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# **Environmental, social and economic impacts of coastal longline fisheries using Selectfish - new automated equipment.**

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## Ostfold Research

- A regional research institute
- Situated in Fredrikstad, Norway
- 23 researchers in total
- 2 research departments
  - Environmental Protection
  - Business and regional development

5 researchers in the field of food and packaging. LCA favoured method.

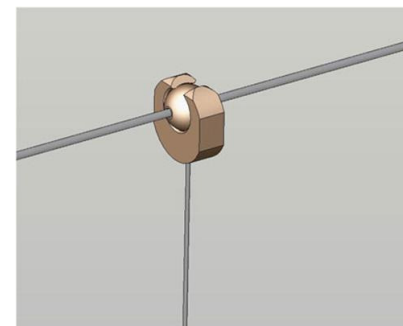
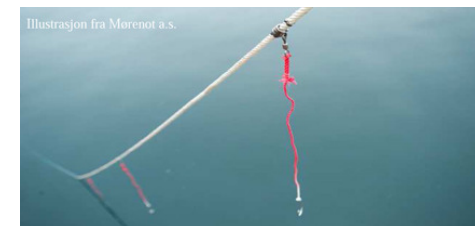


Engaged in applied RnD aimed at contributing to **sustainable development**, focused on **creation of added value** and **efficient use of available resources**.

Coastal cod (Gadus Morhua), one of two cod species exploited by coastal fisheries.



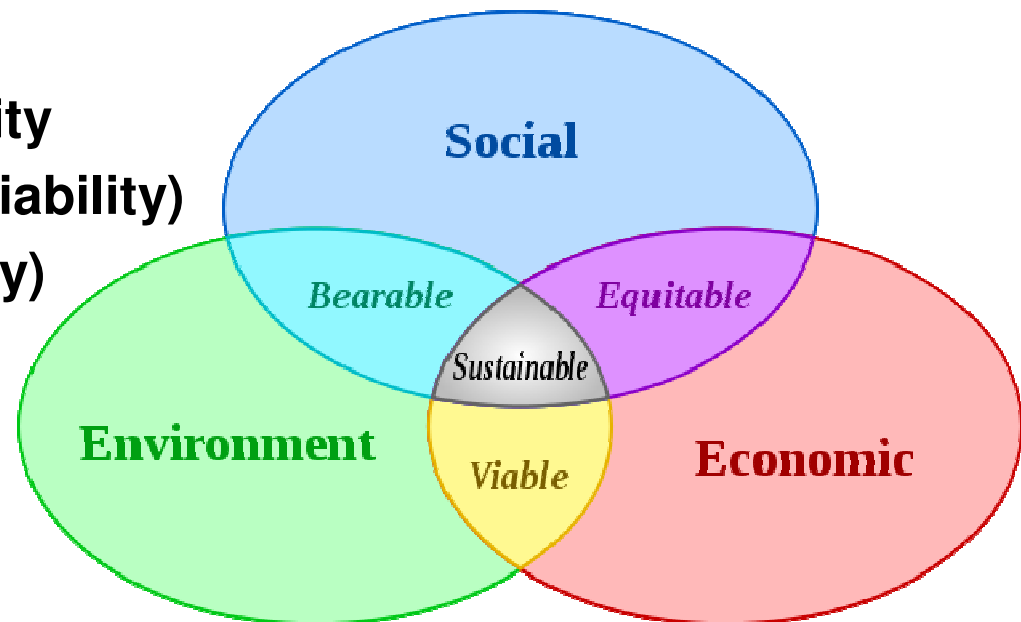
# Coastal linefishing



# Sustainability

*A widely accepted “measuring stick” for decision makers.*

- **Environmental sustainability**
- **Economic sustainability (viability)**
- **Social sustainability (equity)**



*It became clear to us during the project that just studying the environmental sustainability would not be enough to get a complete picture of the impact of a transition to the new technology.*

# Background

Linefishing, a traditional way of fishing:  
High environmental sustainability.  
Profitability is low.

The study was a part of the Norwegian Research Project “From Seabed to Consumer”. Partners fish researchers Nofima Norconserv, equipment manufacturer Mustad and processor Domstein.

