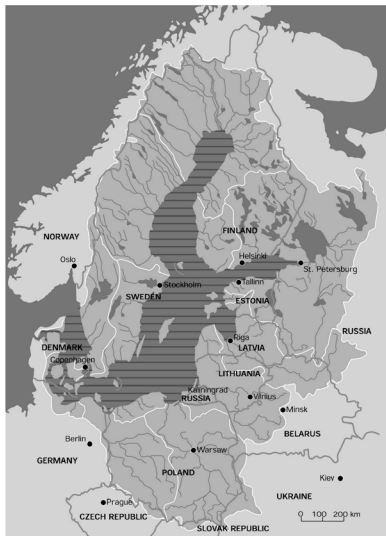


# **ENVIRONMENTAL IMPACTS OF ECO- LOCAL FOOD SYSTEMS**

**- final report from  
BERAS Work Package 2**

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and Thomas Schneider (eds.)*



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## **CONSUMER SURVEYS IN JUVA AND JÄRNA for identification of eco-local food baskets**

Our food habits are, unquestionably, important both for our own health and for the health of the environment. This is recognised as one of the starting points in BERAS. This is also one of the key issues of the S.M.A.R.T. concept (CTN 2001) that gives recommendations for diets that both improve health and decrease environmental impacts. The consumer survey presented here was aimed to provide information about the food habits of environmentally concerned residents in two of the BERAS case study sites. The aim was that this information should be used as input for comparisons of Swedish and Finnish average food baskets to determine their respective environmental impacts in the whole food system, reported in other chapters in this report.

The consumer surveys put together realistic food baskets (consumption profiles) for a Swedish and a Finnish case, containing mainly locally and ecologically produced foodstuffs. The unit used is kg food in different product groups per capita and year. Economic results as EUR per capita for different household types and year are reported in short here, and in more detail in other BERAS reports (Sumelius, 2005).

### *Case study sites*

The case studies were carried out in Juva, Finland and Järna, Sweden – the same sites used for many other studies in the BERAS project. Both the municipality of Juva and the community of Järna have around 7500 inhabitants. For a more detailed presentation of the sites see Seppänen (ed. 2004).

Juva is a rural municipality in South-Savo region, about 270 km northeast of Helsinki. Compared to neighbouring areas, Juva has a strong tradition of organic farming. In Juva 15.8 % of the cultivated land is organic, compared to the Finnish average of 7.6 %. Compared to many other rural municipalities Juva has a strong food processing industry, comprising a dairy, a flourmill, vegetable processing enterprises, meat processing enterprises and bakeries. The dairy processes organic milk while the other enterprises use conventional, non-organic, raw-products.

The small town of Järna is part of Södertälje municipality, located in Stockholm County, 60 km south of Stockholm. The heart of the case study lies in the outskirts of Järna and is connected to an anthroposophist community with a high concentration of anthroposophist initiatives and small businesses which prefer to use biodynamic and organic products. There are several biodynamic farms and market gardens in the area that serve the local market and a well developed consumer network

linked to these farms. There are also several food processing industries like a mill and bakery (with both a local and national market), a farm-size dairy and a farmer cooperative selling vegetables and meat.

### *Subjects*

Most of the research subjects in the study are individuals or families devoted to environment and health, living in Juva, Finland and in Järna, Sweden (Table 8-1). The families were invited to take part in the survey through local food and environment organisations and through staff in the local ecological farming research institutes.

## **Methodology**

The methodology used for the data collection differed slightly between the two case studies but, basically, the families recorded their food purchases for two two-week periods; one in winter/spring (when local products are scarce) and one in late summer/early autumn (when local products are easily available). The periods were chosen in order to get representative results for the yearly consumption. In Finland, the first period was performed during April 2004 and the second in September and November 2004. In Sweden, the survey started in February 2004. The second survey was made in September and early October.

In both Finland and Sweden a family member collected the receipts or filled in purchase diaries for all food entering the household for human consumption during the 14 days period. Information on the amount, price, origin and environmental brand of all food products was recorded either on the detailed receipts or on the specified lists supplied by the project.

After the recording period, the families were interviewed about their food choices, food consumption and food purchasing habits. In the interviews, information on the quantities of different kinds of food that were brought into or taken out of the household stores and the quantities of home-produced food was collected, to get representative values for the consumption during a two-week period at that time of the year.

The amounts of different products purchased during the measured four weeks were then extrapolated to get values for consumption during the whole-year. The comparable data for Finnish average food consumption were obtained from Tennilä (2000) and for the Swedish average from Jordbruksverket (2004).

