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Changes in Food Consumption in Iceland, 1770–1940

ABSTRACT

The history of food consumption in Iceland differs in many fundamental ways from that in the rest of Europe. The prominence of domestically produced dairy products, fish, meat and suet, and the insignificance of cereals until the nineteenth century, are among the most unusual features. This paper presents the first attempt to estimate total food consumption in Iceland on the basis of food supply data, covering the period 1770–1940. The data, derived from trade statistics, production statistics and the author's current study of Iceland's GNP, provides information on the level of consumption, on the composition and the nutritional value of the diet, and on the changing patterns of consumption. In general terms, this can be described as a transition from an animal-based to a more grain-based diet. A short discussion on the causes of dietary change, and its effects on the nutrional status of Icelanders and on population growth, concludes the paper.

Introduction

According to the scanty literature on Icelandic food history, the national diet underwent radical change between the later nineteenth century and well into the present century. This change, it is contended, marked a decisive break from age-old consumption patterns and entailed a shift from a basically animal-based diet towards a more grain-based one.

Such an important change has only been given tentative treatment in the literature as have, in fact, most other topics in the field of Icelandic food history.[1] Many

1 Interestingly, most of the important works were written in the 1940s, see Guðjónsson, Skúli, *Folkekost og sundhedsforhold i gamle dage belyst igiennem den oldnordiske litteratur*. Kjøbenhavn: Nyt nordisk forlag – Arnold Busck 1941; Jónsson, Björn L.,'Heilsufar og mataræði á Íslandi fyrr og nú', *Nyjar leiðir* II. Reykjavík: Natturulækningafelag Íslands 1946, 70–141; Johnsen, Baldur, *Eleven Centuries of Food and Health in Iceland With Special Reference to Caries Dentii*. Reykjavík: Manneldisráð ríkisins 1978; Steffensen, Jón, Um líkamshæð Íslendinga og orsakir til breytinga á henni, *Menning og meinsemdir*. Reykjavík: Sögufélag 1975, 237–257, and also an abridged English version of the article, Stature as a criterion of the nutritional level of Viking Age Icelanders, Third Viking Congress, Reykjavík 1956, *Árbók Hins íslenzka fornleifafelags. Fylgirit 1958*, 39–51. Studies of a more ethnological nature are, Eldjárn, Kristján, Að sauma síl og sía mjólk, *Árbók Fornleifafélags Íslands* 1960, 48–63; Jónasson, Jónas, *Íslenzkir þjóðhættir*. Reykjavík: Ísafoldarprensmiðja H.F. 1961, 34–55; Kristjánsson, Lúðvík, *Íslenzkir sjávarhættir* I. Reykjavík: Menningarsjóður 1980, 35–195; Ibid II, 1982, 449–478; Gísladóttir, Hallgerður, 'The use of whey in Icelandic households', *Milk and Milk Products from Medieval to Modern Times. Proceedings of the Ninth International Conference on Ethnological Food Research, Ireland, 1992*, Ed. Patricia Lysaght. Edinburgh: Canongate 1994, 123–129; Ibid, *Eldhús og matur á Íslandi*, unpublished cand. mag. thesis, University of Iceland 1991.

major aspects of this dietary change deserve closer investigation. But the purpose offering a more systematic approach than is customary in writings on the Icelandic diet. We will start with a description of the traditional diet, but the bulk of the paper will be devoted to the findings of food-supply data compiled for this study, covering the years 1770–1940. This data will be used to identify and analyze the timing, pace and nature of the transition in food consumption patterns in Iceland.

The traditional Icelandic diet

Until the mid-nineteenth century the type of production and the general economic conditions of Iceland set the parameters for food production and consumption. Farming and fishing provided a livelihood for most of the population, whereas only a small number of people made a living from other activities, such as the trades, transport, commerce and other services. There were 20–30 trading ports scattered around the coast but in none of them, excluding Reykjavík, did the population exceed one hundred people. Towns and villages hardly existed until the last decades of the nineteenth century, so Icelanders either lived off the land or the sea – many did both. There is evidence of grain growing in medieval times but by the sixteenth century the practice had come to an end and all cereals had therefore to be imported. Animal husbandry was the mainstay of agriculture and there seems to have been a gradual but steady shift from cattle to sheep rearing over the centuries, which continued well into the second half of the nineteenth century. The emphasis was on keeping ewes for their milk and raising wethers for meat and tallow. With no fields to plough or carts to pull (roads fit for vehicles hardly existed until about 1900) Icelanders valued cattle, not for their ability as draught animals, but for the production of milk. And the Icelandic breed of cows seem to have been of good milking stock despite their small size, for one could expect 1600 litres of milk or more a year per cow according to eighteenth and early nineteenth century sources.

Most Icelanders were thus engaged in food production in one way or another. In ordinary circumstances agriculture supplied most of the food the population required, and the only imported foodstuffs of significance before the nineteenth century were rye and barley imported from Denmark. Other foods such as sugar and syrup, salt, coffee and alcoholic beverages were marginal until the second half of the nineteenth century. Milk from cows and ewes and milk products constituted, together with mutton and suet, the most important foodstuffs of the farming population. The principal milk products were butter, whey and a special Icelandic curd called *skyr*, made of skimmed milk and rennet, all of which were eaten in great quantities. Also of great importance were blood pudding and liver pudding, which were made from sheep's blood, liver, kidneys and suet. Mixing the puddings with ryemeal, as is now customary, did not become common until the nineteenth century. Sheep were slaughtered in the autumn, after having been fattened in highland pastures during the summer, and most of the meat products were soured with whey, smoked or even dried for storage over the winter. Salted mutton was a significant export article, but as salt was too expensive for home use other mediums of conservation were used, particularly whey. These home-produced foodstuffs were complemented with dried fish and cereals bought from coastal farmers or merchants. Many farmers and their male servants worked as fisher-

Table 1. Daily rations for servants, according to Búalög

	Male servants		Female servants	
	g/day	kcal	g/day	kcal
Skyr	1,370	898	822	539
Fish	336	1,167	285	989
Butter	168	1,271	143	1,077
Total	1,874	3,336	1,250	2,605

Source: *Búalög*, 139, 155, 186–187

men during the main fishing season from February till May and provided their households with valuable fish products.

