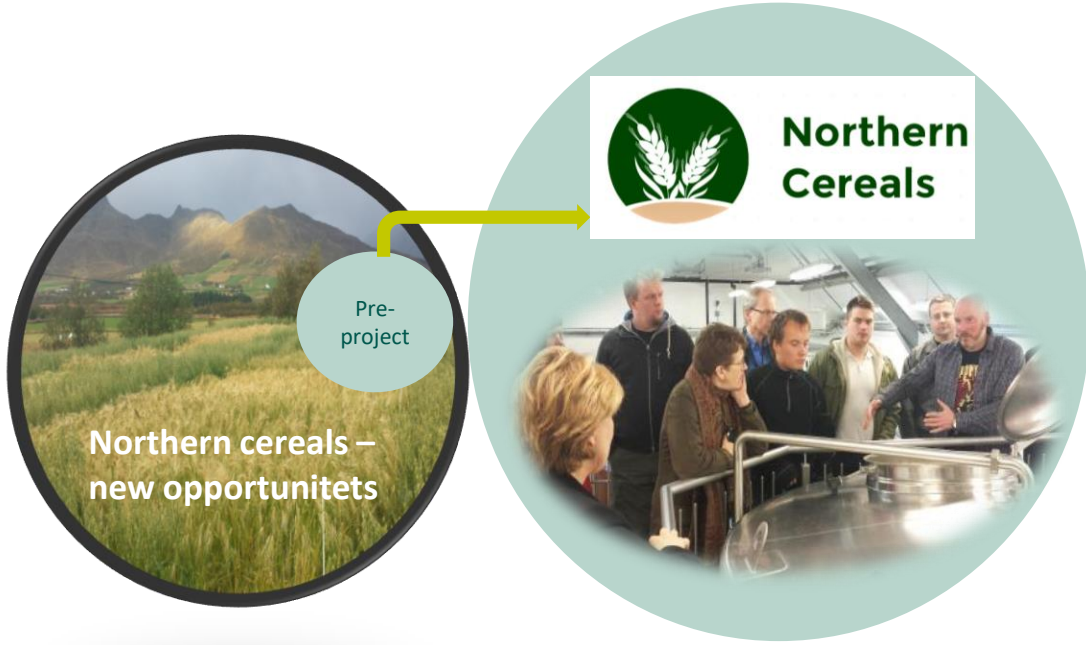
NIBIO
NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

Lessons from

The Northern Cereals Project

Hilde Halland og Sigridur Dalmannsdottir, Iceland 8.oct. 2024

NORTHERN CEREALS – Three projects 2014-2018



Objective:

Developing the value chain from northern barley to food and drink products.

North Atlantic cooperation:

- Iceland: Matis – Icelandic Food and Biotech R&D and Agricultural University of Iceland
- Faroes Islands: Agricultural Centre
- Orkney Island: Agronomy Institute, Orkney College UHI
- New Foundland: Forestry and Agrifoods Agency; Newfoundland and Labrador, Canada
- Northern Norway: Norwegian Institute of Bioeconomy Research
- Greenland: The Agricultural Consulting Services

+ Associated partners from all countries.

NORA
Nordisk Atlanterhavssamarbeid

Northern Periphery and Arctic Programme
2014–2020

EUROPEAN UNION
Investing in your future
European Regional Development Fund

NIBIO

Value-chain perspective

-drink products
-food products

Growing

Challenges:

-Agronomical practice
-Availability of seed of appropriate varieties
-Climate
-Mechanization and investments
-Competence

Malting

Challenges:

-Grain quality
-Optimal farm-malting
-Equipment, mechanization, investments
-Knowledge and competence

Brewing

Challenges:

-Differentiation and innovation
-Investments
-Rules and regulations
-Market orientation
-Small volume

Marketing

Challenges:

-Price
-Differentiation
-Market requirements
-Sparsely populated areas
-Long distances
-Poor communications

