

Consumption of agricultural products in Finland in 1985

LAURI KETTUNEN

Agricultural Economics Research Institute, Rukkila, 00001 Helsinki 100

Abstract. Forecasts of the per capita consumption of main agricultural products until 1985 are based a) on income elasticities and b) on an assumed growth of real income by 40 per cent in 10 years. In some cases such as meat, butter and margarine the development of the consumption will depend largely on the future price policy and therefore the forecasts can be considered as alternatives which seem possible but which may also turn out to be wrong.

Consumption forecasts for wheat and rye are based on an income elasticity of -0.3 . So the consumption of wheat will fall from 46.2 kg per capita in 1975 to 40 kg in 1985 and the consumption of rye from 22.0 to 20 kg per capita, respectively.

Consumption of fluid milk is assumed to fall 10 per cent in 10 years and would be 206 kg per capita in 1985. The consumption of butter will depend on the price policy of butter in relation to margarine. If the ratio of the retail prices of these products remains as constant as it has been for some years, the consumption of butter is likely to be about 10 kg per capita in 1985. The cheese consumption is expected to increase annually by 4 per cent up to 8.5 kg per capita in 1985. The consumption of other dairy products will stay at the present level. The consumption of eggs will, on the other hand, increase 20 per cent during the next 10 years.

Beef and pork are close substitutes the consumption of which depends largely on the price policy. Since the supply of beef may not increase due to the declining number of dairy cows it is assumed that the retail price of beef will rise faster than that of pork and therefore the demand pressure on meat will shift to pork, the consumption of which is expected to increase by 1 kg per capita per year so that it will be 35 kg in 1985.

The diet of 1985 is checked by calculating its energy, fat and protein content. The results seem to be rather acceptable.

1. Introduction

Forecasts of the consumption of agricultural products are needed for many purposes. In particular, public decision makers need them for the planning of long term agricultural policy. For example, the production targets are often related to the development of the consumption. Foreign trade plans have to be based on consumption and production forecasts (or projections). The processing industry is interested in the development of the consumption in making its investment plans. And even for a farmer it may be important to know the future prospects of production which are determined to a large extent by the development of the consumption.

The following consumption forecasts were made mainly for two purposes. Firstly, they serve as a basis for the determination of the production targets, which is the task of a special committee. Secondly, the forecasts are needed also for a research project whose purpose is to forecast the development of the agricultural production. In some cases it is quite obvious that the production is adjusted to the development in consumption. A good example is the pork production which can easily be directed so that a balance between consumption and production is reached.

Even though consumption may also be guided by policy measures, it may develop more autonomously than production. Therefore, the consumption forecasts are important in assessing the possible production so that it is not disproportionate to the consumption. Possible policy actions may even be predicted when independent consumption and production forecasts are available.

In the following, the forecasts of the per capita consumption of the major agricultural products are presented. They are called forecasts even though in many cases they can be considered only as projections. There are, however, certain reasons which make it possible to call them forecasts as will be seen later on. The paper is based on a more comprehensive study by Haggren and Kettunen on the same subject (HAGGREN and KETTUNEN 1976).

2. Background information

Demand studies made so far in Finland cover adequately all agricultural products. In some cases they are, however, too old for prediction purposes. With the rising wages and salaries the income elasticities tend to become smaller or even turn to negative (like in case of butter or bread). In the case of close substitutes we have to take into consideration the price elasticities, which also change with time.

We were not able to be completely consistent in using the demand studies, but in some cases we used our own judgement as to the size of the elasticities. The method of making forecasts based formally on demand elasticities has to be considered as a final outcome of a mixed use of elasticities and other calculations.

The forecasts are by nature trend projections, which are based mainly on an assumed per capita income growth by 40 per cent in 10 years. This may be a slightly optimistic assumption. If it is too high, the biggest errors are liable in respect of products whose income elasticities are high (such as meat and cheese). The agricultural policy, it is assumed, will be conducted in the same way as hitherto even though this assumption is rather vague. Consumption of different kinds of meat or of butter and margarine may be controlled to some extent, and therefore the forecasts presented below are conditional and based on certain assumptions regarding the agricultural policy.

