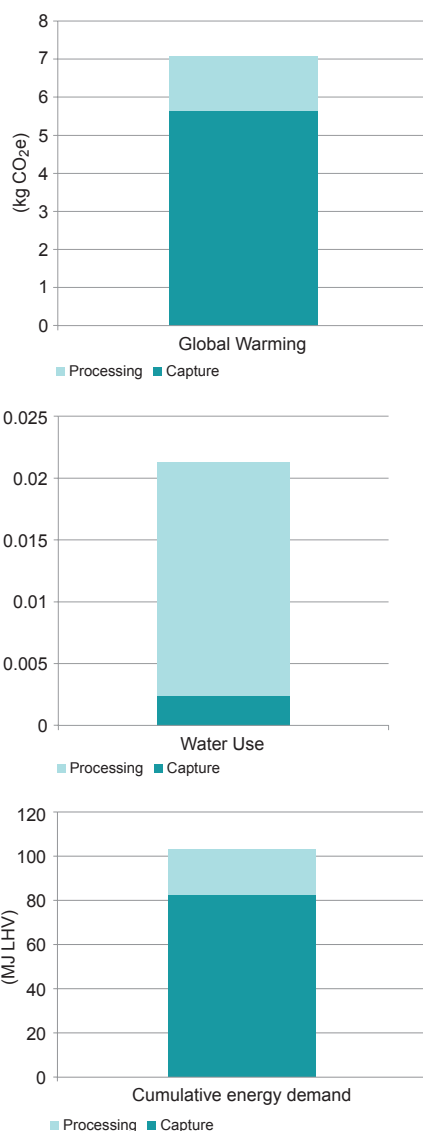


FIGURE 2 Contribution by category to the life cycle impacts of 1 kg of frozen Banana prawns at wholesale.

volume of product and price and completion from other producers.

Economic analysis regarding the long run price flexibilities for prawn species in the Australian domestic market demonstrated:

- ♦ Co-integration between Australian wild and farmed prawns and prawn import prices;
- ♦ Imports will depress the price received by Australian prawns, it will not necessarily be the other way around;
- ♦ Import prawns are lower value than Australian prawns.

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

> Long term trend to higher floods and wetter summers increase recruitment, growth and migration to fishing grounds.

Scenario two

Potential demand change

> Long term increase in competition from imported and farmed prawns.

The adaptation options and stakeholder interviews showed that:

- ♦ Improving fishing operations to achieve increased efficiencies and take advantage of economies of scale as volume of supply increases is a potential adaptation option;
- ♦ Stakeholders had mixed responses to a potential increase in supply of banana prawns as shown by concern by some for oversupplying a market resulting to reduced prices and overall profitability, while others feel that the market is undersupplied, and has the potential to increase quite significantly;
- ♦ A key concern is a decrease in price as the volume of imported and farmed product in the market poses stronger competition to wild-caught prawns, resulting to an overall contraction of the industry.

FURTHER INFORMATION

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