Fishing provided the coastal population with its staples: cod, haddock, ling, saithe, halibut and other species of fish, as well as fish liver oil. Catfish was a daily food of the people in the West Fiords. Obviously, fish was eaten fresh in the coastal households when available, but much of it was dried raw to be eaten later with large quantities of butter or tallow. Salted fish became an important export article towards the end of the eighteenth century, but was too luxurious and expensive to be eaten in large quantities by the Icelanders themselves. This seems to have slowly changed during the nineteenth century, and one source indicates that fresh and salted fish replaced the tough dried fish around the middle of the nineteenth century as the main dish.[2]

The most prominent feature of the Icelandic diet was the predominance of animal-based foods and to such an extent that it had few parallels in Europe, except perhaps among the Inuit in Greenland, the nomads in Lapland and coastal communities in the far north of Europe.[3] "Eating consists of a lifetime of consuming bread, more bread, and gruel", wrote Fernand Braudel about food habits in preindustrial Europe.[4] In the case of Iceland it was milk, more milk and fish. Although bread was known it was more of a luxury food, and the modest consumption of cereals such as ryemeal and barley was primarily in the form of gruel until the last decades of the nineteenth century.[5] The reason for this is probably the scarcity of fuel, which shaped the Icelandic diet in many ways and explains, at least in part, why most of the food was eaten cold.

Evidence on the eighteenth and nineteenth century Icelandic diet is found in various qualitative sources, in particular descriptions of *útvigt*, the custom of rationing or portioning out staple foodstuffs to the members of households as their

2 Johnsen, *Eleven Centuries*, 32.

3 Many similarities are found in the diet on the coastal and island areas of northern and western Scotland, see Fenton, Alexander, Food and coastal environment, *Food in Change. Eating Habits from the Middle Ages to the Present Day*. Eds. Alexander Fenton and Eszter Kisbán. Edinburgh: John Donald Publishers 1986, 122–126.

4 Braudel, Fernand, The Structures of Everyday Life, *Civilization and Capitalism 15th–18th Century*. Volume I. London: Fontana Press 1985, 130.

5 Gísladóttir, Hallgerður, The use of whey, 124.

food allowance for shorter or longer periods, from a week to several months at a time. The *útvigt* normally included fish, butter and sometimes *skyr*, but varied according to the availability of food. It applied especially to servants and fishermen during the main fishing seasons.

The old by-laws, *Búalög*, which have been preserved in many manuscripts dating from the fifteenth to the eighteenth centuries, include regulations on rations for servants. Female servants were to have 5 marks or 1,250 g of food, and male servants 7.5 marks or 1,874 g a day.[6] The exact composition of the diet is not stated, but most of the *Búalög* manuscripts prescribe a daily ration of no less than 822 g of skyr for females and 1,370 g for males. The quantity of other foodstuffs is not stated, but we know that dried fish and butter were the most commonly rationed foods. Assuming that these made up the rest of the diet and were portioned out in the ratio 2:1, as was customary, we arrive at the figures shown in Table 1. Calculating the nutritional value of the diet gives a daily energy value of 3,336 kcal for male servants and 2,605 kcal for female servants. The value of the diet calculated in this way corresponds roughly with the monetary value of a daily meal for servants as prescribed in *Búalög*, and we can therefore assume that other common foodstuffs such as milk, whey or blood pudding were not included as additional fare but were substituted to a greater or lesser extent for the three staples.

If taken literally, *Búalög* and the sources on *útvigt* indicate staggeringly high annual consumption levels for butter and even more for fish. For a female servant the annual consumption of dried fish would be 104 kg and for a male servant 174 kg, or an equivalent amount of fresh fish. Converting these figures into fresh, ungutted fish, using the factor 7.7, we arrive at a yearly consumption of 801 kg and 946 kg respectively. These are high figures indeed, but as already noted other foodstuffs replaced fish, butter and skyr to a large extent.

Our concern here is with the general picture, but there were, of course, important regional and social variations in food consumption. The main geographical difference was between the inland farming areas, which relied heavily on meat and milk products, and the fishing communities on the coast, where fish products constituted by far the largest part of the food. In his *Beskrivelse af Gullbringu og Kjósar syslur*, of 1785, Royal Treasurer Skúli Magnússon describes the typical diets of farmers and fishermen in a county in the south-west, which can be regarded as the two most common types of diets all over the country, even though there were, of course, local variations in the number of meals and their composition.[7] In the farming areas of the county the daily fare consisted of fish and butter for the midday meal or lunch, and *skyr* for supper and possibly for breakfast as well. In the coastal areas people took fish at most meals and maybe a little *skyr* and whey bought from farmers. It is difficult to overstate the importance of fish, especially dried fish, in the diet of the coastal population. Broth with meat, a little grain and vegetables were served instead of fish and butter at Sunday lunch, both in rural and coastal households. In addition, an early breakfast consisting of gruel, *skyr*, meat or bread was served in farmers' households during hay harvesting. The three-meal system seems to have been predominant in most areas.

6 Two of the manuscripts mention 8.5 marks rations, cf. *Búalög um verðlag og allskonar venjur í viðskiptum og búskap á Íslandi*. Reykjavík: Sögufélag 1915–33, 34 and 61. The mark is here equal to 250 g.

7 Magnússon, Skúli, *Beskrivelse af Gullbringu og Kjósar syslur* (1785), udgivet af Jón Helgason. København: Bibliotheca Arnamagnæana, Vol. IV, 1944, 22–23.