The basic facts concerning the forecasts can be summarized as follows:

- a) The forecasts of grain products are based on an income elasticity of -0.3 .
- b) The consumption of fluid milk (milk and sour milk) is assumed to decline

by 1 per cent per year. The forecast for cheese consumption is based on an income elasticity of 1.0, which means that the annual growth rate is about 4 per cent. The consumption of butter is assumed to be 10 kg per capita in 1985 or the same as the consumption of margarine. This is, however, simply an alternative. The ratio of butter and margarine consumption may be greatly affected by the price policy.

- c) According to many studies the income elasticity of all meat is about 1. As it is assumed that the real price of meat will rise slightly, the growth of the meat consumption is assumed to be 1.5 kg per year. Due to the decrease in the number of dairy cows the supply (as well as the consumption) of beef is assumed to stay at the present level. The demand pressure will thus shift to pork.
- d) As a basis for the forecast on eggs there is an income elasticity of 0.5. The diet of 1985 is checked by calculating its energy, fat and protein content.

3. The forecasts

3.1. Grain

During the 1960's the consumption of bread grain (wheat and rye) fell quite rapidly (Figure 1). In the crop year 1960/61 it was 96.5 kg per capita (65.0 kg of wheat and 31.5 kg of rye). In 1970 the grain consumption was 25 per cent less or 71.9 kg per capita. In the 1970's the rate of decline has been smaller and there is some hope that the consumption might remain at the present level. Nutritional aspects even favour attempts to increase the consumption of rye bread.

In this study we have, however, assumed that the consumption of bread grain will still decline slightly. In the case of bread the price elasticities may

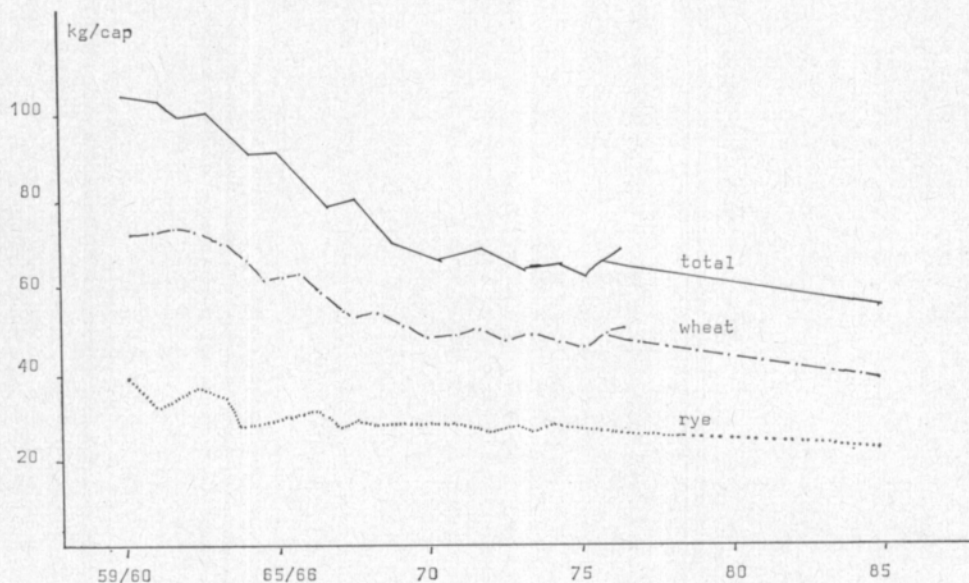


Fig. 1. The per capita consumption of wheat and rye.

be disregarded and the forecast may be based solely on the income elasticity. We have used an income elasticity of -0.3 , which gives a total decline of 12 per cent during the 10 year period (cf. IHAMUOTILA 1972). The forecast should not prove to be completely wrong. Since the tendency is to encourage the consumption of rye bread, the forecast may overestimate the decline in the consumption.

Table 1. The per capita consumption of agricultural products in 1965/66, 1970 and 1975 and forecasts for 1985, kg.

