Climatic Data and Faroese Agriculture

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Úrtak

Vísindaligar staðroyndir av veðurlagnum sýna, at neyvt samband er ímillum tær og tað, sum fæst butur úr føroyska landbúnaðinum; tær sýna eisini, at tær hava virði, við tað at tær í ávísan mun boða frá, hvussu gróðurin fer at hilnast.

Veðurlagið er ógvuliga skiftandi á hesum heldur lítla oyggjalandsøki, og broytingarnar ár undan ári eru stórar – sum staðroyndirnar úr Kollafirði sýna. Hetta vísir seg eisini aftur í skurðinum, sum sýnir eins stórar broytingar í úrtøkuni. Hetta er ikki at undrast á, hava vit í huga, at Føroyar liggja á tí norðara markinum fyri meginpartinum av búnaðargrøði. Men tá ið nú soleiðis er, kunnu vísindaligar staðroyndir av veðurlagnum møguliga verða nýttar til at boða frá, hvat ið vit kunnu vænta okkum av búnaðarskurði.

Summary

Local climatic data are shown to be closely connected with yields in Faroese farming and agriculture and to have a certain predictive value.

The variation in climate over the rather small island area is large and the year-to-year variation – as shown by data from Kollafjørður – is high. This is also mirrored in the crops, which shows similar large variation in yields. This is not surprising, the Faroes being situated near the northern limit for most agricultural crops. However, this is being the case, local climatic data could possibly be used for predictive purpose as concerns agricultural yields.

Introduction

Measurements and recording of climatic condition have been carried out for very long time and in many locations in the world.

Apart from the historical value the records enable us to see variations and trends over longer periods of time.

Today the many discussions on ozone, CO_2 content in the atmosphere and the expectations of global temperature increase of 2,5°C. over the next 100 years are very actual in relation to climatic records.

Faroese climatic data

Climatic records for the Faroes are available as far back as before the year 1900 (Danish Meteorological Institute). Recent data are published in the yearly reports from the Agric. Research Station, Hoyvík (from 1921). These records show a large variation in rainfall for different parts of the island area – plus the annual precipitation for Hvalvík (Streymoy) and Klaksvík (Borðoy) is over 3.000 m.m., while Sandoy and Suðuroy only recieve maximum 1.100 m.m. (Annual rep. A.R.S. Hoyvík).

The total rainfall is 2-3 times more than is needed for the agricultural crops (Andersen, 1961). Cultivation and harvest are both

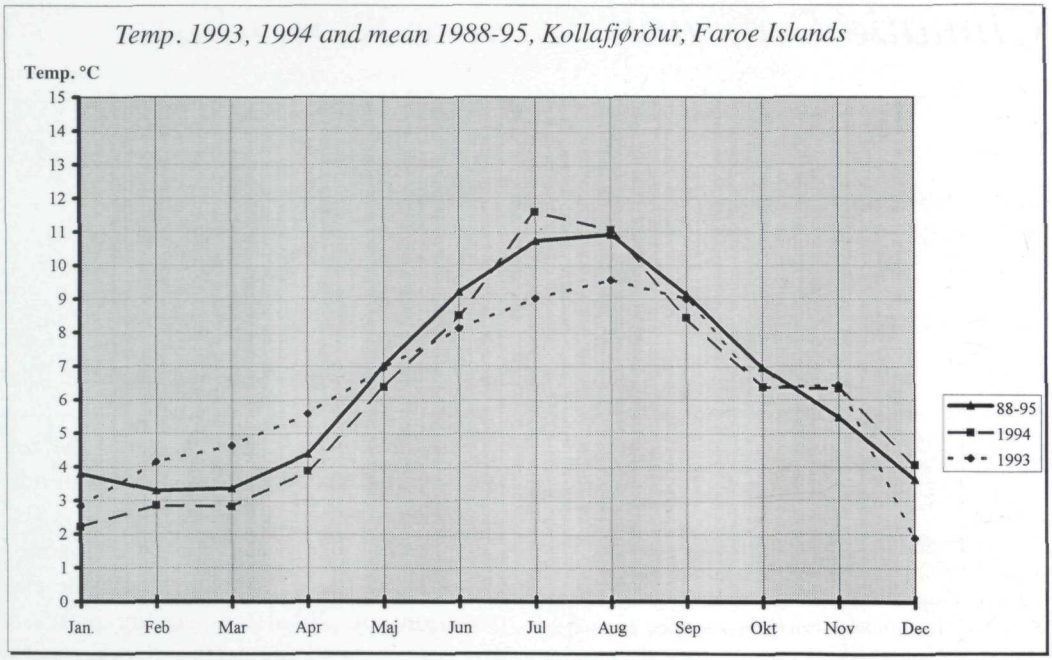

Fig. 1

hindered by this excess of precipitation Hvalvík (Streymoy, and also by the relative low temperature.