For some comparisons to Swedish average figures, the results for the Järna consumers were also extrapolated to cover meals eaten outside

*Table 8-1. Composition of research subjects.*

period	Juva		Järna	
	April 2004	Sept/Nov 2004	February 2004	Sept/Oct 2004
no. households	9	9	15	13
no. adults	15	15	29.5	25
no. children 0–19 years	13	12	19.5	18.5

home based on an estimated factor. The factor was obtained through an estimation made by each household of how many meals they ate outside home in an average week during the measuring periods, and an assumption that each person eats three meals a day. In average, the Järna households ate 16 % of their meals outside home. Thus, when measured consumption was compensated for “eating-out” the original figures were multiplied by 1.16. This implies an assumption that food eaten outside home had the same proportions of different product groups and energy content as that purchased for home-consumption. In the Juva study, meals eaten outside were not taken into consideration because the Finnish statistics only cover the expenses for food which is bought and eaten at home.

The method used in this consumer survey has some limitations which should be taken into account when interpreting the results. The purchase diary used in these studies records food availability in households, not the food consumption of individual people. In other words, the results presented here per capita per year are estimations about purchased food, not actual food consumption. Also, purchasing patterns may be distorted and no information on the distribution of foods within households is normally obtained (Cameron, 1988). One problem is the possible lack of information about whether a product is never purchased or whether it simply was not purchased during the recorded weeks (Irish, 1982). Bulk purchases make it more difficult to estimate annual food expenditures than if the consumers acquire all or part of their food in relatively small quantities once or several times per week (Pena, 1998). However, when the families were interviewed and their purchase diaries and collected receipts checked, information on the above issues was received.

## **Results and discussion**

The results for amounts of different food products consumed are presented and discussed separately for the two surveys and compared to the national averages respectively. The shares of ecologically and locally produced foods and the expenditures for food are presented and discussed in the following sub-chapters.

### *Amounts of food consumed in the Juva households*

The main differences in the consumption patterns between the investigated households in Juva and the Finnish national average are the lower consumption of meat and potatoes and the higher consumption of garden products (Figure 8-1). However, concerning the potatoes and garden products it is only possible to comment on the *purchased* amount. Some families grow their own potatoes and vegetables, and as this has not been taken into account in the results, the consumption may be substantially higher than the results indicate. On the other hand, there were some bulk purchases of carrots. One vegetarian and one meat producer may account for lower meat purchase. Thus the difference in

consumption patterns may partly be explained by weaknesses in the methodology. Other differences are small when looking at whole product groups.

When the product groups are broken down into smaller groups (Figure 8-2) additional differences, but no striking new patterns, appear.

#### *Amounts of food consumed in the Järna households*

When studying the results from the Järna survey there are some evident differences between the consumption patterns in the investigated households and the Swedish average (Figure 8-3). The most obvious are their lower consumption of meat and potatoes and the higher vegetable consumption. The differences in meat and vegetable consumption were expected but that potatoes seem to be less favoured by these households was somewhat surprising. This fact might partly be explained by anthroposophist nutritional concepts recommending limited intake of solanin producing products, like potatoes and tomatoes. Thus, it is likely that the result reflect an actual lower consumption of potatoes.

When looking at more detailed product groups some more interesting differences become apparent (Figure 8-4). Although there is no difference in cereal products as a group it can easily be seen that these households seem to bake more of their bread at home. They also eat

