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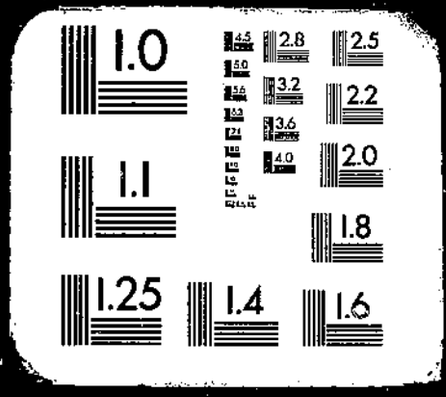

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Norwegian Nutrition and Food Policy

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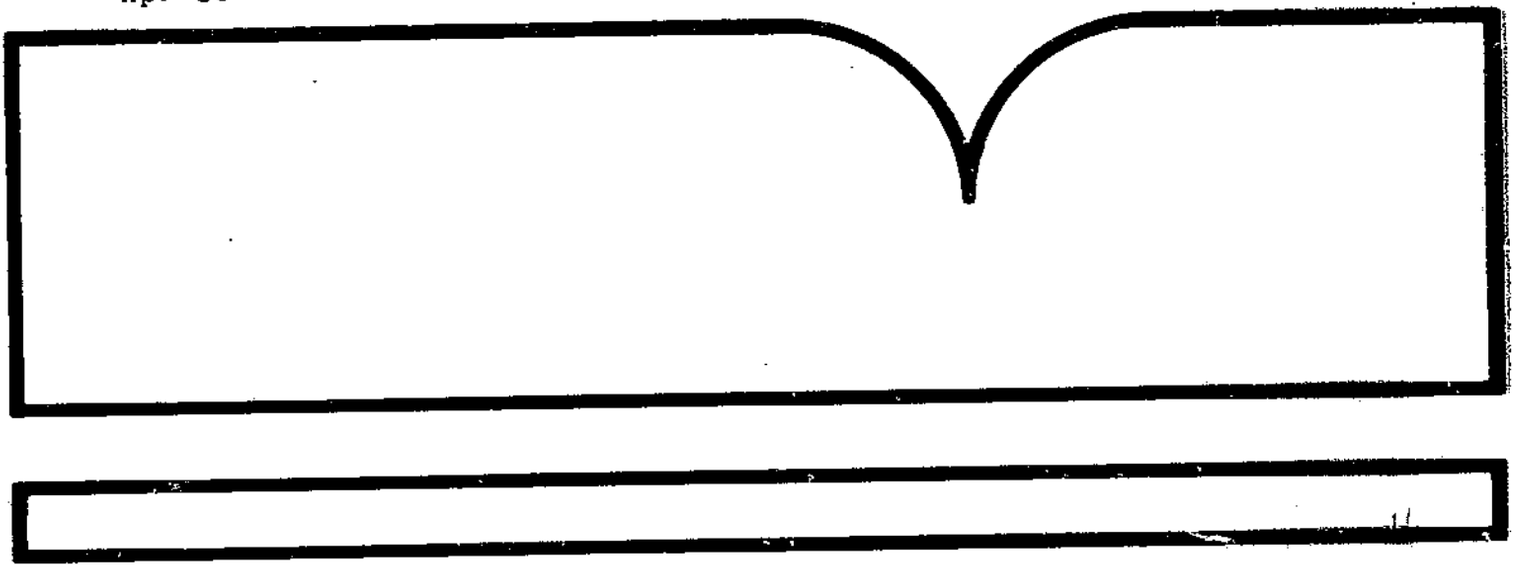

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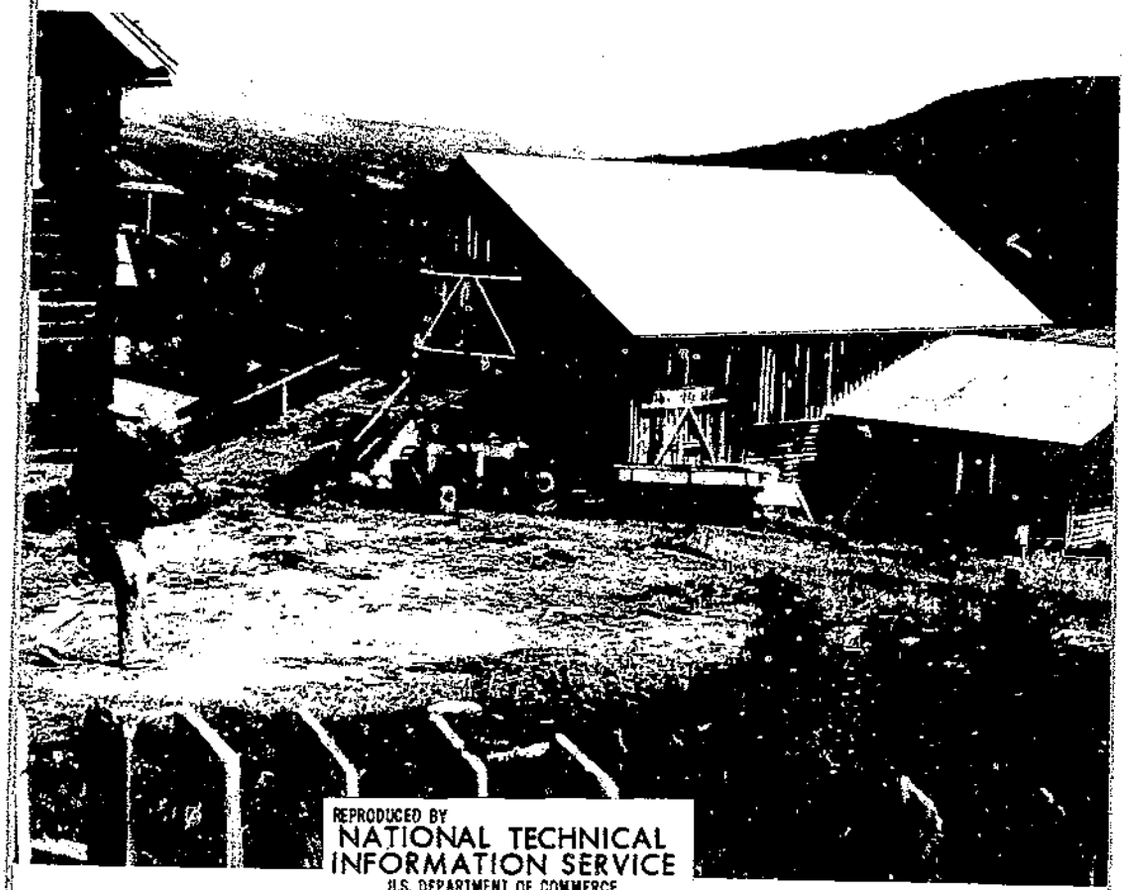
Norwegian Nutrition and Food Policy

Marshall H. Cohen



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ABSTRACT

Norway's Nutrition and Food Policy, begun in 1975, aims to provide wholesome food and increase agricultural self-sufficiency, largely by increasing agricultural productivity in disadvantaged areas. This and related Norwegian agricultural policies are explored for implications for the United States. Data on food consumption patterns in Norway, especially fat consumption, and their relation to health are presented. The main tools to implement the policy are consumer education and price policies. Alternatives for increasing domestic food production include expanding cultivated area and improving yields.