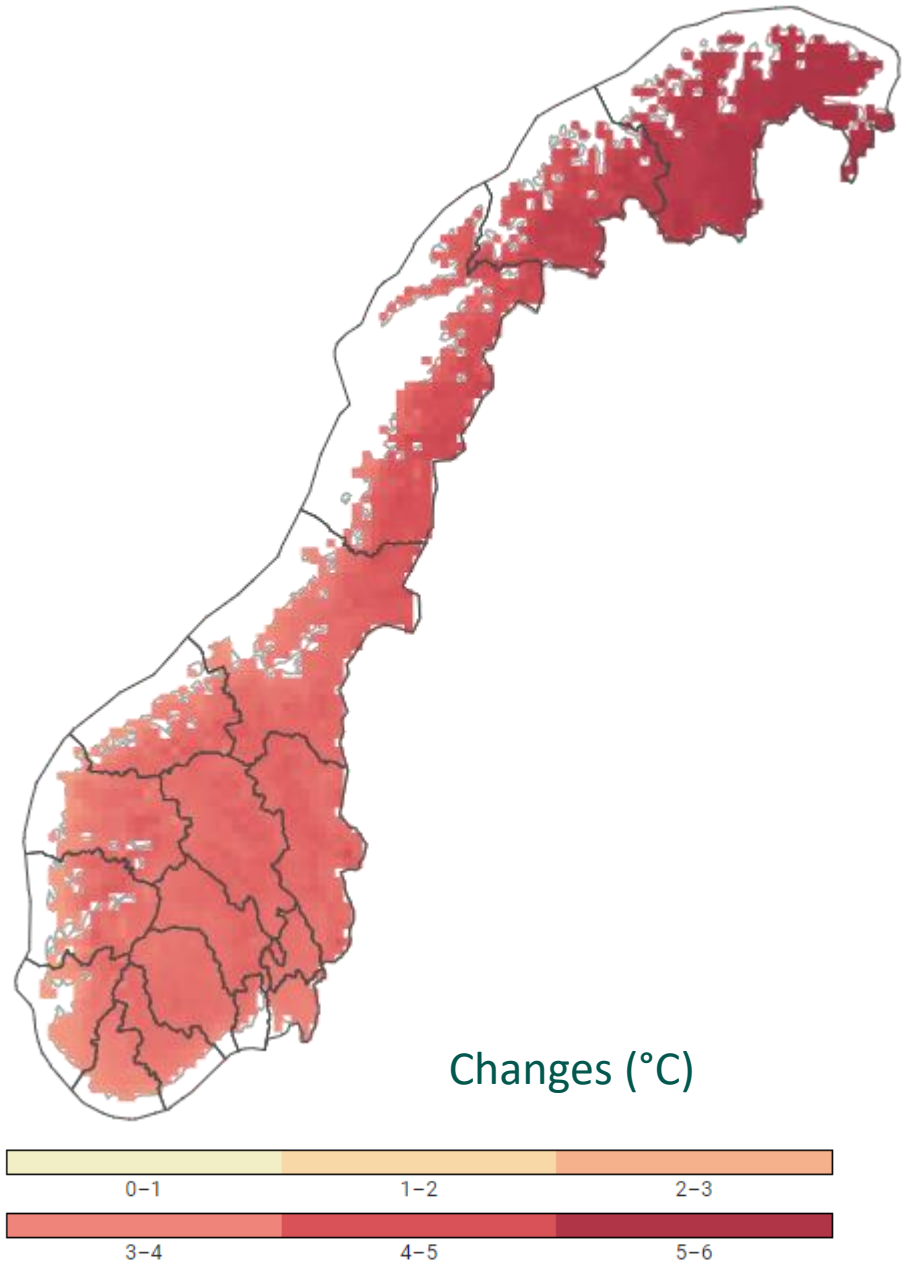
Photo: NIBIO/Northern Cereals

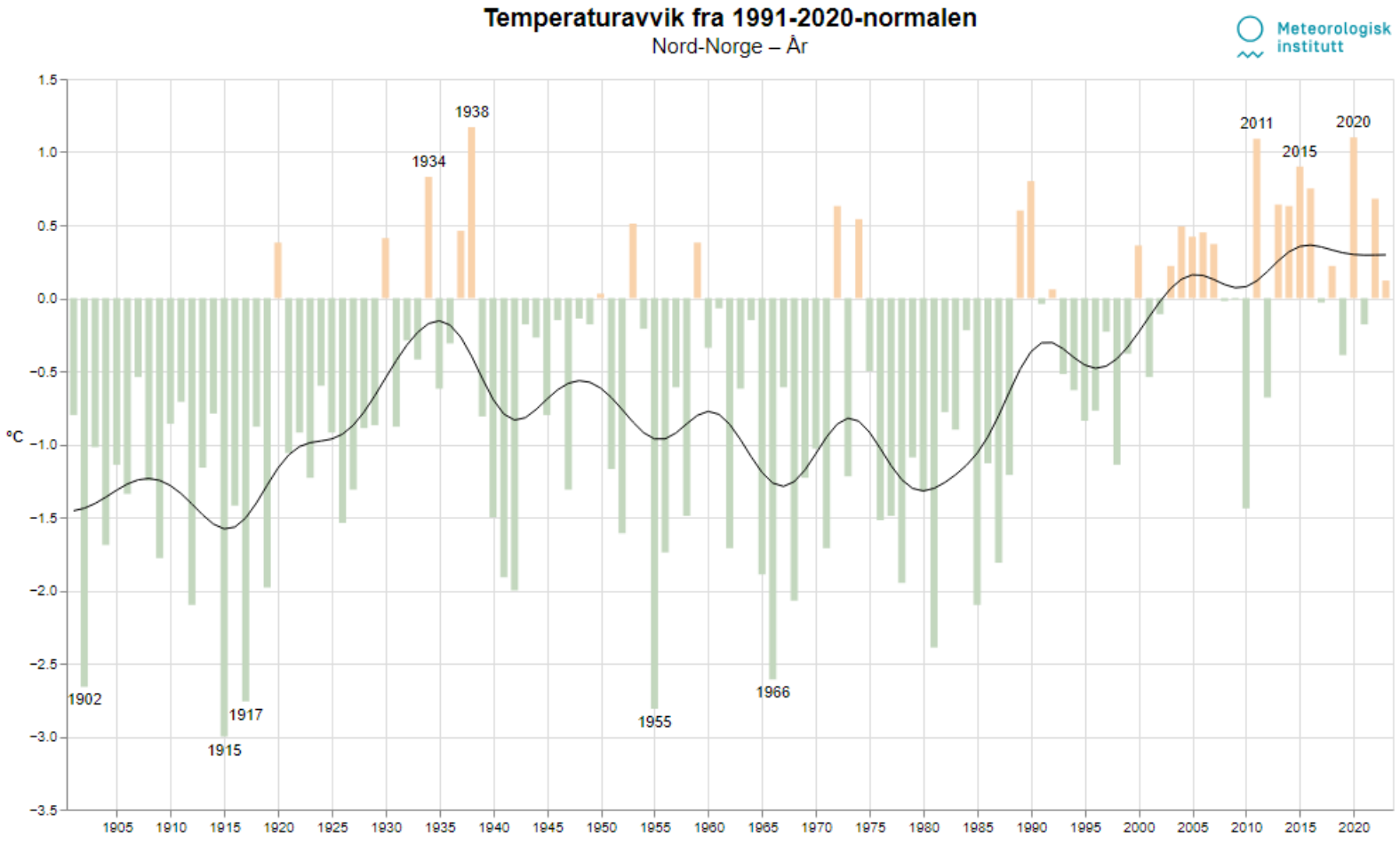
NIBIO

Value chain segments	Farming	Malting	Brewing	Marketing
Methods	Test-production Quality testing Various Guidelines for growing, potential land use, sustainability, grain drying and storage. Knowledge exchange	Test-malting Quality testing Malting Guidelines Knowledge exchange Malting placements	Test brewing Knowledge exchange	Product development Review of market situation
Outcomes	Climatic factors in all areas specified for cereal production Arable land cross the regions quantified Old varieties tested and seed multiplied in OR, FO, NO. Testing of modern Icelandic varieties in all countries. Quality testing of grain in NO, OR and IS. Demonstration plots in OR, FO and NO Farmer handbook for growing barley in all languages Knowledge exchange, local and transnational, all regions. Farm visits in OR and IS.	Test malting in OR, IS and NO. Quality testing of malt in OR and NO Malting process experiments in NO with varieties from NO, IS and OR Malting guidelines in English and Norwegian. Knowledge exchange in all regions. Malting placements in OR for 8 companies from IS, FO and NO.	Test brewing of locally grown barley by microbreweries in OR, IS and NO. Company visits in all regions Knowledge exchange company to company, all regions.	Product development by microbreweries in IS, OR and NO. Review of market potential, all partners.
Partners and stakeholders involved	R&D partners Farmers (Microbreweries)	R&D partners Microbreweries External R&D specialists	(R&D partners) Microbreweries	Microbreweries (R&D partners)

Halland, H., Martin, P., Dalmannsdóttir, S., Sveinsson, S., Djurhuus, R., Thomsen, M., ... & Reykdal, Ó. (2020). Transnational cooperation to develop local barley to beer value chains. Open Agriculture, 5(1), 138-149.

