



Northern Periphery and Arctic Programme

Northern Cereals – New Markets for a Changing Environment

THE SIZE OF SUITABLE AREA FOR CEREAL CULTIVATION IN THE NORTHERN PERIPHERY REGION

A Project Report

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By

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THE SIZE OF SUITABLE AREA FOR CEREAL CULTIVATION IN THE NORTHERN PERIPHERY
REGION- A Project Report

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1 Summary

The Northern Cereal project aims to increase area and value of barley cultivation in the Northern Periphery and Arctic (NPA) region. Availability of cropland suitable for cereal cultivation is a prerequisite for any increase in cereal production in the area. In some regions in the NPA area, availability of arable land is a possible limiting factor for increased cereal production. The regions included in the NPA Northern Cereal project are the following: Northern-Norway, Orkney, Faroe Islands, Iceland and Newfoundland. Mapping methodologies, definition of arable land and data sources for assessing its area were thoroughly described in a previous NPA report (Sveinsson and Dalmannsdóttir, 2016). In this report we successfully compiled information of the size of arable land in the participating regions of the Northern Cereals project, with the exception of the Faroe Islands. The proportion of arable land, relative to the total land area, ranged extensively. It was lowest for Northern-Norway (0.8%) and highest in Orkney (15%).

2 Introduction

2.1 Aims of this report

The Northern Cereal project aims to increase area and value of barley cultivation in the Northern Periphery and Arctic (NPA) region. Availability of cropland suitable for cereal cultivation is a prerequisite for any increase in cereal production in the area. In some regions of the, availability of arable land is a possible limiting factor for increased cereal production. Therefore, it is important to estimate the total area of land which can be considered arable. A number of conditions must be met for land being defined as arable and suitable for barley cultivation, the main being favourable soil conditions as well as a growing season of sufficient length for barley to mature grain. We compiled information from various sources into this report, some of which have never been published in English before. The aim of this document is to report that current information regarding the size and availability of arable land suitable for barley cultivation in the NPA region. We focus on the following regions: Northern-Norway, Orkney, Iceland and Newfoundland and Labrador.

2.2 Regions in this study and previous estimates of crop land area

The regions included in the NPA Northern Cereal project are the following: Northern-Norway, Orkney, Faroe Islands, Iceland and Newfoundland. Reviewed estimates of the size of arable land will be reported in the conclusion section of this report for all of the regions listed in Table 1, except the Faroe Islands (see table 2).

3 Methods

3.1 Mapping, defining and data sources for assessing suitable land for cereal production in the NPA region.

Mapping methodologies, definition of arable land and data sources for assessing its area were thoroughly described in a previous NPA report (Sveinsson and Dalmannsdóttir, 2016). It would be redundant to repeat the text here and therefore we point to the report cited about for relevant information regarding methodologies

4 Results and discussions

In the following chapters, estimates of arable land will be reported for all participating regions of the NPA Northern Cereals project, with the exception of the Faroe Islands.

4.1 Northern-Norway

4.1.1 Current estimates of arable land

The area of arable land has previously been estimated in the three counties that make up N-Norway: Nordland, Troms and Finnmark (Table 1). The total area of arable land in that region was estimated to be around 900 km², which is roughly 0.8% of the total land area (<http://kilden.nibio.no>). Nordland has by far the most arable land, about 530 km², which is more than twice the size of arable land in Troms, 260 km². Finnmark, the northernmost county in Norway, only has about 103 km² of arable land. These estimates of arable land were made by the Norwegian Institute of Bioeconomy Research (NIBIO), formerly Norwegian Forest and Landscape Institute. The estimates are based on vegetation mapping of the whole country in 1960-1990. Further details regarding how these estimates were

obtained can be found in Sveinsson and Dalmannsdóttir (2016). Future climate change can affect the area of arable land and open new possibilities in areas where climate has earlier been the limiting factor for barley cultivation.