Aims:

Increase the availability of Norwegian Seafood of high quality.  
Increase the environmental efficiency of seafood from line fisheries.

## Goal and scope

Goal:

What is the environmental, economic and social impact of introducing new automated equipment in the coastal longline fisheries?

What are the environmental hotspots along the value chain and what mitigation measures can be identified,

Scope: Cradle to gate (B2B approach)

## Functional unit and method

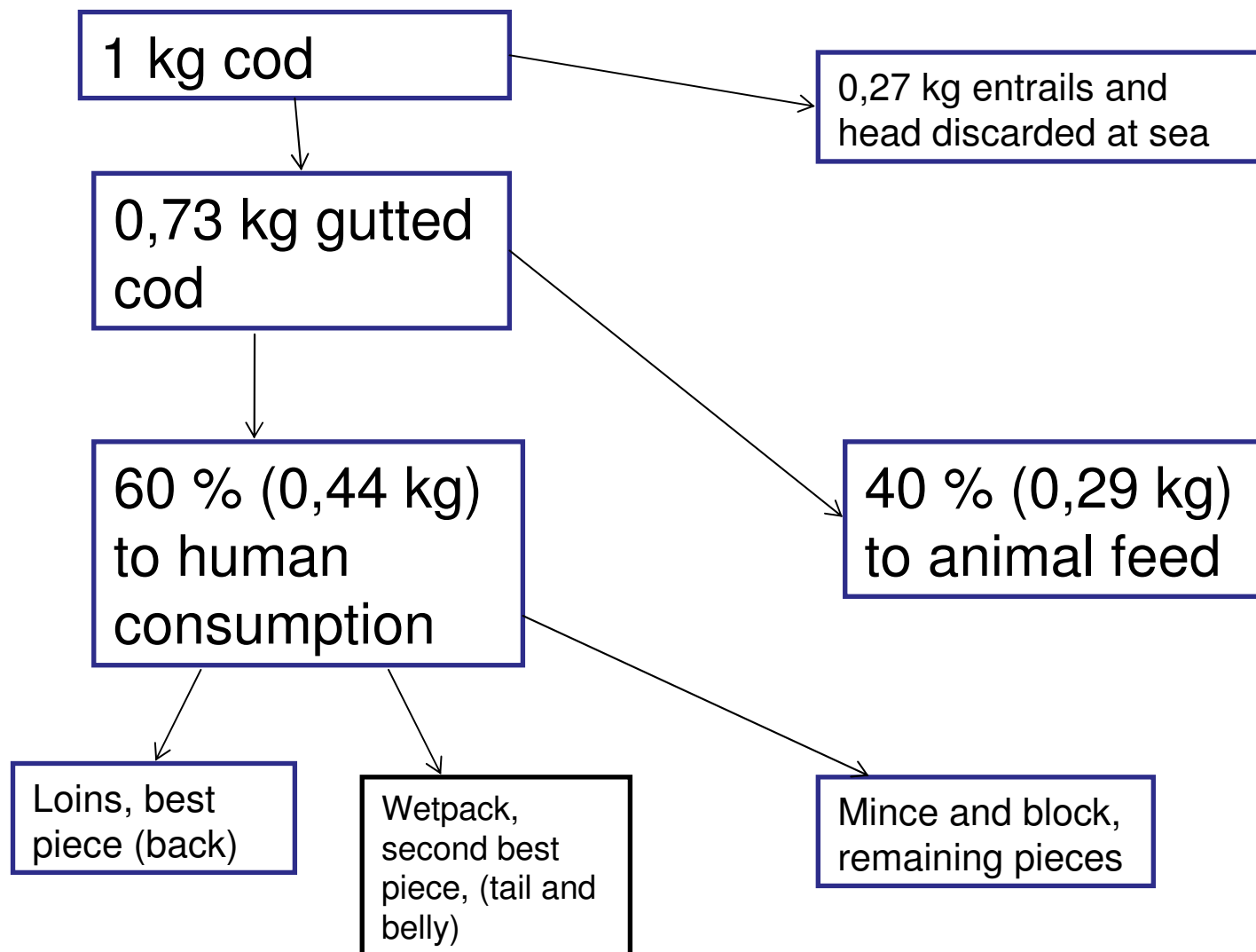
**F.U.:** One kg processed product (“wetpack”) delivered to Paris.

