

## Consumption and production of herbs in Finland

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**Abstract.** A study on the consumption and production of spice and medicinal herbs in Finland was carried out in 1983. There are approximately 150 commercial herb plant growers in Finland. Most of the farmers grow leafy herbs; only ten percent grow seed (botanically also fruit) spices e.g. caraway and mustard.

The total cultivation area for leafy herbs is 30 hectares; for dill 14 and for parsley 12 hectares. Seed spices are grown on 130 hectares, most of this is devoted to mustard.

Finland is almost self sufficient for fresh dill and parsley, but dry herbs are mostly imported. Self-sufficiency of caraway is 40 % and mustard 20 % while the other herbs and spices are also mostly imported. The total herb and spice import in 1982 was approximately 30 million Finnmarks, half of which was for the import of the so-called exotic spices.

The total import of those herbs that could be cultivated in Finland was 17 million FIM. The most promising of these being mustard, garlic, chamomile, mints, dill and parsley.

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Index words: herbs, medicinal and spice plants, consumption, production

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### Introduction

During the last few years there has arisen all over the developed world a growing interest in spice and medicinal plant use and cultivation. So far the production in Finland has been limited, although it has been found that the aroma and vitamin content is high in herbs and vegetables grown in the north. In addition

the air here is cleaner than in the densely populated industrialised countries of Middle Europe, from which most of the herbs are imported to Finland. Moreover the cultivation of herbs in our country would give a suitable alternative means of living for some small-scale farmers in the present complicated situation of over supply of nearly all the agricultural products.

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Finnish Academy of Sciences and by the Ministry of Agriculture and Forestry. It was carried out in order to provide basic information in the use of spices and medicinal plants and degree of self-sufficiency in Finland. So far the basic statistics on horticultural consumption and production is deficient especially on plants grown in small scale.

### Materials and methods

The following information was collected: The species of herbs grown, the production areas and yields in 1983, the labour force and market conditions. The information was collected by interviewing the growers on the telephone and with the help of farmers' organizations.

Furthermore a questionnaire was delivered to 24 major wholesale and co-operative marketing firms and also to the foodmarketing industry in order to obtain the statistics on

herb and spice use. Questions about the use of spices in the years 1980—1982 and the forecast for 1985 and 1990 were included. The household survey of the Central Statistical Office of Finland provided the statistics on home-use. Import information was collected from the foreign trade statistics and from a separate survey carried out by the statistics section of the Board of Customs. The latter was carried out to receive information on individual species, which are placed, in the foreign trade statistics, under larger groups of species.

### Consumption

The main herb users are the food and alcohol industry, and domestic consumers. Also the pharmaceutical industry uses medicinally important herbs. The wholesale value and quantity during the period 1980—1982 is shown in table 1. Also the three years'

Table 1. The amount (tonnes) and value (1000 FIM) of herb consumption, mean wholesale price (FIM/kg), range of price variation and self sufficiency in the years 1980—1982 in Finland.

Species	1980		1981		1982		Mean price	Self suff.	
	t	FIM	t	FIM	t	FIM		Var.	%
Angelica	5.1	61.4	4.2	38.6	4.7	51.2	10.7	5.0—13.8	10
Aniseed	11.6	118.2	15.8	249.5	22.5	317.8	13.4	7.8—38.6	0
Basil	3.0	21.3	4.9	35.9	5.2	51.4	8.1	6.4—91.8	0
Caraway	34.4	253.0	38.4	278.1	45.3	363.2	7.5	4.2—22.9	<40
Chives									
— air dried	0.8	26.6	0.4	13.8	0.8	26.4	33.8	31.7—35.5	4
— freeze dried	0.2	20.8	0.4	66.3	0.5	81.8	140.6	88.9—176.0	0
Coriander	14.6	34.8	14.1	49.5	15.7	80.6	3.6	1.8—11.1	0
Dill									
— fresh	14.0	93.0	9.5	76.1	24.0	177.3	7.3	4.0—29.1	98
— dry	11.0	475.3	3.5	122.9	10.9	352.3	28.5	19.0—186.1	<1
Fennel	7.1	26.4	13.8	49.7	14.2	85.4	4.4	2.9—14.9	0
Marjoram	4.8	50.0	5.7	54.3	4.2	55.2	11.0	6.5—50.0	0
Mustard	378.4	883.0	380.9	888.4	452.9	1276.9	2.5	1.9—13.0	<20
Parsley									
— fresh	10.6	81.4	9.4	80.4	21.5	202.2	8.4	6.8—50.0	99
— dry	4.3	188.4	3.0	36.3	6.2	68.1	22.3	13.0—155.0	5
Rosemary	1.7	12.1	2.5	21.2	2.5	19.3	7.8	5.0—46.2	0
Sage	0.6	14.3	0.8	10.0	1.3	9.2	14.1	4.5—51.8	0
Savory	0.3	13.0	0.4	7.5	0.6	10.6	29.1	13.7—128.6	0
Tarragon	0.9	64.1	1.1	78.9	2.0	125.9	58.2	35.0—130.9	0
Thyme	2.0	33.1	2.7	26.3	1.0	11.2	12.5	7.1—112.8	0
Others*	4.1		5.0		5.2				0
Total	506.3	2499.7	512.9	2215.2	657.6	3407.3			