It is getting warmer
…especially in the north



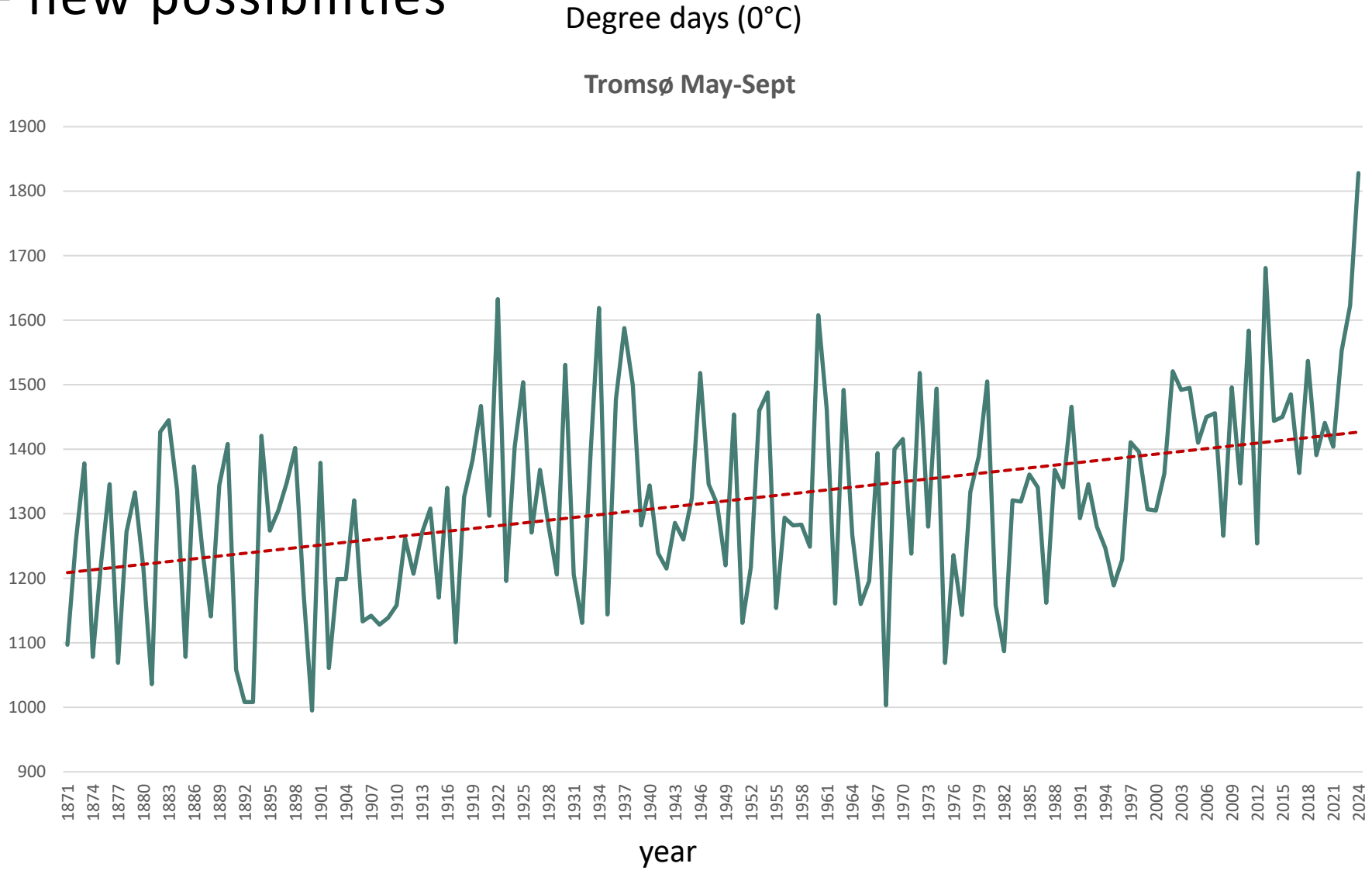


NIBIO

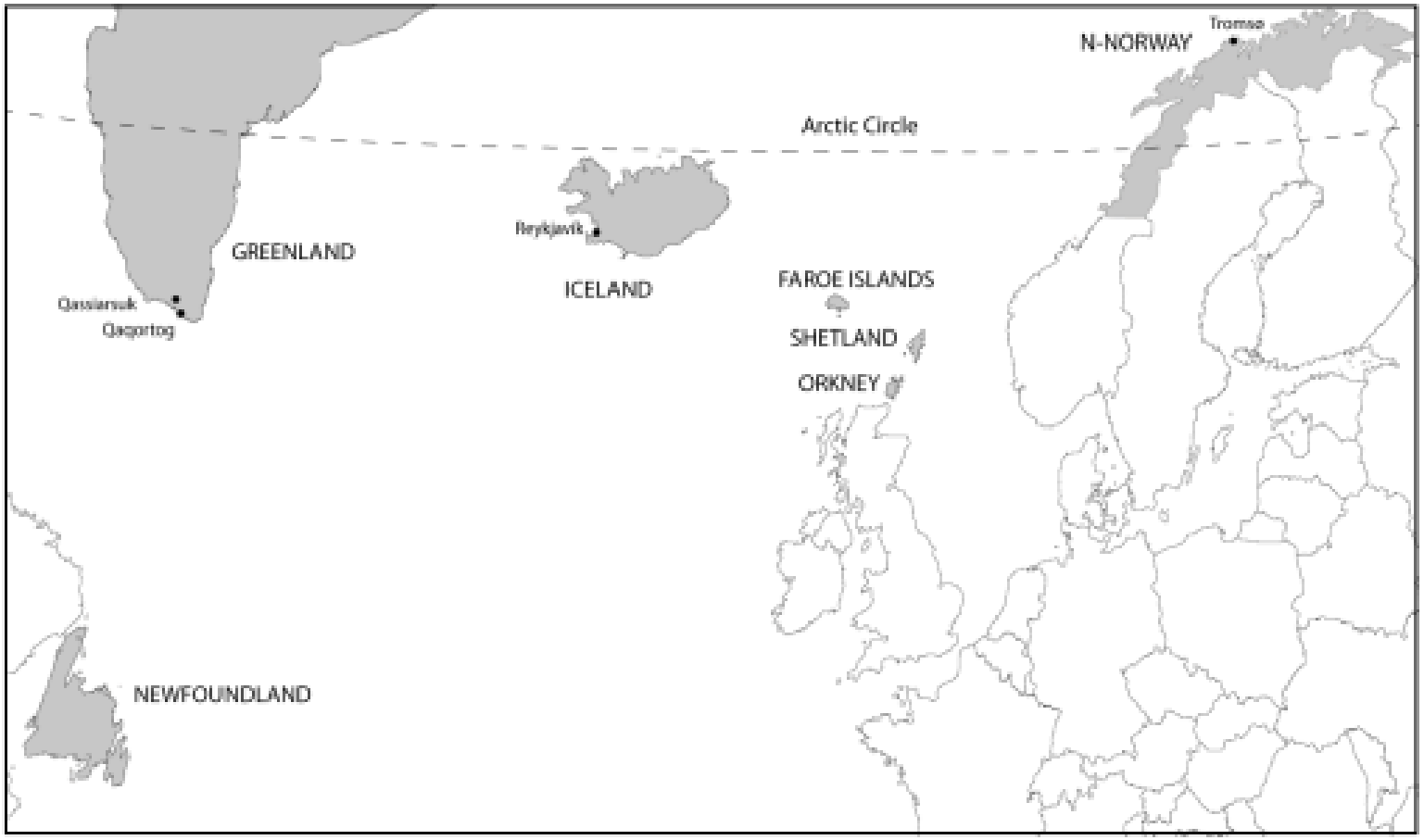
Changing climate – new possibilities

– Day degrees during growing season are increasing

– High yearly variations, but more years with potentially mature barley

