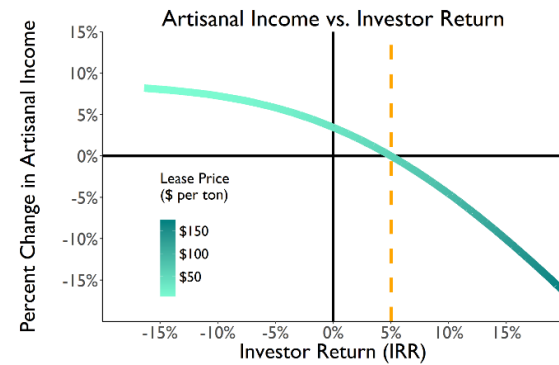


Intervention 3: Quota Buyback and Leasing

Investment Structure:

There is a distinct mismatch between northern and southern quota allocations. Regions in the south account for up to 92% of total catch, yet only 67% of the quota. As the biomass of hake moves South, this disparity will grow. Depleted northern stocks encourage some fishers to exit.

Therefore, this intervention allows an investor to purchase quota from fishers willing to retire. The investor chooses to retire some of the quota in order to alleviate fishing pressure, or to lease to fishers in need of more quota to supplement their legal income and reduce illegal fishing effort. As the stock recovers, the value of holding a quota also increases. The investor then sells the remaining quota to new fishers willing to reenter a healthy fishery, thus generating a significant return to the investor.



Problems Addressed:






By providing fishers with the opportunity to lease additional quota, the intervention enables fishers to do more of their fishing legally.



Compensates fishers willing to exit immediately. Offers fishers who are illegally fishing opportunity to transition to more legal catch.

Recommendations

Using a bioeconomic model, we evaluated the performance of the Caleta Certification and Quota Buyback interventions. The New National Fish Market was excluded from quantitative analysis as the business plan was out of scope for this project, however the qualitative merits remain strong. Model outputs compare simulated outcomes to our three investment goals.

			
Clean Alternative Market	?	✓	✓
Caleta Certification	✓	✓	✗
Quota Buyback	✓	✗	✓
Combination of Interventions	✓	✓	✓

While none of our interventions achieve all three goals, we envision a combination of interventions could enable investors to meet all environmental, social, and economic goals. Next steps include constructing a model that can evaluate the three interventions simultaneously, and securing the enabling conditions necessary to implement each. Inspired by our design and workshop, business leaders, NGOs, and government officials have begun to develop a pilot caleta certification program to provide artisanal supply to a proposed new alternative fish market in Santiago.

Acknowledgements

We would like to thank all those who assisted with the design, support, and evaluation of our project, beginning with our faculty advisor Chris Costello and PhD advisor Owen Liu. We would also like to thank the team at EDF, particularly Erica Cunningham, Phoebe Higgins, and Layla Osman, for collaborating with us and funding the project. Thank you to our external advisors Rodrigo Oyanedel, John Tobin, and Pablo Obregon.

References

Munoz, G. & Godelman, E. (2016). | Servicio Nacional de Pesca y Acuicultura. (2018). *Anuarios Estadísticos, Descargas* | Gatica, C., Neira, S., Arancibia, H. & Vasquez, S. (2015). | EDF and Nicholas Institute (2018). *Financing Fisheries Reform*

Rebuilding the Chilean Hake Fishery Through Impact Investing



Gonzalo Banda-Cruz | Annie Daly | Nathaniel Grimes | Diego Undurraga | Kathrin Wagner
Faculty Advisor: Dr. Christopher Costello

Project Brief Spring 2018

Follow us at <https://merlucciusproject.weebly.com/>

Collapse of Hake in Chile

Fisheries around the world are in an imperiled state with only 32% in healthy biological conditions. Chilean Common Hake (*Merluccius gayi gayi*) is one such fishery. It possesses high social significance in Chile, being the most domestically consumed fish, and is a main source of income for many artisanal fishers in the central southern regions of the country.

Management of the hake fishery has been difficult, though a robust system exists with tradeable permits ("quota") allocated amongst artisanal fishers by region. After large increases in the total allowable catch and landings in the late 1990's and early 2000's, the biomass began to decline. Overfishing, lack of traceability, and high levels of unreported and illegal fishing in the last 15 years have prevented the fishery from recovering despite implementation of new regulatory reforms created to address the problem.