Keywords: Norway, agricultural policy, nutrition, price policy, land utilization, Nordic agriculture.

Photography by Marshall H. Cohen

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PREFACE

The United States follows with increasing interest the efforts other governments are making in nutrition and food policy. U.S. federally financed programs such as the Food Stamp and National School Lunch programs, and Federal research in such areas as food quality, food additives, and pesticides are all aspects of nutrition and food policy. In February 1980, the U.S. Department of Agriculture and the Department of Health, Education, and Welfare jointly issued dietary guidelines similar to those in the Norwegian policy. The U.S. guidelines inform American consumers about some relationships between diet and health. No integrated nutrition and food policy similar to the Norwegian model has been implemented in the United States or any other country.

The United States has recognized the importance of a national nutrition policy and considered establishing a Federal Food and Nutrition office in 1969, as well as forming coordinating organizations responsible for ongoing surveillance similar to those in Norway (*29*). (Italicized numbers in parentheses refer to references cited at the end of this report.) The U.S. Senate Select Committee on Nutrition and Human Needs in 1975 reemphasized the need for a comprehensive nutrition policy and recommended establishing a Federal Food and Nutrition office and an advisory Nutrition Board. The Senate report recommended the following goals:

- Maintaining and improving the health of the American people,
- Insuring adequate food production for domestic needs and global commitments,
- Maintaining food quality,
- Guaranteeing accessibility to food supplies, and
- Preserving freedom of choice as an essential feature of U.S. food distribution and allocation.

The Senate Select Committee on Nutrition and Human Needs, in its 1977 report *Dietary Goals for the United States*, pointed cut that Americans consume a diet with high health risks. Citing the Scandinavian experience, the report recommended broad public education programs emphasizing nutrition and health education—particularly focusing on the relationships between certain diseases and consumption of fats, sugar, salt, cholesterol, and food additives (*30*).

The need for nations to embrace nutrition policies was also affirmed emphatically during the World Food Conference in Rome in November 1974. One conference resolution was "that each country formulate integrated food and nutrition plans and policies based on careful assessments of malnutrition in all socioeconomic groups" (*27*). Norway's official plan to adopt a long-range food and nutrition policy—the first country in Western Europe to do so—represents a commendable sensitivity of a national government toward complex and changing social needs.

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BACKGROUND INFORMATION

The population of Norway was 4.04 million in 1978. Approximately half the population resides in urban settlements of 6,000 persons or more. Agriculture employs 9 percent of the labor force. Norway's Gross National Product in 1978 was $35 billion or $8,663 per capita. Agriculture's share of Gross Domestic Product is approximately 6 percent. Total imports were $11.4 billion in 1978, of which 8 percent ($964 million) were agricultural products. The European Economic Community supplied $292 million of agricultural products in 1978, with Denmark and the United Kingdom the main suppliers. U.S. agricultural exports to Norway were $166 million in 1978 consisting largely of soybeans ($69 million), grain ($38 million), and fruits and vegetables ($32 million). Their currency is the Norwegian krone (Nkr), divided into 100 øre. In 1978, the exchange rate was 5.00 NKr = 1 U.S. dollar. A kilogram (kg) is equal to 2.2046 pounds. A metric ton (MT) is equal to 2,204.6 lbs. A liter equals 1.0567 liquid quarts.

CONTENTS

SUMMARY

Norway's Nutrition and Food Policy is an attempt to coordinate several objectives, such as improving diets, increasing food production, and developing agricultural resources in disadvantaged regions. A major thrust of the nutritional objective is to reduce total consumption of fat in the Norwegian diet, as the proportion of energy provided by fat has risen in recent years, along with cardiovascular diseases.

Policies that can help implement these nutritional goals encourage greater consumption of relatively low-fat foods such as skim milk, restrain the rise in consumption of red meat, and reduce the proportion of saturated fat used in margarine production.

The Norwegian Government utilizes a complex price policy to regulate the direction of agricultural production. It is also planning a wide range of regional programs to expand agricultural land, including reclamation of marginal forest land and transferring arable land from the coniferous forest to grass crops in the subarctic region. The Norwegian Government expects cultivated area to increase from 790,000 hectares in 1974 to 900,000 hectares by 1990.

If the production goals materialize, Norway's agricultural self-sufficiency will rise from 51 percent (on a caloric basis) in 1974 to 56 percent by 1990 with most of the increase in grain production. Consequently, Norway's dependence on agricultural imports, including feeds from the United States, could decrease.

NORWEGIAN NUTRITION AND FOOD POLICY

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INTRODUCTION

The Norwegian Government's Nutrition and Food Policy, instituted in 1975, aims to improve the Norwegian diet, and also coordinate several other objectives of agricultural policy, including increased food production and regional development.

Norway is the first country in Western Europe to establish a comprehensive nutrition and food policy. This report describes the Norwegian experience, which can serve as a case study for other countries attempting to implement a comprehensive nutrition and food policy.

This report discusses the major objectives of the policy, dealing with both food consumption and production. It describes the major tools Norway has used—including consumer education, subsidies, and other price mechanisms—to realize policy goals. It also gives historical background on Norwegian food consumption and existing agricultural policy, and options for increasing food production in Norway.

Americans consume a diet high in such nutrients as fats, especially saturated fats, sugar, and salt, and this kind of diet is associated with a higher incidence of certain diseases, according to the U.S. Senate Select Committee on Nutrition and Human Needs. The Norwegians are attempting to reduce fat consumption and improve health while achieving agricultural production and regional development objectives.

This report is based largely on interviews and materials supplied by experts in Norway in 1978. They underscored that implementing the policy will be difficult, and that success will require a combination of legislation and cooperation among the various parties involved.

Why has Norway led the way in molding an integrated Nutrition and Food Policy? One reason may be that it has already had experience

using some of the policy tools, such as consumer education, consumer subsidies, and other price mechanisms. Also, increased consumption of domestic food grain production to offset lower fat consumption will ease import requirements. However, concerns with nutrition questions have been shared by other Scandinavian countries for many years. For example, in 1968, the joint medical boards of Norway, Sweden, and Finland published *Medical Viewpoints on the National Diet in Scandinavian Countries*, which included several recommendations found in the present Norwegian policy (cited in *30*). Norway's relatively small population, its physical isolation in Western Europe, and its long history of social legislation may also be reasons for Norway's prompt policy response in the field of public health.

OBJECTIVES OF THE NUTRITION AND FOOD POLICY

The long-range policy is contained in the report, *On Norwegian Nutrition and Food Policy*, Report No. 32 to the Storting (Parliament). This policy was formally approved in 1975 and subsequently supplemented with other legislation necessary for its implementation by 1990 (*14, 15*).

