

**Pathways for introduction of invasive pests to Finland
and the value of production at risk in the different sectors
of plant production in Finland**

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1 THE OBJECTIVE OF THE DOCUMENT

The objective of this document is to make the results presented in the report Pathways for introduction of invasive pests and the value of production at risk in the different sectors of plant production (Hannunen et al. 2014, in Finnish only) available to the non-Finnish speaking audience.

Estimates of 1) the volume of the pathways for entry of pests to Finland and 2) the economic value at risk in the different sectors of plant production in Finland are presented. This data is needed when assessing the pest risks related to different pathways of entry, sectors of plant production or pest species.

Only an outline of the used methods and sources of information is given. Hence, if you wish to use the data presented here, please either consult the aforementioned report or contact Salla Hannunen (salla.hannunen@evira.fi) to learn about the assumptions and uncertainties related to the estimates.

If you do use the results, please cite the original report as: Hannunen S., Parkkima T., Vuorinen K., Heikkilä J., Koikkalainen K., 2014. Kasvintuhoojien leviämisyölyt ja kasvintuhoojien uhkaaman tuotannon arvo. Eviran tutkimuksia 1/2014. 75 pp.

2 AN OUTLINE OF THE METHODS

2.1 The volume of pathways

For some of the pathways the volume of trade was obtained directly from the foreign trade statistics or from other official statistics. This approach was used for wood and articles of wood, food, feed and their raw materials, cut plants and other living plant parts, wooden packaging material, fertilizer products, forest reproduction material, seeds of some field crops, and traffic. Most of these estimates are considered to be rather reliable. However, most of the used statistics (except the forest reproduction material statistics and fertilizer statistics) are inherently incomplete, and hence the actual values of trade can be larger than those reported in the statistics.

For some of the pathways the volume was estimated by assessing the amount of foreign propagation material needed yearly. This was done mainly by combining information about the production area and the seeding or planting rate. Such an approach was possible since propagation material of these plants is not produced in Finland at all, and hence it is safe to assume that all propagation material is bought from outside Finland. This method was used for seeds of outdoor and greenhouse vegetables, and seeds, cuttings and seedlings of greenhouse ornamental for professional production. These estimates are considered to be rather reliable.

A similar, although a slightly more complicated approach was used for some field crop seeds and fruit and berry plants intended to be used in professional fruit and berry production. The estimates for field crops were based on the production area cultivated using certified seed (instead of the total production area). Also, the availability of domestic certified seed was taken into account. In the estimates for fruit and berry plants the fact that also Finnish plants are used was taken into account. This was done using rough

estimates of the proportions of Finnish and foreign plants. These estimates are considered to be rather uncertain.

For some of the pathways the estimates were based on questionnaires sent to operators that potentially buy plant material from abroad. Since the operators were reluctant to give out information about the absolute numbers of purchased plants the estimates had to be done by combining information about the volume of domestic production and the market shares of foreign plants. This approach was used for landscaping plants, fruit and berry plants intended for private gardens, and greenhouse ornamentals intended to be marketed directly to consumers. For these plants the estimates were done for very broad groups of plants (e.g. perennials, deciduous trees, shrubs), not individual plant species. These estimates are very rough and uncertain.

The volume of plant propagation material was estimated both in kilograms and in numbers of seeds, seedlings or cuttings whenever it was possible. The transformation of kilograms of seeds to numbers of seeds was considered relevant since using numbers enables comparison of plant species purchased as seeds to those purchased as cuttings or seedlings. Also, the number of seeds and plants was considered to be more relevant for pest risk assessment, since pest prevalence is normally expressed as a proportion of infected plant individuals.

For most of the propagation material pathways a range of possible volumes (min and max values) was estimated. This was done by using the minimum and maximum of seeding rates and seed weights obtained from literature. Also, a mean of the minimum and maximum values was calculated in order to facilitate a more straight forward comparison of the different pathways. However, it should be noted that the actual volume of trade can be anywhere in between the estimated minimum and maximum values.

In most cases the estimates are based on data from the years 2007-2011, and the presented values are means for those years. Only the estimates for outdoor nursery production (i.e. production of landscaping plants and fruit and berry plants) is based on more general information and not on data specifically from the years 2007-2011.

In most cases the estimates represent the total amount of goods traded to Finland from outside Finland. Hence, the origin of the goods can be either within EU or outside it. The proportion of trade from other EU member states is presented when possible.

2.2 The economic value of production

The economic value of production was estimated as the product of crop (tons) and producer price (€/ton). Production costs, value added or subsidies were not taken into account in the estimates. The estimates are done based on data from the years 2007-2011.

2.3 The main sources of information

Information about the trade volumes for wood and articles of wood (including wood packaging material as a commodity), food, feed and their raw materials, seeds of some field crops, and cut plants and other living plant parts was obtained directly from the foreign trade statistics (Finnish Customs 2013a). Information about the trade volumes for forest reproduction material, fertilizer products and seeds of some field crops were obtained from statistics collected by the Finnish Food Safety Authority Evira (Evira 2013a, 2013b, 2014). The volume for wood packaging material entering the country as packaging for other commodities was obtained from the official packaging statistics (Pirkanmaa ELY Centre 2013, PYR Ltd 2013). The volumes for traffic were obtained from several traffic statistics (Finnish Rail Administration 2008, 2009; Finnish Transport Agency 2010, 2011, 2012a, 2012b; Finnish Border Guard 2012, 2010; Finnish Customs 2013b; Finavia 2014).

Information about the production areas was obtained from the official agricultural statistics (Tike 2008, 2009, 2010, 2011, 2012, 2013a), and information about the availability of domestic certified seeds was obtained from Evira's seed inspection statistics (Evira 2013c). Information about the seeding and planting rates was obtained from trade literature (Puutarhaliitto 2006, ProAgria 2013) or from producers or other experts. Information about seed weights was obtained mainly from trade literature (Puutarhaliitto 2006, ProAgria 2013).

Most of the information needed in the estimates of the economic value of production was obtained from the agricultural statistics collected by Tike (2008, 2009, 2010, 2011, 2013a, 2013b) and the statistical yearbook of forestry published by the Finnish Forest Research Institute (Metla 2013).

3 AN OVERVIEW OF THE RESULTS

3.1 Pathways of entry

The total amount of goods traded to Finland was estimated to be about 12 billion kilograms yearly, of which about 92% were wood and articles of wood, 7% food, feed and their raw materials, and about 0.2% propagation material (Table 1). The report covers the trade of more than 200 plant products.

Table 1. The estimated total volumes of all the pathways covered in the report.

	Kg/year
Wood and articles of wood	1.10×10^{10}
Food, feed and their raw materials	8.37×10^8
Organic soil and mulch materials	1.09×10^8
Propagation materials	2.28×10^7
Other living plant parts	4.71×10^6
Total	1.19×10^{10}

The total amount of wood and articles of wood traded to Finland was estimated to be about 11 billion kilograms yearly (Table 19). Of this about 70% was wood in the rough and saw logs and about 22% chips, particles and fuel wood. During the years 2007-2011 about 2/3 of the wood originated from Russia. The total amount of wood packaging material brought to Finland annually was estimated to be at least 130 million kilograms. Of this about 80% came in as packaging of other traded commodities.

The total amount of plants and plant products intended for food, feed and their raw materials was estimated to be about 840 million kilograms annually (Table 20). Of this about 50% was composed of fresh products that are produced also in Finland. Most of these plants and plant products were traded to Finland from other EU member states.

Of the organic soil and mulch materials traded to Finland about 99% was fuel peat. The amount of fuel peat was about 108 million kilograms per year (Table 22). The amount of mulch was only about 18 000 kilograms and the amount of packed soil about 9 000 kilograms (Table 22).

The total amount of propagation material traded to Finland was about 2 900 billion seeds and/or plants for planting per year (Table 2). Of this about 99.7% were seeds of field crops. The second largest group, i.e. outdoor vegetable seeds covered only 0.2% of the total volume of propagation material. The volumes were the smallest for landscaping plants and fruit trees. The report covers the trade of propagation material of about 130 plant species or families.

Table 2. The estimated minimum and maximum total volumes of the propagation material pathways (expressed as numbers of seeds, seedling or cuttings) covered in the report. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values.