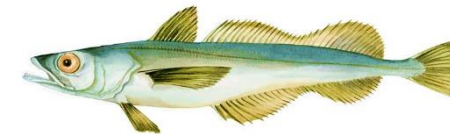


Figure 1. Chilean Common Hake. Source: WWF - SASSI

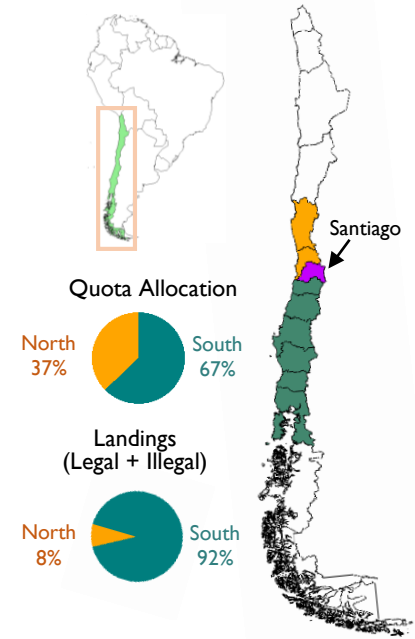


Figure 2. Hake Fishing Regions of Chile



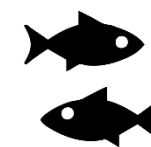
Figure 3. Fishing Caleta Curanipe in VII region

Financing the Recovery

Impact Investing is a potential tool to catalyze recovery of the fishery. It is a new class of investment where investors are willing to receive lower returns in order to generate beneficial social or environmental impacts. Recovering Chilean Common Hake will improve fishers livelihood and restore ecological health. Impact investment expands funding sources needed to provide change in the economic incentives perpetuating overfishing. Successful investments in Chile Common Hake could serve as blueprints for future global recovery.

Project Objectives

Our project explores the recovery of the Chilean Common Hake stock by designing and evaluating impact investment interventions that restructure incentives in the fishery to achieve three goals:



Recover hake biomass to sustainable levels



Mitigate loss of artisanal fisher income

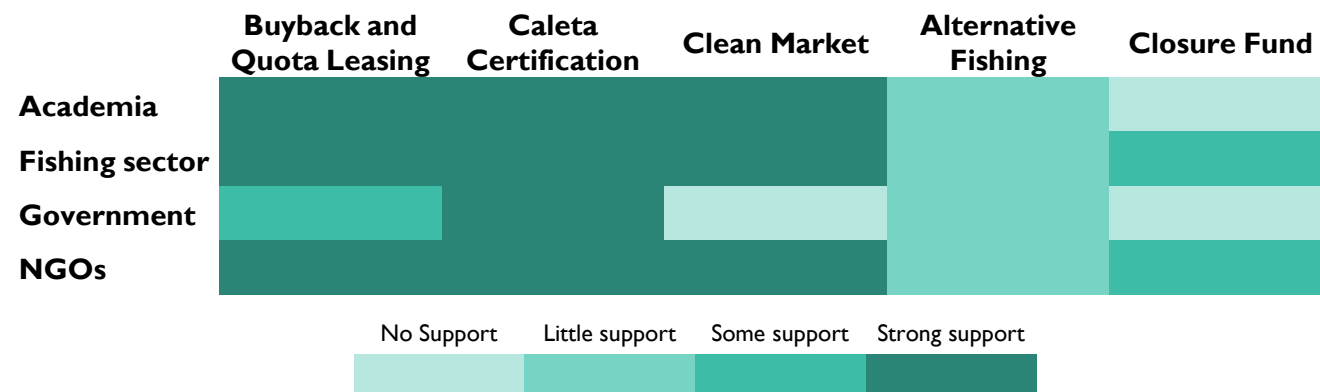


Provide investors with a positive return

Approach

A thorough literature review identified key problems afflicting the fishery and analyzed the potential financial landscape for impact investment in Chile. Field interviews with stakeholders in Chile validated findings from the literature review and synthesized collective perspectives on the primary problems in the fishery. Our group used this information to design 5 potential impact investment interventions, which attempt to correct the identified problems. Stakeholder groups (e.g. artisanal fishers, fishery management committees, industrial representatives) assessed the interventions during a presentation held in Valparaiso, Chile in December 2017. Based on their feedback (shown below), we narrowed our analysis to the three interventions with the greatest support: Clean Alternative Market, Caleta Certification, and Quota Buyback and Leasing

Stakeholder Assessment of Interventions

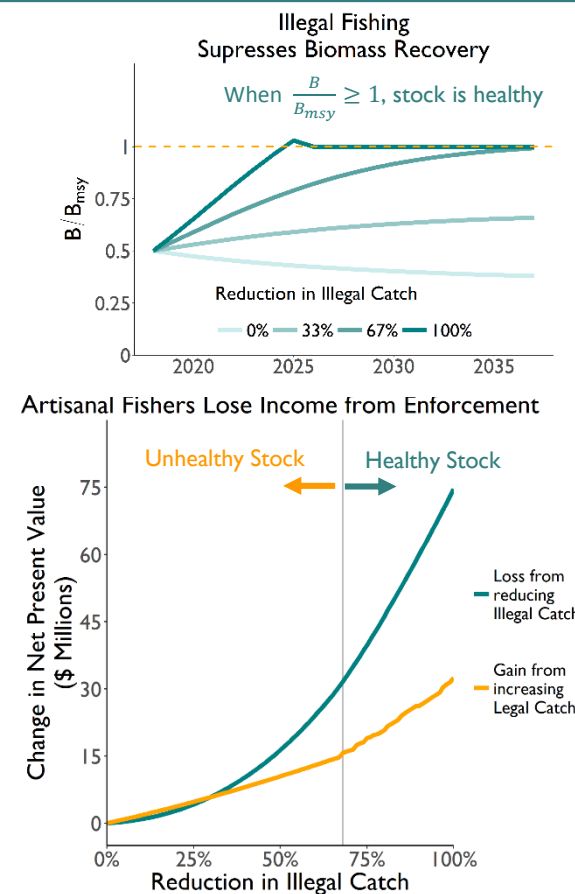


Key Problems to Recover the Fishery

From the literature review and multiple rounds of stakeholder input, four primary problems continued to arise as drivers of overexploitation in the fishery.