The two main aspects of the Nutrition and Food Policy are (1) policies dealing directly with nutrition and food and (2) programs for increasing domestic food production. The major objectives of the overall policy are as follows:

1. To formulate a Nutrition and Food Policy in accordance with the recommendations of the 1974 World Food Conference in Rome. These recommendations include the broad view that a rational use of food resources by nations would deflate the pressure on global food resources, thus benefiting poorer nations.
2. To encourage healthy dietary habits.
3. To increase production and consumption of food produced domestically, and increase self-sufficiency in the food supply.
4. To utilize food production resources fully, especially in economically weaker areas (*14*).

The policy is intended to be highly flexible, since scientific conclusions related to nutrition are likely to change, and policy in Norway is determined by the consensus of many interest groups. Also, it was designed to be linked to existing policies. Furthermore, there are physical limitations on Norway's ability to diversify production—an important aspect of agricultural policy. Despite the difficulties of implementation, the policy represents a new and serious social statement. The policy is a sophisticated integration of social and economic goals which will require a high degree of cooperation among farmers, consumers, and manufacturers.

FOOD CONSUMPTION PATTERNS

The policy goals dealing directly with nutrition and food are based on several observations concerning the Norwegian diet. Food consumption patterns have changed considerably since the turn of the century. According to the Nutrition and Food Policy report, the Norwegian diet has improved dramatically, and this has contributed to long life expectancy rates, reduced infant mortality, and a marked reduction in diseases such as rickets and scurvy (*14*). The Norwegian diet has "become more abundant and more balanced" and "the overwhelming majority of the population is well supplied with proteins, minerals, and vitamins" (*14*). Nevertheless, food consumption changes have resulted in a notable shift in the nutrients used to provide energy (see table 3). The proportion of fats in the energy supply has increased, particularly in the saturated fat category, the proportion of carbohydrates to total energy consumption has declined, and sugar intake has increased.

The Government's policy objectives are reflected in table 1, which expresses food consumption goals on an energy basis projected to 1990. These objectives are linked to increasing domestic production and consumption of certain products, primarily grains and potatoes. As the table indicates, the desirable projected consumption level for these product groups is 1,337 million calories for grain, up around 29 percent from 1977, and 312 million calories for potatoes, up 17 percent. Fish consumption will increase by 31 percent, according to the Government's forecast. Beef and veal consumption, on a caloric basis, is projected to decline by approximately 10 percent from 1977 (or held relatively constant at 1975 levels).

Milk production is central to the Norwegian agricultural economy. Thus, a strong decline in milk utilization could be both politically and economically undesirable. Consumption of whole milk is forecast to fall from the 1971-77 average but be offset by the sharp rise in the share of skim milk. The policy report underscores the difficulty of changing the ratio of nutrients in milk, but recommends that research might help develop a dairy herd that could produce a lower percentage of fat. If these projected consumption levels materialize, Norwegians will have a generally healthier diet consistent with the nutritional objectives.

Historic Consumption Patterns

A comparison of food consumption during World War II, when food was scarce, and recent years suggests some relationships between diet and health. During the German occupation of Norway

Table 1—Total caloric consumption of selected foods in Norway

Food category	1953-1955	1963-1965	1971	1972	1973	1974	1975	1976	1977	1990 (projected)
					Millions of calories					
Grain (incl. rice)	1,169	965	950	949	983	1,002	996	1,023	1,034	1,337
Potatoes	251	263	270	271	270	271	255	268	267	312
Beef and veal	103	128	138	140	144	160	173	173	182	163
Pork	152	181	191	204	204	227	222	239	233	235
Eggs	36	47	55	56	57	55	54	58	58	60
Fish[1]	84	93	91	78	69	77	65	77	80	105
Milk (whole)	449	457	459	464	474	475	468	460	450	458
Skim milk	12	12	20	21	23	27	35	37	39	89
Cream	54	79	89	88	87	87	86	89	92	87
Cheese	105	127	149	153	151	163	169	169	182	171
Butter	102	109	149	140	163	155	139	159	156	205
Margarine	603	602	596	588	579	575	572	557	530	398
Vegetables	26	30	31	31	32	34	32	33	36	39
Fruit	81	115	127	127	131	128	131	134	130	153
Other	721	321	863	893	817	718	657	826	855	779[2]
Total	3,948	4,001	4,178	4,203	4,184	4,154	4,054	4,302	4,324	4,591

[1]Includes canned fish.
[2]ESCS estimate.
Sources: [*14*, *19*].

(1940-45), consumption of sugar declined to about half of present levels while the consumption of grain and flour, bread, potatoes, and vegetables increased. The quantity of fat consumed was sharply reduced due to this spartan diet. Mortality rates from cardiovascular disease declined during that period and the frequency of tooth decay among school children dropped. With sharply higher consumption of sugar and saturated fats in recent years, there has been a corresponding increase in a number of diseases in Norway—as well as in many other industrialized countries where this type of diet is common. In addition to the rise in cardiopulmonary disorders, tooth decay, related to the high consumption of sugar, has been a serious problem in Norway. Obesity, certain digestive disorders, and iron deficiency anemia, all related at least in part to dietary factors, have also increased (*14*).

A time series of data on consumption of selected foods in Norway indicates notable food consumption changes (table 2). Grain consumption at 73.1 kilograms (kg) per capita in 1977 had fallen sharply since 1953-55 when it was 98 kg per capita. However, there was a very slight rise in 1978. Similarly, consumption of potatoes declined to 80.8 kg per capita in 1977 compared to 92 kg per capita in 1953-55.

Consumption of fish, although relatively high compared with that of many developed countries, has shown a longrun decline—from 35.2 kg per capita in 1953-55 to 29.5 kg per capita in 1977. The data indicating the longrun tendency of declining fish consumption may be understated slightly, however, since the so-called private catch or sports fishing accounts for about 6 kg per capita of additional consumption annually. In the long run, gradually higher domestic fish prices have resulted in lower rates of consumption; less than 10 percent of the domestic catch is sold on the home market.

The per capita consumption of whole milk has declined continuously, and was 161.5 kg in 1977, down from both the 1953-55 average and the 1963-65 average. The decline in the consumption of whole milk was offset by increases in skim milk consumption, particularly during the seventies. Consumption of 27.7 kg per capita in 1977 was nearly double that in 1971. Cheese consumption at 11.6 kg per capita in 1977 has remained relatively high and butter intake has remained fairly constant.

Consumption of fruit has increased strongly and was 68.2 kg per person in 1977, about 27 kg per person above 1953-55. Vegetable consumption also has risen moderately, from 35.2 to 40.6 kg per capita during this period.

Consumption of margarine was 17.5 kg per capita in 1977 compared with 24.0 kg per capita in 1953-55. Margarine consumption was over three times the quantity of butter consumed in 1977 (5.2 kg per capita).