	Min, no/year	Max, no/year	Mean, no/year
Field crops	2.5×10^{12}	3.3×10^{12}	2.9×10^{12}
Outdoor vegetables	5.1×10^9	9.1×10^9	7.1×10^9
Outdoor cut flowers	1.2×10^6	1.8×10^9	8.9×10^8
Greenhouse vegetables	7.1×10^8	1.0×10^9	8.6×10^8
Greenhouses ornamentals	1.9×10^8	1.9×10^8	1.9×10^8
Forest trees	4.2×10^7	4.3×10^7	4.2×10^7
Fruit and berry plants	1.7×10^7	1.7×10^7	1.7×10^7
Landscaping plants	1.1×10^6		8.8×10^6
Total	2.5×10^{12}	3.3×10^{12}	2.9×10^{12}

The total number of field crop seeds traded to Finland was estimated to be at least 2 900 billion (5 million kilograms) (Table 7, Table 8). Of this about 87% were seeds of grass and fodder plants. Most of the field crop seeds were purchased from other EU member states, yet a considerable proportion of seeds of some grass and fodder plants were imported from outside the EU. For example clover seeds were imported from Australia, New Zealand, Canada, China and Taiwan.

The total number of seeds of outdoor vegetables traded to Finland annually was estimated to be about 7.1 billion (1.7 million kilograms) (Table 9, Table 10). Of this about 31% were dill seeds, about 30% pea seeds, and about 20% carrot seeds. Some outdoor vegetables, such as leek, cauliflower and broccoli are traded to Finland also as seedlings. The number of outdoor vegetable seedlings traded to Finland was estimated to be 4-14 million yearly. The outdoor vegetable seeds used in Finland are produced, e.g. in the Netherlands, France, Germany, Italy, Japan, Chile and Guatemala.

The total number of seeds, seedlings and cuttings of greenhouse ornamentals traded to Finland for professional production was estimated to be about 159 million (Table 13, Table 14). Of these about 37% were tulip bulbs. The proportion of the propagation material intended for cut flower production was only about 0.5% of the total amount. The origin of the propagation material of greenhouse ornamentals is often outside Europe, e.g. in Kenya, Ethiopia, Israel, Japan, Peru, Mexico, New Zealand or Vietnam.

The total number of seeds of greenhouse vegetables traded to Finland annually was estimated to be about 850 million (1 250 kg) (Table 17, Table 18). Of this about 38% were estimated to be seeds for potted

vegetables. The numbers were highest for dill, parsley and lettuce. The seeds used in Finland are produced, e.g. in the Netherlands, France, Germany, Chile, Guatemala and USA.

The number of forest tree seeds traded to Finland annually was estimated to be about 24 million, and the respective number for seedlings was estimated to be about 18 million (Table 4, Table 6). More than 90% of both the seeds and seedling was reproduction material for spruce. Most of the foreign forest reproduction material was purchased from Sweden.

It was estimated that about 16.7 million berry plants and about 60 000 fruit trees are traded to Finland annually for professional fruit and berry production (Table 11). Of the berry plants about 99% were estimated to be strawberry plants for planting, and of the fruit trees about 99% apple trees for planting. The respective number of fruit trees intended for private gardens was estimated to be about 3 400-13 000 annually.

The number of landscaping plants traded to Finland annually was estimated to be about 8.8 million (Table 12). Of this at least 80% were estimated to be perennials.

3.2 Economic value of production

The total value of plant production was estimated to be about 3.5 billion euros per year. Of this, forestry covers about 54%, field crops about 31% and horticultural production about 11% (Table 3).

Table 3. The estimated economic value of production in the different sectors of plant production during the years 2007-2011.

	Million €/year
Forestry	1 834
Field crops	1 042
Greenhouse vegetables	152
Outdoor vegetables	104
Greenhouse ornamentals	94
Fruits and berries	53
Forest propagation material	36
Outdoor nursery production	31
Wild berries and mushrooms	16
Total	3 362

The value of logged trees was estimated to be about 1 834 million euros per year (Table 24). Of this about 46% comes from Norway spruce and 44% from scots pine. The value of the production of forest reproduction material was estimated to be about 36 million euros annually, of which seedling production comprises about 92% (Table 25).

The value of field crops was estimated to be about 1 042 million euros per year (Table 26). Of this the greatest proportions (about 28%) come from silage and from barley (about 21%).

The value of greenhouse vegetable production was estimated to about 152 million euros (Table 31) and the value of outdoor vegetable production about 104 million euros per year (Table 27). Of the value of greenhouse vegetable production tomato production covers about 40%, cucumber production about 28%

and lettuce production about 20%. Of the value of outdoor vegetable production about 32% comes from carrot and about 15% from cabbages.

The value of berry production was estimated to be about 47 million euros (Table 30) and the value of commercially utilized wild berries about 16 million euros per year (Table 32). Strawberry is the most important cultivated berry, and it covers about 80% of the value of berry production. Of the wild berries lingonberry (6.8 million euros per year) and blueberry (5.3 million euros per year) are the most important. The value of professional apple production was estimated to be about 6 million euros per year (Table 30).

4 ESTIMATES OF THE VOLUMES OF PATHWAYS

4.1 Propagation material

4.1.1 Forestry

Table 4. The mean number seedlings of forest trees traded to Finland during the years 2007-2011 (Evira 2013a).

	No/year	Variation among years, -/+ %
<i>Picea abies</i>	1,6×10 ⁷	-45/51
<i>Pinus sylvestris</i>	1,4×10 ⁶	-85/113
<i>Betula pubescens</i>	1,1×10 ⁴	-100/393
<i>Betula pendula</i> var. <i>carelica</i>	2,7×10 ³	-100/164
<i>Larix</i> spp.	2,7×10 ³	-100/219
<i>Populus × wettsteinii</i>	2,5×10 ³	-100/321
<i>Betula pendula</i>	1,1×10 ³	-100/355
<i>Quercus robur</i>	3,2×10 ²	-100/213
Total	1,8×10 ⁷	-41/56

Table 5. The mean amount of seeds of forest trees traded to Finland during the years 2007-2011 (Evira 2013a).

	Kg/year	Variation among years, -/+ %
<i>Picea abies</i>	143	-59/106
<i>Quercus robur</i>	4,0	-100/400
<i>Fagus sylvatica</i>	3,0	-100/167
<i>Pinus sylvestris</i>	1,5	-100/200
<i>Pseudotsuga menziesii</i>	0,8	-100/400
<i>Fraxinus excelsior</i>	0,6	-100/400
<i>Pinus nigra</i>	0,2	-100/400
<i>Abies alba</i>	0,2	-100/400
<i>Pinus cembra</i>	0,2	-100/400
<i>Robinia pseudoacacia</i>	0,2	-100/400
<i>Pinus contorta</i>	0,2	-100/400
<i>Pinus mugo</i>	0,1	-100/400
Total	154	-54/92

Table 6. The estimated minimum and maximum number of seeds of forest trees traded to Finland annually. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values.

	Min, no	Max, no	Mean, no
<i>Picea abies</i>	$2,39 \times 10^7$	$2,39 \times 10^7$	$2,39 \times 10^7$
<i>Pinus sylvestris</i>	$2,50 \times 10^5$	$2,50 \times 10^5$	$2,50 \times 10^5$
<i>Pseudotsuga menziesii</i>	$7,07 \times 10^4$	$1,86 \times 10^5$	$1,28 \times 10^5$
<i>Pinus contorta</i>	$1,90 \times 10^4$	$4,84 \times 10^4$	$3,37 \times 10^4$
<i>Pinus mugo</i>	$1,33 \times 10^4$	$1,69 \times 10^4$	$1,51 \times 10^4$
<i>Fagus sylvatica</i>	$7,32 \times 10^3$	$1,69 \times 10^4$	$1,21 \times 10^4$
<i>Fraxinus excelsior</i>	$5,85 \times 10^3$	$1,80 \times 10^4$	$1,19 \times 10^4$
<i>Pinus nigra</i>	$9,52 \times 10^3$	$1,40 \times 10^4$	$1,18 \times 10^4$
<i>Robinia pseudoacacia</i>	$7,56 \times 10^3$	$1,26 \times 10^4$	$1,01 \times 10^4$
<i>Abies alba</i>	$1,43 \times 10^3$	$4,60 \times 10^3$	$3,01 \times 10^3$
<i>Quercus robur</i>	$8,00 \times 10^2$	$2,77 \times 10^3$	$1,78 \times 10^3$
<i>Pinus cembra</i>	$4,84 \times 10^2$	$1,31 \times 10^3$	$8,96 \times 10^2$
Total	$2,43 \times 10^7$	$2,45 \times 10^7$	$2,44 \times 10^7$

4.1.2 Field crops

Table 7. The estimated minimum and maximum amount of seeds of field crops traded to Finland annually. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values (¹an estimate of the needed amount of foreign propagation material, ²Evira 2013b, no superscript = Finnish Customs 2013a). Please note that the estimates are rather uncertain and that the estimates that are based on the trade statistics represent the minimum amount of trade.