Data for Royndarstøðin

At the Agricultural Research Station, Royndarstøðin, in Kollafjørður, the following data have been collected every day at 8:00 hours since 1988:

Precipitation – for the previous 24 hours.
Minimum and maximum temperature for the previous 24 hours.

– Average temperature for the previous 24 hours (day and night) is calculated as minimum + maximum temp. devided by 2.

The data shows that the mean annual precipitation is 2.750 mm and the mean annual temperature is 6,5 °C for the period 1988 - 1995.

The variations in temperature and precipitation over the years are shown in figures 1 and 2. The years 1993 and 1994 are shown separate, since theese years stand out from the long-term average. The temperature sums (day x degree) do not vary much over the years (normally between 1.400 - 1.500 degree-days, with a maximum in 1988 of 1.576 and a minimum in 1993 with 1.306 degree-days).

These data (degree-days) indicate that cultivation of many commercial crops – like maize, wheat, sugarbets and others – is not possible in the Faroes (Andersen, 1961). Others, however like grasses, pota-

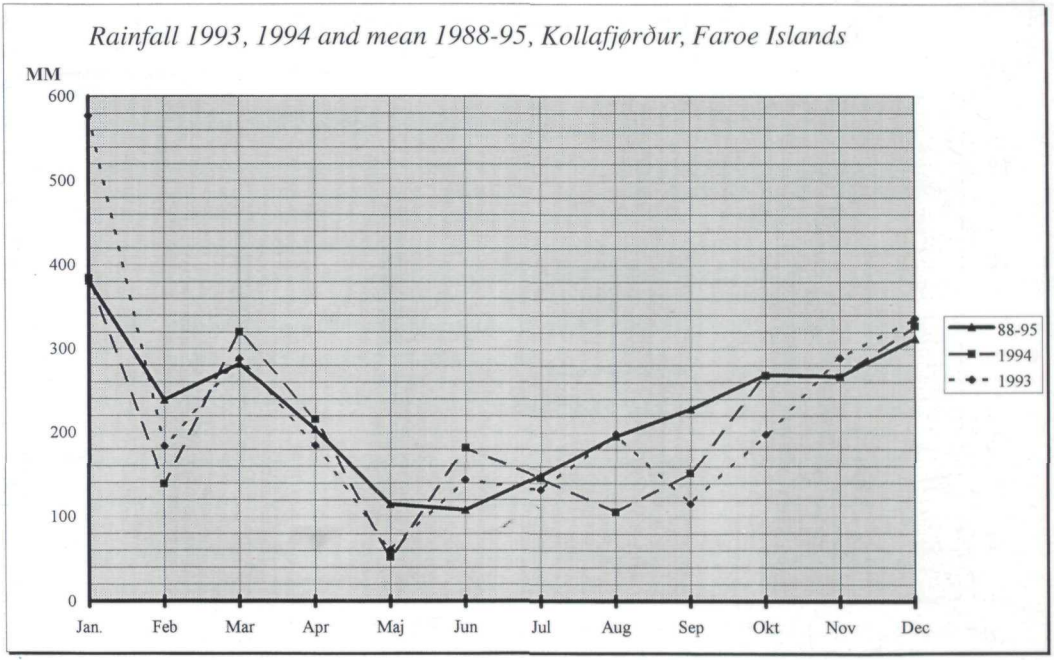

Fig. 2

toes, carrots, cale and cabbages can give acceptable yields, as they can germinate and grow under present climate, although not maximal yields (Andersen, 1961).

Factors limiting crop and animal production

Precipitation and light intensity is fully sufficient for production of most agricultural crops in the Faroes. The low temperature is the main limiting factor (sometimes together with excessive precipitation).

The annual meat production from 75.000 mother sheep is depending on the temperature (and growth of the grasses) during there season, and, may vary by up to 25% (Helgi í Brekkunum, pers. comm.).

Most crops need above 5-6 °C for growth (Andersen, 1961) and thus a variation in midsummer temperature between 9 and 11 °C has a large influence on total production, as two summer months with 9 deg. give 240, – and two months with 11 deg. give 360 degree-days for growth (above 5 °C).

The year 1993 had a low sum, and 1988 high mid-summer degree-sum, above 5 °C degree the difference being more than 40%.

Agricultural applications

Comparison of growth and yield in research trials from different years can be compared when adjustments are made for the climate of the years.