- Illegal Fishing:** Leads to overexploitation of the stock. Artisanal fishers exceed quota allocation by estimates between 300-400%
- Inefficient Supply Chain:** Hake changes hands up to seven times on the way to market. Significant value is lost. Middlemen may take advantage of fishers by suppressing beach prices.
- Lack of Traceability:** Prevents enforcement officials from verifying the origin and legality of catch. Compounded by inefficient supply chain.
- Sustaining Fishers Income:** Illegal fishing is a significant source of revenue for artisanal fishers. Large proportion live at or near the poverty line.

While an increase in enforcement successfully reduces illegal fishing, it can be politically contentious because it also leads to a steep reduction in fisher's income.

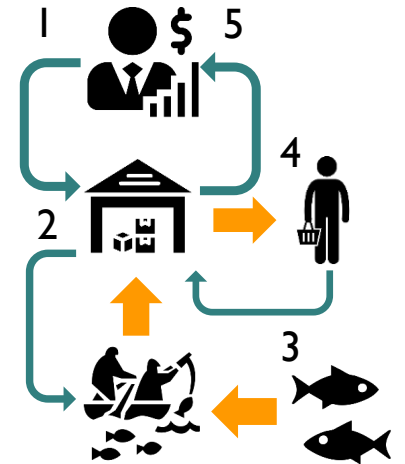


Intervention 1: Clean Alternative Market

Investment Structure:

Nearly 80% of all domestic hake flows through the National Fish Market in Santiago. Decaying infrastructure, corruption, lack of enforcement, and an extensive supply chain to market hinder recovery efforts.

An investor would acquire equity in exchange for upfront capital in the construction of new clean, alternative fish market (1). Artisanal fishers will receive a higher price for legal fish sold through a new streamlined delivery network (2). Enforcement at the new market will verify legality of catch improving the biomass (3). Consumers are willing to pay a higher price for better quality, legal fish (4). The investor receives dividends or sells equity as the value of the market rises (5).



Problems Addressed:

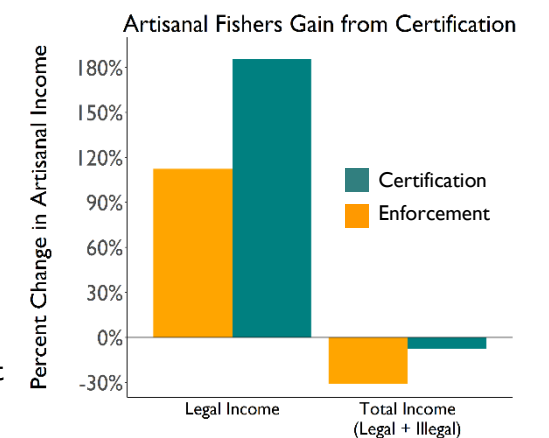
- Illegally caught fish are excluded from the Alternative Market. Enforcement is easier at the new market.
- More efficient supply chain allows greater traceability with less exchange of hake. Reporting origin of catch is mandatory at the new market.
- The Alternative Market provides transparent distribution network to caletas, eliminating excess distributors.
- The Alternative Market provides a higher price to fishers who legally catch hake through binding contracts.

Intervention 2: Caleta Certification

Investment Structure:

Artisanal fishers reside in fishing villages called caletas. Organized fishing cooperatives exist in caletas and influence fisher actions. This intervention empowers cooperatives in the caletas by rewarding those that adopt strict standards targeted at eliminating illegal fishing and mandating traceability in the fishery.

An investor finances the creation of a new certifying agency. Caletas adopt the certification standards in order to receive a price supplement paid out by the investor. The agency sends auditors to ensure compliance and rewards the caletas with certification. Market demand for legally caught certified hake grows, inducing a market price premium. After the price supplement expires, caletas pay the certifying agency to maintain access to the market price premium. Surplus profits are paid to the investor to receive a return for the seed capital.



Caleta Certification improves fishers' income more than only enforcing heavily. Though investors struggle to achieve a positive return (IRR = -18.2%).

Problems Addressed:

- Caletas self-enforce and reduce illegal catch in order to become certified.
- Certification requires traceability measures from ex-vessel landing to market. New traceability platform clarifies origin of fish along chain.
- Certified caletas gain bargaining power over middlemen and access to new markets. Disreputable middlemen are pushed out of the supply chain.
- Price supplement raises fishers revenue per ton and mitigates loss of income from previous illegal fishing.