	Min, kg	Max, kg	Mean, kg	Variation among years, -/+ %	EU trade, %
Grass and fodder plants			2,66×10⁶		
<i>Festuca</i> spp.			1,30×10 ⁶	-41/26	99
<i>Lolium</i> spp.			3,80×10 ⁵	-32/46	–
<i>Poa pratensis</i>			3,25×10 ⁵	-33/38	92
<i>Trifolium</i> spp.			2,59×10 ⁵	-48/62	72
<i>Vicia</i> spp., <i>Poa palustris</i> ,					
<i>Poa trivialis</i> , <i>Dactylis</i> spp., <i>Agrostis</i> spp.			2,02×10 ⁵	-59/68	93
<i>Phleum pratense</i>			1,79×10 ⁵	-37/52	53
<i>Medicago sativa</i>			1,83×10 ⁴	-69/228	49
<i>Lupinus</i> spp.			1,20×10 ³	-100/101	100
<i>Vicia faba</i> ²			1,00×10 ³	-100/180	–
<i>Zea mays</i>			8,46×10 ²	-62/134	62
<i>Glycine max</i>			7,26×10 ¹	-100/166	100
<i>Solanum tuberosum</i>			1,24×10⁶	-17/37	100
Other plants	4,39×10⁵	8,12×10⁵	6,25×10⁵		
<i>Phalaris arundinacea</i> ¹	1,89×10 ⁵	2,88×10 ⁵	2,38×10 ⁵	-14/9	–
<i>Carum carvi</i> ¹	4,78×10 ⁴	3,11×10 ⁵	1,79×10 ⁵	-13/12	–
<i>Pisum sativum</i> ²			1,37×10 ⁵	-48/136	–
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>altissima</i> ,					
<i>B. vulgaris</i> subsp. <i>vulgaris</i> var. <i>alba</i>			5,12×10 ⁴	-14/18	100
<i>Linum usitatissimum</i> ¹	1,32×10 ⁴	2,30×10 ⁴	1,81×10 ⁴	-60/77	100
<i>Helianthus annuus</i> ²			9,60×10 ²	-58/77	100
<i>Chenopodium quinoa</i> ¹	5,66×10 ¹	8,49×10 ¹	7,08×10 ¹	-100/229	–
<i>Sinapis alba</i> , <i>Brassica juncea</i>			3,60×10 ¹	-100/178	100
<i>Papaver</i> spp.			5,4	-100/400	100
<i>Sesamum indicum</i>			1	-100/400	0
<i>Cannabis sativa</i> ¹	0	5,10×10 ¹	0	-53/46	–
<i>Camelina sativa</i> ¹	0	0	0	-99/380	–
Cereals	3,31×10⁵	3,32×10⁵	3,31×10⁵		
<i>Secale cereale</i> ²			1,33×10 ⁵	-98/354	–
<i>Hordeum vulgare</i>			1,14×10 ⁵	-92/172	83
<i>Triticum aestivum</i> ²			7,37×10 ⁴	-85/131	–
<i>Avena sativa</i> ²			6,75×10 ³	-81/73	–
<i>Fagopyrum esculentum</i> ¹	1,84×10 ³	2,01×10 ³	1,92×10 ³	-99/193	–
<i>Triticum spelta</i>			1,48×10 ³	-100/400	100
× <i>Triticosecale rimpaui</i> ¹	1,02×10 ²	9,58×10 ²	5,30×10 ²	-87/164	99
<i>Oryza sativa</i>			3,76×10 ²	-100/400	0
Oil plants	3,04×10⁴	1,37×10⁵	8,39×10⁴		
<i>Brassica napus</i> subsp. <i>oleifeira</i> ¹	2,06×10 ⁴	1,27×10 ⁵	7,40×10 ⁴	-15/25	–
<i>Brassica rapa</i> <i>Oleifera</i> -Ryhmä ²			9,82×10 ³	-98/183	–
Total	8,00×10 ⁵	1,28×10 ⁶	4,95×10 ⁶	-58/128	

Table 8. The estimated minimum and maximum number seeds of field crops traded to Finland annually. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values. Please note that the estimates are rather uncertain and that the estimates that are based on the trade statistics represent the minimum amount of trade.

	Min, no	Max, no	Mean, no
Grass and fodder plants	2,32×10¹²	2,76×10¹²	2,54×10¹²
<i>Poa pratensis</i>	1,08×10 ¹²	1,08×10 ¹²	1,08×10 ¹²
<i>Festuca</i> spp.	6,48×10 ¹¹	6,48×10 ¹¹	6,48×10 ¹¹
<i>Phleum pratense</i>	3,58×10 ¹¹	4,47×10 ¹¹	4,03×10 ¹¹
<i>Trifolium</i> spp.	1,04×10 ¹¹	3,70×10 ¹¹	2,37×10 ¹¹
<i>Lolium</i> spp.	1,09×10 ¹¹	1,90×10 ¹¹	1,49×10 ¹¹
<i>Medicago sativa</i>	9,16×10 ⁹	9,16×10 ⁹	9,16×10 ⁹
<i>Vicia</i> spp., <i>Poa palustris</i> , <i>Poa trivialis</i> , <i>Dactylis</i> spp., <i>Agrostis</i> spp.	5,06×10 ⁹	1,01×10 ¹⁰	7,59×10 ⁹
<i>Lupinus</i> spp.	6,29×10 ⁶	9,19×10 ⁶	7,74×10 ⁶
<i>Zea mays</i>	1,92×10 ⁶	5,52×10 ⁶	3,72×10 ⁶
<i>Vicia faba</i>	1,67×10 ⁶	3,33×10 ⁶	2,50×10 ⁶
<i>Glycine max</i>	1,89×10 ⁵	1,40×10 ⁶	7,95×10 ⁵
Other plants	1,91×10¹¹	4,82×10¹¹	3,37×10¹¹
<i>Phalaris arundinacea</i>	1,71×10 ¹¹	3,20×10 ¹¹	2,46×10 ¹¹
<i>Carum carvi</i>	1,59×10 ¹⁰	1,55×10 ¹¹	8,57×10 ¹⁰
<i>Linum usitatissimum</i>	1,66×10 ⁹	3,83×10 ⁹	2,75×10 ⁹
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>altissima</i> , <i>B. vulgaris</i> subsp. <i>vulgaris</i> var. <i>alba</i>	1,71×10 ⁹	1,71×10 ⁹	1,71×10 ⁹
<i>Pisum sativum</i>	5,08×10 ⁸	7,42×10 ⁸	6,25×10 ⁸
<i>Papaver</i> spp.	1,69×10 ⁷	9,00×10 ⁷	5,34×10 ⁷
<i>Chenopodium quinoa</i>	2,48×10 ⁷	8,09×10 ⁷	5,29×10 ⁷
<i>Sinapis alba</i> , <i>Brassica juncea</i>	5,11×10 ⁶	1,96×10 ⁷	1,23×10 ⁷
<i>Helianthus annuus</i>	1,07×10 ⁷	1,37×10 ⁷	1,22×10 ⁷
<i>Sesamum indicum</i>	3,33×10 ⁵	5,46×10 ⁵	4,40×10 ⁵
<i>Cannabis sativa</i>	0	5,10×10 ⁶	0
<i>Camelina sativa</i>	0	0	0
Oil plants	8,03×10⁹	4,64×10¹⁰	2,72×10¹⁰
<i>Brassica napus</i> subsp. <i>Oleifera</i>	4,10×10 ⁹	4,24×10 ¹⁰	2,33×10 ¹⁰
<i>Brassica rapa</i> <i>Oleifera</i> - <i>Ryhmä</i>	3,93×10 ⁹	3,93×10 ⁹	3,93×10 ⁹
Cereals	7,86×10⁹	1,13×10¹⁰	9,59×10⁹
<i>Secale cereale</i>	3,59×10 ⁹	5,54×10 ⁹	4,57×10 ⁹
<i>Hordeum vulgare</i>	2,10×10 ⁹	3,16×10 ⁹	2,63×10 ⁹
<i>Triticum aestivum</i>	1,86×10 ⁹	2,24×10 ⁹	2,05×10 ⁹
<i>Avena sativa</i>	1,73×10 ⁸	2,11×10 ⁸	1,92×10 ⁸
<i>Fagopyrum esculentum</i>	7,35×10 ⁷	1,00×10 ⁸	8,69×10 ⁷
<i>Triticum spelta</i>	3,70×10 ⁷	3,70×10 ⁷	3,70×10 ⁷
<i>Oryza sativa</i>	1,26×10 ⁷	1,47×10 ⁷	1,37×10 ⁷
× <i>Triticosecale rimpaui</i>	2,03×10 ⁶	2,46×10 ⁷	1,33×10 ⁷
<i>Solanum tuberosum</i>	1,66×10⁷	4,14×10⁷	2,90×10⁷
Total	2,52×10 ¹²	3,30×10 ¹²	2,91×10 ¹²

4.1.3 Outdoor vegetables

Table 9. The estimated minimum and maximum amount of seeds of outdoor vegetables traded to Finland annually. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values.