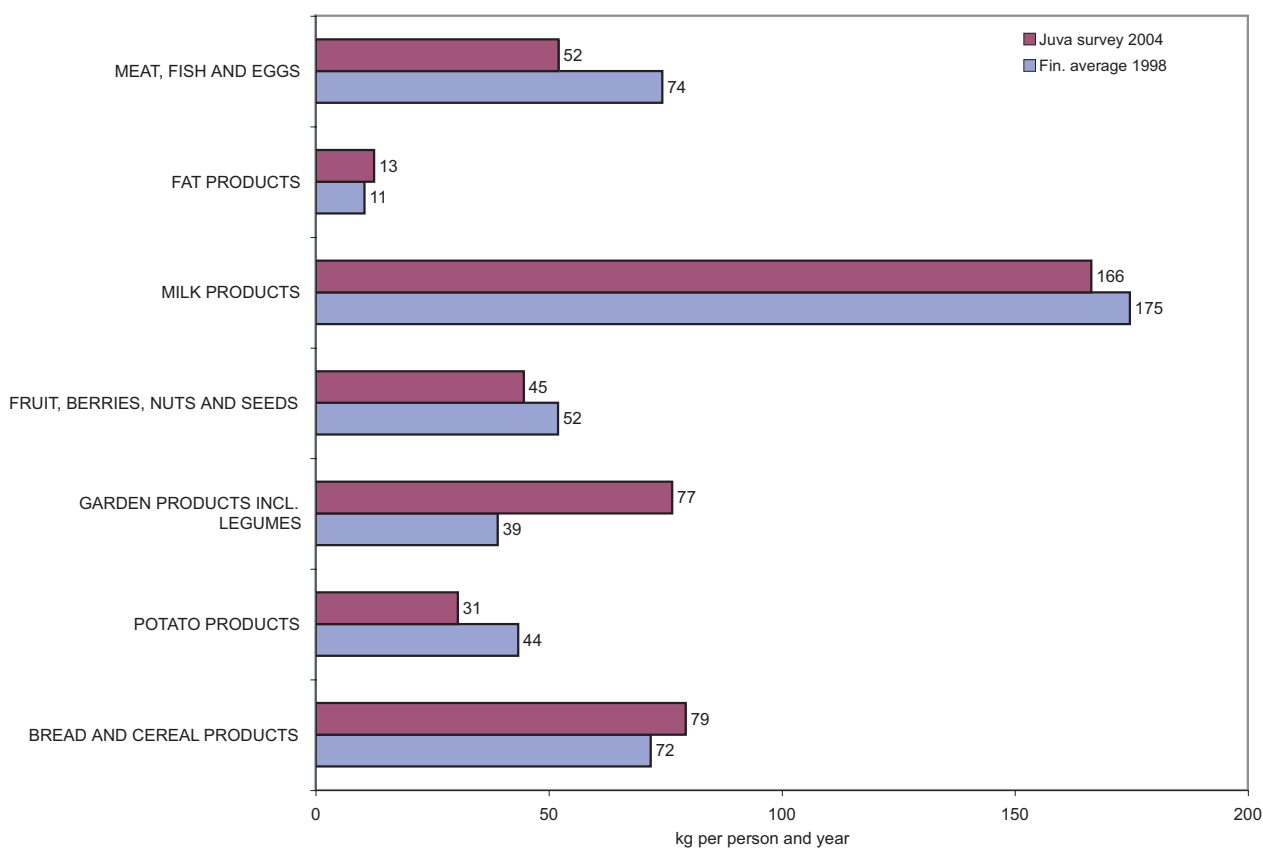


Figure 8-1. Food consumption of product groups in Finland 1998 and in the Juva survey 2004 (kg per person and year). Meals outside home excluded.

more groats and flakes, which is in accordance with the higher consumption of yoghurt and other fermented dairy products. Concerning the fat products consumed, it is obvious that these households prefer butter to the more processed margarine. Figure 8-4 also shows that when these households eat meat, they seem to choose meat from animals that have been kept outside (e.g. lamb and wild boar) in what can be presumed to be a more animal friendly production.

#### *Share of ecological and local food*

The main objective of this study was to present data for an “eco-local” food basket; i.e. a food basket mainly consisting of ecologically and locally produced food. The shares of ecologically and locally produced food reported in the surveys and for national averages are presented in Table 8-2. The households in both Järna and Juva bought a much larger share of ecological food compared to the national averages. The por-

