



Economic Challenges of Post-Tsunami Reconstruction and Redevelopment:

A case study of the recovery of longline fisheries from the 2011 Great Tohoku Earthquake/Tsunami

石村学志

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An aerial photograph showing the aftermath of the 2011 Great East Japan Earthquake. The foreground is filled with a large pile of twisted metal and debris floating in the water. In the background, several multi-story buildings are visible, some of which appear damaged or partially submerged. The sky is overcast, and the overall scene conveys a sense of destruction and loss.

March 11 2011 東北大震災

Kesennuma 気仙沼

The 9th largest fishery landing values in Japan (2010).

A base port for distant water fisheries.

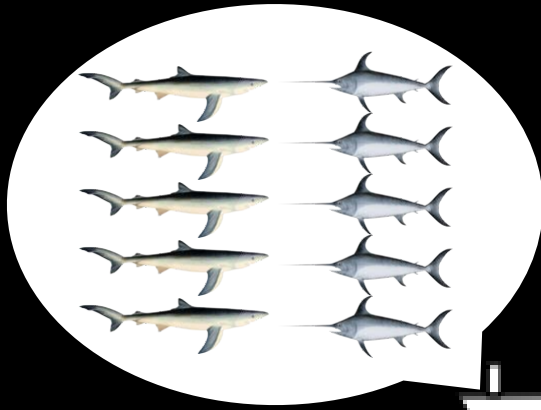


Photo: Yuma Sugawara

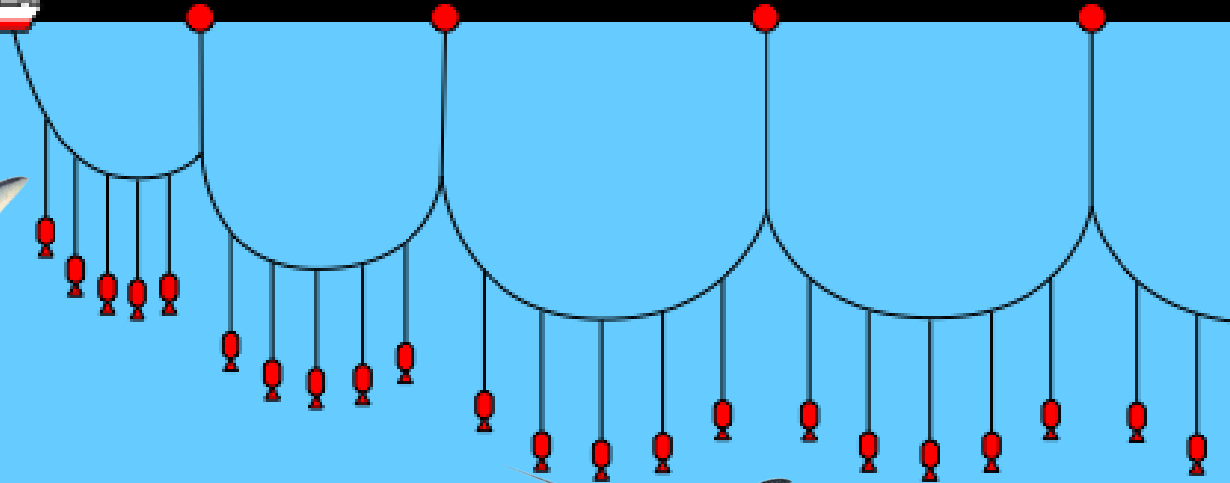


In 2011, 18 active, 119 MT distant water longline vessels based on *Kesennuma*.

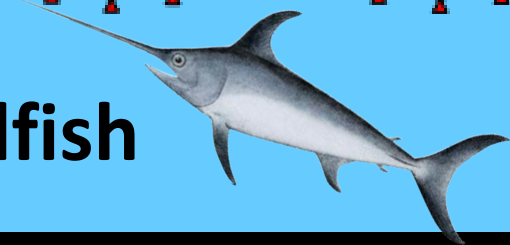
16 119MT-longline fishing
vessels **survived**
after the 2011 tsunami.



Blue shark



Swordfish



In Keenrime

After the 2011
Earthquake/Tsunami

Ex-vessel Price



Fuel Price



Kesennuma Longline Fisheries

Society
社会

Fishery
漁業

Fish
魚

Economic
Motivations



Employment
generated by the
processing
industries



North Pacific
swordfish
& blue shark
resources

Kesennuma Longline Fisheries

Society
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Functions of off-shore longline Fishery at *Kesennuma*

Building resilience against risks
disasters, socioeconomic or natural
perturbations

Strategies

Group Operations(2012-14)

Portfolio Fisheries

MSC Certification

Moving from the competitive individual operations to the **group operations**



- A core of rebuilding strategies with 3-year government aid
 - 4 groups with 18 vessels.
 - Over 40 days per trip (before 2011)
 - 25~30 days per trip(group operations).
- Ishimura (2012) suggests 25 days as the optimal days.*
- Schedule and limit the landings as one vessel per day.