\* = hyssop, chamomile, lavender, oregano, common balm and yarrow

weighted mean price and the range of variation is shown. Prices vary according to sample size and quality, and are also dependant on world-market prices. The percentage of self sufficiency has been calculated according to the consumption in 1982. Table 1 is based on the questionnaire, and does not contain the total consumption in Finland as will be noticed when comparing with the import statistics in table 2.

The largest demand in Finland are for the following species: aniseed (*Pimpinella anisum* L.), caraway (*Carum carvi* L.), mustard (*Sinapis* sp., *Brassica* sp.), dill (*Anethum graveolens* L.) and parsley (*Petroselinum* sp.). All of these except aniseed are cultivated in Finland on small scale. Domestic supplies are small except in the case of fresh dill and parsley. Dry dill and parsley are mainly imported. Self-sufficiency of caraway is 40 % and that of mustard 20 %. The production of other herbs is scarce, with 16 % species included in the questionnaire being imported only.

Herb consumption has increased steadily in the 1980's, with a further rise by approximately 5 % predicted for 1985. Forecasting the consumption in 1990 from the results of the questionnaire has appeared to be an impossible task. GREENHALGH (1979) has studied the spice market in Europe, The United States and Japan. He states that the herb consumption will increase by approximately 10 % per year. Herb demand will grow faster than for other flavourings. The demand for dill, basil (*Ocimum basilicum* L.) marjoram (*Origanum majorana* L.), oregano (*Origanum vulgare* L.), mints (*Mentha* sp.) and tarragon (*Artemisia dracunculus* L.) will increase most predominantly.

The household survey includes many groups with spices and herbs. The survey in 1981 (ANON. 1984) includes also a group consisting of dill and spinach (*Spinacia oleracea* L.), parsley and chives (*Allium schoenoprasum* L.). A family consumed these products on the average of the value of 8.2 FIM per year. When the ten income groups are surveyed it

Table 2. Import of some herbs in 1982.

Species	Amount tonnes	Value 1000 FIM
Aniseed, <i>Pimpinella anisum</i> L.	17.5	236.0
Angelica, <i>Angelica archangelica</i> L.	0.1	0.9
Basil, <i>Ocimum basilicum</i> L.	6.6	51.3
Caraway, <i>Carum carvi</i> L.	23.0	139.0
Chamomile, <i>Matricaria recutita</i> L.	8.7	521.1
Chervil, <i>Anthriscus cerefolium</i> (L.) Hoffm.	0.5	12.5
Common balm, <i>Melissa officinalis</i> L.	0.2	8.5
Coriander, <i>Coriandrum sativum</i> L.	34.1	139.0
Dill, <i>Anethum graveolens</i> L.		352.0
Fennel, <i>Foeniculum vulgare</i> Mill.	9.3	74.0
Garlic, <i>Allium sativum</i> L.	221.0	3 403.0
Hop, <i>Humulus lupulus</i> L.	261.0	7 630.0
Hyssop, <i>Hyssopus officinalis</i> L.	0.1	0.6
Lavender, <i>Lavandula angustifolia</i> Mill.	0.3	9.1
Marjoram, <i>Origanum majorana</i> L.	4.0	55.2
Marygold, <i>Calendula officinalis</i> L.	0.1	1.7
Mints, <i>Mentha</i> sp.	3.0	218.0
Mustard, <i>Sinapis</i> sp., <i>Brassica</i> sp.	773.0	3 375.0
Nettle, <i>Urtica</i> sp.	2.7	17.4
Parsley, <i>Petroselinum</i> sp.		53.0
Peppermint, <i>Mentha</i> × <i>piperita</i> L.	5.0	179.6
Rosemary, <i>Rosmarinus officinalis</i> L.	2.0	14.2
Sage, <i>Salvia officinalis</i> L.	0.9	13.9
Savory, <i>Satureja hortensis</i> L.	0.1	0.6
Tarragon, <i>Artemisia dracunculus</i> L.	1.1	53.0
Thyme, <i>Thymus serpyllum</i> L.	1.8	19.9
Yarrow, <i>Achillea millefolium</i> L.	0.4	2.9
Total		16 542.1