**Method:** Environmental impact was studied by LCA. Economic allocation in fisheries (different species and processing (different products)).

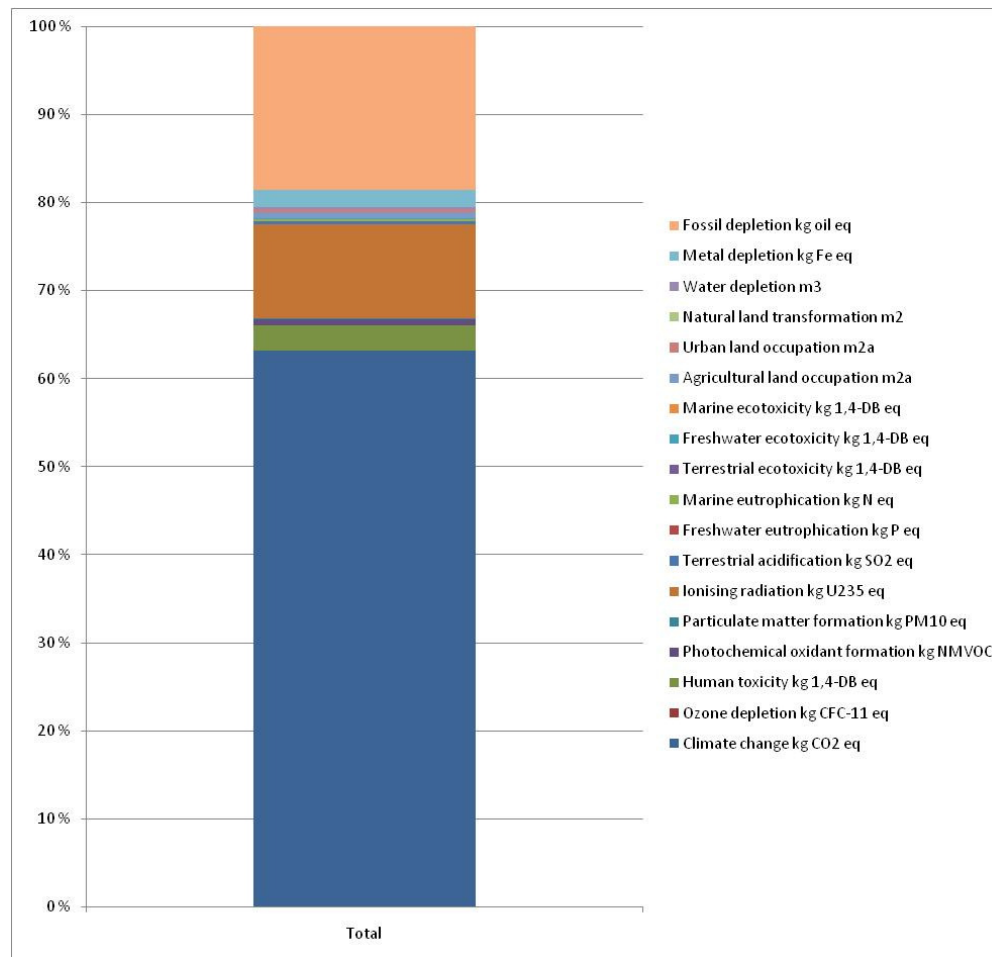
**Social impacts:** Indicators were identified and qualitative evaluation was done on the basis of interviews of fishermen.