Table 2—Per capita consumption of selected foods in Norway

Food category	1953-1955	1963-1965	1971	1972	1973	1974	1975	1976	1977
	Kilograms per capita								
Grain (incl. rice)	98.0	74.6	69.6	69.0	71.0	71.9	71.1	72.7	73.1
Potatoes	92.0	87.4	85.1	84.7	84.4	82.9	80.0	81.9	80.8
Beef and veal	19.9	22.6	23.7	23.8	24.1	26.5	28.4	28.0	29.4
Pork	13.2	15.8	18.2	19.2	19.1	21.1	20.5	22.0	21.4
Eggs	7.3	8.8	9.8	9.8	9.9	9.6	9.4	9.9	9.9
Fish (raw)[1]	35.2	40.6	32.7	27.5	24.5	28.0	24.1	28.5	29.5
Milk (whole)	193.4	179.4	170.5	171.1	173.5	172.9	169.2	165.6	161.5
Skim milk	10.0	9.4	14.6	15.3	16.8	19.6	25.3	26.6	27.7
Cream	5.0	6.8	7.3	7.2	7.1	7.0	6.9	7.1	7.3
Cheese	7.9	8.7	9.8	10.0	9.8	10.5	10.8	10.8	11.6
Butter	3.8	4.1	5.1	4.8	5.5	5.2	4.6	5.3	5.2
Margarine	24.0	22.0	20.4	20.0	19.6	19.3	19.1	18.5	17.5
Vegetables	35.2	36.6	35.5	35.9	36.8	36.6	36.5	37.8	40.6
Fruits	41.0	62.2	67.9	68.7	69.6	69.1	68.0	69.6	68.2
Sugar (incl. sirup and honey)	39.9	42.6	40.5	40.6	37.7	31.0	26.5	34.8	36.1

[1]Includes canned fish.
Source: (*19*).

Sources of Fat

Growth in the relative share of fat in total energy consumption is illustrated in table 3. Total per capita daily consumption of energy declined slightly from 3,080 to 2,830 calories between 1953-55 and 1974. The contribution of fat increased from 37.7 percent to 42.5 percent. The proportion of energy contributed by protein, which remained virtually constant from 1953-55 to 1973, increased slightly in 1974 to 12 percent while the percentage share of carbohydrate actually dropped from 50.8 percent to 45.5 percent during that period.

Approximately 90 percent of the fat consumed by Norwegians in recent years is from meat, milk, and the so-called industrially processed products, which are dominated by margarine (although other fats are included). In 1976, milk and milk products contributed 33 percent of total fat consumed and margarine contributed a high 34 percent, while the contribution of meat was 22 percent.

Hardened fat (saturated fat) accounts for a relatively high percentage of total fat intake in Norway. The saturated fat groups have a correlation with both cardiac disorders and certain forms of cancer. There has been an alarming longrun increase in the incidence of cardiovascular disease in Norway since World War II, particularly among the middle aged. The death rate from heart disease among people 40-49 years old increased 280 percent for men and 190 percent for women in 1966-67 compared with the 1951-55 period (*14*). Fatalities due to heart disease in people 40-45 years old continued to increase from 1968 to 1973 at a slower rate, increasing at roughly the same rate as the total population (4 percent). The total number of cardiovascular deaths has declined annually since 1973, particularly in the group 40-45 years old (*13*); this decline is reportedly due to more thorough physical exams which include the monitoring of blood fats and preventive treatment including changes in the diet. Studies undertaken in many developed countries and most recently in the United States have uncovered a strong relationship between diet and certain cardiac disorders. These studies have indicated a special relationship between a high intake of saturated fats and increased incidence of heart disease (*5*). The Norwegian Government report states the following objectives specifically directed at fat consumption (*14*):

1. The Norwegian diet should be modified in order to reduce fat consumption from 42.5 percent (a level which has remained relatively constant during the 1974-78 period) to 35.0 percent by 1990.[1] It is particularly important to reduce the relatively high intake of so-called

[1]According to officials in the margarine industry, the current actual consumption of fat is 39 percent when the data are adjusted for waste (for example in frying) and exports.

Table 3—Norway: Per capita daily consumption of protein, fat, carbohydrates, and energy, and estimated goals for energy and fat consumption to 1990

Year	Protein	Fat	Carbohydrates	Energy	Protein	Fat	Carbohydrates
	Grams per person			*Calories*	*Percent of energy*		
1953-55	87	129	391	3,080	11.5	37.7	50.8
1964-65	83	126	357	2,890	11.5	39.1	49.4
1969	84	127	357	2,910	11.5	39.3	49.2
1970	83	130	340	2,870	11.6	40.8	47.6
1971	84	131	344	2,890	11.7	40.7	47.6
1972	84	132	346	2,900	11.5	40.9	47.6
1973	83	135	338	2,900	11.5	41.9	46.6
1974	85	134	322	2,830	12.0	42.5	45.5
1990	—	—	—	3,088	—	35.0	—

— = Not available.
Source: (*17*).

saturated fats (*14*). The Government believes that this reduction of fat and especially saturated fat will lower the risks of cardiovascular disease.

2. The decrease in the supply of fat should be replaced by foods containing starch, primarily cereals and potatoes. The proportion of sugar in the energy supply should also be limited.

3. The proportion of polyunsaturated fats to saturated fats in the total fat intake should be increased. In Norway, hardened or saturated marine fat in margarine accounts for a relatively high percentage of fat consumption. Consequently, officials and nutrition experts have recommended reducing total margarine consumption as well as shifting its ingredients to less saturated fats, a development which has already begun.

Total margarine production declined from 75,500 tons in 1972 to 68,000 tons in 1977, according to officials in the Norwegian margarine industry. A further production decline to 65,000 tons is projected for 1982 (*9*). Furthermore, production of soy oil margarine has risen in recent years and is projected to rise sharply by 1982 while fish and other vegetable oil margarines (containing a higher percentage of saturated fat) are projected to drop (see tables 4 and 5 for comparative data).

Per capita margarine consumption (which reached a peak in the mid-sixties) declined from 20.0 kg to 17.5 kg from 1972 to 1977; a continuing decline to 15.7 kg has been projected for 1980 (*9*). The Norwegian margarine industry forecasts a stabilization at around 15 kg per capita through 1990. This level (15 kg) is slightly above the Government's recommendation of 12.5 kg. For comparison, per capita consumption of butter has risen from 4.8 kg per capita in 1972 to 5.2 kg per capita in 1977; a moderate decline to 4.74 kg per capita is projected to 1982 (*9*). Hardened marine fat has represented a significant 46 percent of the raw materials used in the production of margarine in recent years. This percentage has increased from 43 percent since 1972 but is below the 1970 level of 49 percent. Saturated or hydrogenated vegetable oil accounts for about 15 percent of the raw materials used in margarine production. Thus, hydrogenated marine and vegetable fats together account for 61 percent of the raw materials in a heavily consumed product (margarine).[2]

The Government policy is to reduce aggregate consumption of all fat by 1990 (or earlier) until the desirable quantity of energy derived from fat is achieved, namely 35 percent. Policy recommendations in this regard are:

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[2]Desirable levels of fat consumption vary by region; in cold climates such as in northern Norway, a relatively higher intake is required compared to warmer areas.

Table 4—Production of edible fats in Norway

Type of fat	1972	1973	1974	1975	1976	1977	Projected 1980	Projected 1982
				Tons				
Margarine (consumption)	75,500	74,450	72,600	72,650	70,650	68,000	66,000	65,000
Margarine (bakery)	3,100	3,280	3,950	3,930	4,150	4,100	3,850	3,750
Edible oil	1,470	1,550	1,560	1,430	1,595	1,650	1,800	1,900
Butter	2,950	3,090	2,800	2,800	2,930	3,000	3,000	3,000
Total	101,910	82,390	80,910	80,810	79,325	76,750	74,650	73,650

Source: (*9*).