	1965/66	1970	1975	1985
Wheat	52.7	48.7	46.4	40
Rye	26.3	23.2	22.1	20
Barley	4.8	3.5	2.8	3
Oats	3.0	2.8	2.5	2.5
Potatoes fresh	100.1	80.4	70.8	60
Potato flour	2.6	2.2	2.9	2.5
Beef	20.0	20.8	24.2	23
Pork	15.0	20.6	26.7	35
Poultry meat	0.4	0.8	2.4	5
Eggs	9.3	10.4	10.9	13
Milk:				
Fluid milk (l)	284.9	219.4	238.4	206
Sour milk (l)	19.6	35.1	38.5	40
Cream (l)	4.9	5.7	5.8	6
Dried milk	1.5	2.3	3.0	4
Cheese	3.5	4.3	6.1	8.5
Butter	17.7	14.4	13.3	10
Margarine	4.5	7.3	8.5	10
Sugar	42.9	43.9	38.5	40
Calories per day	2 807	2 651	2 461	2 584
(kilo joules)	(11 752)	(11 099)	(10 303)	(10 819)
Protein grams per day	81.1	80.8	87.2	89.3
Fat grams per day	107.3	112.6	120.3	117.8

3.2. Milk products

Milk still forms nearly half of the farmers' gross income from agriculture. Consequently, the development of the consumption of milk products is important to Finnish agriculture and the forecasts should be made carefully.

It is commonly accepted that the consumption of fluid milk will remain constant or will slightly decline in the future. Since farmers have traditionally consumed more milk than people in other occupations, and since the number of farmers is declining, it seems reasonable to assume that the fluid milk consumption will decrease. In Finland the decline is predicted at 1 per cent per year. Even though milk consumption is rather price inelastic (KALLIO 1974), the rise in real milk price may also lower consumption somewhat.

When the forecasts were made in spring 1976 it was predicted that the «light» milk (fat content 2.5 per cent) would cover about 80 per cent of the

fluid milk consumption (milk with 3.9 per cent fat content is the other type of milk usually consumed). Since then, however, the fat content of «light» milk has been raised to 2.9 per cent and the retail price of both qualities is now the same. The forecast of the distribution of the milk consumption has not yet been adjusted to the new situation, but it is probable that the forecast for the total fluid milk consumption may not need any revision.

It is particularly difficult to make forecasts for the butter consumption. Butter and margarine are close substitutes (KETTUNEN 1971) and for many years the butter consumption has been declining whereas margarine consumption has been increasing at the same time (Figure 2). The total consumption

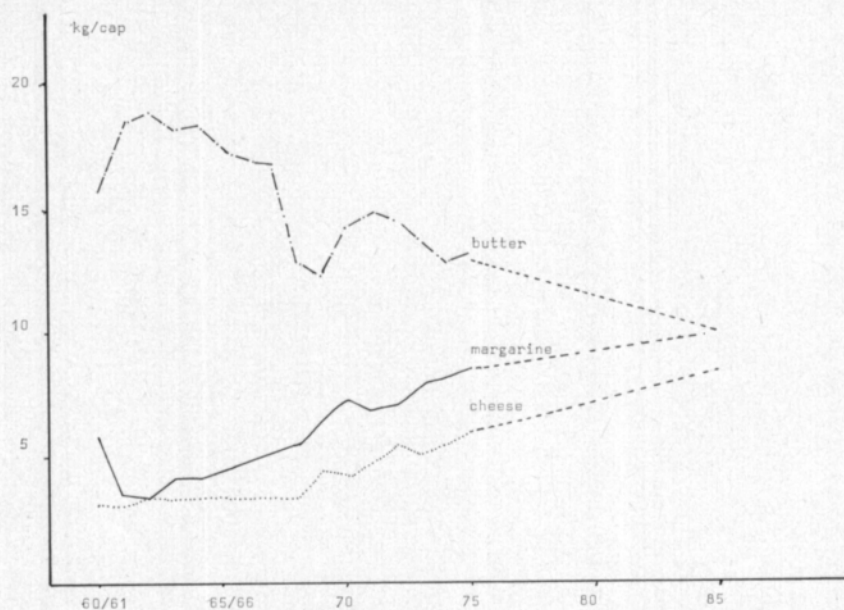


Fig. 2. The per capita consumption of butter, margarine and cheese.

