

VEGETABLES IN EUROPE

2016

**Consumption
moments offer
opportunities to
enhance
vegetable
consumption**





Despite the considerable evidence that eating vegetables has various health benefits, consumers' intake is less than recommended in most Western countries. In order to stimulate vegetable consumption, more insight is needed in consumers' beliefs and motives with regard to (specific) vegetables. Under the auspices of Fresh Produce Centre (GroentenFruit Huis), Wageningen University & Research conducted a European study in nine countries on vegetable consumption. Results reveal that:

- Vegetable consumption differs between countries;
- Daily users of vegetables are more likely to consume more servings of vegetables than regular (3-6 days a week) or occasional (less than 3 days a week) vegetable users;
- Vegetables are most likely to be consumed as part of lunch or dinner;
- Country (cultural) differences in consumption moments are shown;
- Important determinants of consumers' vegetable consumption across different consumption moments are:
 - openness to try new foods,
 - having a routine in vegetable consumption,
 - having a younger age

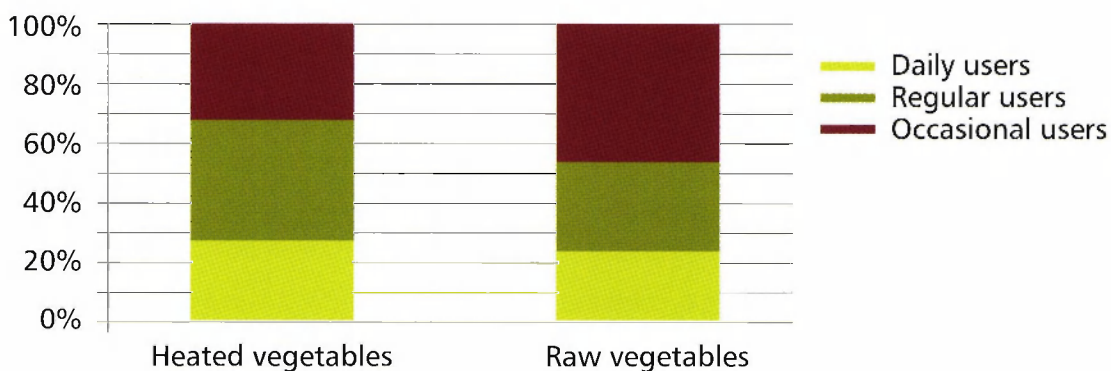
This leaflet takes you further into these, and other, results. Differences and similarities across countries are discussed.

A short overview of the methodology and study sample can be found in the Appendix of this leaflet.

Vegetable consumption in nine European countries

A European study was conducted in the Netherlands, Germany, France, the United Kingdom, Poland, Spain, Greece, Croatia and Serbia. In this study, a distinction was made between heated vegetables (i.e., cooked, baked or steamed vegetables) and raw vegetables (i.e., salad). 28% of the respondents indicated to consume heated vegetables on a daily basis. On those days, most consumers consumed two to four serving spoons. Slightly less respondents indicated to consume raw vegetables on a daily basis (25%) and on those days mostly 2-3 serving spoons were eaten. Interestingly, differences between the consumption frequency and the amount of raw vegetables are found. On a day that occasional users consume raw vegetables, they are more likely to consume less serving spoons than the regular and daily raw vegetable users do. This is not found regarding the heated vegetables.