Table 2. Diets of four households in 1847

average daily intake – male equivalents

	A well-off farmer's household in the South	A poor farmer's household in the South	A well-off farmer's household in the East	A poor farmer's household in the East	A well-off farmer's household in the North
Size of household	11	4	25	11	15
Male equivalents	9,5	3,0	20,4	8,3	12,2
Foodstuffs, g					
Cereals	121	38	304	125	85
Dried fish	46	36	5	27	50
Lamb/mutton	171	31	296	90	77
Suet	57	10	98	30	25
Offal	23	4	40	12	10
Milk	1.241	618	616	494	806
Butter	100	34	69	48	69
Skyr	928	374	567	417	592
Whey	1.182	477	720	530	754
Iceland moss			27	11	11
Potatoes					45
Energy nutrients, g					
Protein	230	102	173	114	158
Fat	230	71	253	113	129
Carbohydrate	240	94	339	168	177
Energy value, kcal					
Total	3.994	1.437	4.370	2.168	2.534
% Energy value from:					
Fats	12,1	6,0	19,2	11,8	8.6
Fish products	4,0	8,7	0,4	4,2	6.8
Vegetables and potatoes	0,0	0,0	2,2	1,8	2.9
Meat products	13,1	6,5	20,7	12,7	9.3
Cereals	10,8	9,4	24,9	20,7	12,0
Milk products	60,0	69,2	32,6	48,8	60.4
Protein	23,4	28,8	16,0	21,4	25,4
Fat	52,2	44,6	52,5	47,1	46,3
Carbohydrate	24,4	26,6	31,5	31,5	28,3

Source: Schleisner, *Island*, 137–138.

Some foods were particular to certain regions or areas: Iceland moss, for instance, was used extensively in the North and East; seabirds and their fat and eggs formed an important source of food in island communities like the Westman Islands and several coastal areas on the mainland; while edible plants like dulse, *söl*, on the south and west coast and scurvywort, *skarfakal*, around the bay of Breidafjördur were much sought after. Farmers in the county of Skaftafellssysla in the South-East harvested lyme grass, *melgresi*, for grain and straw. Some of these regional foods, like dulse and Iceland moss, spread to other areas with trade, but not as widely as the more important staples such as butter, tallow, salted mutton and dried fish.

Social class and income affected the diet in a fundamental way. Not only did the poor have much less to eat than the well-off, but their fare was also more monotonous. Fresh and dried fish, fish heads, fish liver oil and suet formed the staples of cottar families by the seaside, while poor inland cottagers ate mostly milk products, blood pudding and, to a lesser extent, meat. Few sources deal explicitly with the social differences in food consumption. Yet in a valuable study of Icelandic health conditions around the middle of the nineteenth century the Danish physician, P. A. Schleisner, presents information on the annual consumption of 7 households of different classes and locations in the country which, in Schleisner's words, can be regarded as "averages of a sort".[8] Here we will take a closer look at the nutritional value of the five most detailed of those diets, two from South Iceland, two from the East and one from the North. A note of caution is required, however, for the food lists are not complete: no mention is made, for instance, of fresh fish or fish-liver oil which were an essential part of the diet in coastal regions. Quantities, moreover, are not stated for some of the foodstuffs listed, i.e. milk products are only expressed as butter, skyr and whey from x number of cows and y number of ewes, and only the number of sheep slaughtered are reported. A number of assumptions have therefore been made about the quantities of produce per animal.

Nevertheless, Schleisner's information offers a rare opportunity to analyze actual food consumption in nineteenth-century Iceland, its composition and nutritional content. Table 2 shows a statistical interpretation of Schleisner's account. There are huge variations between households in terms of consumption levels, which reflect differentials between social groups rather than regions, although more information is needed in order to establish how representative Schleisner's examples are. In any case, they offer important information on the composition of the diet and rough indications of the level of energy intake in different households.

The stark contrast between the three high-income households and the two low-income households is primarily manifested in different amounts of food and therefore energy intake, which ranges from as low as 1,437 kcal to 4,370 kcal. Evidently the extremely low level of energy intake in the case of the poor farmer in the South must be partly due to incomplete information. Interesting variations in the composition of the diet can been observed between households, such as the prominence of meat and cereals and the relatively moderate role played by milk products in the well-off farmer's household in the East, despite this being a thriving dairy farm by Icelandic standards, with 6 cows and 140 ewes.[9] There are great variations in the consumption levels of cereals and fish between households, but it must be borne in mind, as already mentioned, that fresh fish was not recorded in Schleisner's account.

The table conveys an important characteristic of the Icelandic diet, namely the great significance of milk products. They are shown in the form of the four most common milk products, fresh milk, butter, *skyr* and whey, but the relative weight of the individual products is estimated. Changing the weight of individual milk

8 Schleisner, P.A., *Island undersögt fra et Lægevidenskabeligt Synspunkt.* Kjöbenhavn: Boghandler C. G. Iversen 1849, 137–138.

9 Note, however, that butter is included in the "fats" category and not "milk products" throughout this paper.

products affects only slightly their overall nutritive content. Other foodstuffs of importance, i.e. mutton, cereals, dried fish and suet, show greater variation between households.[10]

The prominence of fish, meat, butter and suet made the Icelandic diet rich in proteins and fat, whereas the carbohydrate content was small, as cereals and potatoes were scarce. Apart from the lack of fibre-rich foods in the form of grains and vegetables, vitamin C seems to have been the most serious deficiency in the diet. It does not, therefore, come as a surprise that scurvy was presumably the most common deficiency disease, especially by the seaside, in the West Fjords and West Iceland.[11] Rickets were also reported in the eighteenth and nineteenth centuries.[12]

The use of food supply data for historical analysis

It is difficult to draw hard and fast conclusions about the radical changes in the Icelandic diet over the last two centuries because of the lack of quantitative information. In order to get a better grasp of the quantitative aspects of dietary change, I have compiled food supply data for the entire population of Iceland for the period 1770–1940. The food supply, which was basically composed of net imports of foodstuffs (imports less exports) and domestically produced foodstuffs, presents the total supply of foodstuffs available to the population and is therefore an important, albeit an indirect, measure of actual consumption. Estimating food consumption on the basis of food supply has its drawbacks, for there is always a discrepancy between available supply and actual consumption, and this approach tends to overestimate the level of consumption. This discrepancy is to some extent accounted for in the food supply data presented here, particularly for imports where quantities have been reduced by 3–5 per cent to allow for storage loss and waste, but also for milk. The figures on fish consumption are basically consumption and not production figures.