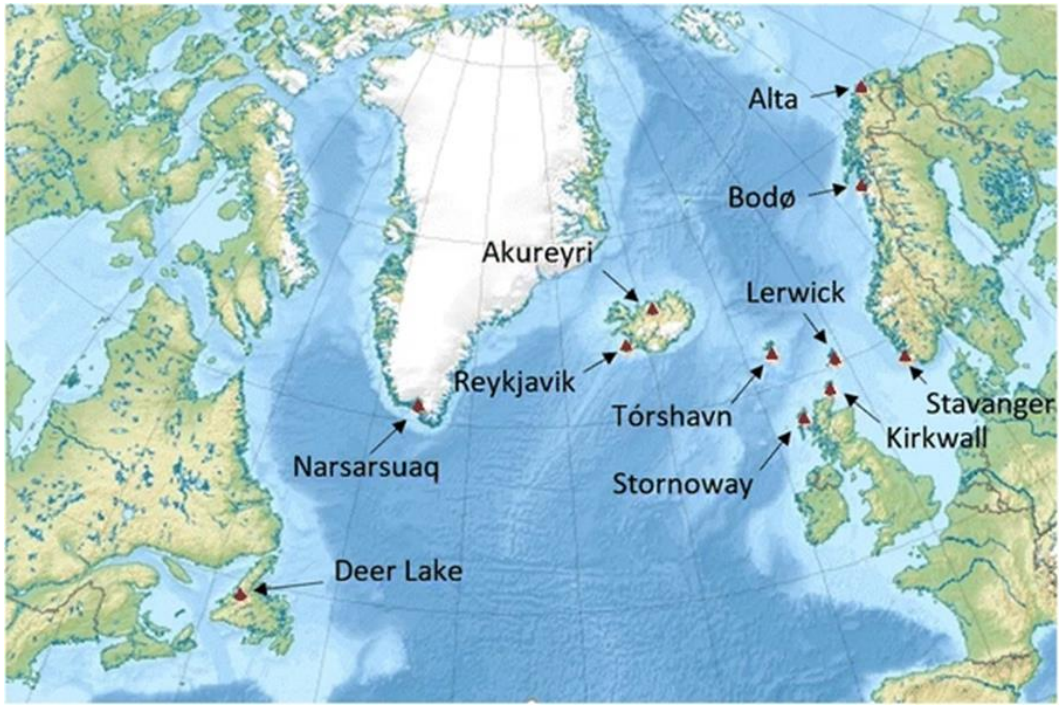


Field trials in the North Atlantic region

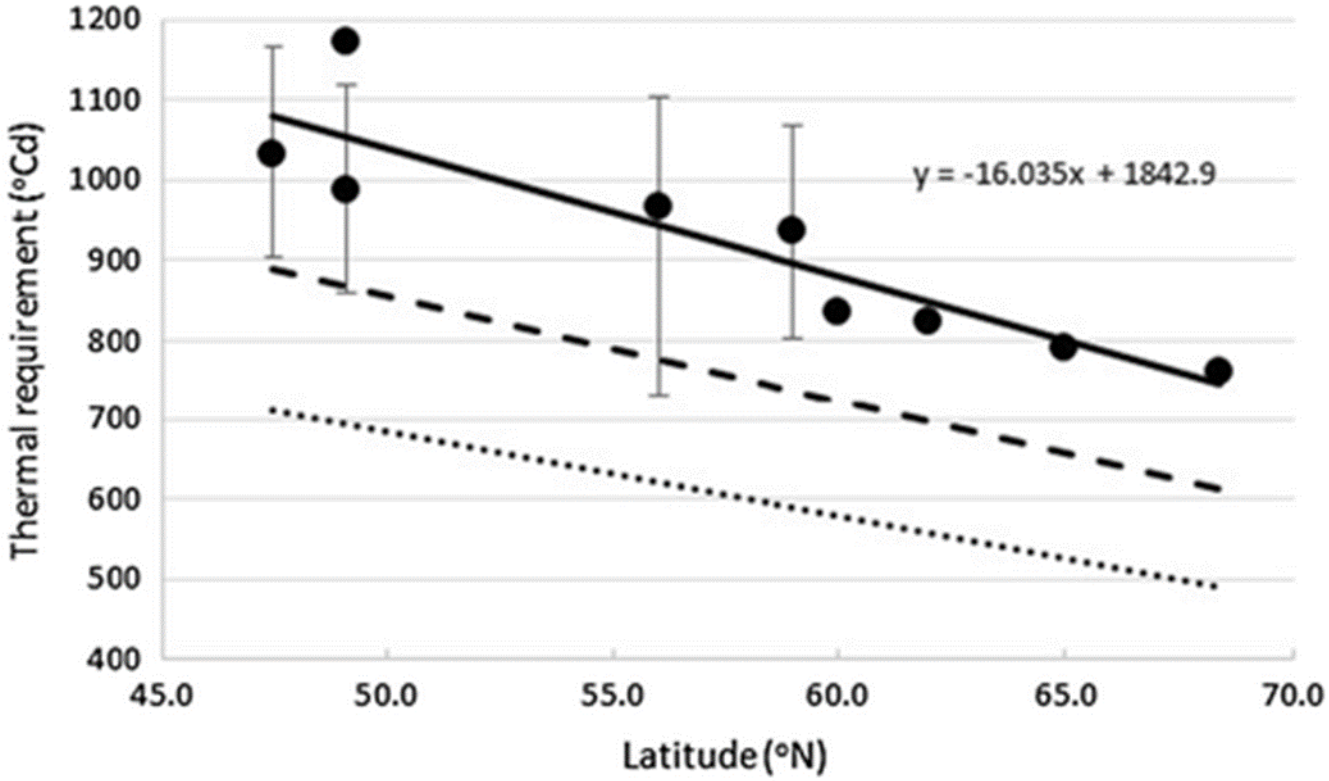


NIBIO

North Atlantic region – the thermal requirement of early maturing spring barley i less at higher latitudes