**Economic analyses:** Costs pr trip and pr kg fish.  
Income= average price \* catch weight



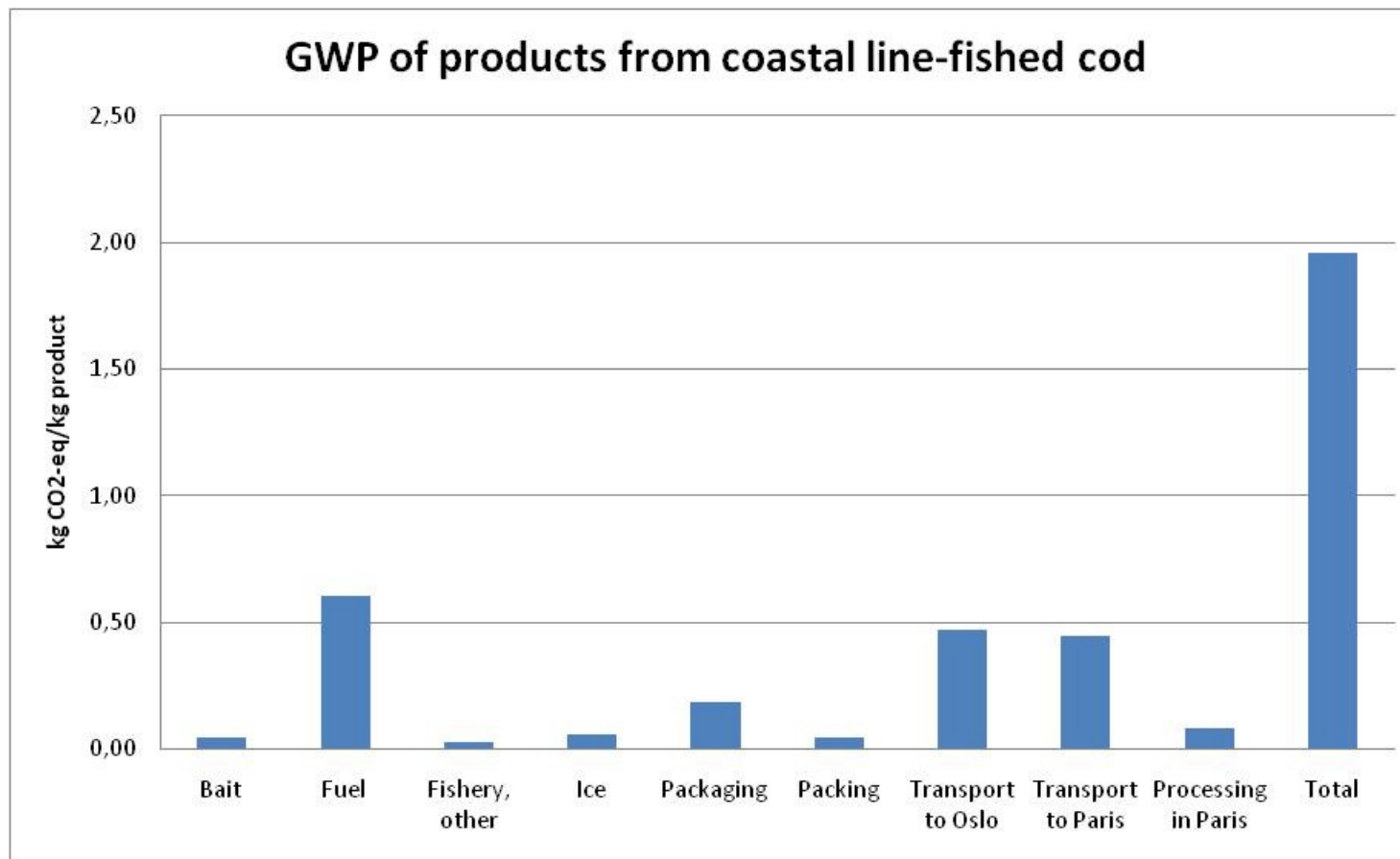


# Results, environment



- ReCiPe Midpoint (H) V1.03 / World ReCiPe H
- Climate change and fossil depletion is most important.
- Ionizing radiation also important, but caused by electricity production in France.