	Min, kg	Max, kg	Mean, kg	Variation among years, -/+ %
<i>Allium cepa</i> Cepa Group	7,91×10 ⁵	1,48×10 ⁶	1,14×10 ⁶	-7/13
<i>Pisum sativum</i>	4,31×10 ⁵	5,92×10 ⁵	5,12×10 ⁵	-8/11
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>conditiva</i>	4,04×10 ³	4,85×10 ³	4,45×10 ³	-6/8
<i>Anethum graveolens</i>	2,86×10 ³	3,81×10 ³	3,33×10 ³	-12/19
<i>Allium sativum</i>	1,13×10 ³	4,51×10 ³	2,82×10 ³	-10/23
<i>Spinacia oleracea</i>	2,19×10 ³	2,63×10 ³	2,41×10 ³	-44/45
<i>Daucus carota</i> subsp. <i>sativus</i>	1,30×10 ³	1,95×10 ³	1,62×10 ³	-3/3
<i>Phaseolus vulgaris</i> var. <i>nanus</i>	6,80×10 ²	1,13×10 ³	9,06×10 ²	-15/25
<i>Cucumis sativus</i>	3,43×10 ²	6,86×10 ²	5,14×10 ²	-13/19
<i>Brassica napus</i> subsp. <i>napobrassica</i>	2,63×10 ²	2,63×10 ²	2,63×10 ²	-5/12
<i>Zea mays</i> var. <i>saccharata</i>	1,93×10 ²	2,51×10 ²	2,22×10 ²	-29/50
<i>Brassica oleracea</i> Capitata Group	1,74×10 ²	1,74×10 ²	1,74×10 ²	-10/6
<i>Pastinaca sativa</i>	95	95	95	-3/5
<i>Brassica oleracea</i> Botrytis Group	86	86	86	-3/6
<i>Brassica rapa</i>	81	81	81	-19/10
<i>Brassica rapa</i> Pekinensis Group	60	99	80	-14/21
<i>Brassica oleracea</i> Italica Group	49	97	73	-9/3
<i>Lactuca sativa</i>	57	57	57	-10/9
<i>Cucurbita pepo</i>	40	40	40	-11/21
<i>Allium porrum</i>	27	27	27	-16/28
<i>Cucurbita</i> spp.	24	24	24	-17/14
<i>Brassica oleracea</i> Capitata Group	7,8	7,8	7,8	-15/15
<i>Brassica oleracea</i> Gemmifera Group	6,9	6,9	6,9	-18/13
<i>Raphanus sativus</i> Radicula Group	6,1	6,1	6,1	-39/63
<i>Brassica oleracea</i> Gongylodes Group	4,5	4,5	4,5	-21/17
<i>Petroselinum crispum</i>	4,0	4,0	4,0	-27/29
<i>Phaseolus vulgaris</i> var. <i>vulgaris</i>	1,8	3,0	2,4	-80/80
<i>Brassica oleracea</i> Sabauda Group	2,1	2,1	2,1	-12/12
<i>Apium graveolens</i> Rapaceum Group	1,5	1,5	1,5	-15/20
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>lutea</i>	0,7	0,8	0,8	-43/43
<i>Scorzonera hispanica</i>	0,8	0,8	0,8	-80/80
<i>Raphanus sativus</i> Daikon/Niger Group	0,5	0,5	0,5	-9/9
<i>Apium graveolens</i> Dulce Group	0,5	0,5	0,5	-19/62
<i>Brassica oleracea</i> Sabellica Group	0,3	0,3	0,3	0/0
<i>Foeniculum vulgare</i> var. <i>azoricum</i> , <i>Foeniculum vulgare</i> var. <i>dulce</i>	0,1	0,1	0,1	-24/24
Total	1,24×10 ⁵	2,10×10 ⁶	1,67×10 ⁶	-4/5

Table 10. The estimated minimum and maximum number of seeds of outdoor vegetables traded to Finland annually. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values.

	Min, no	Max, no	Mean, no
<i>Anethum graveolens</i>	1,71×10 ⁹	2,67×10 ⁹	2,19×10 ⁹
<i>Pisum sativum</i>	1,29×10 ⁹	2,96×10 ⁹	2,13×10 ⁹
<i>Daucus carota</i> subsp. <i>sativus</i>	9,08×10 ⁸	1,75×10 ⁹	1,33×10 ⁹
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>conditiva</i>	3,23×10 ⁸	4,85×10 ⁸	4,04×10 ⁸
<i>Allium cepa</i> Cepa Group	3,46×10 ⁸	3,96×10 ⁸	3,71×10 ⁸
<i>Spinacia oleracea</i>	1,64×10 ⁸	3,16×10 ⁸	2,40×10 ⁸
<i>Brassica napus</i> subsp. <i>napobrassica</i>	9,21×10 ⁷	1,18×10 ⁸	1,05×10 ⁸
<i>Brassica oleracea</i> Capitata Group	4,58×10 ⁷	6,87×10 ⁷	5,73×10 ⁷
<i>Brassica rapa</i>	4,36×10 ⁷	5,23×10 ⁷	4,80×10 ⁷
<i>Brassica rapa</i> Pekinensis Group	3,26×10 ⁷	4,89×10 ⁷	4,07×10 ⁷
<i>Brassica oleracea</i> Botrytis Group	1,79×10 ⁷	4,97×10 ⁷	3,38×10 ⁷
<i>Pastinaca sativa</i>	2,58×10 ⁷	3,44×10 ⁷	3,01×10 ⁷
<i>Brassica oleracea</i> Italica Group	1,89×10 ⁷	2,84×10 ⁷	2,37×10 ⁷
<i>Cucumis sativus</i>	1,22×10 ⁷	2,92×10 ⁷	2,07×10 ⁷
<i>Allium porrum</i>	1,03×10 ⁷	2,74×10 ⁷	1,89×10 ⁷
<i>Lactuca sativa</i>	9,38×10 ⁶	1,07×10 ⁷	1,00×10 ⁷
<i>Phaseolus vulgaris</i> var. <i>nanus</i>	2,04×10 ⁶	6,80×10 ⁶	4,42×10 ⁶
<i>Apium graveolens</i> Rapaceum Group	2,99×10 ⁶	3,74×10 ⁶	3,37×10 ⁶
<i>Petroselinum crispum</i>	2,98×10 ⁶	3,58×10 ⁶	3,28×10 ⁶
<i>Brassica oleracea</i> Capitata Group	1,94×10 ⁶	2,33×10 ⁶	2,14×10 ⁶
<i>Brassica oleracea</i> Gemmifera Group	1,71×10 ⁶	2,06×10 ⁶	1,89×10 ⁶
<i>Brassica oleracea</i> Gongylodes Group	1,12×10 ⁶	1,34×10 ⁶	1,23×10 ⁶
<i>Zea mays</i> var. <i>saccharata</i>	7,72×10 ⁵	1,51×10 ⁶	1,14×10 ⁶
<i>Apium graveolens</i> Dulce Group	9,06×10 ⁵	1,13×10 ⁶	1,02×10 ⁶
<i>Allium sativum</i>	1,25×10 ⁵	1,50×10 ⁶	8,15×10 ⁵
<i>Raphanus sativus</i> Radicula Group	5,47×10 ⁵	9,12×10 ⁵	7,30×10 ⁵
<i>Cucurbita pepo</i>	3,98×10 ⁵	7,96×10 ⁵	5,97×10 ⁵
<i>Brassica oleracea</i> Sabauda Group	5,21×10 ⁵	6,26×10 ⁵	5,73×10 ⁵
<i>Cucurbita</i> spp.	9,73×10 ⁴	1,95×10 ⁵	1,46×10 ⁵
<i>Brassica oleracea</i> Sabellica Group	6,83×10 ⁴	8,19×10 ⁴	7,51×10 ⁴
<i>Scorzonera hispanica</i>	6,00×10 ⁴	7,50×10 ⁴	6,75×10 ⁴
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>lutea</i>	5,60×10 ⁴	5,60×10 ⁴	5,60×10 ⁴
<i>Raphanus sativus</i> Daikon/Niger Group	4,46×10 ⁴	4,95×10 ⁴	4,70×10 ⁴
<i>Foeniculum vulgare</i> var. <i>azoricum</i> , <i>Foeniculum vulgare</i> var. <i>dulce</i>	1,45×10 ⁴	1,74×10 ⁴	1,60×10 ⁴
<i>Phaseolus vulgaris</i> var. <i>vulgaris</i>	5,40×10 ³	1,80×10 ⁴	1,17×10 ⁴
Total	5,07×10 ⁹	9,07×10 ⁹	7,07×10 ⁹

4.1.4 Fruit and berry plants

Table 11. The estimated minimum and maximum number of fruit and berry plants traded to Finland annually for commercial fruit and berry production. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values. Please note that the estimates are rather uncertain.