Table 5—Production of margarine in Norway

Type of margarine	1972	1973	1974	1975	1976	1977	Projected 1980	Projected 1982
				Tons				
Margarine, largely fish and mixed vegetable oils	35,100	30,800	35,100	34,650	32,270	30,770	28,700	26,900
Extra salted	2,700	1,900	2,000	1,530	1,100	990	—	—
Butter blend	2,500	2,150	1,330	1,140	1,035	1,050	800	600
Mineral blends	—	—	—	2,030	1,345	1,050	800	800
Total	40,300	34,850	38,450	39,350	35,750	33,700	30,300	28,300
Soy oil margarine	20,700	26,750	22,200	22,190	23,760	24,050	27,200	28,400
Restaurant blend	2,900	2,300	2,000	1,630	1,380	1,500	1,200	1,000
Other vegetable margarine	3,700	2,350	1,950	1,880	1,760	1,450	—	—
Total	27,300	31,400	26,150	25,700	27,100	27,000	28,400	29,400
Other bakery varieties	7,900	8,200	8,000	7,600	7,800	7,300	7,300	7,300
Grand total	75,500	74,450	72,600	72,650	70,650	68,000	66,000	65,000

— = Not available.
Source: (9).

1. Consumption of lowfat milk should be increased considerably in comparison with whole milk and the consumption of cream should be reduced.

2. Consumption of margarine (as well as "hidden fats" such as in fried foods and bakery products) must be reduced considerably.

3. Per capita consumption of red meat should be held constant at 1975 levels (*14*).

Although the reduction of total fat consumption is a key nutritional objective, other aspects of nutrition policy are important and are linked to agricultural production goals. For example, the decrease in the supply of fat should be replaced by foods containing starch, primarily cereals and potatoes, and domestic production of these foods will be increased. The proportion of sugar, which is entirely imported, in the energy supply should be limited.

IMPLEMENTING THE NUTRITION AND FOOD POLICY

This section discusses how the new Nutrition and Food Policy relates to other aspects of Norwegian agricultural policy. It then discusses the policy tools—mainly education and pricing policies—available to achieve policy objectives.

Agricultural Policy Background

Agricultural policy in Norway is closely tied to the economic and social objectives of the society as a whole, particularly a goal of income-equalization between the farm and nonfarm sectors. Furthermore, policy objectives are tied in with overall economic and sociological strategies. For example, because of Norway's unique geography, some of the population is scattered in small pockets in remote areas. In order to sustain the farm population in remote regions, separate income standards have been established and relatively high prices are awarded these farmers to encourage them to stay on the farm and thereby preserve a stream of communication throughout the country. Thus, there is a quasi-defense motive in Norway's regional and economic planning.

The Nutrition and Food Policy is designed to mesh with other aspects of agricultural policy such as price, income, and regional policies. In some instances it is difficult to separate highly integrated aspects of policy, for example, regional and production policy, or aspects of price policy which combine both income and nutrition goals. Thus, it is appropriate to outline briefly aspects of overall agricultural

High price supports help sustain small farms such as these in an isolated mountain pocket in western Norway.

policy in Norway, as well as isolate specific measures which apply directly to food and nutrition.

Overall agricultural policy traditionally has included three objectives: an income target, a production target, and regional policy objectives.

1. *An income target*—Broadly defined, the target is that net income from efficient farm holdings should be on a par with incomes in nonfarm industries. Norwegian policy spells out income incentives based on farms of different sizes in various regions (see the following section).

2. *A production target*—This target is designed to fill domestic requirements for most livestock and dairy products and expand production of field crops such as grains, vegetables, and fodder, which could substitute for imported concentrates. Production of livestock and dairy products in remote areas such as northern Norway where grassland areas are available will be encouraged in the new policy by high prices, subsidies, and other incentives, some directly related to improving productivity. Some of these policies are incorporated into comprehensive national policies which emphasize regional development.

3. *Regional policy objectives*—These policies are to encourage farmers to remain in agriculture in disadvantaged areas and to expand use of marginal land. The new policy also encourages the farmer to earn supplemental income from fishing and forestry wherever feasible.

New Income Standards

One innovative aspect of Norwegian agricultural policy is the formulation of efficiency standards or norms to promote productivity in remote areas through income and price incentives. These norms essentially are tools for implementing aspects of income and regional policy. These rather complex standards were devised to keep farms (and a food production potential) viable in marginal areas. An income target based on a specific labor input (equal to a comparable labor input in the nonfarm sector) was calculated, based on model dairy farms with specific numbers of animals. From these model farms a schedule of the labor input per year was calculated, which varies by region and farm and herd size.

The scheme provides for farm prices to be raised in disadvantaged regions where farms are likely to be very small. Fewer cows[3] are required in these less developed regions in order for an efficient farmer there to earn relatively higher prices as in more fertile areas. Thus, the farmer's income in these areas is based on a labor input for fewer animal units (or crops converted to animal units). For example, in Norway's highly fertile Oslo area, 15 to 20 cows are required per labor input, while in northern Norway only 10 to 15 cows are required to earn a price comparable to that in the Oslo area. In other poorer regions (Ostlander, Agder, Rogaland), 12 to 15 cows are required. On very small farms, fewer cows may be required for farmers to earn a given income for their labor input, while a very large farm would hold 20 to 34 cows.

A vacation subsidy was also introduced in the policy under which the Government pays temporary help to work a farm while the farm family takes a vacation. This enables farmers to enjoy leisure time on a level with their industrial counterparts.

Also, many farmers in less favorable regions receive supplemental income from forestry or fishing. This income is not included in the calculations for income equity.

Policy Tools for Implementing the Nutrition and Food Policy

The policy tools available may be subdivided into two areas: consumer education and the use of price policy, particularly the selective use of consumer subsidies.

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[3]Cows are measured in so-called dairy cow units which equal one dairy cow plus a normal number of calves for maintenance of the herd. For nondairy farms, the efficiency standards are based on products converted to dairy cow equivalents.

Successful implementation of a complex nutrition and food policy with major socioeconomic implications requires a high degree of cooperation among Government agencies dealing with many aspects of food regulations, such as marketing, processing, and hygiene. It also requires cooperation among the private sector, consumer groups, trade organizations, manufacturers, and the Government.

