

# Supply chains and climate change

## Sydney Rock Oyster

| Number 5

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.



Sydney rock oysters, *Saccostrea glomerata*, (SRO) are cultivated along the coast of NSW and south-east QLD. The cultivation of SROs has a long tradition in Australia dating back over 120 years. Today, SROs have a predominantly domestic market with less than 1% of export sales. The industry has experienced

increased competition from Pacific oyster industry in Tasmania and South Australia over the past decade.

### 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 Sydney rock oyster supply chain is highly linear at the supply end, with the interim storage and transport identified as key elements. The dominance of these two elements suggests that this supply chain may be particularly vulnerable

### Sydney Rock Oyster (SRO)

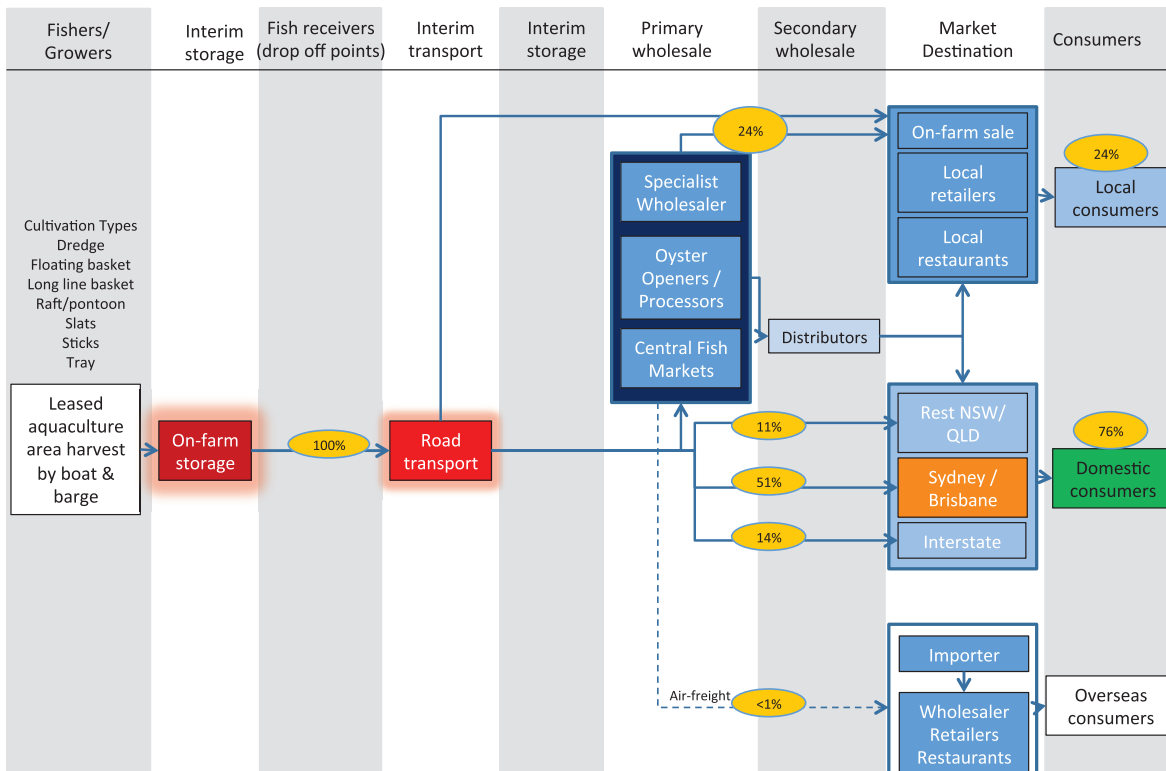


FIGURE 1 SRO supply chain, showing the relative flow of product with colour coding to highlight critical elements. Individual Supply Chain Index (SCI) scores for each element in the supply chains are coloured when they represent 1% or more of the total score. From highest to lowest scores, the colour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



to external factors impacting on these key elements, and hence that this chain may not be as resilient as other seafood supply chains.

## Market analyses

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

Economic competition between seafood products is of interest for industry stakeholder since an increase in production can affect price formation if products are part of the same market or even substitutes. Schrobback et al (manuscript under review) found that:

- ♦ SROs and Pacific oyster (second major commercial species produced in Australia) markets are integrated. This means that over the long run prices in both markets move together but may not necessarily be the same;
- ♦ The market share of SROs decreased from about 70% in 1989 to 30% in 2011 compared to an increasing share of Pacific oysters;
- ♦ SRO prices are adversely affected by increasing Pacific oyster supply but not vice versa, suggesting that both species are not perfect substitutes.



## Reference

Schrobback P, Pascoe S and Coglan L (manuscript under review) Impacts of introduced aquaculture species on markets for native marine aquaculture products: The case of edible oysters in Australia. *Aquaculture Economics & Management* (submitted May 2013).

Given the existence of a competing Pacific oyster market, the adaptation of the SRO supply chain to the challenges of changing climatic conditions are important for the industry's future prospects.

## Future adaptation options

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

### Scenario one

#### Potential supply change

> Extreme weather events (e.g. floods occurring in SE Australia) lead to closures of lease due to:

- i) run-off pollution form acid sulphate soils caused by upstream farming activities,
- ii) fresh water flooding which leads to the delusion of saline water,
- iii) disease outbreaks, and
- iv) algal blooms.

### Scenario two

#### Potential demand change

> Consumer demand for oysters slowly decreases due to a perception of contamination of oysters in coastal areas of eastern NSW.

The adaptation options and stakeholder interviews showed that the Sydney rock oyster fishery has been exposed to extreme weather events leading to flooding and the temporary closure of leases as a result. The key concern for members of the industry is the frequency to which such events would occur. Businesses would not be able to cope if supply was interrupted frequently and customer trust would be eroded over time, limiting the ability of fishers to re-establish connections once supply resumes

Possible adaption options include the investment in research addressing disease resistance, to manage the impacts of pollution and minimise impact on supply. Stakeholders also consider a shift from intertidal to sub-tidal production, to build resilience from flooding as well as manage impacts of extreme temperatures currently experienced in intertidal production. This adaptation however, is seen as quite costly and is considered a transformation for the industry which could result to some growers leaving rather than making the change as areas for sub-tidal production are limited. The engagement in a publicity campaign to inform consumers about the effects of different types of environmental conditions to human health is seen as a way to increase consumer awareness.



## FURTHER INFORMATION

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