	Min, no	Max, no	Mean, no	Variation among years, -/+ %
Berry plants	1,67×10⁷	1,67×10⁷	1,67×10⁷	
<i>Fragaria</i> × <i>ananassa</i>	1,65×10 ⁷	1,65×10 ⁷	1,65×10 ⁷	-2/2
<i>Rubus idaeus</i> , <i>Rubus</i> × <i>binatus</i>	1,38×10 ⁵	1,38×10 ⁵	1,38×10 ⁵	-10/7
<i>Ribes nigrum</i>	5,05×10 ⁴	6,31×10 ⁴	5,68×10 ⁴	-9/8
<i>Ribes Rubrum</i> -Ryhmä	8,19×10 ³	1,02×10 ⁴	9,21×10 ³	-7/7
<i>Vaccinium corymbosum</i>	4,66×10 ³	4,66×10 ³	4,66×10 ³	-6/3
<i>Hippophaë rhamnoides</i>	0	0	0	-12/7
<i>Ribes uva-crispa</i>	0	0	0	-4/6
Fruit plants	4,00×10⁴	7,93×10⁴	5,97×10⁴	
<i>Malus domestica</i>	3,93×10 ⁴	7,86×10 ⁴	5,89×10 ⁴	-2/2
<i>Pyrus</i> spp.	6,65×10 ²	6,65×10 ²	6,65×10 ²	-28/11
<i>Prunus</i> spp.	48	56	52	-4/5
<i>Prunus cerasus</i> , <i>P. avium</i>	0	0	0	-11/13
Total	1,68×10 ⁷	1,68×10 ⁷	1,68×10 ⁷	-2/3

3.1.5 Landscaping plants

Table 12. The estimated minimum, maximum and most likely number of plants for planting traded to Finland annually to nurseries and garden centres. Please note that the estimates are very rough and uncertain.

	Min, no	Max, no	Most likely, no
Nurseries	1,14×10⁶	1,80×10⁶	1,48×10⁶
Garden centres	0	Cannot be estimated	7,27×10⁶
Perennials	0	Cannot be estimated	6,94×10 ⁶
Scrubs	0	6,67×10 ⁵	3,17×10 ⁵
Deciduous trees	0	2,22×10 ⁴	1,05×10 ⁴
Total	1,14×10⁶	Cannot be estimated	8,75×10⁶

4.1.6 Greenhouse ornamentals

Table 13. The estimated amount of propagation material of greenhouse ornamentals, excluding cut plants, traded to Finland annually.

	No	Variation among years, -/+ %
Flower bulbs	7,42×10⁷	-5/8
<i>Tulipa gesneriana</i>	5,96×10 ⁷	-6/10
<i>Narcissus</i> spp.	8,00×10 ⁶	-49/60
<i>Hyacinthus orientalis</i>	2,70×10 ⁶	-8/9
<i>Hippeastrum</i> spp.	1,16×10 ⁶	-11/7
<i>Lilium</i> spp.	8,89×10 ⁵	-13/28
Other	1,90×10 ⁶	-35/20
Bedding plants and hanging pots	7,42×10⁷	-6/7
<i>Lobelia</i> spp.	3,30×10 ⁷	-14/17
<i>Viola</i> spp.	1,27×10 ⁷	-9/8
<i>Petunia × hybrida</i>	5,45×10 ⁶	-5/6
<i>Pelargonium</i> Zonale Group	4,47×10 ⁶	-9/12
<i>Tagetes</i> spp.	3,25×10 ⁶	-9/8
<i>Begonia</i> Semperflorens Group	1,85×10 ⁶	-2/2
<i>Impatiens</i> spp.	1,78×10 ⁶	-13/15
<i>Senecio cineraria</i>	1,69×10 ⁶	-4/10
<i>Argyranthemum</i> Frutescens Group	1,20×10 ⁶	-13/11
<i>Dianthus caryophyllus</i> and <i>Dianthus</i> Caryophyllus Group	8,24×10 ⁵	-11/20
<i>Sutera cordata</i>	8,10×10 ⁵	-10/7
<i>Begonia × tuberhybrida</i>	6,02×10 ⁵	-5/4
<i>Fuchsia</i> spp.	5,89×10 ⁵	-6/15
<i>Scaevola aemula</i>	2,28×10 ⁵	-18/25
Other	5,81×10 ⁶	-11/13
Potted plants	1,07×10⁷	-12/9
<i>Euphorbia pulcherrima</i>	2,15×10 ⁶	-18/6
<i>Begonia</i> Elatior Group	1,78×10 ⁶	-9/9
<i>Chrysanthemum × grandiflorum</i>	1,17×10 ⁶	-11/10
<i>Kalanchoë</i> Blossfeldiana Group	9,96×10 ⁵	-26/24
<i>Saintpaulia</i> Ionantha Group	9,26×10 ⁵	-21/6
<i>Rosa</i> spp.	6,74×10 ⁵	-50/54
Other	6,66×10 ⁵	-25/34
Foliage plants	6,04×10 ⁵	-18/22
<i>Primula</i> spp.	5,36×10 ⁵	-13/15
<i>Cyclamen persicum</i>	4,58×10 ⁵	-5/4
<i>Gerbera × cantabrigensis</i>	3,96×10 ⁵	-29/21
<i>Rhododendron</i> spp.	2,88×10 ⁵	-9/8
<i>Campanula</i> spp.	4,90×10 ⁴	-100/170
Total	1,59×10⁸	-4/4

Table 14. The estimated amount of propagation material of greenhouse cut plants traded to Finland annually.

	Min, no	Max, no	Mean, no	Variation among years, -/+ %
<i>Chrysanthemum × grandiflorum</i>	2,72×10 ⁵	8,17×10 ⁵	5,45×10 ⁵	-43/61
<i>Rosa</i> spp.	6,72×10 ⁴	3,24×10 ⁵	1,96×10 ⁵	-44/50
<i>Gypsophila</i> spp.	1,95×10 ⁴	7,79×10 ⁴	4,87×10 ⁴	-17/32
<i>Gerbera × cantabrigensis</i>	2,27×10 ⁴	4,62×10 ⁴	3,44×10 ⁴	-53/55
Total	3,82×10 ⁵	1,27×10 ⁶	8,24×10 ⁵	-43/50

Table 15. The mean amount of flower bulbs and houseplants traded to Finland annually during the years 2007-2011 (Finnish Customs 2013a). Please note that due to the inherent incompleteness of the trade statistics the volumes reported here represent the minimum amount of trade.

	Kg/year	No/year	Variation among years, -/+ %	EU trade, %
Flower bulbs	3,04×10⁶			93
<i>Tulipa gesneriana</i>	1,49×10 ⁶	4,77×10 ⁷	-23/50	98
<i>Narcissus</i> spp.	4,12×10 ⁵	8,44×10 ⁶	-13/24	99
<i>Hyacinthus orientalis</i>	2,24×10 ⁵	2,36×10 ⁶	-16/27	100
<i>Gladiolus</i> spp.	1,25×10 ⁴	5,33×10 ⁵	-37/43	100
Other flower bulbs, tubers etc.	8,95×10 ⁵		-10/13	81
House plants	6,96×10⁶			100
Flower bulbs	3,56×10 ⁵		-17/10	100
Cuttings and seedlings	4,50×10 ⁵		-23/22	99
Other	6,06×10 ⁶		-3/2	100
Total	1,00×10 ⁷		-4/6	

Table 16. The estimated number of greenhouse ornamentals traded to Finland annually to be marketed directly to final consumers. Please note that these estimates are very rough and uncertain.

	No
Potted plants	1,07×10 ⁷
Bulbs	9,06×10 ⁶
Bedding plants and hanging pots	7,60×10 ⁶
Total	2,74×10 ⁷

4.1.7 Greenhouse vegetables

Table 17. The estimated minimum and maximum amount of seeds of greenhouse vegetables traded to Finland annually. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values.