# Distribution of impact



# Comparison of impact of traditional and new equipment

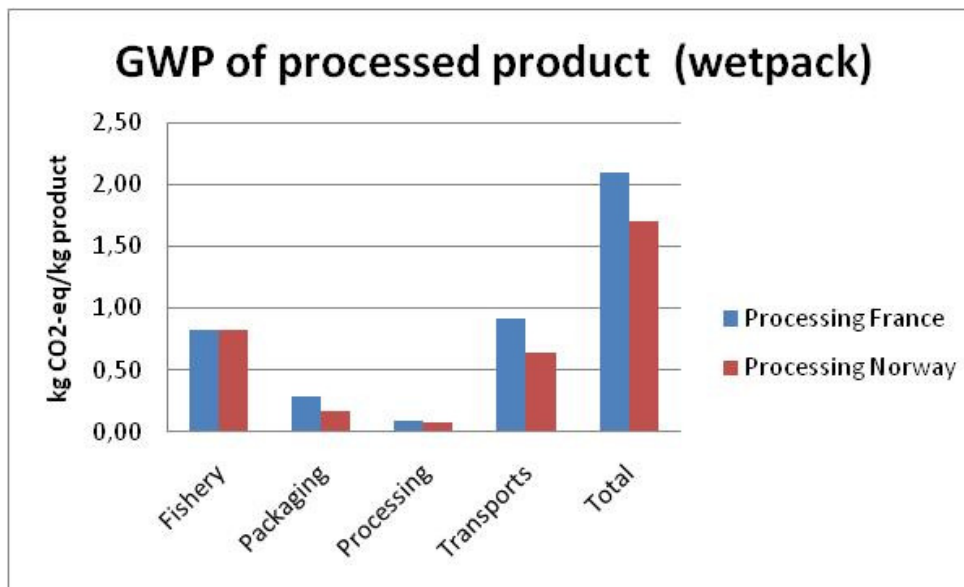
Relative fuel consumption (l fuel/kg fish)

	Coastal linefishing using Selectfish	Traditional coastal linefishing
Yearly average specific fuel consumption (l fuel/kg whole fish)	0,15	0,18
Test trial in October 2009 (l fuel/kg whole fish)	0,10	0,10
Winter fishery (Nov-Dec 2009) in Barents Sea (l fuel/kg whole fish)	0,06	n.a.

There is no significant difference in fishing boat fuel consumption or environmental impacts between the "old" and new equipment.

However the study identified several possibilities for reducing the products environmental impact.