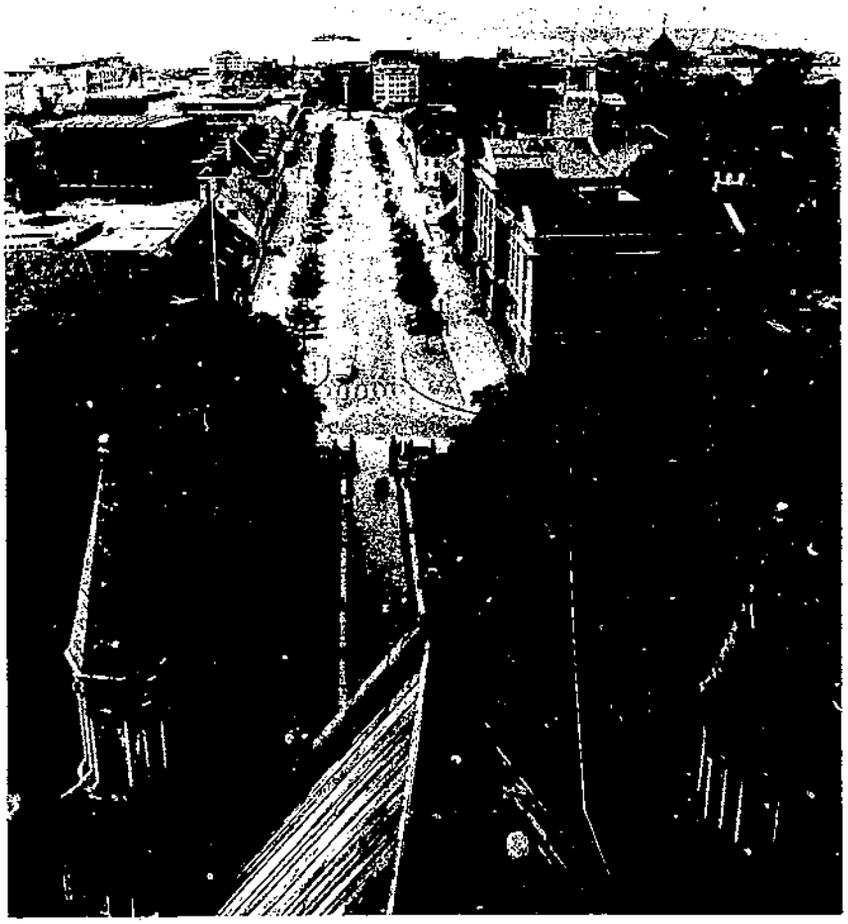
Consumer Education

Consumer education is an important tool for implementing the policy, especially since the Norwegian public has expressed wide interest in nutrition questions, and the Government anticipates a strong consumer response to information dealing with nutrition.

Nutrition objectives may be achieved slowly, and may change as more information related to diet and health becomes available. Therefore, the National Nutrition Council (Statens Ernaeringsraad), established in 1946, plays an important role. The council provides an interministerial committee on nutrition with recommendations concerning nutrition issues, and also supplies nutrition information to the public.[4] The Government anticipates this widespread public information from the council could shift food demands, and that dietary change "will ensue from consumers voluntarily altering their dietary habits" (*14*). Also, Government agencies such as the Ministry of Social Affairs and the Ministry of Consumer Affairs, as well as private manufacturers, publish a wide range of information on nutrition questions.

Nutrition information has already affected the ingredients used in manufacturing margarine. The margarine industry has agreed to cooperate with the Government and continue to reduce the ratio of saturated to unsaturated fat in margarine by 1990. Also, the industry has increased its use of soybean oil in many varieties of margarine to about 59 percent, doubling the use of soybean oil in margarine over the past 15 years. Soy oil margarine, which was 27 percent of total margarine production in 1972, increased to 34 percent by 1976. It is projected to reach 44 percent by 1982 (*9*). However, on the average, hardened (saturated) fats account for over 50 percent of margarine. Thus, the shift in the composition of margarine away from hardened fats, coupled with the trend of lower total consumption of margarine (projected to decline to a 15.0 kg per capita range by 1990) will contribute significantly to a reduction in the overall intake of saturated fat.

[4]The interministerial body is composed of representatives of eight Government ministeries: Fisheries, Consumer Affairs, Trade and Commerce, Church and Education, Environment, Agriculture, Social Affairs, and Foreign Affairs (*22*).



A major goal of the new policy is to educate Norwegian consumers in large urbanized areas, such as here in Trondheim, about the relationship between diet and good health.

Price Policy

A major part of Norwegian agricultural price policy is spelled out in the Agricultural Agreement—between representatives of the Government and farmers—which is normally enacted for 2 years, with provisions such as an escalator clause for annual price adjustments tied to changes in production costs in agriculture. The present agree-

ment continues to follow the original guidelines in the 1958-61 legislation, and now includes the following areas: price setting, measures for adjusting production, market regulation, policies affecting trade, rationalization measures, and special income policies (*16, 23*).

The 2-year Agricultural Agreement most importantly sets product prices for each of the 2 years resulting from negotiations between the Government and representatives of the farmers, primarily the farmers' unions. Each side in the negotiations outlines a specific strategy reflecting cost increases in agriculture, the extent to which price increases in agriculture will reflect parity of income with industrial counterparts, and so forth.[5] If no agreement is reached between the parties (as occurred in 1978), the negotiations can go into mandatory arbitration, with an Arbitration Committee appointed by Parliament (Storting) (*26*).[6]

The agreement specifically includes compensation for increased production costs, incremental income based on agreements between the trade unions and the Norwegian Employers' Federation, the escalation increment mentioned previously, and measures for promoting leisure and social welfare. As an example, in the 1976-78 agreement, the increases amounted to 1.8 billion Norwegian kroner ($350 million) for the second year of the agreement (July 1, 1977 through June 30, 1978). Part of the total allocation—or 1,047 million kroner ($204 million) (table 6)—reflects compensation for higher production costs and was distributed over most commodities in Norway, with most of the price increase falling heavily into the milk sector.

The balance of the total awarded increase in this example, the difference between the total allocation of 1.8 billion kroner ($350 million) and 1.047 billion kroner ($204 million), is distributed through a wide range of special grants, subsidies, rebates for value added taxes (VAT), and measures for promoting leisure and social welfare. Some of these subsidies and payments, which have applied to various sectors in recent years, are enumerated briefly for the major commodities:

Dairy—A basic subsidy is paid for all milk delivered, a subsidy is paid to some farmers for butter made on the farm when they are unable to deliver milk to dairies, a freight subsidy is paid on milk and

[5]As a result of price and subsidy programs, the average farmer's income is approximately 95 percent of industrial counterparts.

[6]In 1978, the farmers' unions asked a total farm income increase of 1.1 billion kroner. The Government offered 775 million. A final agreement was arbitrated at 990 million kroner.

Table 6—Producer price changes and Government budget allotments by commodity under the 2-year Agricultural Agreement, 1977/78 compared with 1976/77

Product	Price increase	Total allocation
		Nkr million (Dollar equivalents are in parentheses)
Cow milk	25 øre per liter	435.0 (85 million)
Beef and veal	300 øre per kg	191.4 (37 million)
Mutton and lamb	400 øre per kg	64.6 (13 million)
Pork	160 øre per kg	121.1 (24 million)
Eggs	110 øre per kg	37.5 (7 million)
Grains	13-14 øre per kg	114.4 (22 million)
Oilseeds	25 øre per kg	2.2 (430 thousand)
Potatoes (all types)	16 øre per kg	40.0 (8 million)
Fruit (all types)	No change	15.0 (3 million)
Glucose	No change	1.0 (200 thousand)
Total price change		1,047.0 (204 million)[1]

[1]The total allows for further possible price increases.