There are two other factors of uncertainty in the food supply accounts that are worth mentioning here. First, when the food stock is converted into nutritional elements modern food tables are used, which are based on techniques of food preparation, conservation and storage very different from those used in the past. By using the oldest available food tables, an attempt has been made to compensate somewhat for this deficiency. Secondly, the imperfection of the historical material often prevents the calculation of detailed and reliable measures of the food supply. In the case of Iceland there is an additional problem caused by the fact that the bulk of the population was engaged in food production, for even as late as 1940 a considerable part of the food production still took place within the household economy. Because food production for own consumption was so widespread these important activities are less visible in the historical records than would

10 The weight of dried fish may be misleading as to its importance. As a rule of thumb, the factor of 7.7 is used to convert dried fish into ungutted fresh fish.

11 Ólafsson, Eggert, *Ferðabók Eggerts Ólafssonar og Bjarna Pálssonar um ferð þeirra á Íslandi árin 1752–1757*, I. Reykjavík: Örn & Örlygur 1974, 263; *Íslandsleiðangur Stanleys 1789. Ferðabók*. Reykjavík: Örn & Örlygur 1979, 117; Jónsson, Heilsufar, 87–88.

12 Jónsson, Heilsufar, 88–89; Schleisner, *Island*, 143.

have been the case had market transactions been more prominent. Cases in point are vegetable production around the country, animals slaughtered at home, and fishing by peasant or cottar households.

Despite all the drawbacks, the food supply data does provide fairly detailed and, in many ways, unique quantitative information on the consumption levels of all the major foodstuffs in the whole of the country over a long period of time. Thus it offers the best possibility of analyzing the composition of the Icelandic diet and its nutritive contents in a long-term perspective, and of comparing it with that of other nations. The principal sources are, on the one hand, official agricultural statistics and, on the other, external trade statistics. The construction of the food supply data has greatly benefited from two research projects: *Icelandic Historical Statistics*,[13] published recently by Statistics Iceland, where detailed and comparable statistics on foreign trade have been produced; and the other, the author's current research on Iceland's national product for the period 1870–1945, in which estimates are made for the production of important foodstuffs.

The foreign trade statistics provide us with figures on imported and exported food articles, stretching far back into the eighteenth century. Data within our period cover the years 1770, 1783–96, 1806, 1815–16, 1818–19, 1840, 1849, 1855 and each year from 1862 onwards. The quantity figures for imports and exports are reasonably accurate and comprehensive, especially on exports, but they must be regarded as a minimum, with higher margins of underrecording in imports as compared to exports. The statistics include all articles of food and beverages, except alcoholic drinks. To allow for storage loss and wastage the trade statistics for the quantities of vegetables, fruit and cereals have been reduced by 5 per cent and for all other imported foodstuffs by 3 per cent.

Estimates for the consumption of domestically-produced foodstuffs are based on the author's calculations for Icelandic agricultural production, including quantity and value data for all the major foodstuffs. As there are no official agricultural production records for most of the period, output has been indirectly measured by using livestock data and making certain assumptions about the quantities of foodstuffs produced per animal, based on various sources, the most important of which is a study on national income conducted under the auspices of the Icelandic Commission of Economic Planning in 1936.[14] Livestock data is available for many years in the period 1770–1817 and annually from 1818, which gives a breakdown of the main species of livestock: cattle, sheep and horses. Because of a substantial underrecording of the sheep stock, especially during the latter half of the nineteenth century, the figures have been increased by as much as one-third for a number of years during the 1880s.[15] The estimation of production per cow and ewe, a major determinant in the calculation of milk production, is based on a close examination of the available sources, including the public records. Estimates of consumption figures derived from them are calculated in terms of the four main products, fresh milk, butter, *skyr* and whey. The products have fixed weights which are changed in 1901 to reflect a shift in consumption from *skyr*

13 *Hagskinna.* Sögulegar *hagtölur um Ísland (Icelandic Historical Statistics)*, Ed. by Guðmundur Jónsson and Magnús S. Magnússon. Reykjavík: Statistics Iceland 1997.

14 *Álit og tillögur* I. Reykjavík: Skipulagsnefnd atvinnumála 1936, 161–187.

15 Based on the author's reexamination of the livestock statistics and comparison with other sources, particularly the more reliable statistics on agricultural exports.

and whey to fresh milk, skimmed milk and cream.[16] The weightings for *skyr* and whey are probably too high towards the end of the period. The purpose behind breaking milk down into its products is to give as good an indication as possible of the actual consumption patterns of individual products, based on the available sources. However, it has very little effect on calculations of the nutritive value whether milk is calculated in terms of products other than fresh milk. Calculating the nutritive content of milk products entirely in terms of fresh milk would give slightly higher energy values, some 3–4 per cent greater.

Where fish consumption is concerned, we are treading on more slippery ground. There are annual statistics of fish landings since 1897, and export statistics on fish sold to foreign markets, but they leave too many gaps to render them useful in calculating the fish supply. Instead, I have made use of information on fish consumption contained in the consumption surveys of 1939 and 1940, and the food basket for the calculation of the consumer price index in 1922, which was used until 1939. The 1922 figures have been extrapolated backwards, assuming a certain decline in fish consumption in the period 1870–1922. Consumption per capita is kept constant for the years 1770–1870, although account has been taken of the available information on seasonal fluctuations in the fish catch.

Estimates of domestically-produced foodstuffs have, to some extent, been adjusted to take into account various direct observations on food consumption, primarily the 1939–40 food survey and the food component in the consumer price index base from 1922. The figures presented here are calculated in terms of male equivalents, a uniform unit signifying the consumption requirements of adult males for the purpose of eliminating the effects of different age and sex structures over time.[17] "Edible portion" tables, which exclude wastage, have been used in the calculation of nutrients.

Changes in food consumption, 1770–1940: the results of the food supply data

The main results from the food supply data are presented in Tables 3, 4 and 5. From Table 3 we can see the daily consumption of the principal food categories and the most important foodstuffs within each category per person (male equivalents) for the period 1770–1938. If we look at the consumption patterns before the middle of the nineteenth century, several interesting points emerge.