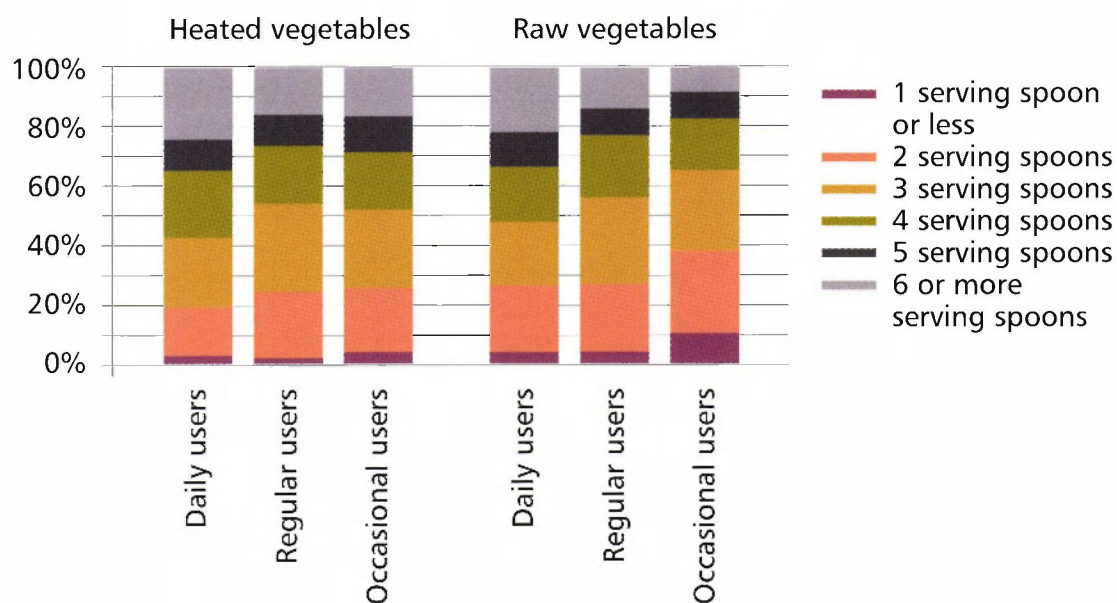
Vegetable consumption frequency



Note: Occasional users = less than 3 days a week; Regular users = 3-6 days a week; Daily users = daily consumption



Number of consumed serving spoons* of vegetables on vegetable consumption days for daily, regular and occasional vegetable users

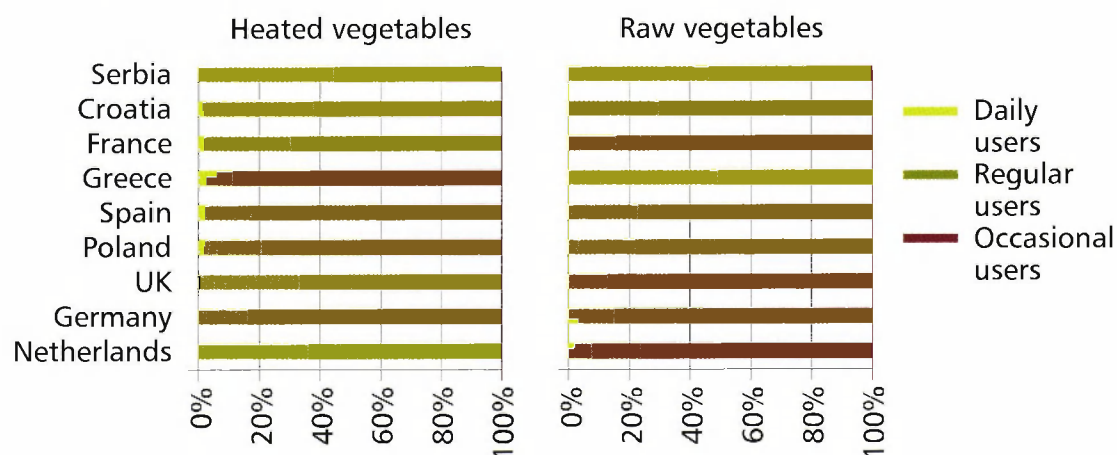


* 1 serving spoon contains about 50 grams of vegetables.