of these products has, however, been rather stable. Since margarine is produced mainly of imported raw materials, there have been attempts to favour the butter consumption by utilizing the retail price ratios of butter and margarine. For some years the price ratio has been kept constant but this has not succeeded in preventing the decline of butter consumption. Here it is assumed that the past trend will continue and so the butter consumption will fall to 10 kg per capita per year by 1985 which would also be the figure for the margarine consumption. What the butter consumption will be in 1985 depends greatly on the future price policy. Also the new qualities of butter may change the development. The forecast is simply a pessimistic alternative, and it is even possible that the butter consumption will stay at the present level.

Cheese consumption is expected to increase 4 per cent annually (according to various studies the income elasticity is about 1 (KALLIO 1974, KETTUNEN 1972), which has been taken as basis for the forecast), and will be 8.5 kg per capita in 1985. Due to the higher price for protein, the real price of cheese may rise and the forecast may prove too high.

Different types of sour milk products have been gaining popularity among the consumers. We have, however, been cautious and predicted only slight increases for them in the future. The total protein consumption is a limiting factor. If the consumption of some milk products increases, the consumption of some other products may decline. The consumption of cream is assumed to stay at the present level.

The total consumption of milk seems to fall by nearly 20 per cent in the coming 10 years. This is due to the fall in the consumption of fluid milk and butter. If the butter consumption would stay at the level of 13 kg per capita as in 1974, the fall would be only a few per cents. Because of the overproduction problems of milk the decision makers will certainly try to find ways to retain the present level of butter consumption.

3.3. Eggs

The consumption of eggs has been increasing steadily due to a rising income level and stable or declining real retail prices. There are no reasons why this development should change. The income elasticity is about 0.5 (NEVALA 1974), which means that the consumption will increase about 20 per cent from the present level and would be about 13 kg per capita in 1985. That may, however, prove a saturation point for egg consumption.

3.4. Meat

The starting point for meat forecasts is an income elasticity of 1.0. This would indicate an increase in the per capita consumption of about 2 kg per year. Since, however, the real price of meat is expected to rise, the total consumption of meat is expected to rise by only 1.5 kg per capita and year. The income elasticity for beef is, according to several studies, rather high (KETTUNEN 1968). Due to the rapid rise of the real price of beef, the consumption has been rather stable during the past years (Figure 3).

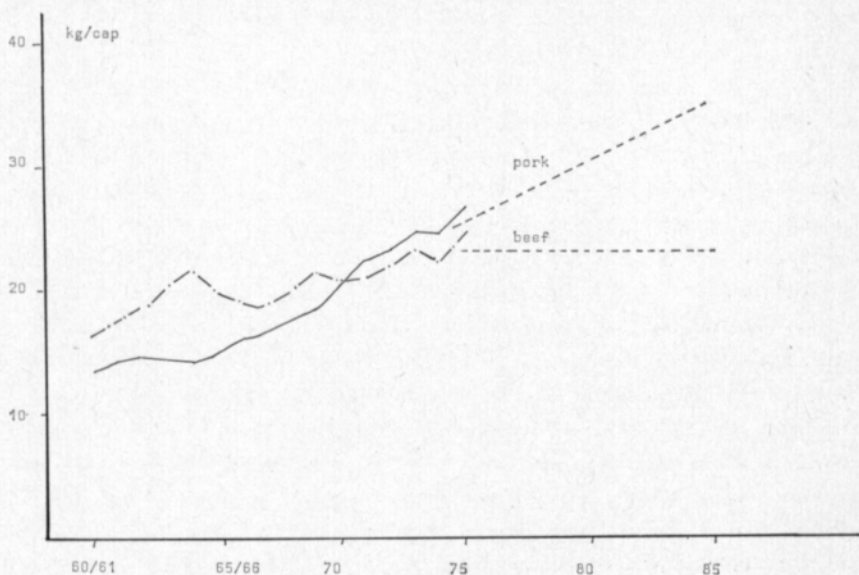


Fig. 3. The per capita consumption of beef pork.