# Effect of processing fish near the fishing grounds or near the market

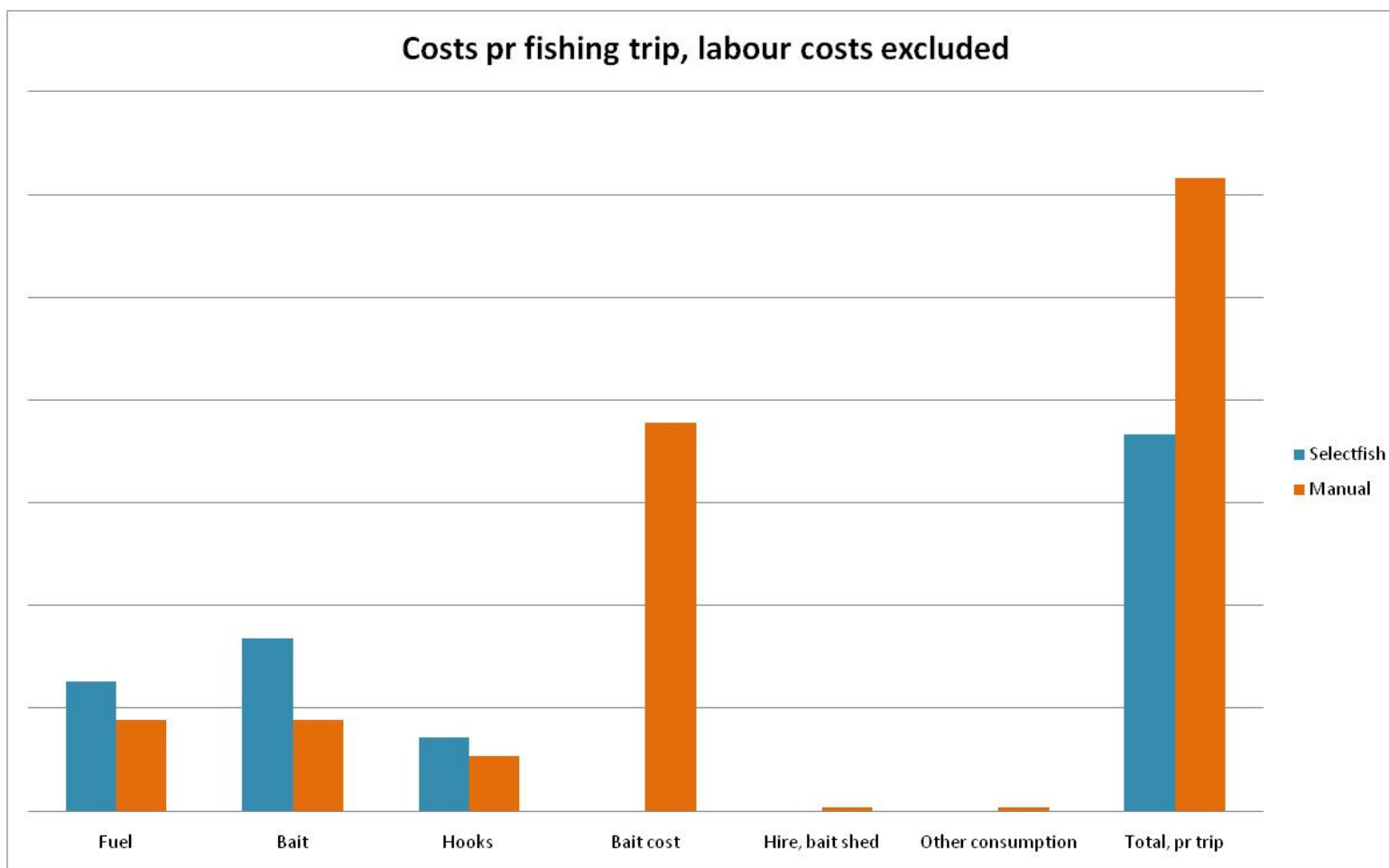


A 26 % reduction in GWP could be achieved by processing the fish in Northern Norway rather than Paris.

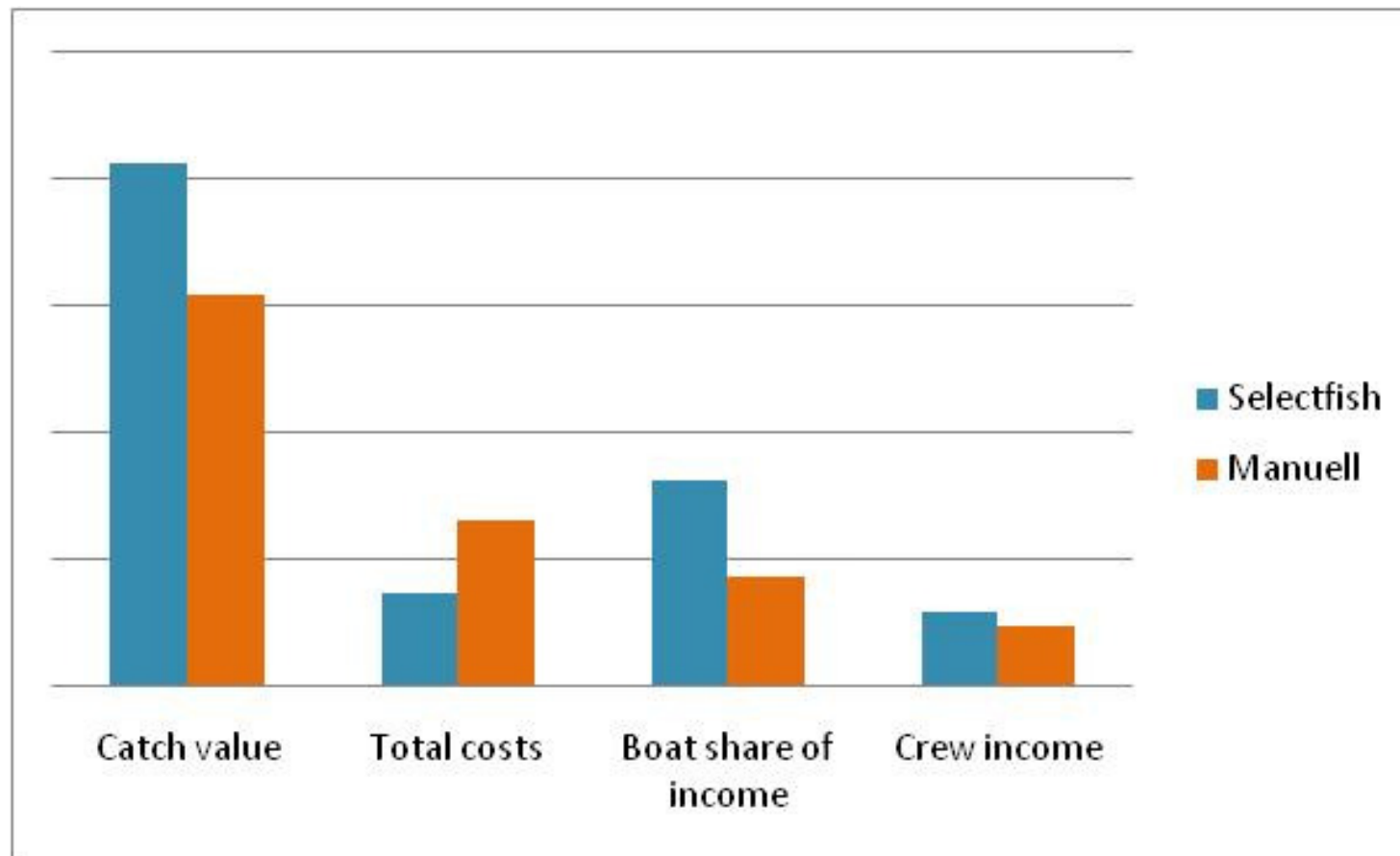
The effect is due to less packaging and less transport work pr F.U.