Serbian are vegetable lovers

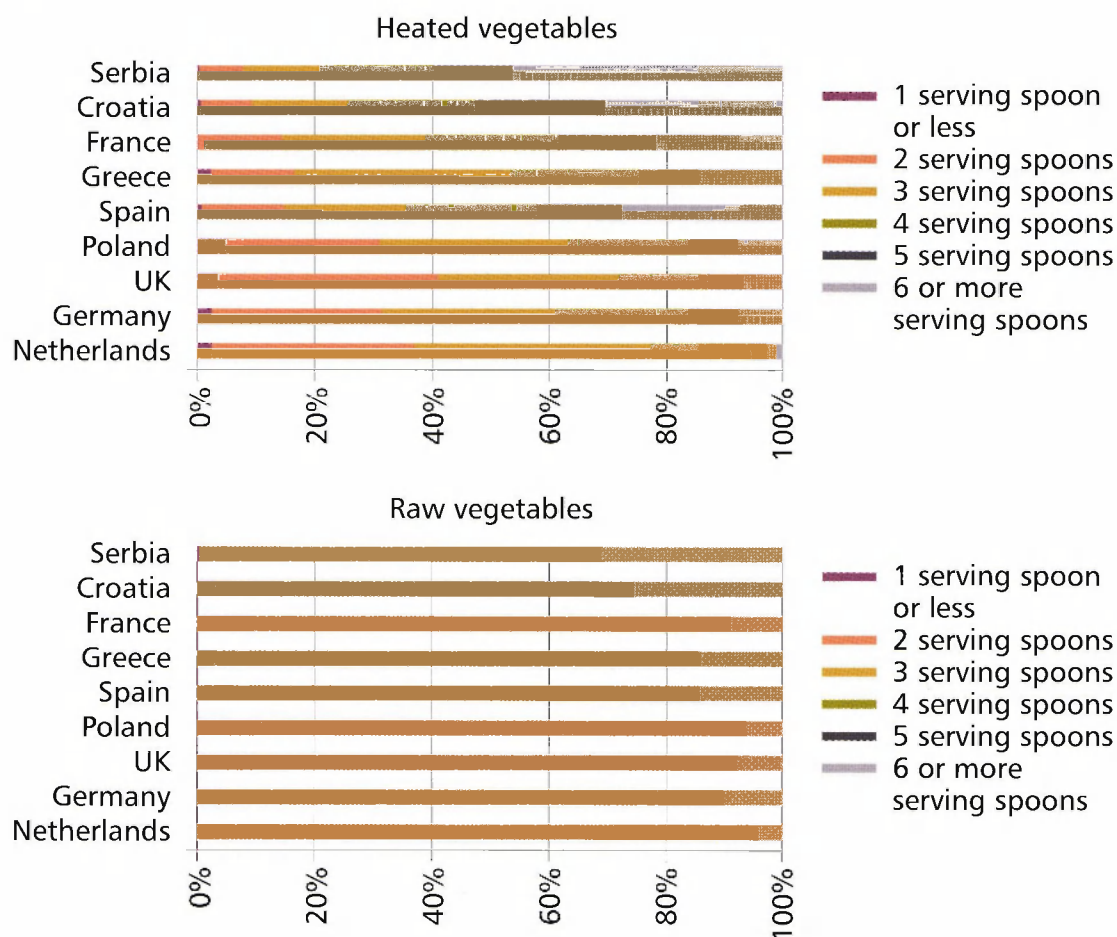
When looking at differences across countries, significant differences are found on both the frequency of vegetable consumption (heated and raw) and consumption amount. The consumption frequency of the Serbians and the Dutch stands out. The Serbians consume both heated and raw vegetables most frequently; 45% of the Serbians indicated to consume heated vegetables on a daily basis and 46% indicated to consume raw vegetables on a daily basis. In contrast, the Dutch are regular consumers of heated vegetables, but only occasionally eat raw vegetables. 76% of the Dutch indicated to consume raw vegetables less than 3 days a week, whereas 56% of the Dutch indicated to consume heated vegetables on a regular basis and 36% on a daily basis. Another interesting finding is the distribution of consumption frequency of the Greeks regarding heated and raw vegetables. Greeks are more likely to consume raw vegetables than heated vegetables on a daily basis.

