

## Part 2

### Greenland today FISHING PRACTICES AND VALUE CHAINS

#### EXERCISE

#### I

#### Fishing practices and value chains

**Subject** Geography  
**Level** medium  
**Duration** 70 minutes

#### Learning Opportunity

Competences	Detailed description
Social and civic	Understand how fishing is organised concerning fishing methods, working conditions and income at the individual and societal level.
Math, science, technology	Gain insight into fishing practices and the vulnerabilities of ecosystems and learn how to calculate and assess data provided in different forms.
Cultural awareness	Observe and understand the dependence of work practices, social life and knowledge base.

#### Overview

Min.	Topic	Tasks for the pupils	Tasks for the teacher	Material
25	Implications of two fishing practices compared	Read and present the two storylines in groups, answer questions and compare the practices	Hand out the material and answer questions	Two storylines of different fishing practices (Material I1 and I2). An overview over marine catch in Greenland (Material I3), answer sheet (Worksheet I4)
30	Value chains and income distribution	Read presentations of the value chain and calculate the distribution, discuss private income and societal benefit	Help understand the concept and the methods of calculation, structure discussion	Overview of the distribution of costs and income for the two practices (Material I5), figures calculated of two value chains (Worksheet I6)
15	Governance of environmental impacts	Investigate and assess fishing gear, read environmental assessment and discuss trade-offs and governance	Hand out the trawl nets and long line, support the assessment and structure discussion	Pieces of two trawl nets and a long line, governance of fishing and environmental/biological impacts (Material I7).

## Detailed Description

### STEP 1

Explain to the pupils the importance of marine resources and fishing for the tax income and exports of goods from Greenland, as well as for the subsistence economy of many settlements. The export of fish and prawns account for 90 % of Greenland's exports.

The daily life of fishermen differs largely depending on the fishing practices. This is shown in two different halibut fishing practices in Greenland that are illustrated with two storylines of two fishermen, one working on a trawler, a large ship for industrial fishing using deep-sea trawls, and the other fishing from a small boat (dinghy) along the coast and from the ice cap using long lines.

Part 2

Learning Sustainability from the Vikings

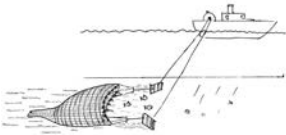
Fishing practices and value chain

**Exercise I**

**Material I1 - Storyline one: Life of a trawler**

They are standing on the deck in the spotlight, the November sky is steel grey and the short daylight is about to disappear. It is rather windy and the temperature is well below zero. The water overflowing the ship and the deck is turning into ice, making it dangerous to walk there. The full halibut trawls are being drawn up slowly and Larseraq and Inoraq are working together with a couple of others on the deck. Occasionally, one of them has to leave the trawl to knock off the ice, making sure the ship does not get too heavy on the side. It is a hard and dangerous job to work on a slippery deck when the boat rolls.

At this time of the year, with many autumn storms, the work on the trawlers is hard and the days are long. Knowing that Naja is standing downstairs in the galley preparing a delicious evening meal for them is what keeps up their spirits. She always knows how to prepare the most excellent food, no matter how strong the wind is. They wonder how she can manage to keep the pans on the stove, the food intact, and still keep her balance. She never lets them down no matter how many days they are out in the heavy storm.



Drawing: © Sebastian Schmitz

The trawl is drawn on board, and it was a good draw, several tons of halibut are put down into the hold. First, the fish has to be cleaned by taking out the guts and cleaning the fish. This must be done before freezing the fish.

This is followed by the tedious, but necessary job to clean the trawl from fry that sticks to the trawl. The slimy fry is a part of the catch, though useless. For the cleaning high pressure flushing is necessary.

EXPEDITION GREENLAND | Learning Sustainability from the Vikings | Information: [www.wilabonn.de](http://www.wilabonn.de)  
funded by the European Union programme Erasmus +

Part 2

Learning Sustainability from the Vikings

Fishing practices and value chain

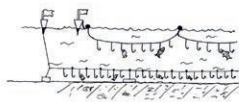
**Exercise I**

**Material I2 - Storyline two: Fishing from the sea ice**

One by one, Aqaluk buckles the dogs to the sledge. The sky is blue, there is almost no wind and the temperature is minus 35. The sun has regained some power and the days and nights will increase by 40 minutes every day. Within a month, there will be midnight sun.

Down upon the sea ice the dogs run very fast and Aqaluk jumps on to the sledge, and during the next couple of hours, the ride towards the fishing spots 25 km inside the fjord goes at full speed. This is where the halibut lives. In the water full of oxygen there is life feeding the halibut. Halibut live at huge depths, from several hundred meters down to one kilometer.

The longlines of the fisher are spread all over the fjord, and today Aqaluk is the first one to come to tend his lines. He has two long lines each of a kilometers length, each containing 200 hooks. During the night, the hole where the longline passes into the water has frozen, so the first half hour goes by knocking off the ice without damaging the line. The first hooks are empty, but then the halibuts start to come. Aqaluk carefully draws the line with the help of a line winder, while with the other hand he loosens the hook from the fish with a very large fishing hook attached to a wooden stick.