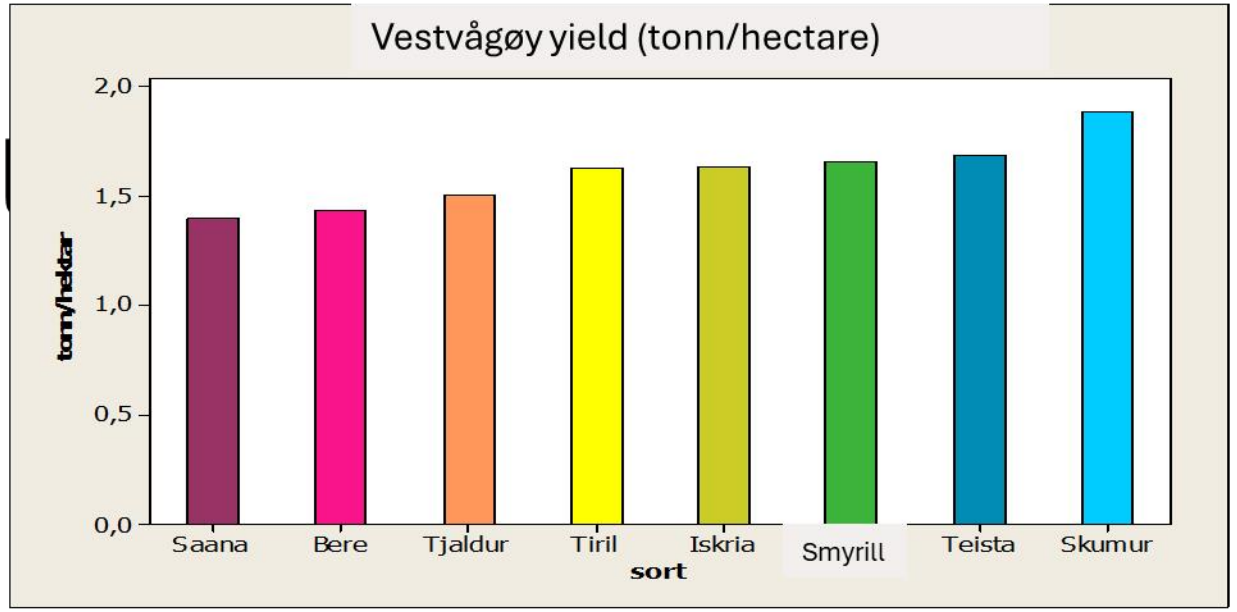
Location of meteorological sites



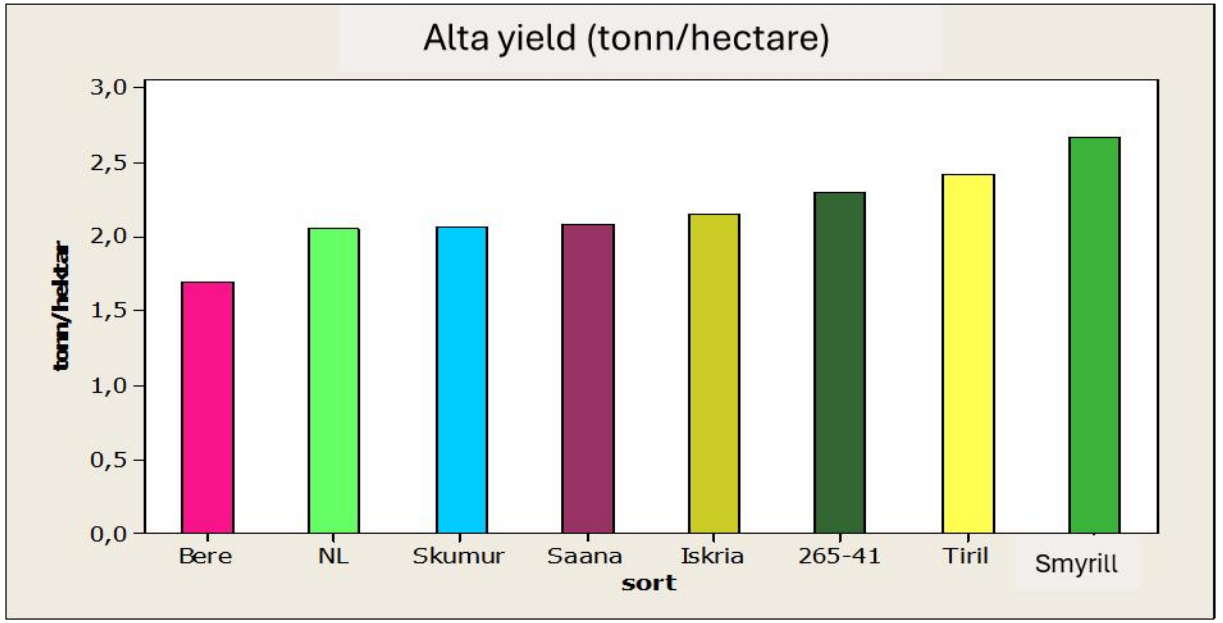
Martin et al. 2017

NIBIO


Vestvågøy


Vestvågøy yield (tonn/hectare)
tonn/hektar
2,0
1,5
1,0
0,5
0,0
Saana
Bere
Tjaldur
Tiril
Iskria
Smyrill
Teista
Skumur
sort


Alta


Alta yield (tonn/hectare)
tonn/hektar
3,0
2,5
2,0
1,5
1,0
0,5
0,0
Bere
NL
Skumur
Saana
Iskria
265-41
Tiril
Smyrill
sort

NIBIO

Grain quality

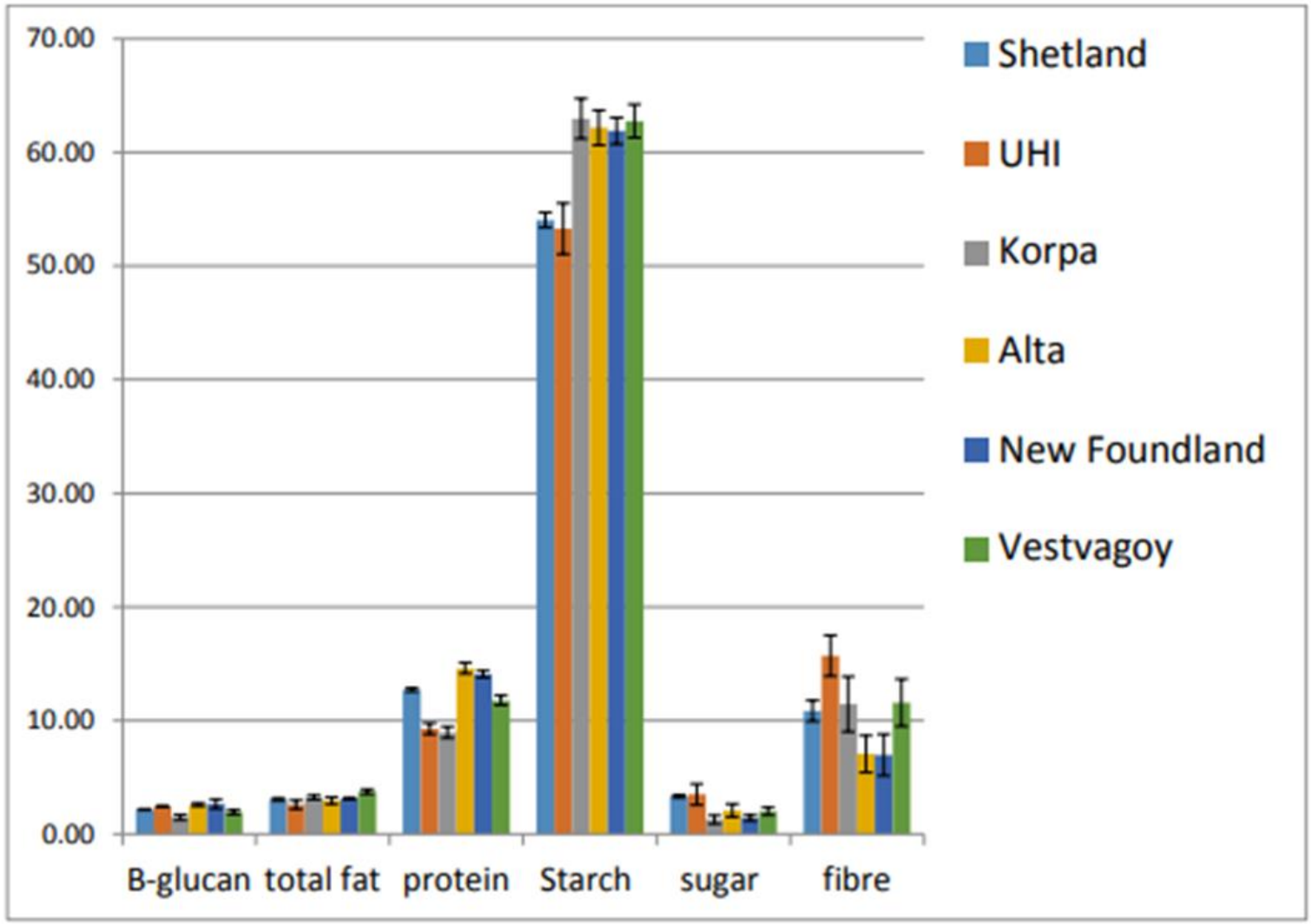


Figure 4-8. Nutrients in 4 barley varieties grown at 6 locations, Shetland, Orkney (UHI), Iceland (Korpa), N-Norway (Alta) and N-Norway (Vestervågøy). From Scott (2015).