is noticed that the herb consumption (B, C) clearly increases in proportion to the increase in income (figure 1). The trend with mustard is opposite. The income groups in figure 1 are based on the disposable income for each family member (1 = least income, 10 = most income). In the other groups including spices and herbs this trend is not so clear.

### Production in Finland

The herb cultivation area was 28 hectares in 1983. Since then the total area is supposed to have increased somewhat. Dill and parsley are the most widely grown herbs (table 3). The total dill area was 14 hectares, with 16 000 square metres in greenhouses. The average dill

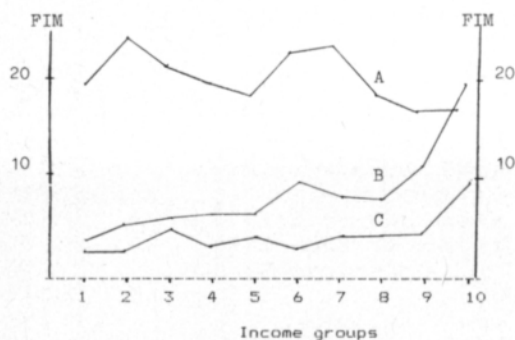


Fig. 1. Consumer costs (FIM) per household according to the income groups in 1981 (1 = the least income, 10 = the maximum income).  
 A = mustard  
 B = dill, parsley, spinach, chives  
 C = the other vegetables including spicy ones

yield in the open field was 65 kg/100 m<sup>2</sup> and in the greenhouses 1.7 kg/m<sup>2</sup>. According to the literature the average yield in the open field is 100 kg/100 m<sup>2</sup> (ANON. 1983).

Parsley was produced on 12 hectares yielding 112 kg/100 m<sup>2</sup>. The area under glass was 12 000 square metres yielding ca. 5 kg/m<sup>2</sup>. In the literature the corresponding average yield has been 2.5–4 kg/m<sup>2</sup>; depending on the sowing time.

The total dill and parsley production in 1983 was 350 tonnes. The total chives area was 6000 m<sup>2</sup> yielding 4 tonnes, most of which was grown during the winter in greenhouses. Marjoram was cultivated on less than 1000 m<sup>2</sup>, the total yield being 700 kg.

In addition to the above mentioned herbs, just over one hectare is used for the cultivation of 20 more species.

Caraway and mustard are the most common of the seed spices. The total area under

Table 3. Herb cultivation in Finland in 1983.

Species (herbs)	Hectares	Species (seeds)	Hectares
Dill	14.0	Mustard	105
Parsley	12.0	Caraway	25
Chives	0.6		
Marjoram	0.1		
Others	1.0		
Total	27.7		130

cultivation is 130 hectares. Caraway was cultivated on 25 hectares yielding 24 tonnes. According to the farmers the average yield is 1300 kg/ha. Mustard was grown on more than 100 hectares, the total production of which was 150 tonnes in 1983. The average yield was 1500 kg/ha. The average yields are corresponding to those in Denmark and England (ANON. 1974, 1980).

## Imports

The value of spice and herb imports in 1982 was more than 30 million FIM. Almost half of this was for so-called exotic spices. The import of dried hop (*Humulus lupulus* L.), mustard, garlic, chamomile (*Matricaria recutita* L.), mints, dill and aniseed was highest in value (table 2).

The value of mustard import was 3.4 mFIM. Half of this consists of rendered mustard, the import of which has increased substantially during the past ten years, being 200 tonnes in 1982. Import of mustard seeds has been rather stable varying around 550 tonnes annually. The former is imported mostly from Denmark and Great Britain, the latter from Denmark, the Netherlands, Canada and West Germany.

The import of caraway in 1973 was about 65 tonnes. After that the import has decreased and varied between 20 and 30 tonnes a year, the value being more than 100 000 FIM. Poland, the Soviet Union, Denmark and the Netherlands were the main sources of supply.