Vegetable consumption frequency by country



When looking at the consumption amount, Serbia stands out again together with Croatia

Number of consumed vegetable servings on consumption days by country

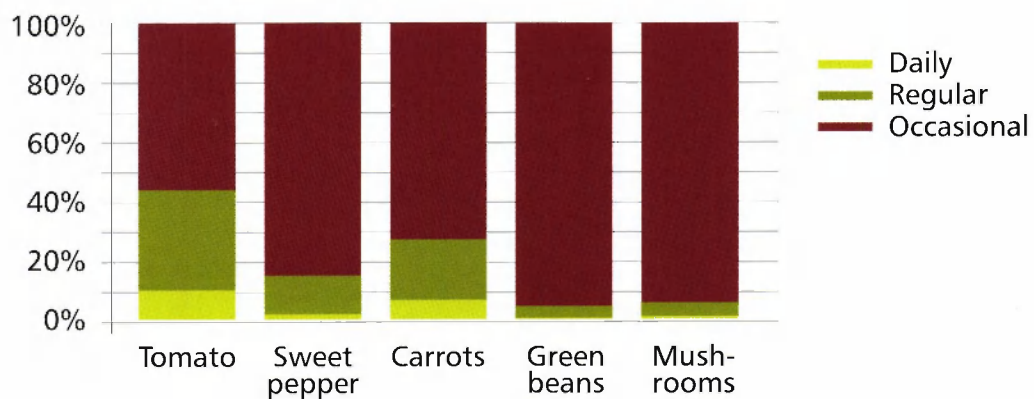


We all love tomatoes

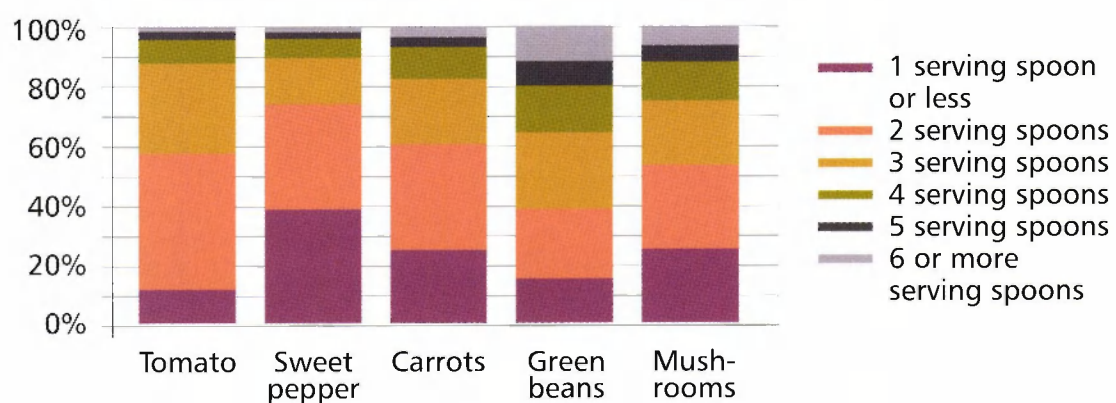
Differences regarding consumption frequency and amount of different types of vegetables (i.e., tomatoes, sweet peppers, carrots, green beans and mushrooms) are found. Tomatoes and carrots are most frequently consumed on a daily basis, while green beans are least likely to be consumed on a daily basis. When these types of vegetables are consumed, mostly 2 serving spoons are consumed. However, the types of vegetables that are least likely to be consumed on a frequent basis, are more likely to be consumed in larger portion sizes. For example, 36% of the respondents indicated to consume 4 serving spoons or more of green beans when consumed.



Consumption frequency of different types of vegetables



Number of consumed serving spoons of different types of vegetables



Note: For tomato pieces were used instead of serving spoons, where 1 piece was equivalent to 1 serving spoon.



Differences in the consumption frequency and amount of the different vegetables are found between the European countries.

Tomato:

- Tomatoes are most frequently consumed.
- Mostly 1 or 2 pieces of tomatoes are consumed.
- Greeks, Polish and Spaniards are the most frequent tomato users.
 - Polish consume the smallest quantities of tomatoes (25% consume 1/2 piece of tomato or less).
- When the British consume tomatoes, they consume in large amounts (almost 60% consumes 2 or more pieces).