The first is the dominance of milk products, the table indicating the daily consumption of milk at 2–2.4 kg per person and as much as 2.9. kg in 1770. Fish was another staple, of which an average of 650–700 g was eaten daily, calculated in terms of fresh fish, or the equivalent of 84–90 g of dried fish. The third most important food was meat, especially mutton. Fruit and eggs[18] are interesting by their absence, and vegetables and sugar, although making an appearance, were

16 Jónsson, Heilsufar, 15–16.

17 The population is converted into consumption units by giving adult males between 15–64 years old the weight of 1.0, adult females between 15–64 years old 0.83, males and females 65 years and older 0.75, and children aged 0–15 0.6.

18 Seabirds' eggs were, of course, important in some areas. However, no estimates have been made of eggs or seabirds in the food supply accounts. The breeding of hens for their eggs was very rare until this century.

Table 3. Supply of principal foodstuffs 1770–1938

g/day per male equivalent

	1770	1784	1795	1819	1840	1849	1855	1863	1870	1880	1890	1900	1910	1920	1930	1938
Fruits and berries	...	...	...	...	...	...	...	0	1	0	1	1	5	7	27	5
Eggs	...	...	...	...	...	...	...	...	...	...	0	1	1	3	12	18
Fats	34	56	73	83	74	77	61	58	55	70	70	64	62	57	55	45
Butter	39	43	68	56	62	68	60	51	45	52	47	39	26	18	20	19
Margarine	–	–	–	–	–	–	–	0	0	0	2	4	10	13	32	37
Fish and fish products [1]	706	650	618	654	703	694	696	684	589	515	440	431	445	447	407	369
Fresh fish	...	...	...	...	...	...	...	...	...	204	185	191	206	213	204	191
Salted fish	...	...	...	...	...	...	...	...	...	48	43	45	47	49	39	32
Dried Fish	...	...	...	...	...	...	...	...	...	17	12	10	8	7	7	8
Vegetables and potatoes	0	3	3	30	49	51	54	72	51	52	138	162	230	184	240	332
Potatoes	...	...	0	9	17	23	27	29	21	19	50	65	128	93	117	238
Peas	0	3	3	13	16	11	17	19	12	16	14	12	7	5	4	3
Meat and meat products	201	153	237	251	254	274	232	195	190	202	216	189	201	199	247	198
Mutton/lamb [2]	96	94	155	174	185	206	136	133	130	147	159	134	157	155	209	161
Cereals	81	139	70	81	180	182	174	228	197	255	277	342	363	390	404	358
Rye/ryemeal	71	99	54	69	149	139	118	154	134	160	154	174	175	196	152	148
Wheat	–	–	–	–	0	0	1	1	1	4	27	49	69	112	149	141
Milk products [3]	2 906	1 662	2 440	2 321	2 038	2 177	1 931	1 768	1 487	1 660	1 496	1 438	1 285	1 082	1 280	1 451
Fresh milk	1 261	685	967	906	760	801	738	685	554	603	544	606	674	597	723	828
Sugar and syrup	–	0	0	1	4	8	12	11	12	18	32	54	77	93	123	145

Notes: Figures for 1784 and 1863–1938 show three-year averages.
[1] Fresh fish equivaents.
[2] Including offal.
[3] Butter is includec in the ""Fats"" category."

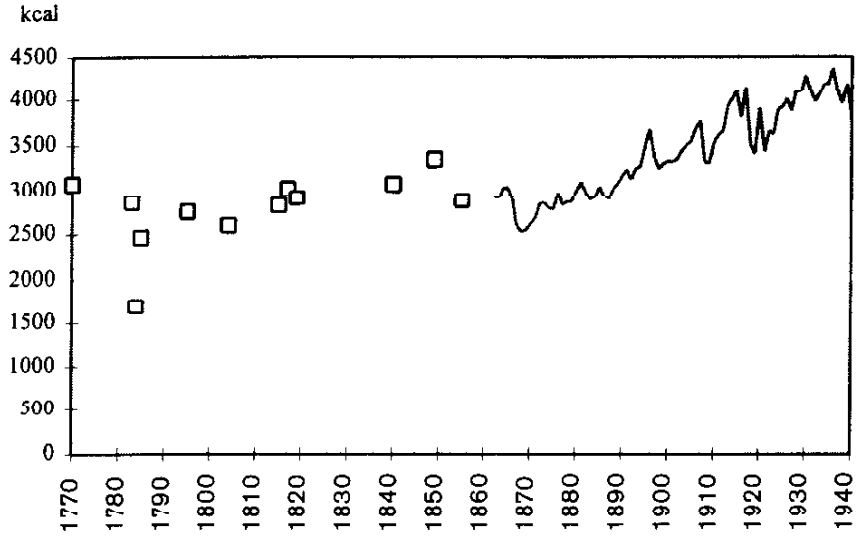
Table 4. Sources of energy by food categories 1770-1938

per cent of total energy value

	1770	1784	1795	1819	1840	1849	1855	1863	1870	1880	1890	1900	1910	1920	1930	1938
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Fruits and berries	...	...	...	...	...	...	...	0	0	0	0	0	0	0	1	0
Drinks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eggs	...	...	...	...	...	...	...	...	...	...	0	0	0	0	0	1
Fats	22	18	21	22	19	19	16	15	17	18	18	15	14	14	16	16
Fish	10	13	10	10	10	9	10	10	10	8	6	6	6	6	4	4
Vegetables and potatoes	0	1	0	2	2	2	3	3	2	2	3	3	4	3	3	4
Meat	11	11	15	16	15	16	15	12	13	12	13	10	11	10	11	9
Cereals	10	23	9	10	21	20	21	27	27	30	32	37	37	39	35	32
Milk products	48	35	44	40	32	33	33	31	28	27	23	22	19	18	17	19
Sugar and syrup	-	0	0	0	0	1	2	1	2	2	4	7	8	10	12	14
Domestic foodstuffs	90,4	76,5	90,5	88,1	76,8	77,6	74,9	69,2	68,9	65,4	61,8	54,2	50,6	44,3	44,4	46,0
Imported foodstuffs	9,6	23,5	9,5	11,9	23,2	22,4	25,1	30,8	31,1	34,6	38,2	45,8	49,4	55,7	55,6	54,0
Of animal origin	90,4	76,5	90,5	87,8	76,3	77,0	74,1	68,4	68,2	64,9	60,1	52,4	48,0	44,3	43,7	42,4
Of vegetable origin	9,6	23,5	9,5	12,2	23,7	23,0	25,9	31,6	31,8	35,1	39,9	47,6	52,0	55,7	56,3	57,6

Note: 1784 and 1863-1938 show three-year averages.