## Features of herb production

The herbs are cultivated mostly in undeveloped countries where the labour costs are relatively low. France is the most important producer amongst the western countries. The middle European countries often transport the raw material from the developing countries and resell the product raw and processed.

GREENHALGH (1979) states that herb-production in the short term will become increas-

ingly uneconomical in the western countries due to the land and labour costs. In the longer term capital-intensive production systems will be developed and even though the cost per unit will be higher than in developing countries the quality and savings on the freight rates will counterbalance the price difference in the consuming countries.

There are about 150 herb growers in Finland. This field is the main occupation for ten families among the interviewed farmers. During the growing season the 67 interviewed has a total of 25 employees (Ahvenanmaa was not included).

Table 4 presents the structure of dill and parsley farming. The most common cultivation area for these species is 200–600 m<sup>2</sup>. Parsley cultivations are larger than those for dill, 35 % being over 1000 m<sup>2</sup>. The green houses are used mostly for early and late crops. The area for the other herbs per farmer is smaller, up to approximately ten square metres.

The herb production is concentrated in Southern Finland as is the herb consuming food industry. The farmers who have trading agreements are usually close to the processing industry. Furthermore the climate is also more favourable for growing in the southern parts of the country. Dill and parsley are mostly cultivated in South-West Finland, especially in Ahvenanmaa and the Turku archipelago.

Mustard and caraway farms are located in Middle and South-West Finland, caraway farmers especially in Häme province. A few mustard growers are found also in South-Pohjanmaa and even as far north as Oulu.

Almost 100 % of the herbs grown in Finland are sold fresh at domestic market. Nearly 80 % of the farmers sell their products in wholesale, and centralized shops. Less than 10 % of the interviewed farmers sell the herbs in the market place. Marketing commonly-used herbs like dill, parsley and marjoram has been relatively easy through the long established marketing channels. Trading agreements are common only among the large-scale

Table 4. Number of dill and parsley farms (%) according to the size of the cultivation.

Green house Size of the farm m <sup>2</sup>	%	Open field Size of the farm m <sup>2</sup>	%
199	14.3	199	14.7
200–599	45.7	200–599	44.1
600–999	14.3	600–999	17.6
1000	25.7	1000–2499	14.8
		2500	8.8
Total	100.0		100.0

farmers. The ratio of supply and demand changes frequently. During the good crops the wholesale price has tended to be rather low compared with the growing costs.

Marketing of the less common herbs has been quite difficult because of the lack of demand, which is in turn due to the consumers unfamiliarity with the use of them. These herbs are normally imported as required by the food industry, with the additional advantage that the quality is consistent. The few farmers that do produce these herbs have promoted them and usually sold them fresh to the restaurants and health food stores. Processing by farmers is rare.

#### Increase in domestic production

Only dill, parsley, caraway and mustard are cultivated on a larger scale in Finland. To increase the self-sufficiency of the named species wider production is needed.

Replacing the import of dry dill and parsley demands an increase in dill production by 5–8 and parsley by 1–2 hectares. The amount and quality of the yield reached in Finland speak for domestic production.

Fresh dill and parsley are nearly all domestic. By storing and lengthening the growing season, full self-sufficiency for those fresh herbs can be reached.

Mustard is imported as seeds, grinded and as oil and prepared mustard. The import of mustard seeds in 1982 was nearly 600 tonnes and the domestic supply 150 tonnes. To re-

place just the seed import requires a four-fold increase in production compared with the present 100 hectare cultivation. The average mustard yield, 1500—2000 tonnes per hectare, corresponds to the yields harvested in Middle-Europe.

Production of caraway is less than half of the total consumption in Finland. Replacing the import assumes a two-fold increase in cultivation. Caraway is suited to Finnish climate and will give a reasonable yield of 1300—2000 tonnes per hectare. The present caraway area is 25 hectares.

Besides the above mentioned species it will only be possible to start or widen the production of numerous herb plants in Finland on the basis of increased domestic demand. Only minor production is needed to satisfy the present demand. The possibilities for export and large scale seed production (mustard and caraway) demand more land which is likely to

be less than 1000 hectares in the near future. The area is small compared with the area necessary for many agricultural crops. Therefore herb production has less importance as an alternative use of land.

The income and labour effect is supposed to be more significant than the production political effect. To find out these effects the production costs and productivity of herb plant growing should be investigated. Labour intensive herb cultivation or large-scale seed production might dramatically change the kind of work and income for a small-scale farmer or even create a totally new occupation. The possibilities of export potential should be assessed at the same time.