Sweet pepper:

- Sweet peppers are most likely to be consumed in small quantities (39% indicated to consume 1 serving spoon or less).
- Serbians are sweet pepper lovers (highest consumption frequency and amount).
 - The Dutch consume a relatively small quantity of sweet peppers (55% consume 1 serving spoon or less).



Carrots:

- Carrots are one of the most frequently consumed vegetables (28% 3 or more days a week).
- The Dutch and Germans are least likely to consume carrots frequently. The Dutch slightly lesser than the Germans.
 - Spanish are most likely to consume carrots in small quantities.
- Serbians stand out regarding their high consumption frequency and amount.



Green Beans

- Green beans are least frequently consumed.
- Green beans are likely to be consumed in larger quantities (36% consumed 4 serving spoons or more).
- British are most likely to consume green beans on a daily basis, but consume then the smallest portion of green beans (33% consumes 1 serving spoon or less).
- When Serbians consume green beans they consume a relatively high amount (36% of the Serbians consumes 6 serving spoons or more).



Mushrooms

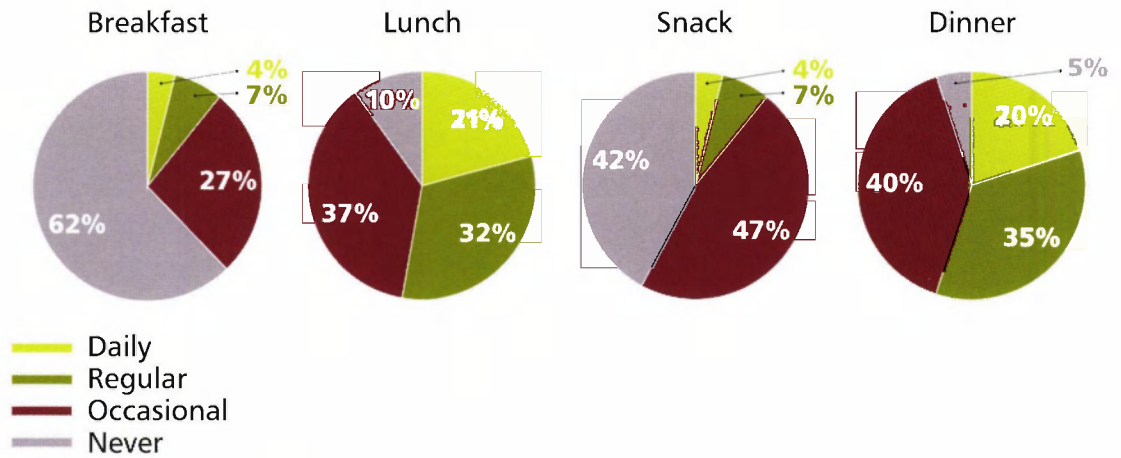
- Mushrooms are not likely to be consumed on a daily basis.
- British are most likely to consume mushrooms on a daily basis.
- Polish are least likely to consume mushrooms on a daily basis, they are more likely to consume them less than 1 day a month.
- Serbians are most likely to consume large quantities of mushrooms



Vegetables are most favourite as part of a meal

Vegetables are most likely to be consumed as part of a main meal: lunch (21% daily basis) and dinner (20% daily basis). In contrast, breakfast and snacking are the least favourite moments. A snack can be defined as food or drink eaten between main meals (Chaplin and Smith, 2011).

Vegetable consumption at different consumption moments



Note: Never=never, Occasional = less than 3 days a week; Regular= 3-6 days a week; Daily= daily consumption

Cultural differences in favourite vegetable consumption moments

When looking at the vegetable consumption during the day, differences are found across countries.