This trend is expected to continue. The beef supply depends in Finland mainly on the number of dairy cows. Since there is no more scope for an increase in milk production, the number of dairy cows will evidently decline. Other factors besides overproduction may also affect the trend in the same direction. In spite of the declining number of dairy cows it is possible to keep the beef supply at the present level by raising the average slaughter weight.

The demand pressure on beef is expected to shift to pork (KETTUNEN 1974). This may, however, occur only if the retail price of beef increases faster than that of pork, as has been the case in the past. The pork consumption is, thus, expected to increase by 1 kg per year. If the future price policy is different from that assumed here, the outcome will also be different.

The consumption of poultry meat is still relatively low. The income elasticity has been estimated to be high (IKÄHEIMO and ROUHIAINEN 1973) and it is consequently assumed that the per capita consumption would be 5 kg in 1985.

4. General considerations

The feasibility of the forecasts may be checked by calculating the energy, protein and fat content of the diet. Since sugar covers about 14–15 per cent of the calorie content of the diet, it has to be taken into account. We have assumed that the sugar consumption would be 40 kg per capita in 1985. If the sugar consumption falls more than has been the case so far, it will be possible to increase the consumption of some other products.

The diet of 1985 seems rather acceptable. The energy content is slightly lower than in 1974. It may be even lower, since it is possible that the consumption of food items that have been excluded — such as fish, vegetables, fruit, etc. — will increase. It has to be taken into account that the waste, which is included in the consumption figures, may increase along with the rising income level and so the forecasts show the development of the domestic disappearance rather than that of human consumption.

The protein and fat contents of the diet seem to grow a little. Compared to the consumption patterns in other countries the outcome seems to be feasible since it would only represent an average level in other European countries. At the same time, however, it indicates that there is little if any room for an increase of dairy or meat products.

It is also interesting to know how many feed units are needed to produce the diet of 1985. It is commonly known that a larger agricultural production is needed for the diet of high income countries, since animal products are substituted for grain products. That has also happened earlier in Finland, but in the future there seems to be little change in this respect, if we take into account only the domestic products (excluding margarine fats). It is true that meat consumption is increasing and that it requires more feed, but on the other hand, the consumption of dairy products is decreasing. If the butter consumption could be maintained at the present level, some of the overproduction of the agricultural produce could be shifted to consumption, but taken as a whole it can only partly solve the problem of overproduction.

Finally, it should be remembered that the forecasts (or projections) are in many respects conditional. The growth rate of incomes and the price policy may be different from what has been assumed. Then also the consumption will develop differently. The largest calculation errors are likely in respect of products with high price and income elasticities.

REFERENCES

- HAGGREN, E. & KETTUNEN, L. 1976. Maataloustuotteiden kulutusennusteet vuoteen 1985. Maatal. taloudellisen tutkimuslait. tied. N:o 37: 1–46.
- IHAMUOTILA, R. 1972. Leipäviljan tarjonnasta ja tarjontaan vaikuttavista tekijöistä Suomessa vuosina 1951–1970 (Summary: On Bread Grain Supply Functions in Finland in 1951–1970). Maatal. taloudellisen tutkimuslait. julk. N:o 26: 1–60.
- IKÄHEIMO, E. & ROUHIAINEN, J. 1973. Siipikarjanlihan tarjonnasta ja kysynnästä Suomessa vv. 1966–68. (Summary: Supply and Demand of Poultry Meat in Finland 1966–68). J. Scient. Agric. Soc. Finl. 45: 272–283.
- KALLIO, J. 1974. Maitorasvan ja maidon rasvattoman osan arvottomismahdollisuuksista Suomen maitomarkkinoilla. Maatal. taloudellisen tutkimuslait. tied. 26: 1–143.
- KETTUNEN, L. 1968. Demand and Supply of Pork and Beef in Finland. Maatal. Taloudellisen tutkimuslait. julk. 11: 1–93.
- » — 1971. Demand for Butter, Margarine and Cheese in Finland. Helsingin Yliopiston kansantaloustieteellisen laitoksen tutkimuksia 10: 1–53.
- » — 1974. Lihan markkinointinäkömät 1970-luvulla. Kehittyvä Maatalous 19: 3–10.
- NEVALA, M. 1974. Kananmunien tuotanto, kulutus ja hinnanmuodostus, Mimeogr. 87 p. (Available at the Agricultural Economics Research Institute, Helsinki).