4.1.2 Future prospects

Personal observations made by Dr. Sigríður Dalmannsdóttir and Hilde Halland, at NIBIO, all point towards increased interest in cereal cultivation by farmers in Northern part of Norway. Several farmers that Dr. Dalmannsdóttir has spoken with are planting barley for the first time or for the first time in a long time. She is also involved in variety trials of barley, that will be conducted in several places across Northern part of Scandinavia. The trials will compare the performance of varieties from Norway, Sweden, Finland and Iceland. It is clear that the NPA Northern Cereals project has sparked interest with the scientific - and farmer communities in the region.

4.1 Orkney

4.1.1 Current estimates of arable land

The total estimated arable land in Orkney, that is suitable for cereal production, was 148 km² in 2015 (Scottish Government Directorate for Environment and Forestry, 2016). This number is estimated based on the total area that was under crops and fallow in 2015 plus area that was under grass for 5 years. The rationale behind this is that in Orkney, many fields of grass are brought into arable cropping after about 5 years to reduce the incidence of weeds and, after a few years cultivation, to allow grass to be re-sown. This therefore the best estimation of land that is arable in Orkney that is suitable for barley. This data is based on a yearly an agricultural census that is conducted by the Scottish Government (see <http://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/PubEconomicReport>).

4.2 Iceland

4.2.1 Current estimates of arable land

Mapping of arable land in Iceland has previously been performed on two different geographical scales: 1) On the country as a whole (Traustason and Gísladóttir, 2009; Snæbjörnsson et al., 2010; Sveinsson and Hermannsson, 2010) and 2) individual municipalities in Iceland (Steinsholt, 2012; Gudmundsdóttir, 2014; Steinsholt, 2016). These estimations were performed using slightly different definitions of arable land and different sources of geographical data. The most reliable census of available arable land, that has been performed in Iceland, concluded that the total area is close to 3,000 km² (Sveinsson and Hermannsson, 2010). The study used existing maps of hayfields and other land already in cultivation and employed local agricultural advisors, in the main agricultural areas of Iceland, to estimate arable land not in use. For information regarding previous efforts to estimate arable land in Iceland and smaller scale studies, please refer to Sveinsson and Dalmanndóttir (2016).

4.2.2 Future prospects

The most recent phase of barley cultivation in Iceland started in the middle of the 1980's with a handful of farmers in the South of Iceland. Favourable weather conditions in the 1990's fueled further expansion of barley cultivation country wide (see figure 1).