40 % less product is transported.

# Costs



## Final results, economy



## Social sustainability – indicators and method

Traditional indicators	Indicators chosen in this case
<ul style="list-style-type: none"><li>•Discrimination.</li><li>•Child labour</li><li>•Forced labour</li><li>•Freedom of association.</li><li>•Physical working conditions.</li><li>•Working hours</li><li>•Minimum wage and benefits</li><li>•Training and education of employees.</li><li>•Development support towards local society</li></ul>	<ul style="list-style-type: none"><li>•Health and Safety performance</li><li>•Employment of people in areas with few other employment possibilities.</li><li>•Number people employed pr quantum fish</li><li>•Ownership structure of boats</li><li>•Length of fishing trip</li><li>•Age of fishermen</li></ul>



## Results – social sustainability

Health and Safety performance	Selectfish better: Manual baiting less safe and give more work-related health problems. More crew pr boat means that risk for accidents and stress-related illnesses decrease.
Employment	Selectfish better: Increased profitability means more secure work places in rural communities.
Number people employed pr quantum fish.	Little difference, but hard baiting work ashore is exchanged with less hard work in boats.
Ownership structure	Probably little difference. Higher profitability but high investment with Selectfish.
Length of trips ("Family friendly")	No difference. Quality concerns dictates length of trip.
Age of fishermen/ recruitment	Recruitment will probably increase when the number of crew and income increase.

## Conclusions

- No significant difference in environmental performance could be detected between traditional linefishing and linefishing with automated equipment. As the crew gets used to the equipment a difference might appear.
- Linefishing is a method that is losing ground to other fishing methods, but equipment like Selectfish will probably increase the profitability and contribute to increased use of the method.
- Based on a preliminary analyses the social effects of a transition to the new equipment seems to be good.
- However the new equipment has been tested for a short time with on just a few boats: The study could only identify trends and potential effects.

## Lessons learned

- When studying complex systems like fisheries it is better to include economic viability as well as social impacts. It also makes the study more interesting to fishermen and other interested parties, e.g. governments.
- In this study the lack of environmental improvement could be discouraging but the improvement in economic viability and social effects means that overall picture of the transition to new equipment is positive.

### Improvement possibilities:

- The study would be even better if quality of the products were considered.
- The study would give a more complete picture if indirect effects had been studied. Perhaps the increased economic viability means that less sustainable fishing methods are displaced?





**Thank you for your attention**

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