The residents of East-European countries, especially the Polish and Croatians are most likely to start their day with vegetables. Just like the Polish and the Croatians, the Greek are likely to consume vegetables as part of their lunch, while the Dutch are least likely to consume vegetables at this moment (41% never). 43% of the Dutch consumes vegetables daily as part of their dinner and 48% at least 3 to 6 times a week. Interestingly, Germans are not likely to consume vegetables at this moment, in comparison with the Dutch they are more likely to consume vegetables as part of their lunch. Vegetables are not likely to be consumed as a snack. Polish are most likely to consume vegetables as a snack (34% of the Polish consumes vegetables as a snack 1 to 2 days a week), while the French are least likely (77% never) to do so.

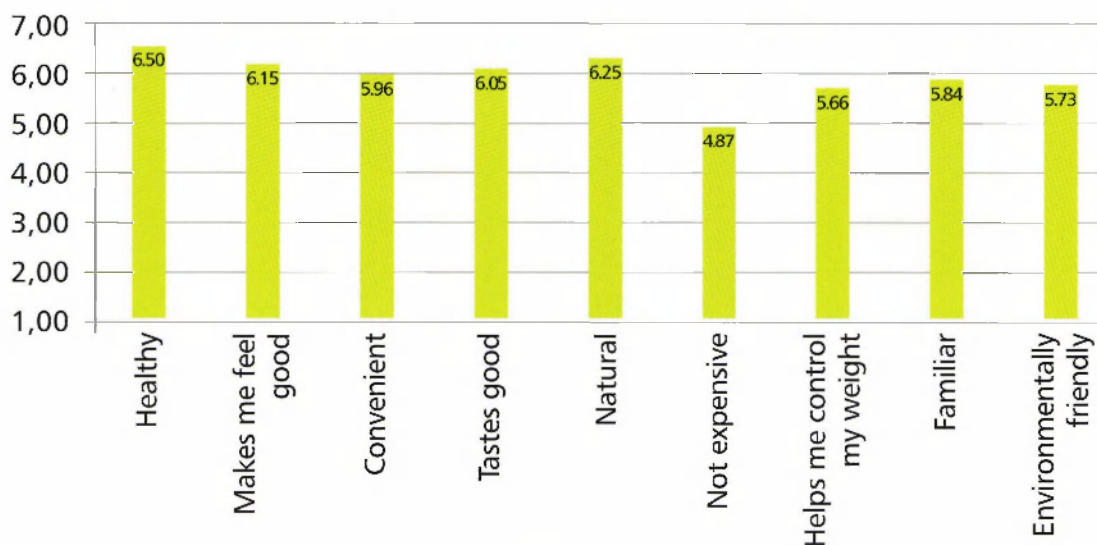




Vegetables perceived as healthy and natural

Consumers associate vegetables with health and naturalness. In addition, consumers perceive vegetables as providing a good feeling, tasting good and convenient. Consumers perceive vegetables least as 'not expensive'.