	Min, kg	Max, kg	Mean, kg	Variation among years, -/+ %
<i>Anethum graveolens</i>	2,25×10 ²	6,22×10 ²	4,24×10 ²	-4/8
<i>Petroselinum crispum</i>	2,45×10 ²	3,57×10 ²	3,01×10 ²	-23/14
<i>Lactuca sativa</i>	1,82×10 ²	2,97×10 ²	2,40×10 ²	-10/8
<i>Cucumis sativus</i>	1,08×10 ²	1,12×10 ²	1,10×10 ²	-7/7
<i>Daucus carota</i> subsp. <i>sativus</i>	72	1,16×10 ²	94	-10/12
<i>Ocimum basilicum</i>	13	74	43	-100/45
<i>Solanum lycopersicon</i>	13	17	15	-1/2
<i>Allium cepa</i> Cepa Group	6,2	24	15	-24/21
<i>Capsicum annuum</i>	0,7	2,6	1,7	-16/16
<i>Brassica oleracea</i> Capitata Group	0,3	0,9	0,6	-30/30
<i>Brassica rapa</i> Pekinensis Group	0,3	0,5	0,4	-36/32
<i>Cucurbita pepo</i>	0,1	0,2	0,1	-32/32
Total	8,66×10 ²	1,62×10 ³	1,24×10 ³	-7/6

Table 18. The estimated minimum and maximum number of seeds of greenhouse vegetables traded to Finland annually. The presented mean according to which the pathways have been ranked is simply the mean of the minimum and maximum values.

	Min, no	Max, no	Mean, no
<i>Anethum graveolens</i>	1,58×10 ⁸	3,73×10 ⁸	2,65×10 ⁸
<i>Petroselinum crispum</i>	2,20×10 ⁸	2,68×10 ⁸	2,44×10 ⁸
<i>Lactuca sativa</i>	2,19×10 ⁸	2,38×10 ⁸	2,28×10 ⁸
<i>Daucus carota</i> subsp. <i>sativus</i>	6,49×10 ⁷	8,11×10 ⁷	7,30×10 ⁷
<i>Ocimum basilicum</i>	3,25×10 ⁷	3,25×10 ⁷	3,25×10 ⁷
<i>Solanum lycopersicon</i>	4,32×10 ⁶	4,32×10 ⁶	4,32×10 ⁶
<i>Cucumis sativus</i>	3,65×10 ⁶	3,72×10 ⁶	3,68×10 ⁶
<i>Allium cepa</i> Cepa Group	3,12×10 ⁶	3,57×10 ⁶	3,34×10 ⁶
<i>Capsicum annuum</i>	1,12×10 ⁵	2,81×10 ⁵	1,97×10 ⁵
<i>Brassica rapa</i> Pekinensis Group	1,62×10 ⁵	1,62×10 ⁵	1,62×10 ⁵
<i>Brassica oleracea</i> Capitata Group	4,20×10 ⁴	7,00×10 ⁴	5,60×10 ⁴
<i>Cucurbita pepo</i>	4,10×10 ³	4,92×10 ³	4,51×10 ³
Total	7,05×10 ⁸	1,00×10 ⁹	8,55×10 ⁸

4.2 Other plant products

4.2.1 Wood and articles of wood

Table 19. The mean amount of wood and articles of wood traded to Finland annually during the years 2007–2011 (¹Pirkanmaa ELY Center 2013, PYR Ltd 2013; no superscript Finnish Customs 2013a).

	Kg/year	Variation among years, -/+ %	EU trade, %
Wood in the rough and sawlogs	7,52×10⁹	-56/58	33
<i>Betula</i> spp.	3,91×10 ⁹	-62/66	19
<i>Picea abies</i> , <i>Abies alba</i>	1,59×10 ⁹	-47/77	51
<i>Pinus</i> spp.	1,54×10 ⁹	-45/67	47
Other coniferous species	8,19×10 ⁷	-100/398	98
<i>Fagus</i> spp.	6,18×10 ⁵	-95/285	100
<i>Quercus</i> spp.	3,82×10 ³	-100/382	4
<i>Populus</i> spp.	2,83×10 ³	-100/400	100
Tropical species	7,17×10 ⁷	-100/388	0,1
Other species	3,20×10 ⁸	-56/44	30
Coniferous chips and particles	1,76×10⁹	-19/17	40
Non-coniferous chips and particles	4,12×10⁸	-41/68	4
Wood waste, sawdust (also as pellets)	3,64×10⁸	-40/36	5
Sawn or chipped wood	3,04×10⁸	-12/19	20
<i>Picea abies</i> , <i>Abies alba</i>	1,72×10 ⁸	-15/16	14
<i>Pinus</i> spp.	9,14×10 ⁷	-23/25	15
Other coniferous species	8,89×10 ⁶	-50/69	36
<i>Quercus</i> spp.	1,17×10 ⁷	-57/105	59
<i>Fraxinus</i> spp.	1,29×10 ⁶	-41/65	17
<i>Fagus</i> spp.	1,16×10 ⁶	-59/181	99
<i>Acer</i> spp.	6,68×10 ⁵	-85/82	86
<i>Prunus</i> spp.	1,07×10 ⁵	-64/211	5
<i>Populus</i> spp.	3,69×10 ⁴	-68/205	53
Tropical species	2,48×10 ⁶	-52/74	28
Other species	1,39×10 ⁷	-16/20	63
Fuel wood	1,91×10⁸	-71/191	50
Particle and fibre boards	1,54×10⁸	-13/10	94
Wood packaging material¹	1,31×10⁸	-12/9	
As packaging of other traded material	1,07×10 ⁸	-12/14	
Packaging material as such	2,36×10 ⁷	-25/36	89
Plywood, veneered panels etc.	8,54×10⁷	-17/6	29
Articles of wood	3,78×10⁷	-13/21	74
Sheets	1,52×10⁷	-44/132	23
Coniferous	1,82×10 ⁵	-46/144	34
Non-coniferous	1,50×10 ⁷	-44/132	23
Total	1,10×10 ¹⁰	-37/42	

4.2.2 Food, feed and their raw materials

Table 20. The mean amount of plants and plant products intended for food, feed and their raw materials traded to Finland annually during the years 2007-2011 (Finnish Customs 2013a).