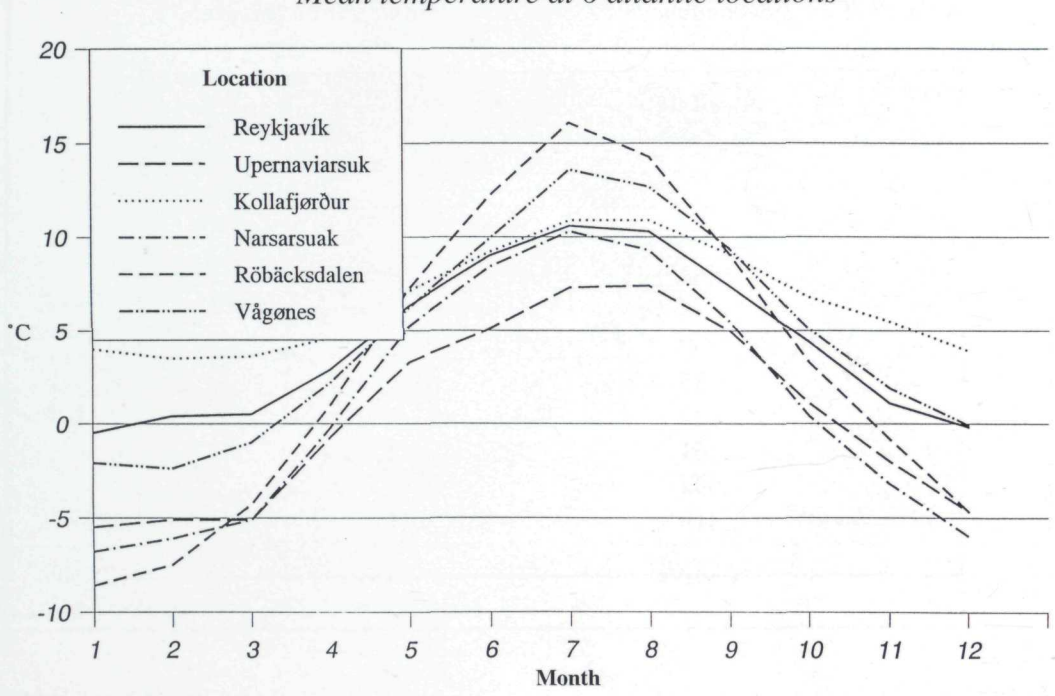

Fig. 3

Expected sheep meat production can be estimated based on actual climatic data. The same applies to milk production from home growth foodstuff.

The amount of minerals and fertilisers washing out into the waterways and sea (pollution) can be estimated from actual rainfall.

Making of dry hay in the fields is depending on dry spells of 4-5 days during July - August. The number of such dry periods (5 days) in the last tree years is found to be: 3 in 1993, 2 in 1994 and 1 in 1995.

Figure 3 shows average temperature for 6 locations in 5 different Atlantic countries, which in 1995 have established common research on grass varieties. The mid-summer temperature is much similar for Reykjavík, Narsarsuak and Kollafjørður, and the results can therefore be valid for all 3 locations.

(Willis and Dunnett, 1995) found that overall productivity of vegetation in roadside plots Bibury, southern England and the performance of certain individual species are both linked indirectly to Gulf Stream displacements and related climatic conditions.

(Lockwool, 1996) found average transpiration rates on low growing vegetation (grass pasture) was considerable higher under anticyclonic than under cyclonic weather conditions.

Tabel 1

Rainfall and Temperature-sum above 5°C.

Year	Rainfall annual	Temperature-sum above 5°C. May-Sept.	Jun-Aug.
1995	2864	643	478
1994	2558	633	487
1993	2709	541	361
1992	3155	649	467
1991	2825	689	474
1990	2861	714	526
1989	2694	645	474
1988	2319	771	556
1988-95	2748	661	478

Future use

With today's advanced tools and equipment much better registrations can be made, and computer assisted estimates for the future can be better utilised (e.g. „The Greenhouse Effects").

Satellite surveys of climate and crops provides very good data for forecasts.

In a Finnish research programme on climatic changes (SILMU) the estimated CO_2 and temperature increase over the next 100 years will increase the area suitable for wheat production more than 10 times.

Should the mentioned Finnish estimate be reality, the Faroese agriculture will also change drastically with much higher production potitentiale.

If more precise data on production had been available (e.g. grass and meat production) models to forecast production from climatic data could be developed.

Conclusion

Climatic records for the Faroe Islands in the past have shown big variations in rainfall for various locations, but only small differences in temperature.

For Royndarstøðin, Kollafjørður the collected data since 1988 show rather wide variations in potential agricultural growth and production from year to year.

The main limiting growth factor is low temperature.

The collected data is useful for evaluating of crop yields and to estimate production.

In the future more extensive use should be made of climatic records.

Literature

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