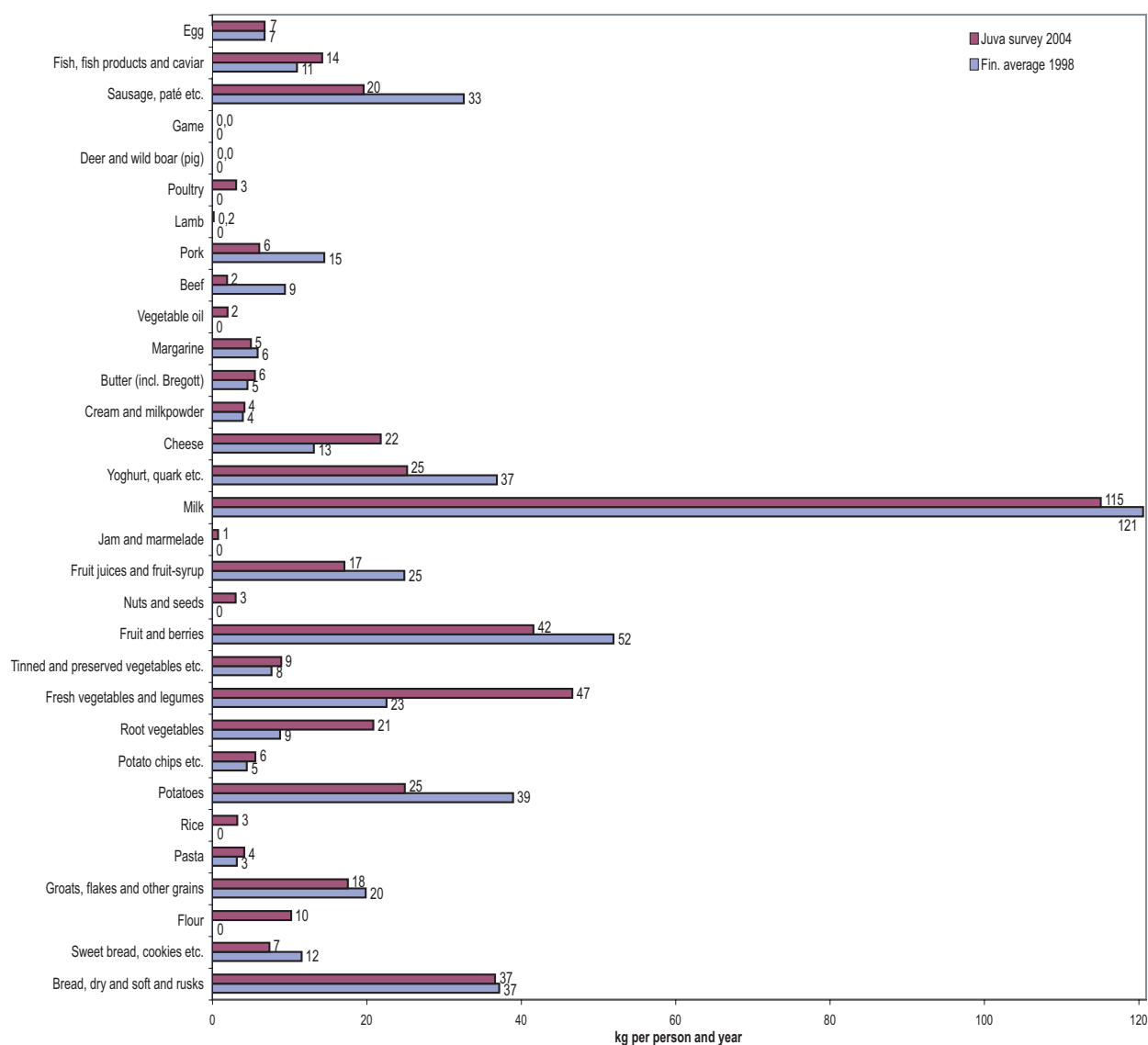


Figure 8-2. Food consumption of detailed product groups in Finland 1998 and in the Juva survey 2004 (kg per person and year).

tion of ecologically produced food purchased was substantial for some product groups, especially in Järna.

In Juva the share of ecological food in general was smaller than in Järna but the availability of such products was most certainly a large constraint. For example, no ecological meat or fish was bought in Juva. The reason given was that there very rarely are ecological alternatives on sale. However, the Juva households bought much more ecological milk than average Finns do. Also the share of ecological fresh garden products, cereal products and eggs was larger. In the food basket of the average Finnish consumer, the share of organic food is 1 %. (Tennilä, 2000) In another survey only 4 % of the Finnish households estimated that the share of organic products in their food basket is 6 % or more (Nielsen, 2004). In Finland about 20 % of the consumers answered in interviews that they buy organic products continuously. Half on them have estimated that the share of organic products in their food basket is less than 20 % (Nielsen, 2004).

It is worth noting that the share of ecological food in the Järna households is very large, 73 % of the weight for what is considered 'real food' (sugar, candy, beverages etc. not included). This is certainly influenced by the availability of these products which in turn is influenced by the long standing demand for ecologically produced food in Järna. Some of the Järna consumers even mentioned that they would