Grain quality

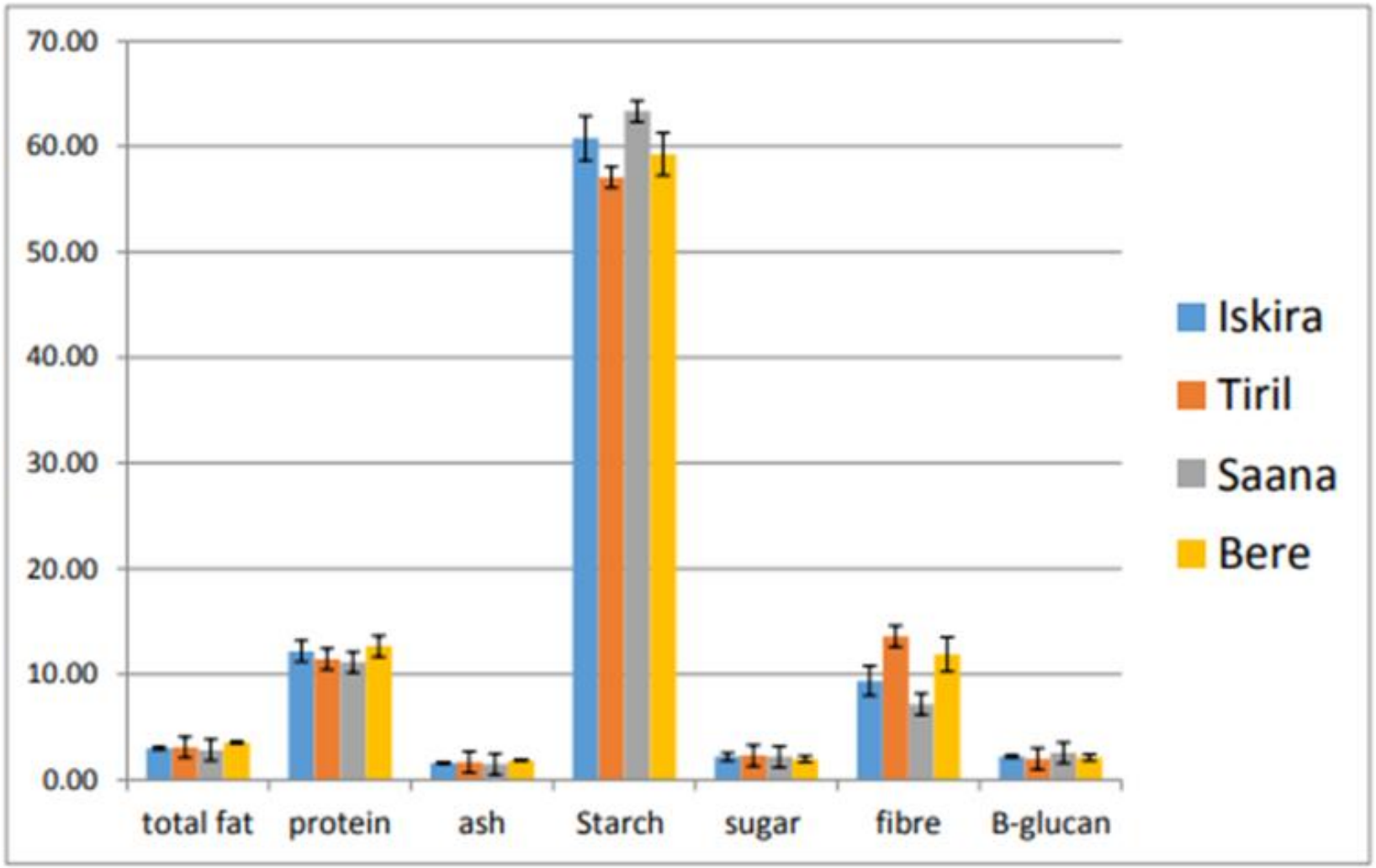
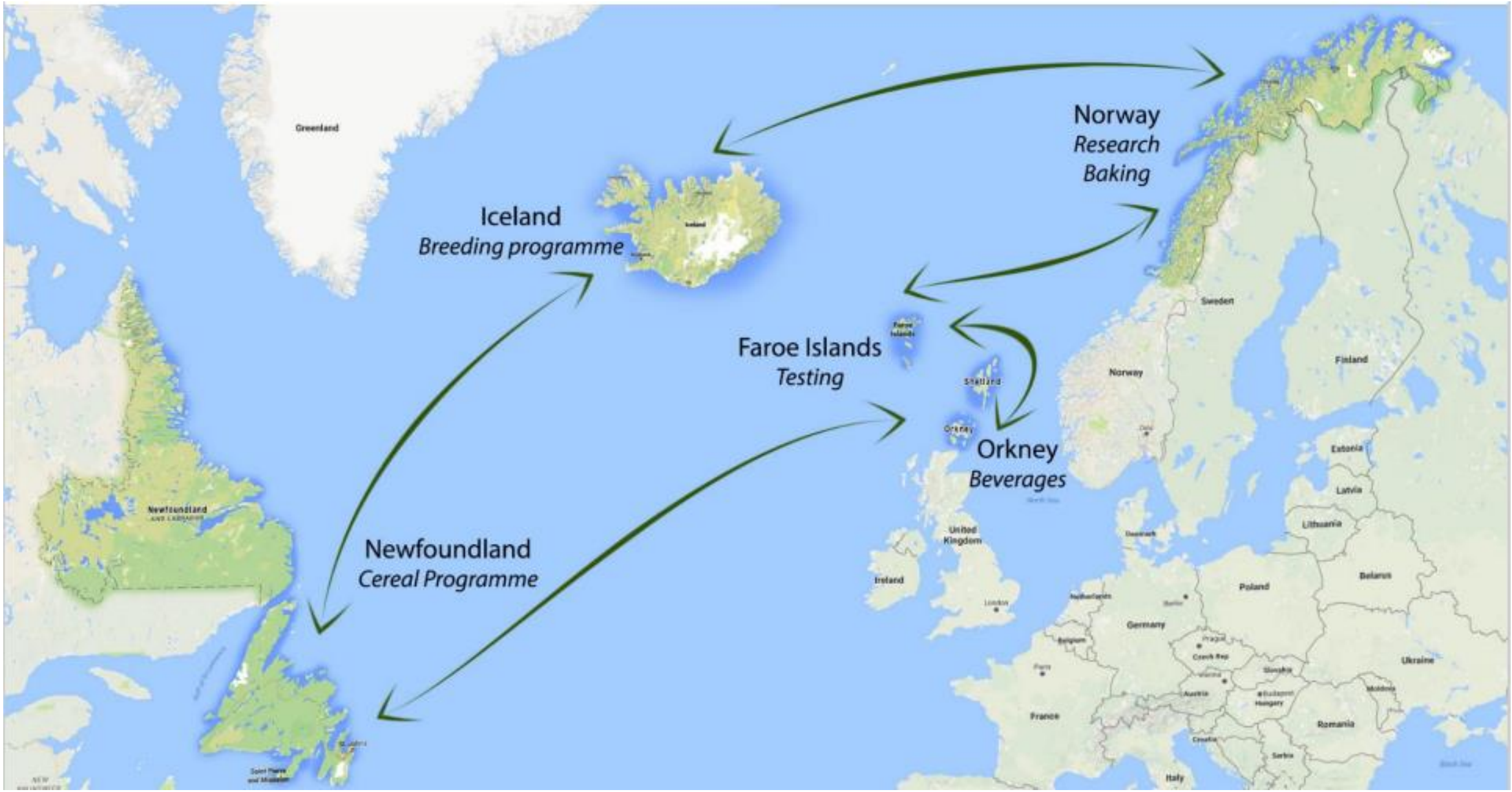