Vegetable benefit perceptions

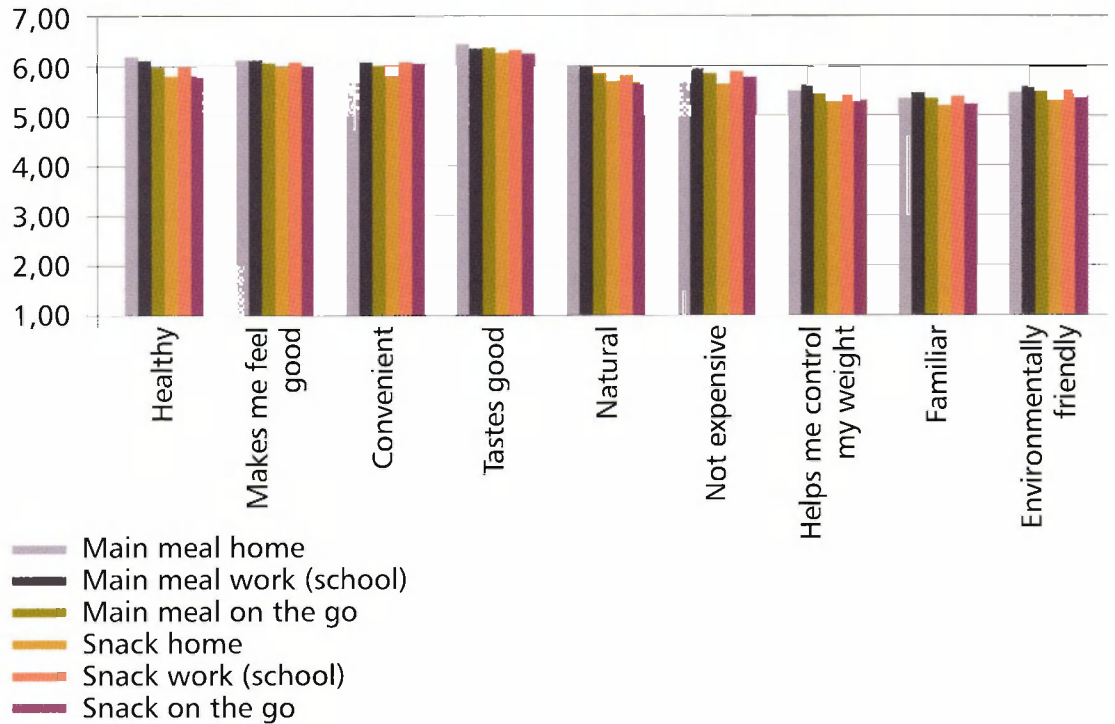


Note: Scores ranged from 1 = Strongly disagree to 7 = Strongly agree

Importance of product benefits differ across consumption moments

Respondents in the study were asked to what extent they found these different product benefits important at different consumption moments. The figure below shows that there are differences between consumption moments. For example, convenience is more important in the situations 'at work (school)' or 'on the go'. Price also seems to play a more important role in the out-of-home situations. Healthiness is playing a slightly more important role in the consumption of main meals as compared to snacks. Finally, weight control, familiarity and environmental friendliness seem to play the most important role in the work (school) situations.

Importance of different product benefits at different situations



Note: Scores ranged from 1= Strongly disagree to 7= Strongly agree

Health and familiarity perceptions play a role at all consumption moments

These different perceptions of vegetables are relevant in understanding consumers' vegetable consumption. The main determinants of vegetable consumption at different consumption moments are shown in the Box 1. Weight control and makes



me feel good are important factors across all consumption moments. Except for breakfast, also good taste is an important factor. For the lunch and dinner situations, familiarity is additionally important. In addition, for breakfast and snack situations, perceived healthiness plays a (negative) role when controlling for the other product benefits. Finally, country differences (not shown in the Box below) are of importance in the frequency of vegetable consumption on these different moments.

Box 1:
Determinants of vegetable consumption in order of importance

Breakfast

- Healthy (-)
- Helps me control my weight (+)
 - Makes me feel good (+)
 - Environmental friendly (+)

Lunch

- Makes me feel good (+)
 - Tastes good (+)
 - Familiarity (+)
- Helps me control my weight (+)
 - Natural (+)

Snack

- Healthy (-)
- Helps me control my weight (+)
 - Tastes good (+)
 - Makes me feel good (+)

Dinner

- Familiarity (+)
 - Makes me feel good (+)
 - Tastes good (+)
- Helps me control my weight (+)