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SELOSTUS

Maataloustuotteiden kulutus Suomessa vuonna 1985

LAURI KETTUNEN

Maatalouden taloudellinen tutkimuslaitos, Rukkila, 00001 Helsinki 100

Artikkelissa esitellään lyhyesti niitä kulutusennusteita, joita on tehty maatalouden taloudellisessa tutkimuslaitoksessa ja joista on myös erillinen suomenkielinen julkaisu. Ennusteista ja niiden perusteista todettakoon seuraavaa.

Kulutusennusteet ovat luonteeltaan trendiennusteita, ja ne perustuvat pääasiassa tulojoustoihin ja olettamukseen, että per capita tulot kasvavat vuoteen 1985 mennessä 40 %. Mikäli tämä oletamus on liian optimistinen, jää ilmeisesti lihojen ja juuston kulutuksen kasvu ennustettua pienemmäksi. Muiden tärkeimpien maataloustuotteidemme tulojoustot ovat suhteellisen pieniä, joten niiden kulutuksen kehitys on vähemmän riippuvainen tulojen kasvusta ja siten mahdollinen ennustevirhe on ilmeisesti pienempi. Eräitä oletamuksia on jouduttu tekemään myös tulevasta hintapolitiikasta, joten tehdyt ennusteet ovat monessa suhteessa ehdollisia.

Leipäviljan kysynnän tulojoustona on käytetty -0.3 . Kulutus tulee alenemaan siis edelleen noin 12 % vuoteen 1985 mennessä. Ravitsemuspoliittiset seikat puolustaisivat kuitenkin kulutuksen (ja kulutusennusteenkin) pitämistä nykyisellä tasolla.

Kulutusmaidon (3.9 prosenttisen ja kevytmaidon) kulutuksen ennustetaan alenevan 1 %:n vuodessa. Voin kulutuksen oletetaan myös alenevan edelleenkin aina 10 kg:aan per capita vuonna 1985, mutta on huomattava, että hintapolitiikalla voidaan säädellä voin ja margariinin kulutusta niin, että nykyiset kulutustasot voitaisiin säilyttää. Esitetty ennuste on siis vain eräänlainen vaihtoehto. Juuston kulutuksen ennustetaan kasvavan 4 % vuodessa, joten per capita kulutus on vuonna 1985 8.5 kg.

Lihan kokonaiskulutuksen ennustetaan kasvavan 1.5 kg vuodessa henkeä kohti. Koska naudanlihan tarjonta on sidoksissa maidontuotantoon, oletetaan naudanlihan tarjonnan ja siis myös kulutuksen säilyvän nykyisellä tasolla. Lihan kysynnän kasvu siirtyy siis ilmeisesti sianlihaan, jonka kulutus kasvaa vuosittain 1 kilolla. Kananmunien tulojousto on tutkimusten mukaan noin 0.5. Niiden kulutus kasvaneeksi vuoteen 1985 mennessä noin 20 %.

Ennusteiden mielekkyyttä on tarkasteltu laskemalla niiden antaman ruokavalion energia-, valkuais- ja rasvasisältö. Kovin suuria muutoksia ei näytä tapahtuvan, joten siinä mielessä ennusteet näyttävät hyväksyttäviltä. Rasvasisältö nousee tosin hiukan mutta ei oleellisesti. Toisaalta rasvan samoin kuin valkuaisen kulutuksen lisäys ilmeisesti sulkee pois toiveet lisätä kotieläintuotteidemme kulutusta nykyisestä tasosta, mitä ylituotantotilanne muutoin vaatisi.