	Kg/year	Variation among years, +/- %	EU trade, %
Fresh plant products that are produced also in Finland	4,04×10⁸	-15/23	90
Field crops	2,39×10⁸	-22/39	88
<i>B. napus</i> subsp. <i>oleifera</i> , <i>Brassica rapa</i> Oleifera Group	1,41×10 ⁸	-20/37	91
<i>Secale cereale</i>	5,20×10 ⁷	-27/32	86
Wheat, meslin and spelt	1,49×10 ⁷	-88/165	29
<i>Solanum tuberosum</i>	1,37×10 ⁷	-31/42	99
<i>Helianthus annuus</i>	1,10×10 ⁷	-34/50	88
<i>Zea mays</i>	2,80×10 ⁶	-64/88	75
<i>Linum usitatissimum</i>	1,03×10 ⁶	-12/10	81
<i>Hordeum vulgare</i>	9,04×10 ⁵	-100/210	89
Hay, clover, lupines and similar forage products	8,00×10 ⁵	-92/56	87
<i>Sinapis alba</i> , <i>Brassica juncea</i>	7,24×10 ⁵	-13/28	15
<i>Avena sativa</i>	3,70×10 ⁵	-99/309	71
<i>Pisum sativum</i>	2,11×10 ⁵	-23/28	84
<i>Phaseolus vulgaris</i>	8,91×10 ⁴	-14/14	65
<i>Cannabis sativa</i>	1,12×10 ⁴	-61/85	98
Swedes, mangolds and fodder roots	7,80×10 ³	-92/80	100
× <i>Triticosecale rimpaui</i>	7,00×10 ²	-100/400	100
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>altissima</i>	2,30×10 ²	-100/234	53
Other leguminous plants	4,38×10 ³	-53/57	58
Vegetables	9,52×10⁷	-5/7	97
<i>Solanum lycopersicon</i>	2,32×10 ⁷	-6/5	93
<i>Lactuca</i> spp.	2,02×10 ⁷	-9/13	100
<i>Capsicum annuum</i>	1,18×10 ⁷	-13/14	95
<i>Cucumis sativus</i>	1,14×10 ⁷	-12/10	100
<i>Daucus carota</i> subsp. <i>sativus</i> , <i>Brassica rapa</i>	6,20×10 ⁶	-23/32	100
<i>Allium cepa</i> Cepa Group	5,84×10 ⁶	-19/39	94
<i>Brassica oleracea</i> Gongylodes Group, <i>B. oleracea</i> Sabellica Group	2,75×10 ⁶	-8/9	100
<i>Cucurbita pepo</i>	2,66×10 ⁶	-8/8	100
<i>Brassica oleracea</i> Botrytis Group	2,52×10 ⁶	-18/22	100
<i>Brassica oleracea</i> Capitata Group	2,40×10 ⁶	-15/15	99
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>conditiva</i> ,			
<i>Raphanus sativus</i> Radicula Group, <i>R. sativus</i> Daikon/Niger Group	1,06×10 ⁶	-18/54	99
<i>Allium sativum</i>	9,52×10 ⁵	-4/4	57
<i>Solanum melongena</i>	7,64×10 ⁵	-11/24	100
<i>Apium graveolens</i> Rapaceum Group	4,86×10 ⁵	-10/22	100
<i>Asparagus officinalis</i>	4,58×10 ⁵	-16/29	85
<i>Apium graveolens</i>	3,68×10 ⁵	-24/24	98
<i>Allium cepa</i> Ascalonicum Group	1,66×10 ⁵	-13/10	97
<i>Brassica oleracea</i> Gemmifera Group	7,82×10 ⁴	-60/75	100
<i>Spinacia oleracea</i>	7,31×10 ⁴	-27/40	100
<i>Armoracia rusticana</i>	6,64×10 ³	-100/350	77
<i>Allium</i> spp.	1,70×10 ⁶	-14/8	90
Fruits	6,57×10⁷	-4/5	84
<i>Malus</i> spp.	5,05×10 ⁷	-5/8	81
<i>Pyrus</i> spp.	1,07×10 ⁷	-14/13	95
<i>Prunus</i> spp.	3,89×10 ⁶	-11/14	89
<i>Prunus cerasus</i> , <i>P. avium</i>	5,96×10 ⁵	-12/10	80
Berries	2,68×10⁶	-21/43	98
<i>Fragaria</i> × <i>ananassa</i>	1,28×10 ⁶	-20/26	98
<i>Vaccinium</i> spp.	7,56×10 ⁵	-85/59	97
<i>Vaccinium vitis-idaea</i>	4,43×10 ⁵	-85/144	97
<i>Rubus idaeus</i>	8,38×10 ⁴	-41/68	97
<i>Vaccinium macrocarpon</i> , <i>V. corymbosum</i>	7,14×10 ⁴	-76/97	97
<i>Ribes Rubrum</i> Group	1,19×10 ⁴	-75/163	92
<i>Rubus</i> Blackberry Group	1,14×10 ⁴	-71/176	85
<i>Ribes Rubrum</i> Group, <i>R. uva-crispa</i>	1,81×10 ³	-69/141	76
<i>Ribes nigrum</i>	6,55×10 ²	-75/73	97
<i>Prunus spinosa</i>	5	-100/400	100
Other <i>Vaccinium</i> spp.	1,82×10 ⁴	-78/55	79
Mushrooms	9,78×10⁵	-17/30	96
Preserved or otherwise processed plant products	2,36×10⁸	-4/4	57
Fresh plant products that are not produced in Finland	1,97×10⁸	-5/5	44
Total	8,37×10⁸	-6/11	

4.2.3 Cut plants and other living plant parts

Table 21. The mean amount of some living plant parts traded to Finland annually during the years 2007-2011 (Finnish Customs 2013a). Please note that due to the inherent incompleteness of the trade statistics the volumes reported here represent the minimum amount of trade.

	No/year	Kg/year	Variation among years, -/+ %	EU trade, %
Cut flowers and green cuttings	3,04×10 ⁷	4,21×10⁶	-10/16	90
Green cuttings		1,01×10 ⁶	-41/44	93
<i>Rosa</i> spp.	1,40×10 ⁷	9,89×10 ⁵	-19/14	94
<i>Dianthus caryophyllus</i> , <i>Dianthus Caryophyllus</i> Group	1,24×10 ⁷	3,63×10 ⁵	-19/14	32
<i>Chrysanthemum × grandiflorum</i>	3,35×10 ⁶	2,29×10 ⁵	-9/8	100
Orchidaceae	3,34×10 ⁵	3,74×10 ⁴	-32/50	77
<i>Gladiolus</i> spp.	3,02×10 ⁵	2,56×10 ⁴	-26/26	100
Other cut flowers		1,56×10 ⁶	-12/15	98
Conifer branches		1,40×10⁵	-62/81	100
Christmas trees	4,06×10⁴	2,90×10⁵	-54/79	100
Mosses and lichen		6,81×10⁴	-35/83	12
Total		4,71×10 ⁶	-14/21	

4.2.4 Peat, organic growing media, mulch, fertilizers and their raw materials

Table 22. The mean amount of some organic materials traded to Finland annually during the years 2007-2011 (¹Finnish Customs 2013a, ²Evira2014).

	Kg/year	Variation among years, -/+ %
Fuel peat¹	1,08×10⁸	-90/91
Fertilizer products²	3,87×10⁵	-44/27
Organic fertilizers	3,44×10 ⁵	-47/28
Mulch materials	1,76×10 ⁴	-79/48
Other soil improvement substances	1,61×10 ⁴	-79/99
Packed soil	9,04×10 ³	-100/134
Raw materials for fertilizers²	4,01×10⁴	-34/9
Total	1,09×10 ⁸	-90/91

4.3 Traffic

Table 23. The mean amount of different types of traffic to Finland during the years 2007-2011 (¹Finnish Transport Agency 2012b; ²Finnish Customs 2013b; ³Finnish Rail Administration 2008, Finnish Rail Administration 2009, Finnish Transport Agency 2010, Finnish Transport Agency 2011, Finnish Transport Agency 2012a; ⁴Finavia 2014; ⁵Finnish Border Guard 2012, Finnish Border Guard 2010).

	Per year	Variation among years, -/+ %
Vehicles, no	6,84×10⁶	-7/7
Road vehicles ²	6,06×10 ⁶	-5/9
Containers ²	4,31×10 ⁵	-21/19
Train carriages ³	2,47×10 ⁵	-28/29
International aviation traffic ⁴	7,33×10 ⁴	-6/9
Ships, directly from abroad ¹	2,75×10 ⁴	-10/15
Passengers, no	2,67×10⁷	-5/10
Road traffic ⁵	1,18×10 ⁷	-10/13
Marine traffic ¹	8,49×10 ⁶	-6/5
Aviation traffic ⁴	6,07×10 ⁶	-6/12
Railroad traffic ³	3,94×10 ⁵	-12/12
Goods, kg	6,99×10¹⁰	-15/13
Marine traffic ¹	5,34×10 ¹⁰	-16/9
Railroad traffic ³	1,32×10 ¹⁰	-14/25
Road traffic ²	3,34×10 ⁹	-23/24
Aviation traffic ²	4,10×10 ⁷	-20/16

5 ESTIMATES OF THE ECONOMIC VALUE OF PRODUCTION

5.1 Forestry

Table 24. The estimated economic value of logged trees (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
<i>Picea abies</i>	1 261	836	558	816	829	860
<i>Pinus sylvestris</i>	1 067	869	544	790	807	815
<i>Betula</i> spp.	151	186	124	162	170	159
Total	2 479	1 892	1 226	1 768	1 806	1 834

Table 25. The estimated economic value of the production of forest reproduction material (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
Seed production	4,8	1,5	1,0	1,7	4,9	2,8
<i>Pinus sylvestris</i>	4,6	1,2	0,9	1,2	4,8	2,5
<i>Picea abies</i>	0,0	0,3	0,0	0,4	0,0	0,1
Other species	0,1	0,0	0,1	0,1	0,1	0,1
<i>Betula pendula</i>	0,1	0,0	0,0	0,0	0,0	0,0
Seedling production	33,7	33,8	36,3	32,4	29,2	33,1
<i>Picea abies</i>	24,2	24,4	26,4	23,0	21,0	23,8
<i>Pinus sylvestris</i>	8,3	7,9	8,4	7,9	6,9	7,9
<i>Betula pendula</i>	0,9	1,1	1,3	1,3	1,1	1,1
Other	0,3	0,4	0,2	0,2	0,2	0,3
Total	38,5	35,3	37,3	34,1	34,1	35,9