Figure 1. Energy value in the diet, 1770–1940
kcal per day



only consumed in small quantities. The consumption of cereals was modest, around 70–80 g a day in a normal year until the second quarter of the nineteenth century. It should be noted that the year 1784 was a freak year with low figures for all foodstuffs except cereals, due to the enormous volcanic eruption in *Lagagígar* in the south-east in 1783–84, one of the most devastating eruptions ever known in the country, which killed the larger part of the livestock. In this catastrophe, commonly referred to as the 'Famine of the Haze', about 20 per cent of the population died, primarily as a result of the reduction in livestock and, to a lesser extent, disease.

The food supply data not only supports the thesis that the Icelandic diet underwent a radical change during the nineteenth century, but also offers a more precise indication of the timing, pace and structure of such change than has hitherto been available. It shows that already in the first half of the century important dietary changes were taking place which became more pronounced as the century progressed. The consumption of vegetables and potatoes increased rapidly, but more important was an increase in the consumption of cereals, which more than doubled between 1819 and 1840. After 1855 there was again a sharp upturn, presumably related to the setback in agriculture caused by a severe sheep disease, scab, which was raging in the period 1855–70. Cereal consumption continued to increase steadily in the following decades, from about 180 g about the middle of the century to 340 g in 1900, and peaking in 1930 at a daily consumption of more than 400 g.

In the last two decades of the nineteenth century a broader-based change occurred as sugar and vegetable consumption (primarily potatoes and to lesser degree swedes and cabbage) rose to significant levels, while traditional foods like milk, meat and fish declined, although the drop in the per capita consumption of fish was partly offset by the growth of the fish-eating urban population. A more

varied consumption of cereals can be discerned from the increased imports of flour (to make white bread and cakes) and oatmeal (to make porridge and blood pudding). Fruit and berries, eggs and various vegetables made an appearance about the turn of the century, but as their consumption levels were low their contribution to energy values was modest. There was a big drop in the consumption levels of fruit and berries during the 1930s, presumably due to the combined effect of lower incomes and higher import tariffs. After slowly increasing during most of the nineteenth century, sugar consumption increased by leaps and bounds after 1870, reaching one of the highest consumption levels in Europe towards the end of the period of 145 g a day per person.

It is worth noting the absence of potatoes in the diet, which stands in contrast to many countries in northern Europe. Although known and even grown among a few "progressive" farmers in the eighteenth century the potato first started to make real inroads in the decades about 1850 in some parts of the country. It then spread rapidly after 1880, so that by the end of the period the daily consumption was around 240 g a day.

The importance of individual food categories can be better assessed when we look at their contribution to the energy value, as shown in Table 4. Milk products contributed no less than 40–50 per cent of energy value well into the nineteenth century. Fats, i.e. butter and suet, took second place, providing about 20 per cent of the energy value, followed by meat with 11–16 per cent and fish and cereals with 10 per cent. As the nineteenth century progressed the share of cereals steadily increased; by 1840 they occupied second place after milk products. An historic turning point was reached in the last decades of the century when cereals replaced milk products as the principal source of food, accounting for more than a third of the energy intake by 1900, and remaining at that level for several decades with but a slight drop during the very last years of the period. Milk products, on the other hand, dropped to less than one-fifth of the total energy intake. Other traditional foodstuffs followed the same trend, although their relative decline was not as dramatic as that of the milk products.

The overall change in the Icelandic diet can be characterized as a transition from almost exclusively animal-based foodstuffs to more vegetable-based ones. Table 4 shows that animal-based foods accounted for about 90 per cent of energy value in the traditional diet. After 1819 their share rapidly declined, to amount to only 52 per cent by the turn of the century, and continuing to decline to comprise only 42 per cent in 1938. Conversely, the share of vegetable-based foods rose steeply and had reached 50 per cent by 1910. As most foodstuffs of animal origin were domestically produced and most foodstuffs of vegetable origin were imported we find almost identical figures in the breakdown between domestic and imported foodstuffs, as also shown in Table 4. About 90 per cent of all foodstuffs were produced in the country, confirming Iceland's high degree of self-sufficiency in the provision of food. Imported foodstuffs gained increasing significance over the nineteenth century, so much so that after 1910 the country reached the stage where more than half of all the food consumed by its inhabitants was imported. This was certainly a turning point in a country in where food production had such a central role in the economy.

As Table 5 demonstrates, the combined results of these changes led to a major shift in the balance of energy nutrients from the early nineteenth century to 1938. The share of proteins in total energy value declined from 31 per cent to 17 per cent

Table 5. Energy value and energy nutrients in the diet, 1770–1938

male equivalents Year	Energy value, kcal.	% Energy value from: Protein	Fat	Carbo-hydrate
1770	3.048	30,8	44,0	25,2
1784	2.322	29,7	37,8	32,5
1795	2.724	31,0	44,9	24,1
1819	2.887	29,7	45,8	24,5
1840	3.080	28,1	40,0	31,9
1849	3.381	27,8	40,4	31,8
1855	2.917	28,8	37,0	34,2
1863	2.885	27,4	34,5	38,2
1870	2.573	26,8	35,5	37,7
1880	3.002	24,2	35,7	40,1
1890	3.106	22,1	35,1	42,8
1900	3.316	20,5	31,0	48,5
1910	3.499	19,1	31,2	49,6
1920	3.610	18,1	30,3	51,6
1930	4.207	17,1	33,3	49,6
1938	4.066	17,0	32,0	51,0

Note: The figures for 1784 and 1863–1938 are three-year averages.

and fat from 44 per cent to 32 per cent, while the share of carbohydrates doubled from 25 per cent to 51 per cent. If we take a closer look at the nutritive content of the traditional diet until the late nineteenth century, the high proportion of protein is not surprising given the dependence on fish, meat and milk. Fat, almost exclusively animal fat, was the prime contributor of energy, providing around 45 per cent of the energy value. This extremely large share is explained by the high consumption levels of butter and suet, especially as complements to fish, as already mentioned. Carbohydrates contributed only about a quarter of the energy value until 1840, but by the end of the period their share had reached 50 per cent.