Figure 4-7. Nutrients in 4 barley varieties grown in Iceland, N-Norway, Orkney and Newfoundland. From Scott (2015).

Exchanging experiences

NIBIO

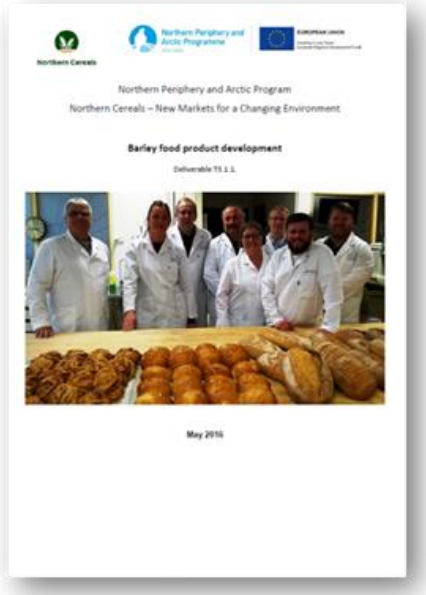
Social settings may also result in new adventures!


Greenland
Iceland
Breeding programme
Norway
Research
Baking
Faroe Islands
Testing
Orkney
Beverages
Newfoundland
Cereal Programme
Sweden
Finland
Norway
Estonia
Latvia
Lithuania
Belarus
Poland
Germany
Ukraine
France
Romania
Italy
United Kingdom
Ireland
Newfoundland

NIBIO

Knowledge exchange

Product development course at Nofima in Norway



Training and testing at the floor malting facilities at Highland Park, Orkney Islands



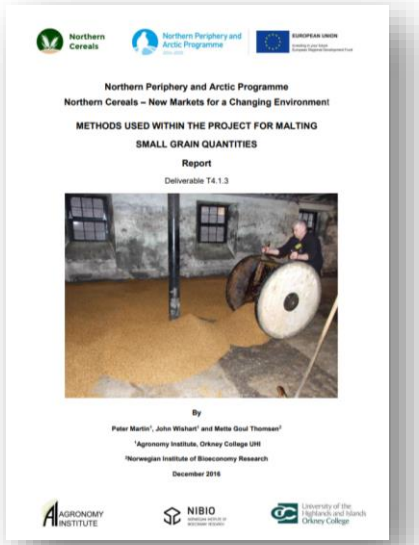












Testmalting of barley

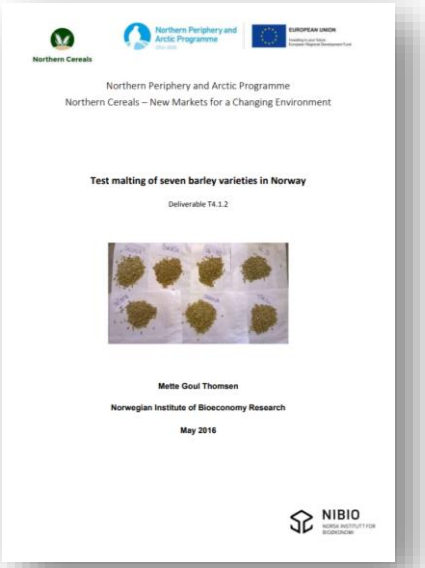
High germination in all the seven varieties.

Malt quality was found to vary between varieties.

->”so far no reason to believe that it is not possible to grow malting barley in Northern Norway”.

Table 7. *Malt quality of seven varieties of barley*

Variety	Friability test	Sacchari-fication time, min	% Plato	Colour, EBC	Filtration rate	Total protein dry basis, %	Kolbach index (Soluble N ratio)
Optimal result	>80%	<12 min	10% = 4,5% alcohol	4.0 ±0.5	Normal/ Slow	10.5 – 12%	38-45%
NL3	44.03	15	8.3	5.3	S	8.52	37.04
Iskria	64.88	10	8.2	5.7	S	9.24	38.36
Tiril	60.08	10	8.3	5.4	S	7.96	36.38
Saana	75.60	10	8.4	4.8	S	8.32	37.1
06-72	79.38	10	8.6	4.9	N	7.73	41.16
Skumur	61.78	10	8.2	5.4	N	9.21	36.89
Teiste	33.48	15	7.8	3.7	S	10.25	27.52


Northern Periphery and Arctic Programme
Northern Cereals – New Markets for a Changing Environment

Test malting of seven barley varieties in Norway

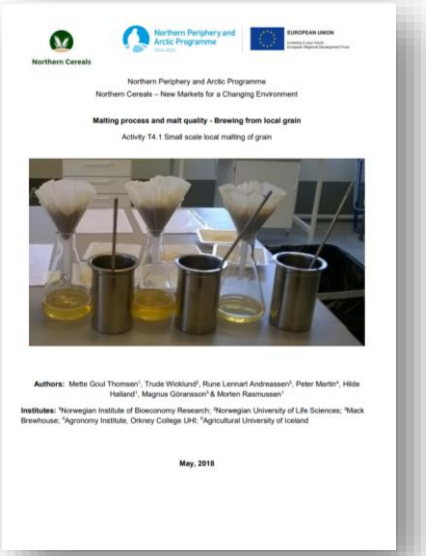
Deliverable T4.1.2

Mette Goul Thomsen

Norwegian Institute of Bioeconomy Research

May 2016

NIBIO

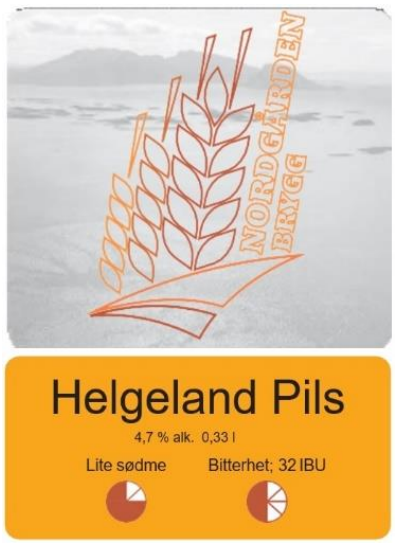

Northern Periphery and Arctic Programme
Northern Cereals – New Markets for a Changing Environment