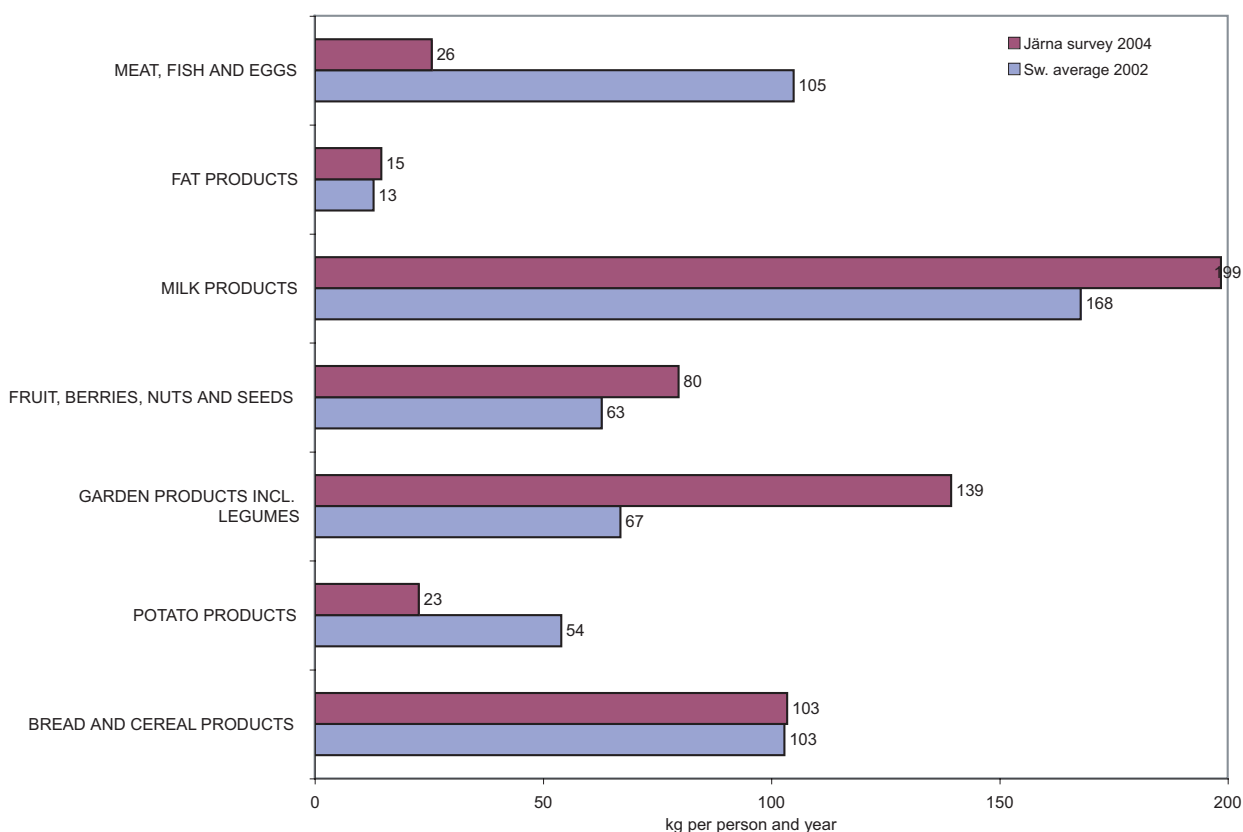


Figure 8-3. Food consumption by product groups in the Järna survey 2004 and in Sweden 2002. Swedish averages include all meals. Järna figures are corrected for meals eaten outside the home by adding 16 % to purchased amounts (kg per person and year).

have bought more eco-food if it was available and not too expensive.

Concerning the second important issue investigated in BERAS, the locally produced food, the portion purchased by the investigated households was found to be substantial for some product groups (Table 8-2). Also here the shares in general were larger in Järna, again probably the result of there being so readily available. In Juva the share of local food varied greatly between the food groups. For example the share of local milk was 37 % of the weight. This is possible because there is a local dairy in Juva. The share of local cereal products was only 10 % of weight despite the fact that there is a local mill. The people in the Finnish study seem to prefer the ecological cereal products to the local ones. However, about 20 % of the bread purchased is produced by the Juva bakery.

It is not possible to make comparisons with national averages concerning local food. However one can assume that the average share is very low because food retail chains tend to market a nationally standardised assortment favouring centralised suppliers.

#### *Households' expenditure on food*

The expenditures on food are summarised in Table 8-3 and discussed shortly below. For more detailed results, see Sumelius, 2005.

The Juva households' expenditure for food was between 1622 and 6815 EUR/household and year and the mean was 4334 EUR/household and year. The average Juva household consisted of 2.9 persons. Average consumption expenditure of households in Finland in the year 2001 was 3397 EUR/household/year for food and non-alcoholic beverages. The value of home grown products is not taken into account in these statistics. The mean Finnish household had 2.15 persons in year 2001 (Statistical Yearbook, 2004).

The Juva households' expenditure for food per consumption unit (CU) ranged between 908 and 4803 EUR/CU/year, the mean was 3013 EUR/CU/year. There is no reference for EUR per CU in Finland. In Juva average expenditures for food was a little bit higher than the Finnish averages. One reason for this may be that the second purchase diary period was near Christmas and families bought dried fruits etc. for baking Christmas cakes and ginger biscuits in advance.