Table 5 also gives figures for total energy value, calculated as three-year averages. According to the food supply data, the daily energy intake was just over 3,000 kcal for male adults in 1770, a level not reached again until 1840. The data clearly reflects the hardships during the 'Famine of the Haze' in 1783–85, when the energy intake dropped below 1700 kcal. From then on the trend moves erratically upwards from 2,500–3,000 kcal in the first half of the nineteenth century to around 4,000 kcal at the end of the period. There are interesting troughs in the years 1855–70, at the end of the First World War, and again in the 1930s, which correspond well with the setbacks in the economy at those times.

Comparisons with other sources

How do the findings from the food supply data compare with other statistics on food consumption in Iceland during the period under investigation? The food consumption survey of 1939–40, the first of its kind in Iceland, is the only direct measurement of consumption levels available, but the study of the diet at the Leprosary in Reykjavík between 1899–1912, and the food basket used in constructing the cost of living index from 1922 onwards, are also useful reference points.[19] Consumption levels of a number of important foodstuffs according to the food supply data were compared with the findings of these three sources.

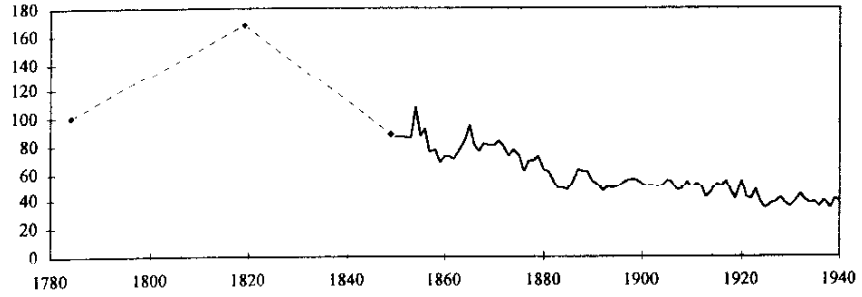
The estimates of fish consumption are in fact derived from the survey of 1939–40 and the food basket of 1922, so we do not find discrepancies there. The food supply figures on the consumption levels for other domestically-produced foodstuffs, which are mainly based on the author's study of agricultural output, are slightly higher than those of the other sources (1899–1912, 1922 and 1939–40). In the case of milk a word of caution is needed, however, because the food supply data gives considerably higher figures in all instances. As for imported foodstuffs, the figures show no systematic pattern of discrepancy. Sugar consumption is very similar in 1899–1912 and 1922, while the 1939–40 survey shows more than 50 per cent lower sugar consumption than the food supply data, a discrepancy which can partly be explained by the unusually large imports encouraged by the government under the imminent danger of war in 1939.

Jón Steffensen's article from 1950 is one of the very few attempts to estimate the energy intake and the nutritive content of the Icelandic diet in the past. His estimates, which offer a fairly rough reckoning, of the energy value, are much higher than the figures presented here, showing a daily intake of 4,300 kcal until the middle of the nineteenth century, with a steady drop to 3,500 kcal in 1940. The food supply data, however, casts serious doubts on the validity of Jón Steffensen's figures, and shows an opposite trend of upwards movement. But his figures on the composition of the diet are more in line with the findings of the food supply data and show similar trends, indicating a steady shift from milk products to cereals and sugar from the eighteenth century onwards, and especially between 1850 and 1920. Between 1920 and 1940 the trend is reversed, as his figures indicate an increasing consumption of milk products at the cost of cereals. According to Jón Steffensen milk products accounted for more than 60 per cent of Icelandic fare in the early eighteenth century, maintaining about a 50 per cent level even as late as the mid-nineteenth century, and then gradually falling to 24 per cent in 1920.

Björn L. Jónsson gives a similar account of dietary changes, but he dates their beginning later than the food supply data indicates, as do most writers. He makes some interesting observations about changes in the diet and its nutritional status. One is that the share of wheat flour among imported cereals became ever higher, replacing whole rye and barley with a consequent deterioration in vitamin levels. Like numerous other writers, Jónsson attaches great importance to the increased imports of coffee, tobacco and sugar, which he viewes with dismay seeing them

19 Sigurjónsson, Júlíus, *Mataræði og heilsufar á Íslandi*. Rannsóknir Manneldisráðs I, Reykjavík: Manneldisráð ríkisins 1943. – The food budgets of the Leprosary in Reykjavík have been utilized by the author of this paper to calculate the daily energy intake and the nutritive value of the diet of 60–70 patients and staff at the hospital between 1899 and 1912. Summary figures are published in *Hagskinna*, 656. On the food basket in the cost of living index of 1922, cf. Þorsteinsson, Þorsteinn, Verðbreytingar síðustu ára, *Tímarit lögfræðinga og hagfræðinga* I (1923), 64–66.

Figure 2. Relative price changes, 1784–1940
Index of imported foodstuffs / index of domestic foodstuffs
(1784–100)



as signs of a serious decline in the health status of the nation.[20] He contends that, although the traditional diet may have been bleak and bare, it was more nutritious than many of the poor quality foodstuffs that had flooded the country in recent times. This is a key argument in Björn L. Jónsson's overall conclusion that the health status of Icelanders deteriorated during the preceding quarter of a century.