Increase in demand, both domestic and overseas, depends on effective promotion. For increased production many aspects of production techniques, processing and economics need investigating.

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## SELOSTUS

### Mausteiden kulutus ja tuotanto Suomessa

Seija Hälvä

Tämä selvitys on osa Suomen Akatemian vuonna 1983 asettamaa maustekasvien yhteistutkimusta, jonka tarkoituksena oli tutkia mitä mahdollisuuksia Suomella on lisätä mausteomavaraisuutta ja käynnistää vienti yrttimausteidemme laadun ja aromikkuuden perusteella.

Kiinnostus mauste- ja lääkekasvien käyttöön ja viljelyyn on lisääntynyt viime vuosina. Mausteita käyttävät kotitalouksien lisäksi elintarvike- ja lääketieteellisyys. Maus-

teyrtit ovat melko vaatimattomia viljelykasveja ja monien lajien viljely onnistuu myös Suomessa. Toistaiseksi viljely on kuitenkin ollut vähäistä. Maamme pohjoisen sijainnin takia useiden kasvien aromiaine- ja vitamiinipitoisuus on korkea ja myös ilma on puhtaampaa kuin esimerkiksi Keski-Euroopan tiheään asutuissa teollisuusmaissa, joista tuodaan mausteita Suomeen.

Tämän työn tarkoituksena oli kartoittaa perustietoja

mausteiden kulutuksesta, tuotannosta ja tuonnista. Mauste- ja lääkekasveja koskevaa tietoa ei ole Suomessa viime vuosikymmeninä koottu.

Suomessa noin 150 viljelijää kasvattaa maustekasveja myyntiä varten. Enin osa heistä viljelee yrttikasveja, vain kymmenen viljelijää kasvattaa siemenmausteita, sinappia ja kuminaa (kasvitieteellisesti hedelmämauste). Vuonna 1983 kaupallisen maustetuotannon ala oli noin 160 hehtaaria. Yrttimäisiä mausteita kasvatettiin 30 hehtaarin ja siemenmausteita 130 hehtaarin alalla. Siemenmausteista pääosa oli sinappia, kumina-ala oli 25 hehtaaria.

Yrttimausteista tilliä ja persiljaa viljellään eniten. Tillin viljelyala oli vuonna 1983 noin 14 hehtaaria ja persilja-ala 12 hehtaaria. Ruohosipulia ja meiramia kasvatetaan alle hehtaarin alalla. Muiden mausteyrttien viljely on vähäistä.

Tuoreen tillin ja persiljan osalta Suomi on lähes omavarainen. Kuivattua tilliä tuotiin vuonna 1982 noin 11 tonnia ja kuivattua persiljaa 6 tonnia. Kuminan omavaraisuusaste on 40 % ja sinapin lähes 20 %. Muut mausteet tulevat elintarviketeollisuudelle ja kaupan keskusliikkeille ulkomailta.

Suomeen tuotiin vuonna 1982 mausteita yli 30 miljoonan markan arvosta. Lähes puolet tuonnin arvosta oli niin sanottuja eksoottisia mausteita. Lajeja, joita voitaisiin mahdollisesti viljellä myös Suomessa, tuotiin lähes 17 miljoonan markan arvosta. Eniten tuotiin humalaa, sinappia, valkosipulia, kamomillaa, minttua, tilliä ja anista.

Kotimaisen kulutuksen perusteella voidaan todeta, että mauste- ja lääkekasvituotannon vaatima peltoala on vähäinen. Mahdollisesta viennin käynnistämisestä ja laajemmasta siemenmausteiden tuotannosta huolimatta viljelyala jää lähivuosina ilmeisestikin alle tuhannen hehtaarin. Tämän perusteella maustekasvien viljelyn tuotantopoliittinen merkitys on vähäinen. Tulo- ja työllisyyspoliittisista vaikutuksista ei ole toistaiseksi tutkittu. Todennäköisesti ne ovat kuitenkin suuremmat kuin tuotantopoliittiset vaikutukset. Työvoimavaltainen yrttikasvien viljely tai laajamittainen siemenmausteiden tuotanto voi olla merkittävä työllistäjä muun maatalouden lisänä tai kokonaan uutena viljelyvaihtoehtona. Laaja tuotanto edellyttää kuitenkin taloudellisten ja viljelyteknisten sekä sadon jatkokäsittelyyn liittyvien seikkojen ja vientimahdollisuuksien selvittämistä.