In Järna the investigated households seem to spend more money on food than the average Swedish household. The mean value for food expenditures per household was 5833 EUR/household/year in the monitored households, while the Swedish average household expenditures was 3376 EUR, alcoholic beverages and restaurant meals not counted (Statistics Sweden, 2004). However, when calculated per consumption unit (CU) the difference is smaller. The results was 2600 EUR/CU/year in Järna compared to 2100 EUR for the Swedish average CU, a 24 % larger expenditure on food for the Järna households compared to the Swedish average. Whether this is a result of these families really giving higher prioritising to food or of something else is however hard



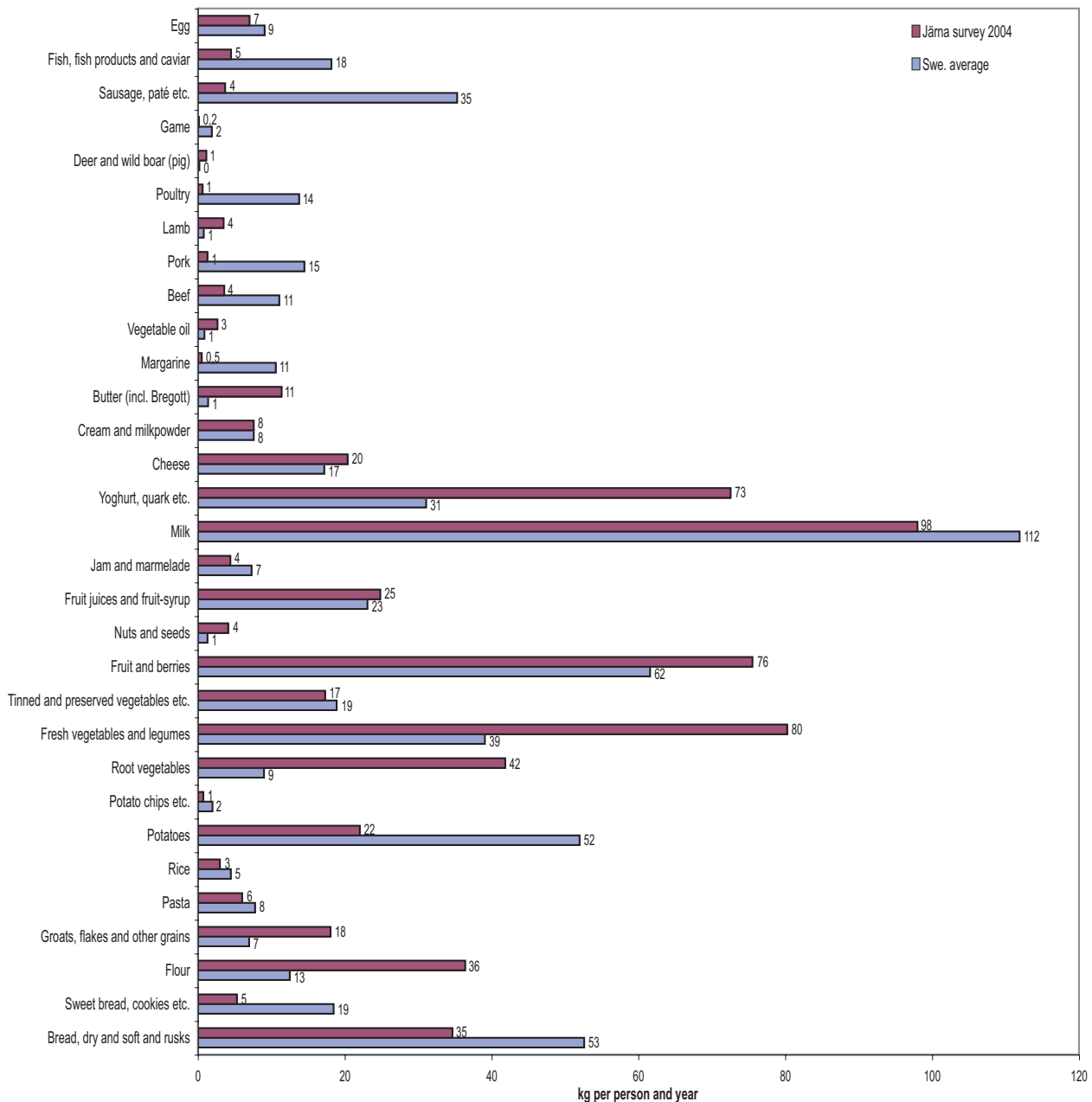


Figure 8-4. Food consumption of detailed product groups in the Järna survey 2004 and in Sweden 2002 (kg per person and year). Swedish averages include all meals. Järna figures are corrected for meals outside home – purchased amounts added by the part of meals eaten outside home (16%).

to say. Of course ecological food is generally more expensive but the difference could as well be a result of the socio-economic status of the studied households. This was not investigated in Järna. In the Finnish case the proportion of meals eaten at home was not investigated which might affect the results.