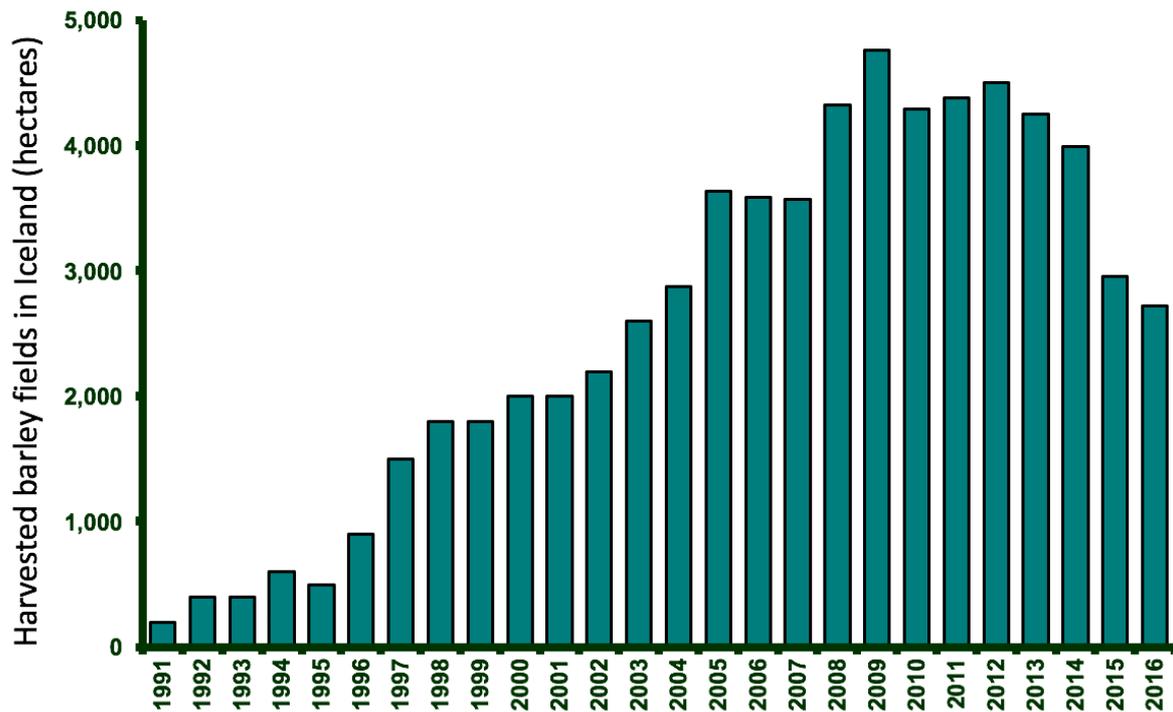


Figure 1. Harvested hectares of barley in Iceland for the past 26 years (1991 – 2016). Each bar represents the total area of barley that was harvested in a particular year. Data source: Icelandic Food and Veterinary Authority.

The main growth period in the Icelandic barley cultivation was from 1991 to about 2009. Area of harvested barley expanded from about 200 ha in 1991 to about 4,700 ha in 2009. Unfavourable weather conditions in 2009 caused a slight reduction in barley cultivation in the years that followed. After that there were three bad years in a row 2013, 2014 and 2015, which are probably responsible for the large slump in the total cultivated area seen in 2015 and 2016. Researchers at the Agricultural University of Iceland however sense a feeling of optimism among Icelandic barley growers and anticipate that the barley cultivation will increase again, due to favourable weather conditions in 2016 as well as a very good outlook for the current season of 2017.

4.3 Newfoundland and Labrador

4.3.1 Current estimates of arable land

The estimates of the total area of arable land in Newfoundland is based on a census of agriculture conducted by Statistics Canada and released in 2011 (Statistics Canada, 2016). The total land area of Newfoundland and Labrador has is 405,212 km² of which about 1% has been estimated to be arable 4,052 km². Out of theses roughly 4,000 km² merely 313 km² are farmed and the average farm size is 0.615 km². About a third of total farmed area in NL is pasture land. About 81.4 km², or 26.7% of farmed land, is on cropland which includes field crops such as maize, wheat, peas. Other cultivation of this land includes hay, fruits, sod and nursery, and vegetables.

5 Conclusions

In table 2 are the results of estimated size of arable land in the NPA region. The proportion of arable land, relative to the total land area, ranged extensively. It is lowest for Northern-Norway (0.8%) and highest in Orkney (15%). In Iceland and Newfoundland & Labrador the arable land was estimated to be 3% and 1% of the total land area respectively.

Table 1. Current estimates of the size of arable land in the NPA region.

Region	Total area of region (km ²)	Area of arable land (km ²)	Proportion of arable land (%)
N-Norway ^{1,5}	113,093	900	0.8
Orkney ²	990	148	15
Faroe Islands ^{1*}	1,400	NA	NA*
Iceland ⁴	103,000	3,000	3
Newfoundland and Labrador ⁴	405,212	4,052	1

* No data available

¹Reykdal et al. (2014)

²Scottish Government Directorate for Environment and Forestry (2016)

³Statistics Canada, 2016

⁴Sveinsson and Hermannsson (2010)

⁵The Norwegian counties of: Nordland, Troms and Finnmark.

This report significantly contributes to knowledge regarding the possibilities for the expansion of cereal cultivation in NPA region. The availability of arable land is not equally distributed in the region. The largest areas of arable land seem to be in Iceland and Newfoundland & Labrador. In respects to available arable land, it seems that those two regions are the most promising in regards to large scale increase in cereal cultivation. However, further increase in barley cultivation within the NPA region relies strongly on the political framework, including custom and subsidises.

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