Malting process and malt quality - Brewing from local grain

Activity T4.1 Small scale local malting of grain

NIBIO

Product development

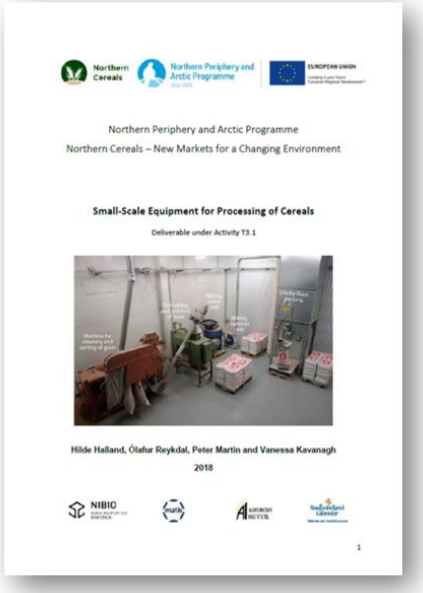


Recommendations for increased cereal production and use in the north:

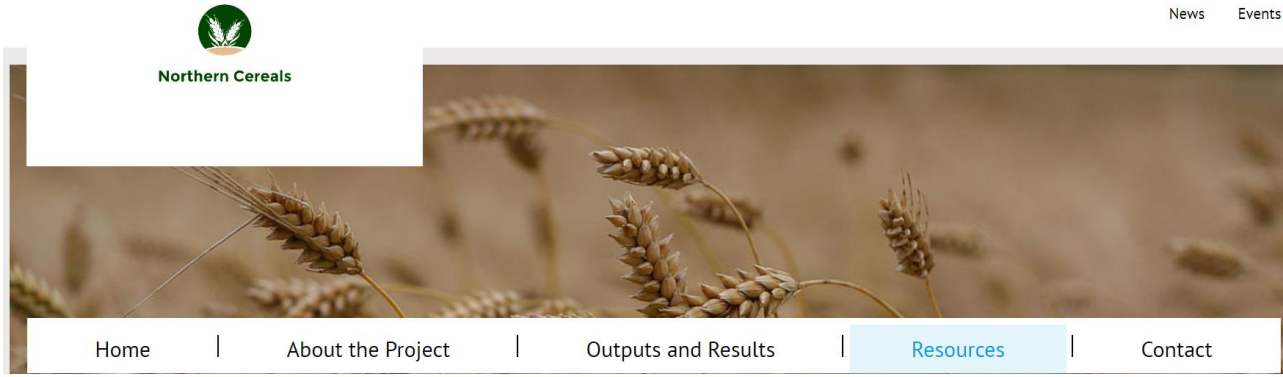
- Cooperation for building competence and knowledge exchange between researchers, advisors and farmer
- Value chain perspective thinking: direct cooperation between farmers and food and drink producers
- Sustainable feed production from own cereal
- Investment in threshers and dryers – if possible, machine cooperation
- Intermediaries; mills, malteries and storage/drying facilities must be developed; small scale equipment.
- Further research on malting quality
- Breeding and collaboration in the north for adapted cereal varieties

To access the knowledge produced regarding:

- Cereal cultivation
- Grain Drying
- Bakery products
- Small-scale equipment
- Malting
- Beverages
- Sustainability
- Cereal Market



https://cereal-2014-20.interreg-npa.eu/resources/



Cereal cultivation

The Cereal Project establishes guidelines and information on cereal (particularly barley) cultivation under northern conditions. This work is ongoing. A report on methodology can be downloaded (determination of suitable areas for barley cultivation).

Information under this topic should make it possible for a number of farmers in the NPA region to establish themselves as producers of high quality cereals that will provide the raw material for the development of new local food and beverage products.

- Cereal cultivation-Mapping suitable areas Report NPA Cereal DT211.pdf
- Cereal cultivation-Size of suitable areas-Report-NPA-Cereal-DT212.pdf
- Cereal cultivation-Farmers handbook-Report-NPA-Cereal-DT213-Version2.pdf
- Warming-Thermal requirement-Barley-Iceland Report NPA-Cereal-DT243.pdf
- Warming-Thermal requirement-Barley-Norway Report NPA-Cereal-DT243.pdf
- Cereal cultivation-FarmersHandbook Report In Icelandic NPA-Cereal DT213.pdf
- Warming-Thermal requirement-Barley-Faroe Islands NPA-Cereal-DT243.pdf
- Cereal cultivation Farmers handbook Summary In Faroese NPA-Cereal DT213.pdf
- Cereal cultivation-Faroe Islands Summary NPA-Cereal DT2.pdf
- Cereal cultivation Newfoundland-Programme Summary NPA-Cereal DT2.pdf
- Warming-Termal requirement-Barley-Faroe Islands Summary In Faroese NPA-Cereal DT232.pdf
- Cereal Cultivation Farmers handbook Report In Norwegian NPA-Cereal DT213 Version2.pdf

Grain drying

Bakery products

A report based on a bakery product development course has been prepared in English and Norwegian. The information is valuable for product development within this sector. The discussion is confined to barley which is the most important cereal for northern regions. Information is provided on the properties and wholesomeness of barley, health claims and development methodology.

- Bakery products-Product development-Report-NPA-Cereals-DT311.pdf
- Bakery products-Product development-Report in Norwegian-NPA-Cereal-DT311.pdf
- Barley products-Examples-List-NPA-Cereals-DT311.pdf
- Small-Scale-Equipment Report NPA-Cereals DT311.pdf

Malting

Reports are available on malting trials, quality criteria for malting barley and case studies using floor malting methods. For successful malting, knowledge on the correct execution of all steps is very important. Therefore, the information provided here can be of great value for people starting in this field.

- Malting-Methods-Small quantities-NPA-Cereals-DT413.pdf
- Malting-Locally grown barley-Report-NPA-Cereal-DT413-6.pdf
- Malting-Testing in Norway-Report-NPA-Cereal-DT412.pdf
- Malting-Testing in Iceland-Report-NPA-Cereal-DT412.pdf
- Malting Barley-Newfoundland Progress Summary.pdf
- Malting-Qality criteria-Report-NPA-Cereal-DT411v2.pdf
- Malting-Barley Supply Chain Case Study Report NPA-Cereal DT424.pdf
- Malting-Small scale-Guidelines-NPA-Cereal DT416.pdf

NIBIO

NIBIO

NORWEGIAN INSTITUTE OF
BIOECONOMY RESEARCH

NIBIO_no

NIBIO.no

NIBIO_no

www.nibio.no/en