*Reliability of data*

Based on the information in the purchase diary the amount of energy consumed was 11.5 MJ/person/day in the Juva district. According to the FINDIET 2002 (Mennistö et al. 2003), dietary energy intake was 9.2 MJ/day among men and 6.6 MJ/day among women. For the Järna case,

the energy content of consumed (purchased + restaurant meals) basic food (excl. sugar, sweets, beverages etc.) was 10.7 MJ/person/day, while the Swedish average 2002 was 10.2 MJ/person/day (Jordbruksverket 2004). Thus, we can conclude that our results are in a reasonable range concerning energy content of the purchased food. However, the results are not easily comparable to statistical data due to differences in survey methods.

#### *Environmental impacts and nutrition recommendations*

Our food choices have an effect on the environment. For example what we eat influences the energy consumed during different stages of the food chain. About 15–20 % of the energy consumed is for the transportation of food. (SwEPA, 1997)

Generally one can say that meat is the most energy demanding food to produce and increased meat consumption is problematic. It is also shown in Chapter 5 that local food production and consumption may have environmental gains due to less transportation. Growing field vegetables demand less energy than greenhouse production. Thus, a higher consumption of local and seasonal vegetables, root crops, fruits and berries decreases the energy needed for food transportation.

New Nordic Nutrition Recommendations (NNR) were approved in August 2004. These are guidelines for the nutritional composition of a healthy diet (NNR, 2004). The NNR does not include instructions for sustainable food choices but such recommendations are available at least in Sweden and in Germany (CTN 2001, SwEPA 1997, SwEPA 1998, SwEPA 2000).

In Table 8-4 both nutritional and sustainable food choice recommendations are presented and used to evaluate households' food choices.

The food consumption profile of the Järna households seems to follow the diets suggested in the Nordic Nutrition Recommendations (NNR, 2004) and in the S.M.A.R.T. project (CTN, 2004). These households buy a larger share of vegetables (less meat), a larger share of nutritional and storable vegetables (e.g. legumes and root crops) instead of fresh vegetables (e.g. lettuce and cucumbers) during the winter season, less 'empty' calories, more ecological food, more legumes and root crops, less lettuce and cucumbers, and less transported food, compared to the national average food. The only large difference between the results of the Järna survey and the S.M.A.R.T. recommendations is the share of potatoes. The Järna consumers eat substantially less potatoes than the average Swede, while the S.M.A.R.T. project recommends more potatoes. One reason might be recommendations in the anthroposophist nutrient concept to minimise intake of solanin producing products like potatoes and tomatoes.

### **Conclusions**

We conclude that the consumption profile of the participating households in Sweden differed more from the average Swedish

Table 8-2. The share of ecological (organic) and local food purchases in Sweden (15 Järna households) and in Finland (10 Juva households) (kg per capita and year, and % of weight).

Product group	Swedish average		Järna survey 2004 <sup>1</sup>				Finnish average		Juva survey 2004 <sup>2</sup>							
	total <sup>3</sup> kg	eco <sup>4</sup> % <sup>8</sup>	total kg	eco kg	eco-local <sup>5</sup> % kg %		total <sup>6</sup> kg	eco %	total kg	eco kg	local <sup>7</sup> % kg %		eco-local kg %			
Cereal products	103	1.6	103	81	78	58	56	72	3.4	79	13	17	8	10	4	5
Potatoes	54	3.3	23	22	96	9	38	44	2.7	31	7	24	8	25	4	13
Root crops	9	9.9	42	39	92	17	40	9	3.5 <sup>9</sup>	21	18	87	16	79	16	75
Vegetables, veg. products and legumes	58	2.0	98	64	66	29	30	30	3.9	56	11	20	12	21	5	9
Milk products	168	5.1	199	162	81	72	36	175	1.8	166	78	47	50	30	50	30
Meat ruminants (beef and lamb)	12	0.8 <sup>10</sup>	7	5	70	4	49	9	*	2	0	0	2	100	0	0
Meat monogastrics (pork and poultry)	28		2	1	48	1	28	15	*	9	0	0	3	32	0	0
Other meat and mixed meat products	37		5	3	62	2	41	33	*	20	1	4	1	7	0	0
Egg	9	9.7	7	6	88	2	22	7	2.1	7	1	9	2	28	0	0
Fish and fish products	18	0 <sup>11</sup>	5	0	3	0	0	11	0 <sup>11</sup>	14	0	0	1	5	0	0
Fat	13	2.7	15	6	42	0	0	11	3.3 <sup>12</sup>	13	1	5	0	0	0	0
Fruit, berries, nuts and seeds	63	2.6	80	39	48	2	3	52 <sup>13</sup>	*	45	1	3	0	0	0	0
<b>Total 'real food', excl. sugar, candy, beverages etc.</b>	<b>572</b>	<b>2.2</b>	<b>584</b>	<b>428</b>	<b>73</b>	<b>194</b>	<b>33</b>	<b>466</b>	<b>1<sup>14</sup></b>	<b>462</b>	<b>131</b>	<b>28</b>	<b>103</b>	<b>22</b>	<b>79</b>	<b>17</b>