Drawing: © Sebastian Schmitz

While stepping on the line, preventing it from running out again, Aqaluk grasps the fish with his hands and carefully takes out the hook and cuts up the stomach of the fish and removes the guts. Then he throws the fish on the ice making it freeze immediately. He goes on drawing the line and removing the fish. After 150 fish, he has finished the tending of the first line; it is time for some coffee, so he sits down on the sledge and relaxes by putting bait on the many hooks. For baits, he uses small pieces of ammassat (a fish in the salmon family).

When he sets the line, he is very careful not to touch the other lines, or else it will be a mess to get them apart again. The second line is released, just like the first one. It starts to get windy. He turns his back to the wind pulling his hood over his head. In his "kamikker" (boots)

EXPEDITION GREENLAND | Learning Sustainability from the Vikings | Information: [www.wilabonn.de](http://www.wilabonn.de)  
funded by the European Union programme Erasmus +

*Pictures: The two storylines illustrated (Material I1 and I2)*

This step of the exercise entails:

1. Reading the two storylines describing life on a trawler (Material I1) and fishing from the sea ice (Material I2).
2. Answering the questions and writing the answers (Worksheet I4) about the work processes and use of instruments, the command of the processes, the different impact on the daily lives, the reasons to choose one or the other way of living and who is carrying costs and getting the benefits from the two practices.

### STEP 2

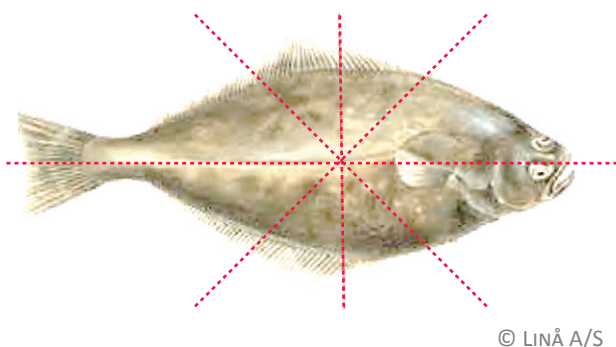
In this activity, we follow the fish on its journey from sea to table in an exercise raising the question how the final price of a fish bought by consumers is distributed among the different companies and workers involved in the fishing, processing, distribution and sales along the value chain. The value chain is defined as: *the different steps in the production process of a good, assuming that after each processing step the value of the product has increased by a certain amount expressed in the price of the product*. Each step may involve different actors who carry costs, invest, have income, etc.

To reduce the complexity of the possible value chain the exercise operates only with the trawlers selling to markets abroad and the fishing from sea ice and small boats sell to local buyers, who then export the fish. The same practices as described in the storylines from step 1.

The exercise includes a challenge as most figures of such a value chain are not aligned and found in only one place, which requires the pupils to align different types of information (Material I5) provided to construct the value chain (on the worksheet).

This step of the exercise entails:

1. Making a first guess of the percentage of the price that consumers pay for the halibut fish that was paid as income for the fishermen using long lines and for the fishermen working on trawlers (Worksheet I6)
2. Reading the text (Material I5) presenting the prices in Euro for fish sold to local purchasing companies, at wholesale auctions and to final consumers. Noting these in the price column of the Worksheet I6.
3. Continue reading the text material and write the percentage of the price for raw halibut fish that covers cost of ship, equipment, etc. on the Worksheet I6,
4. Calculating the distribution of the final price of the fish for the consumer on the different cost elements of the value chain and entering them into the relevant fields of the worksheet as well as adding them as lines to the parted fish and labelling them to indicate which element of the value chain this part represents. Drawing the result on the two fish on Worksheet I6 to illustrate the proportions of the value chain that each step comprise (as a pie chart).



Picture: representation of a halibut to mark the proportions of each processing step in the value chain.

© LINÅ A/S

5. Comparing the result with the first guess you made at the beginning of this step, and discussing the reasons for an eventual difference.
6. Discussing in the group and noting on the worksheet which of the two value chains is most beneficial for:
  - a. the local population (fishermen and factory workers),
  - b. the fishing companies and trawler owners, and/or
  - c. the customers?

### STEP 3

In the last step in this exercise, the pupils shall assess the environmental aspects of the different practices in fishing. The fishing methods affect the reproduction of species and the ocean environment in different ways. This includes the impact of bottom trawl to catch the halibut flatfish living close to the sea bottom which damages deep-sea vegetation as well as bycatches from both the use of trawl and long lines.

Three physical objects are included in the teaching material: two pieces of trawl nets and a piece of a long line, which the pupils investigate along with the information. Followed by the information provided in Material I 7. This step is finalised by combining the results from steps 1 and 2 with the ecological aspects of fishing discussed into an overall sustainability assessment of the two fishing practices.