Source: Norwegian Ministry of Agriculture

Note: The exchange rate was 5.14 Nkr = 1 U.S. dollar in 1977. A krone contains 100 øre.

butter, and consumer or producer price subsidies are paid on dairy products.[7]

Grain—All Norwegian grain producers receive high support payments which are fixed in the Agricultural Agreement, and consumer subsidies are paid on flour.

Meat—A subsidy is paid for transporting animals to the slaughterhouse and from the slaughterhouse to the market, and a storage subsidy is paid for storing surplus meat. Also various consumer and producer subsidies are paid for market regulation.

Thus, the Government has at its disposal a highly complex price policy system which is potentially a strong device for regulating the direction of production, particularly when used with consumer subsidies.

[7]Technically, consumer subsidies and producer subsidies are similar insofar as they are payments made to producers in order to restrain the possible increase in retail prices which would otherwise occur. There are administrative differences, however, in that direct producer subsidies are paid by the Ministry of Agriculture, while payments designated as consumer subsidies are paid by the Ministry of Consumer Affairs.

Price policy in Norway has been used to regulate farm income and production rather than to shift consumption for nutritional objectives. Producer prices for nearly all the major commodities produced in Norway have been set at levels above world market prices in order to support income and ensure that production remains relatively high, the latter reflecting a longstanding philosophy which began when there was an urgent need for food during and following World War II. Consumer subsidies have been an effective price policy tool particularly when certain categories of producers, notably milk producers, needed to receive relatively higher prices while consumer prices were either restrained or frozen. Under the present price system, producer prices are linked to the fat content in the delivered milk, with higher prices paid for higher milk fat content. The Government's Nutrition and Food Policy report proposes modifying the present grading system to base delivered milk prices on protein rather than fat content.

According to the Nutrition and Food Policy report, "price measures through the formulation of consumer subsidies ... will be necessary steps in a coordinated nutrition and food policy" (*14*). Consumer subsidies have been used extensively in Norway, largely in conjunction with retail price freezes in order to dampen the inflationary impact of higher farm prices which would have otherwise occurred in the absence of a freeze.

Consumer subsidies have been used to stimulate consumption of specific foods including those nutritionally beneficial such as skim milk, beef, and mutton (see table 7). In recent years, consumer subsidies have applied to milk, cheese, most red meats, poultry, butter, and fish. As mentioned (see section on Food Consumption Patterns), per capita consumption of skim milk increased dramatically along with sharply higher consumer subsidies particularly since 1975, substituting somewhat for whole milk consumption, which has declined annually for the past decade. Although per capita fish consumption has declined in the long run, it has increased moderately in recent years, largely reflecting consumer subsidies since fish prices would otherwise have been relatively higher in Norway.

Subsidies paid by the Government for food, including consumer subsidies, totalled $492 million in 1975, the year the Nutrition and Food Policy was first declared. This was more than double the amounts paid in 1970, 1971, and 1972. By 1978, the amount allocated for consumer subsidies and VAT compensation totalled $688 million. The principal subsidized food items that year were whole milk for consumption, $248 million or 36 percent of the total; beef, veal, and reindeer meat, $100 million; bread, $63 million; cheese, $61 million; and skim milk for consumption, $55 million (see table 7) (*2*). When subsidies have been generously allocated, they have influenced consumption, especially for skim milk, beef, and veal during 1974-77. According to one

Table 7—Consumer subsidies paid by the Norwegian Government by commodity[1]

Commodity	1974	1975	1976	1977	1978
	Kroner per kilogram (Dollar equivalents are in parentheses)				
Beef, veal, and reindeer	2.10 (0.40)	4.30 (0.77)	4.30 (0.82)	6.88 (1.30)	6.88 (1.38)
Mutton and lamb	2.10 (0.40)	5.85 (1.05)	5.85 (1.06)	8.43 (1.60)	8.43 (1.69)
Pork	1.35 (0.26)	1.65 (0.30)	1.98 (0.38)	2.76 (0.52)	2.76 (0.55)
Poultry	—	—	—	3.20 (0.61)	3.20 (0.64)
Butter	1.80 (0.34)	2.30 (0.41)	2.30 (0.44)	2.42 (0.46)	2.42 (0.48)
Cheese	3.12 (0.59)	4.52 (0.81)	4.71 (0.89)	7.21 (1.36)	7.21 (1.44)
Fish	[2]3.25 (0.62)	[2]4.67 (0.84)	[3]4.67 (0.89)	[3]4.95 (0.94)	[3]5.54 (1.10)
	Øre per liter (Dollar equivalents are in parentheses)				
Whole milk	69.2 (0.13)	121.9 (0.22)	134.7 (0.35)	194.1 (0.38)	194.1 (0.39)
Skim milk	44.4 (0.8)	97.1 (0.17)	109.9 (0.23)	202.2 (0.42)	202.2 (0.44)

— = Not available
[1]Includes estimated rebate on the value added tax.
[2]Frozen fish only.
[3]Fresh, frozen, and processed fish.
Sources: (*18* and *19*).

study, "the decline in per capita consumption of whole milk has to be seen as part of the diversion of whole milk for cream, butter and cheese . . . but the sudden discovery of skim milk by the public may fairly be assumed to be connected with the recent and sharply rising trend in skim milk subsidies" (*2*). The same study also emphasizes the political and economic difficulties of reconciling the conflict between holding the lid on inflation and following nutritional guidelines, particularly in Norway where a high percentage of food is imported. For example, the introduction of a consumer subsidy on poultry in 1977 caused a sharp demand increase resulting in a rise in imports. Pork,

beef, and poultry meat have relatively high demand elasticities in Norway.[6]

Studies have shown the importance of subsidies to Norwegian consumption patterns for principal food items, but the degree to which they will be applied will be carefully calculated in order to avoid depressing other food industries in competition with the subsidized product.

INCREASING AGRICULTURAL PRODUCTION

The Nutrition and Food Policy report stresses the importance of increasing Norway's self-sufficiency in foods and feeds. As table 9 indicates, the projected level of self-sufficiency for foodstuffs for 1990, on a caloric basis, is 56 percent, a moderate rise above the base period (1974) level of 51 percent. When the data are corrected for imported feeds, these relative percentages are 43 and 39, respectively.

Aims of Increased Production

The thrust for higher production (and self-sufficiency) includes these five related motives:

1. *To reduce imports*—The Norwegians emphasize the desirability of increasing domestic production of food and feeds. Increased use of domestic grass crops and feed grains will reduce requirements for imported feed concentrates in livestock production. Projections in the Nutrition and Food Policy report indicate that imports of feed concentrates could be reduced from 782 million kg in 1973 to 423 million kg in 1990.

2. *To achieve regional development objectives*—The report stresses that an increase in agricultural production can contribute to the stabilization of settlement in economically weak areas.

3. *To expand emergency food reserves*—The Government plans to expand emergency stocks of food and feed grains (and storage capacity) to cover at least 1 year's requirements.

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[6]Elasticities are ratios used to estimate the degree to which consumer demand for a specific product may change with price and/or income changes. For example, in Norway meats are products with relatively higher demand elasticities than grain, potatoes, and milk—that is, consumers are more likely to respond to price (or income) changes for meats than for the other products. More specifically, there is a higher price elasticity for beef than pork—consumers are likely to react more to price changes for beef products than they do to price changes for pork products.