5.2 Field crops

Table 26. The estimated economic value of the production of field crops (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
Silage	269,7	259,9	257,7	375,8	334,8	299,6
<i>Hordeum vulgare</i>	247,6	293,6	186,7	136,5	226,6	218,2
<i>Avena sativa</i>	189,5	172,3	100,4	101,5	184,8	149,7
<i>Triticum aestivum</i>	127,4	149,0	118,7	105,8	187,4	137,7
<i>Solanum tuberosum</i>	149,9	153,2	105,7	79,1	127,9	123,2
<i>Brassica rapa</i> Oleifera Group	27,2	25,9	32,3	52,8	39,9	35,6
Dry hay	29,5	28,3	22,3	41,7	41,4	32,6
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>altissima</i>	20,2	14,0	16,8	16,2	19,4	17,3
<i>Secale cereale</i>	16,7	12,6	5,8	11,0	14,7	12,1
<i>Brassica napus</i> subsp. <i>oleifera</i>	5,2	6,7	6,0	6,6	10,9	7,1
<i>Carum carvi</i>	5,5	4,2	3,0	7,7	9,4	5,9
<i>Pisum sativum</i>	2,0	1,6	2,1	2,5	2,6	2,2
Other cereals	0,5	0,5	0,5	0,5	0,5	0,5
Total	1 091	1 122	858	938	1 200	1 042

5.3 Outdoor vegetables

Table 27. The estimated economic value of outdoor vegetable production (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
<i>Daucus carota</i> subsp. <i>sativus</i>	32,3	28,8	28,3	33,2	40,4	32,6
<i>Brassica</i> spp.	16,4	13,7	13,7	16,9	17,3	15,6
<i>Allium cepa</i>	13,8	9,8	8,8	11,1	14,2	11,5
Leaf vegetables	10,8	9,2	6,6	9,7	10,4	9,3
<i>Pisum sativum</i>		6,1	6,1	10,3	13,9	9,1
Other	9,9	1,8	10,3	6,0	9,2	7,4
<i>Brassica napus</i> subsp. <i>napobrassica</i>	7,2	6,0	6,4	6,0	11,3	7,4
<i>Cucumis sativus</i>	4,5	7,6	7,6	8,5	8,5	7,3
<i>Beta vulgaris</i> subsp. <i>vulgaris</i> var. <i>conditiva</i>	4,8	5,3	5,3	5,1	5,6	5,2
Total	99,7	88,3	93,0	106,9	130,8	103,7

5.4 Outdoor nursery production

Table 28. The estimated economic value of outdoor nursery production (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
Outdoor nursery production	31,7	30,0	32,1	34,1	27,7	31,1

5.5 Greenhouse ornamentals

Table 29. The estimated economic value of greenhouse ornamental production (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
Bulbs	23,3	25,3	24,8	23,8	24,0	24,2
<i>Tulipa gesneriana</i>	11,8	11,9	11,9	12,6	12,6	12,2
<i>Hippeastrum</i> spp.	4,1	5,0	4,7	4,8	4,8	4,7
<i>Narcissus</i> spp.	3,9	4,5	4,3	2,8	3,0	3,7
<i>Hyacinthus orientalis</i>	2,3	2,4	2,5	2,4	2,4	2,4
<i>Lilium</i> spp.	0,7	0,6	0,6	0,5	0,5	0,6
Other	0,5	0,9	0,9	0,7	0,7	0,7
Bedding plants	22,4	23,0	23,0	21,5	21,2	22,2
<i>Pelargonium</i> Zonale Group	6,0	6,9	6,9	6,0	6,4	6,4
<i>Viola</i> spp.	5,1	4,7	4,7	4,9	4,6	4,8
<i>Petunia × hybrida</i>	1,8	2,1	2,1	2,1	2,1	2,1
<i>Argyranthemum</i> Frutescens Group	2,2	2,0	2,0	2,0	1,8	2,0
<i>Lobelia</i> spp.	1,4	1,4	1,4	1,3	1,2	1,4
<i>Dianthus caryophyllus</i> ,						
<i>Dianthus</i> Caryophyllus Group and <i>Senecio cineraria</i>	1,3	1,2	1,2	1,3	1,2	1,3
<i>Tagetes</i> spp.	1,1	1,2	1,2	1,3	1,4	1,2
<i>Fuchsia</i> spp.	1,0	1,0	1,0	1,0	1,0	1,0
<i>Impatiens</i> spp.	0,9	0,9	0,9	0,8	0,8	0,8
<i>Begonia</i> Semperflorens Group	0,8	0,8	0,8	0,8	0,8	0,8
<i>Begonia × tuberhybrida</i>	0,8	0,8	0,8	0,8	0,8	0,8
Cut flowers	27,5	23,0	21,7	13,6	10,3	19,2
<i>Rosa</i> spp.	22,9	19,4	18,1	10,8	8,1	15,9
<i>Gerbera × cantabrigensis</i>	1,9	1,4	1,4	0,9	0,5	1,2
<i>Gypsophila</i> spp.	1,3	0,9	0,9	0,9	0,8	1,0
<i>Chrysanthemum × grandiflorum</i>	0,4	0,3	0,3	0,2	0,2	0,3
Other	1,0	1,0	1,0	0,8	0,6	0,9
Potted plants	17,2	17,3	17,3	15,3	14,4	16,3
<i>Euphorbia pulcherrima</i>	4,8	4,9	4,9	5,3	4,0	4,8
<i>Begonia</i> Elatior Group and <i>Begonia × cheimanthia</i>	3,3	3,4	3,4	2,9	3,1	3,2
<i>Chrysanthemum × grandiflorum</i>	1,5	1,5	1,5	1,3	1,3	1,4
<i>Saintpaulia</i> Ionantha Group	1,2	1,2	1,2	1,1	0,8	1,1
<i>Kalanchoë Blossfeldiana</i> Group	1,2	1,1	1,1	0,8	0,7	1,0
<i>Rhododendron</i> spp.	1,0	1,0	1,0	1,0	0,9	1,0
<i>Cyclamen persicum</i>	0,8	0,8	0,8	0,8	0,8	0,8
<i>Rosa</i> spp.	1,5	1,4	1,4	0,8	0,6	1,2
<i>Primula</i> spp.	0,5	0,4	0,4	0,4	0,4	0,4
<i>Campanula</i> spp.	0,1	0,1	0,1	0,0	0,0	0,1
<i>Gerbera × cantabrigensis</i>	0,0	0,0	0,0	0,0	0,0	0,0
Other	1,2	1,4	1,4	1,0	1,8	1,3
Hanging pots	9,2	9,2	9,2	12,4	11,5	10,3
Foliage plants	1,2	1,1	1,1	1,5	1,3	1,2
Total	100,8	98,9	97,1	88,9	83,6	93,8

5.6 Fruits and berries

Table 30. The estimated economic value of the production of fruits and berries (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
Berries	41,3	49,9	43,2	41,1	57,7	46,6
<i>Fragaria × ananassa</i>	34,7	43,4	37,0	33,3	45,6	38,8
<i>Ribes nigrum</i>	3,5	4,3	4,3	4,2	6,3	4,5
Ribes Rubrum Group	2,4	1,8	0,9	2,7	4,4	2,4
<i>Rubus idaeus</i>	0,4	0,1	0,2	0,5	0,7	0,4
<i>Vaccinium corymbosum</i>	0,2	0,1	0,1	0,1	0,2	0,2
Other	0,1	0,1	0,7	0,4	0,5	0,4
<i>Malus domestica</i>	5,3	5,5	5,4	6,9	8,3	6,3
Total	46,6	55,4	48,6	48,0	66,0	52,9

5.7 Greenhouse vegetables

Table 31. The estimated economic value of greenhouse vegetable production (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
<i>Solanum lycopersicon</i>	56,1	59,5	53,8	64,7	77,4	62,3
<i>Cucumis sativus</i>	36,2	38,9	39,3	44,5	55,2	42,8
<i>Lactuca sativa</i>	26,2	29,5	28,9	29,7	40,4	30,9
Other	20,0	19,8	19,8	18,2	3,2	16,2
Total	138,6	147,7	141,8	157,0	176,1	152,2

5.8 Wild berries, mushrooms and lichen

Table 32. The estimated economic value of commercially used wild berries, mushrooms and lichen (million €/year) 2007-2011.

	2007	2008	2009	2010	2011	Mean
Berries	13,3	8,8	8,6	14,0	21,7	13,3
<i>Vaccinium vitis-idaea</i>	5,1	4,2	3,8	8,1	13,0	6,8
<i>Vaccinium myrtillus</i>	7,4	3,2	4,1	4,5	7,5	5,3
<i>Rubus chamaemorus</i>	0,3	1,3	0,6	1,3	1,0	0,9
Other	0,5	0,1	0,1	0,1	0,2	0,2
Mushrooms	1,1	2,0	2,0	2,8	2,0	2,0
Lichen	1,2	1,0	0,9	1,0	0,9	1,0
Total	15,6	11,8	11,5	17,8	24,6	16,3

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