2012-2014 Three years results of the group operations

Landings with all vessels

Increased and recovered as planned

	2012	2013	2014	3-year total
Landing Weight (MT)	5,740	6,257	6,760	19,840
Planned Landing Weight (MT)	5,488	7,176	7,176	18,758
%	105%	87%	94%	106%

Landing value with all vessels

Could not recover as planned

	2012	2013	2014	3-year total
Landing Value (1000USD)	13,593	15,653	18,588	47,834
Planned Landing Value (1000USD)	17,973	23,501	23,501	64,976
%	76%	67%	79%	74%

Ex-vessel unit price

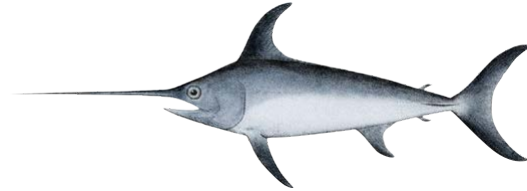
	Average Unit Price (US\$/kg)				
	2012	2013	2014	3-year total	Planned
Swordfish	7.41	7.36	7.27	7.33	6.92
Blue shark	0.99	0.90	1.04	0.98	2.00

Swordfish ex-vessel price increased as more than planned
 Blues shark one stayed as a half of planned (as the same as 2010)

Swordfish unit Ex-vessel price OLS model

Unit Ex-Vessel Price of Swordfish

~ Earthquake Effects+ Group Operation Effects



Explanatory Variables	Estimated Value	Statistical Significance
Weight of a Swordfish	0.24	***
Total Landings given Day	-0.13	***
Three Days Total Landings	-0.07	***
2011 Earthquake Effect	-0.11	***
Group Operation Effects	0.08	***
Month Effects	○	
Year Effects	○	
Day Effects	○	
Individual Vessel Effects	○	

n=148807

✓ 2011 Earthquake/Tsunami affected negatively to the unit ex-vessel price.

✓ Group Operation Effects positively to the unit ex-vessel price.

Group Operations contributed for the recovery of the price of Swordfish.

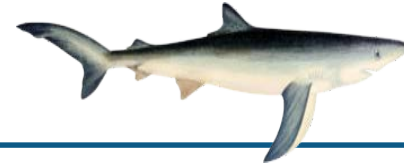
Blue shark unit ex-vessel price OLS model

Unit Ex-Vessel Price of Blue Shark

~ Earthquake Effects+ Group Operation Effects

Explanatory Variables	Estimated Value	Statistical Significance
Weight of a BS cluster	0.076	***
Seven Days Total Landings	-0.138	***
2011 Earthquake Effect	-0.994	***
Group Operation Effects	0.011	NA
Month Effects	○	
Year Effects	○	
Day Effects	○	
Individual Vessel Effects	○	

n=8294



✓ 2011 Earthquake/Tsunami affected negatively to the unit the ex-vessel price.

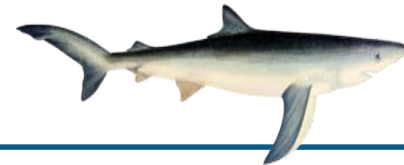
✓ Group Operation does not show statistically significant.

Group Operations did not improve of the price of Blue shark.

Blue shark unit ex-vessel price OLS model

Unit Ex-Vessel Price of Blue Shark

~ Earthquake Effects+ Group Operation Effects



Explanatory Estimated Statistical

- ✓ Lost market due to the developments of substitutions.
- ✓ Affected by anti- shark finning movements (although this fishery utilizes sustainable resources and does **NOT** do finning).
- ✓ Lack of efficient gov policy to bring back processing industries.

- ✓ 2011 Earthquake/Tsunami affected negatively to the unit the ex-vessel price.
- ✓ Group Operation does not show statistically significant.

Individual vessel
Effects



n=8294

Group Operations did not improve of the price of Blue shark.

Conclusion

Group operations have improved both the ex-vessel price and revenue from Swordfish.

However, **due to external factors(i.e. slow recovery of processors and markets), Group operations** could not improve the ex-vessel price and revenue from blue shark.

Policy Implications

- ✓ Need the recovery policy to undertake **vertical integration of sectors**(i.e., fishery and processing) rather than sector specific ones.
- ✓ Need to transform the **short-term recovery policy to the long-term policy** for the industry cluster with the fishery as core.

2015-2016 Outlook

- ✓ Improved the price of blue shark as over \$ 2 USD per kg.
- ✓ Average annual landing value for each vessel has been improved as 130-150% from 2012-2014.

Building resilience against risks
disasters, socioeconomic or
natural perturbations

Strategies

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Thanks!