Causes and effects of dietary change

The gradual retreat of the traditional diet during the first half of the nineteenth century was clearly linked with trade movements and changes in relative prices, changes which made grain-based foods more available and cheaper relative to animal-based foods. This can be seen from Figure 2 which shows the developments in the relative prices of imported foodstuffs against the prices of domestic foodstuffs.[21] The Napoleonic Wars seriously disrupted Iceland's foreign trade and led to food shortages and sharp price rises. They were followed by a deflationary period with a steeper fall in the prices of imported to domestic foodstuffs from 1819 until about 1860. This trend was reversed for a decade or so, but after 1870 the decline in relative import prices started again, until it levelled out and even showed a slight rise during the 1930s. In other words, cereals and sugar became cheaper as compared to meat, fish and milk products. In terms of calories the gain of switching from animal-based to grain-based foods was much greater than the changes in relative prices indicate, as the latter type of food had a much higher calorific content.

Another factor in dietary change exerted a greater influence towards the end of the century, as the migration from country to town got underway and an ever-

20 Jónsson, 'Heilsufar'. Similar findings, although more generally stated, are found in a collection of essays by another phycisist, written in the 1920s and 1930s, see Kristjánsson, Jónas, *Nyjar leiðir: fyrirlestrar og ritgerðir*. Reykjavik: Náttúrulækningafélag Islands 1942, especially 14–41 and 140–142.

21 The price index of imported foodstuffs was comprised of seven articles: rye, rye meal, pearl barley, rice, peas, flour and sugar. The index of domestic foodstuffs was comprised of six articles: butter, *skyr*, mutton, tallow, dried fish and salted cod. These were weighted indices with fixed weights.

larger part of the population was removed from the traditional means of living. People living in towns and villages increasingly turned to store-bought foods, in particular cereals, sugar and margarine, which became the staples of workers in Reykjavík and other towns. However, the growth of petty farming in and around towns and villages, where people had a small stock of sheep and milking cows and even vegetable gardens, somewhat lessened the reliance on marketed foodstuffs during the first decades of this century.

Consumption patterns are not explained by price levels alone; taste and habits also play an important role. The cases in point here include potatoes and herring, both of which were nourishing, cheap and fairly abundant foods, but which entered the Icelandic diet curiously late. According to the food supply data potatoes were insignificant before the middle of the nineteenth century and even later, but by the turn of this century Icelanders were consuming daily some 65 g, and about 240 g in 1938. The late appearance of herring in the diet is partly explained by the fact that herring fishing first started in the second half of the nineteenth century; herring was only used as bait and fodder for cows, and later as an export good. Only slowly did Icelanders come to think of herring as food for human consumption. The food survey of 1939–40 indicates that herring still rarely appeared on the plates of Icelanders, a mere 2.8 g being eaten daily per male adult in the towns and 2.9 g in the rural areas.

The change in food habits raises interesting questions about their effects on nutrition in general and on population growth. Did the changes bring about an improvement or a deterioration in the nutritional quality of the diet? The answer, according to the food supply data, is that the Icelandic diet improved a great deal in terms of energy value, which increased, although somewhat erratically, over the nineteenth century and especially after 1870. The supply data also shows that the diet became much more varied towards the end of the nineteenth century. These findings are in conflict with the descriptions given by many writers on dietary change in the middle of this century. Some writers, like Björn L. Jónsson and Jónas Kristjánsson, maintain that despite the fact that food became more abundant it was of poorer nutritional quality than before. And according to Jón Steffensen's estimate, even the total energy intake declined over this period. The last contention does not seem to hold up in the light of the evidence presented here. The question of food quality is a more complicated issue and needs to be looked into more closely. If we look at the balance of nutritional components in Table 5, a positive development seems to be taking place, as fats and proteins decrease and carbohydrates, mainly from grains, are on the increase.

However, it must be stressed that national averages, such as those presented here on the basis of the food supply data, hide important social and regional variations, both in the quantity and quality of the food consumed. Needless to say, the food supply data ignores such variations, and leaves therefore a substantial gap in our knowledge of the transition from traditional consumption patterns to modern ones. When we turn our attention to the unequal distribution of food, especially as to how the increasing number of poor townspeople fared from the last decades of the nineteenth century until the 1940s, the pessimistic interpretations of physicians in the 1930s and 1940s become more understandable. The urban poor were certainly not winners in this transition; they were subject to undernourishment and more vulnerable to disease than other groups. Their monotonous diet consisted mainly of fish, ryebread, margarine, coffee and sugar, which

provided low-cost calories as compared to the higher quality milk and meat products. Only slowly did the diet of the poor start to improve, and probably not significantly until the Second World War, when there was a general improvement in living standards in Iceland.

The relationship between dietary change and population growth is another area which needs to be explored further. Here we will just point out that the extreme dependence on animal-based foods for centuries set tight limits to the size of the population. The influx of relatively cheap grains during the nineteenth century upset the traditional balance between food supply and population, and paved the way for population expansion. From a demographic point of view, Iceland's foreign trade in foodstuffs is an exceptionally good example of a favourable exchange in calories, the replacement of expensive calories (fish and meat) by cheap calories (cereals, sugar and margarine), thus not only stimulating population growth but also making it possible for more people to live outside the traditional, largely subsistence, economy.

Conclusion

Icelandic food history is in many respects very different from that of continental Europe. Traditionally, up to 90 per cent of the food was of animal origin, mostly milk, fish, meat and suet, whereas cereals played a fairly insignificant part in the diet. The shift in Europe to a more grain-based diet which started in the sixteenth century seems to have had little effect in Iceland. However, when meat consumption started at long last to pick up again in Europe, as a result of better living standards and improvements in transportation in the second half of the nineteenth century, Icelanders moved slowly but steadily in the opposite direction, away from the traditional staples of milk, fish and meat towards cereals and sugar. The transition from animal-based foods to grain-based foods started in the first half of the nineteenth century and was well underway towards the end of the century. By 1910 grain-based foods were providing more than half of the total energy value in the Icelandic diet, which we can take as a turning point in the transition from an animal-based to a vegetable-based diet.