<sup>1</sup> Compensated for meals eaten outside home.

<sup>2</sup> Not compensated for meals eaten outside home.

<sup>3</sup> Swedish average 2002 (Jordbruksverket, 2004).

<sup>4</sup> Certified KRAV, Luomu and/or Demeter.

<sup>5</sup> Produced in Järna district and, since all local is eco in Järna, certified KRAV and/or Demeter.

<sup>6</sup> Finnish average 1998 (Tennilä 2000).

<sup>7</sup> Produced in Juva district.

<sup>8</sup> % of expenditures per product group.

<sup>9</sup> Carrots (Finfood Luomu / A.C.Nielsen ScanTrack).

<sup>10</sup> % of all meat and meat products.

<sup>11</sup> Not possible to certify at that time.

<sup>12</sup> Oil (Finfood Luomu / A.C.Nielsen ScanTrack).

<sup>13</sup> Fruit and berries only.

<sup>14</sup> % for all foods.

Table 8-3. Expenditures on food.

	Euro/CU <sup>1</sup>	Euro/person/year	Euro/household/year
Juva	2213	1642	4334
Finnish average	no reference	1580	3397
Järna	2584	1800	5833
Swedish average	2084	1600	3376

<sup>1</sup> CU = Consumption Unit, a measure that compensates for household structure and the ages of the household members to allow for more relevant comparisons of consumption between different household types.

Table 8-4. Examples of recommendations.

	<b>Nutritional recommendations</b>	<b>Environmental perspective Sustainable food choices</b>
Fruit, berries and vegetables	- A high and varied consumption of fruit and vegetables is desirable.	- A high and varied consumption of domestic vegetables, fruits and berries in season and foodstuffs grown in the field. - If needed off-season, imported fruits or vegetables grown in the field, giving preference to products grown in a nearby country. - More leguminous plants instead of meat.
Legumes		
Potatoes	- Traditional use, several nutrients, potatoes have a place in a diet.	
Cereals	- An increased consumption of wholegrain cereals is desirable.	
Fish	- Regular consumption of fish.	
Milk and milk products	- Regular consumption of milk and milk products, mainly low fat products are recommended as a part of balanced diet.	
Meat	- Consumption of moderate amounts of meat, preferably lean cuts, is recommended as part of a balanced and varied diet.	- Less meat - Choose meat from animals that have grazed on natural pasture, e.g. cattle and lamb. - Eat less chicken and pork.
Edible fats	- Soft or fluid vegetable fats, low in saturated and trans fatty acids, should primarily be chosen.	- Butter instead of margarine.
Energy-dense and sugar-rich foods	- Food rich in fat and/or refined sugars, such as soft drinks, sweets, snacks and sweet bakery products should be decreased.	- Eat less
General		- More locally produced food when this is more eco-efficient. - Ecological food. - Eat less foodstuffs which include few nutrients, for example: eat fruits instead of sweets. - More easily transported foods, eg. juice as concentrate instead of ready to drink. - Choose the product produced most nearby when there are equal products.

consumers than was the case in the Finnish study. However, also the Finnish households participating in this study bought more organic products than ordinary Finnish households. Substantial parts of the food consumed were locally produced but it has not been possible to make any comparisons with national averages due to lack of data.

The calculated expenditures on food in the Finnish group were almost the same as the national average. The Järna group spent 24 % more money on food compared to average Swedish consumers.

The Swedish consumption profile obtained in the study is well suited for use as a good example in the scenario studies of the whole food system reported in the following chapter.

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