This step of the exercise entails:

1. Assessing the two trawl nets and the long line and noting ideas about how these are important for how much bycatch results from their use on Worksheet I 8.
2. Reading the information provided (Material I 7) and discussing the biological and environmental implications of the two fishing methods. Note the environmental and biological impacts of the two methods on Worksheet I 8.
3. Writing down your answers (pros and cons) on Worksheet I 8 to the questions:
  - a. How do you assess the contribution to sustainability of fishing in Greenland concerning economy, social life, environment and control/influence of the two practices?
  - b. What makes one or the other way of organising fishing preferable for Greenland?

### Background information

The export of fish and shrimps is the main income for Greenland in international trade and has contributed 90% of exports for more than half a century. Marine resources also provide an important part of the subsistence basis for the smaller settlements in Greenland. This makes the Greenland economy extremely vulnerable to developments in the global markets for fish.

The statistics for Greenland (figures from 2014 in Material I 3) show that the primary species providing income are Greenland halibut and prawns with catches of 48,643 and 87,162 tonnes respectively, having an estimated value of €105 million and €153 million out of a total fish catch of 348,563 tons. Next in line are cod and mackerel with catches of 78,670 and 34,566 tons respectively, with a value of €24 and €44 million. In the following, the focus is on halibut as a core example of fishing in Greenland. A statistical comparison with the catchment of other important species on deep sea and inshore distributed between fishermen and boats registered in Greenland and foreign fishing boats can complement these figures.



FOTO: GREENLAND INSTITUTE OF NATURAL RESSOURCES

*Picture: caught halibut  
on sea ice*

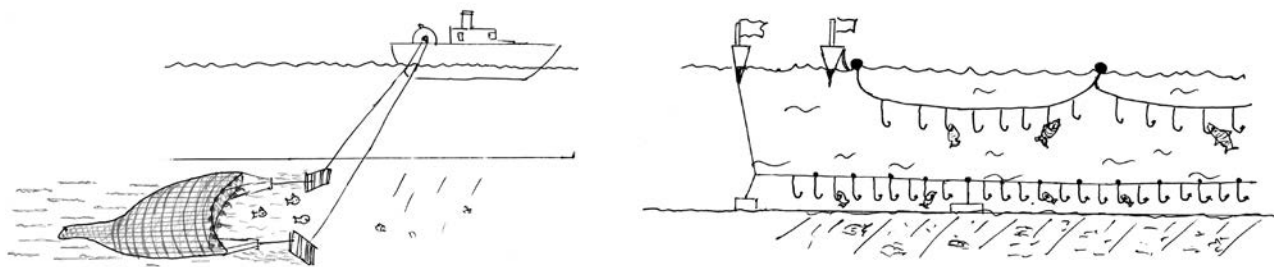
## 2.1

### GREENLAND TODAY Fishing practices and value chains

The Greenland halibut is a deep-sea flat fish living from 500 metres down to 1 kilometre below surface living on the fishing banks as well as along the coastline and in the fjords. Halibut is expected to breed on the banks.

Being a flat fish, the Greenland halibut lives close to the sea bottom. This defines the fishing techniques. These are either trawl nets used when fishing in open waters on the banks for from the coast, or long lines with hooks attached with bait used in the coastal waters and in the deep fjords.

Due to government's fishing regulations, bigger trawlers are not allowed for coastal (inshore) fishing which is defined as 20 sea miles from shore.



DRAWINGS: SEBASTIAN SCHMITZ

*Pictures: trawl (left) and longline (right)*

Using long lines is the most sustainable way of fishing, as it does not destroy vegetation on the sea bottom which is caused by the weights of the trawl-nets. Another challenge when using trawls is that the slimy fry sticks to the net, which must be cleaned by high pressure flushing. The long line also does less damage to the fish, but the work going into this is more time consuming due to the handling of single fish and bait.

Cutting the fish correctly is crucial for the quality of the fish meat as some bones can damage the meat. Halibut is a high value fish traded either as whole, uncut fish (though always cleaned for guts); as fish with skin but without head and tail, called 'Japan cut'; or as fillets where head, tale, fins and bones are removed. Storage of frozen whole fish takes up twice the space of 'Japan cut' and three times that of filleted fish.

The price of the 'Japan cut' fish on the world market is often twice the price of fish fillets on the wholesale markets, but the prices vary quite a lot, and are sometimes almost equal. Consequently, world market prices play an important role when the fishing companies choose how and where to process the fish. The exports of halibut from Greenland comprises 60 to 80 % whole fish or 'Japan cut' fish.

The value chain for halibut differs from the outset according to how it was caught. Whether it is trawlers fishing on the banks or inshore fishing from very small boats, from sea ice or from small fishing vessels defines how the fish is handled and processed and where it is landed. Halibut caught by trawlers are almost always sold as whole fish or 'Japan cut' fish and may even not be landed in Greenland even though the trawlers have fishing licenses and pay taxes for their catches. The inshore catchment can be landed and stored in cities on the Greenland coast that have freezing capacities and can process fish, but it can also be sold to foreign ships that handle exports in the same way as the trawlers.