These mountain farms in north central Norway will play an increased role in meeting Norway's food needs.

4. *To provide nutritionally beneficial foods*—Increased consumption of domestically produced grains and potatoes will beneficially offset the energy loss from decreased fat consumption.

5. *To support the recommendations of the 1974 World Food Conference*—Higher production of grains in Norway will leave a greater available supply on the world market for importing by developing countries.

Alternatives for Increasing Production

The authorities recognize that increasing agricultural production in Norway will be a difficult challenge. Over one-third of Norway is within the Arctic Circle. Farms are small, averaging below 10 hectares[9] and thousands of these small units are isolated along waterways, on islands, or in economically disadvantaged areas. The Nutrition and

[9]The large units are in south-central Norway, a major grain area where most farms range from 10 to 20 hectares.

Food Policy report states that "the lack of area suitable for grain production is one of the most limiting factors in our [Norway's] food production" (*14*). In 1978 approximately one-third (34,000) of Norway's 94,000 farms were between 2.0 and 4.9 hectares of cultivated land. However, average farm size has been increasing while the number of small units has declined. About 20,500 very small farms disappeared between 1970 and 1978.

Greater area and higher yields will both be necessary to raise output of field crops, primarily grain. No shifts in production are called for in the policy report although greater diversification of output may occur in some regions.

Increased area

Cultivated area will have to be increased with about 75 percent of the increase up to 1990 lying in so-called disadvantaged areas. The longer run decline in cultivated area, due largely to reduced area in grass and potatoes, will have to be reversed. The Nutrition and Food Policy Report projects an increase in cultivated area from 790,000 hectares in the 1974 base period to 900,000 hectares by 1990. Grain's share of total arable land increased from 27 percent in 1967 to 34 percent in 1977 (302,000 hectares).

A major policy priority is to increase grain area approximately 20 percent above the 1975 level to 360,000 hectares by 1990, a relatively

Table 8—Norway's use of arable land

Commodity	1957	1967	1977	1978
		1,000 hectares		
Wheat	1	3	21	21
Rye	1	1	3	2
Barley	135	179	179	185
Oats	60	45	99	97
Mixed grain	1	1	0	1
Total grain	198	229	302	306
Potatoes	55	40	28	25
Feed roots	15	9	5	4
Grassland (including pasture)	685	511	514	514
Oilseeds	5	9	5	5
Other arable land	10	14	7	6
Other crops (largely vegetables)	46	33	38	40
Total	1,014	845	899	900

Source: (*28*).

conservative increase. The report cites the possibility of area expansion in prime grain growing areas such as in central Norway, but largely in the so-called disadvantaged areas.

In some of these regions, land reclamation, largely from marginal forest land, is planned. The extent to which forest land could be transferred to agriculture, both in marginal as well as in productive areas, is keenly debated in Norway since timber is a valuable natural resource. Ecological and conservation policies are also important considerations. Thus, a workable balance between forestry and agricultural interests will be sought during the 1980's.

An area for possible expansion of productive resources is the so-called "subarctic."[10] This region contains about 12 percent of the population, 9 percent of Norway's arable land, and 19 percent of the forest land. Transfer of land from coniferous forests to grass crops is possible in this area but very difficult. One expert (*8*) identifies the problem of limited production alternatives in the northern region. Farms in this area have the disadvantages of a shorter growing season than in the south, smaller units, and a lower overall profitability. Also, agriculture is based largely on grass—consequently dairy, sheep, and goats are important enterprises and are frequently mixed (for example, sheep combined with dairying). Reindeer production is another important enterprise; a typical herd has 200-250 reindeer (*25*). Traditionally, reindeer herds have been managed by nomads with a collective right to pasture in certain northern districts. Further exploitation of resources in marginal areas will occur, particularly for increasing production of roughage.

A further source of arable land, particularly for grass and roughage production, lies below the Norwegian timberline where there is an estimated reserve of 400,000-600,000 hectares (*14*).

Improved Yields

Increased grain yields are expected to contribute to the overall rise in production, reflecting improved technology and use of hardy seeds. The Budget Committee for Agriculture has projected yields for barley to rise from a base period of 3,250 kg in 1974 to 4,090 kg per hectare in 1990, and for wheat to increase from 3,660 kg to 4,400 kg per hectare. The comparative increase for potatoes for these years will be from 24,200 kg in 1974 to 26,600 kg per hectare in 1990 (*14*).

Higher yields for livestock are expected from improved feed efficiency and greater use of concentrates. For beef production, an increase in yield of 4 kg per year until 1990 would result in average meat

[10]Defined as north of 71° latitude, or the area north of the boundary at which wheat and barley may be profitable to produce (*8*).

Raising sheep and goats is a small but important enterprise in Norway's subarctic region.

production per animal of over 210 kg in 1990, compared with 146 kg in 1973.

Although there are no specific projections for pig production in 1990, specialists generally agree that reduced pork consumption would be desirable both to reduce overall fat intake and to make more efficient use of Norway's feed resources. A relatively high percentage of concentrates is consumed in the pig sector (*10*). The percentages of imported protein and carbohydrates used in concentrates normally is over 80 percent and 30 percent, respectively; therefore, by reducing growth in pig production and replacing some of the imported ingredients with Norwegian grain or grass crops, a significant import savings could result.

CONCLUSIONS

Unforeseen political, scientific, and economic developments may alter the direction and implementation of the Norwegian Nutrition and Food Policy. These developments could include new medical findings that redefine the relationships between diet and health. Also, periods of budgetary restraint could limit the use of subsidies to shift diet and increase agricultural production.

Therefore, it is premature to calculate the impact of the policy on specific areas such as U.S. agricultural exports to Norway. If Norway succeeds in increasing self-sufficiency in food grains from 7 percent in 1974 to 28 percent in 1990 (table 9), while increasing its ability to substitute domestic grain crops for imported feeds, U.S. agricultural exports of both grains and soybeans could decline. U.S. annual exports of grains and soybeans to Norway have ranged from 150,000 to 300,000 tons, and 150,000 to 250,000 tons, respectively, in recent years. However, three factors could sustain import demand: (1) Norway is likely to increase its use of soybean oil in foods, (2) shifts in the composition of feeds for livestock toward greater use of protein could occur, and (3) periods of adverse weather may be experienced—a common occurrence in Norway. Whether or not the policy is implemented in its present form, it is nevertheless a useful case study for policymakers and researchers in the United States and other countries.

Table 9—Norway's self-sufficiency on a caloric basis in selected foods

Item	1974	1990 (projected)
	Percent	
Grain	7	28
Potatoes	100	100
Sugar	1	1
Vegetables	82	87
Fruit	38	35
Beef and veal	93	100
Pork	91	100
Eggs	100	100
Fish	83	85
Milk (whole)	100	100
Cheese	99	100
Butter	100	100
Margarine	49	60
Other fats	17	20
Total Norwegian self-sufficiency	51	56
Total share of Norwegian produced food corrected for imported feeds	39	43

Source: (*14*).

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