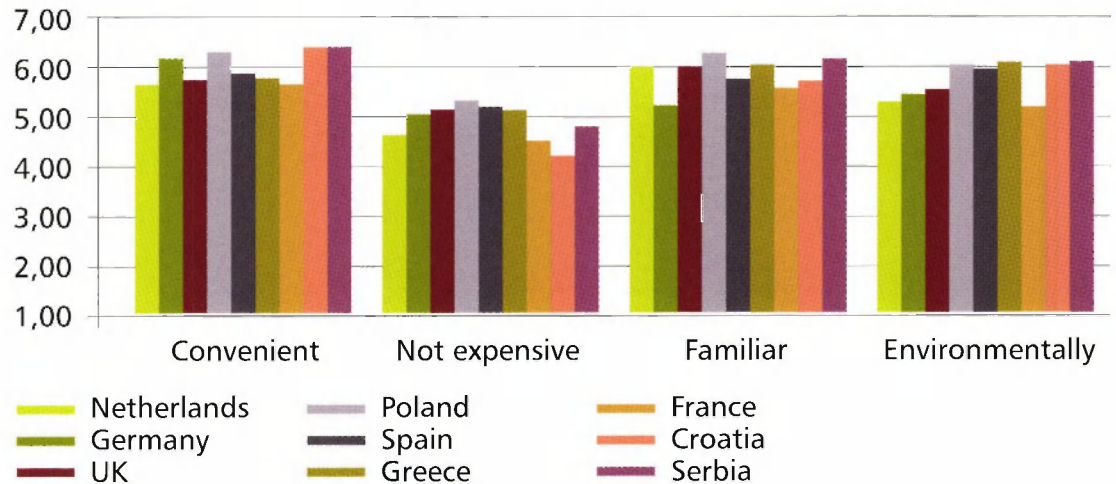
Note: + = positive relationship, - = negative relationship



Importance of perceptions differs across countries

Overall, differences were found between countries: Poland, Croatia and Serbia are the countries that generally provided the highest scores to the different product benefits, whereas France and the Netherlands generally provided the lowest scores. When looking more in detail at the different types of product benefits, the largest differences between countries are found for perceptions of convenience, expensiveness, familiarity and environmental friendliness. The figure below shows how these perceptions differ across countries. For example, in Germany, Poland, Croatia and Serbia vegetables are perceived as more convenient compared to the other countries. 'Not expensive' got highest scores in Poland, whereas familiarity got relatively high scores in the Netherlands, UK, Poland, Greece and Serbia. Finally, vegetables are strongly perceived as environmental friendly in Poland, Spain, Greece, Croatia and Serbia.

Vegetable benefit perceptions by country

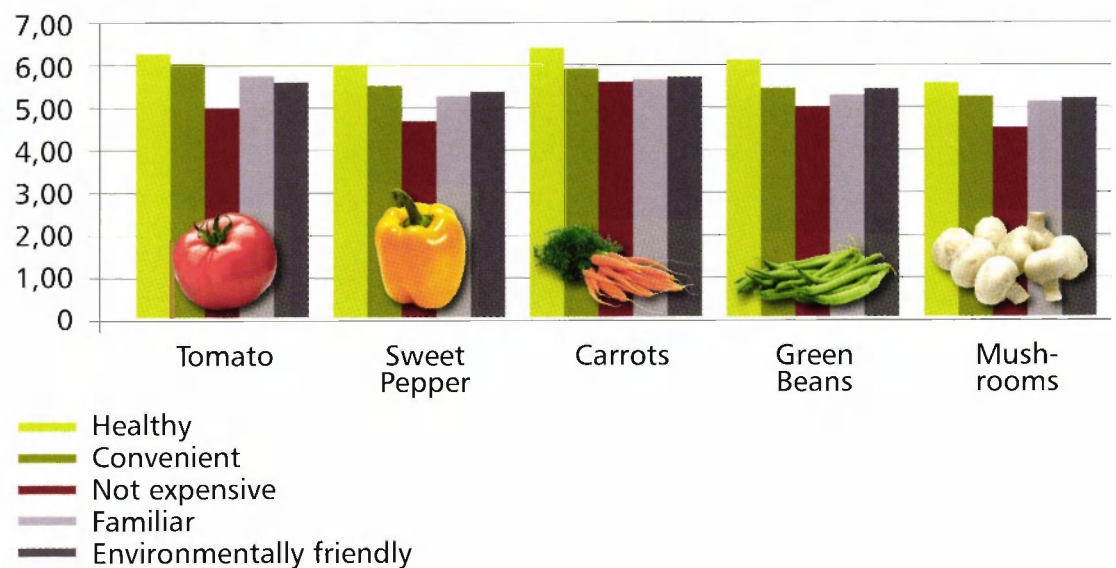


Note: Scores ranged from 1 = Strongly disagree to 7 = Strongly agree

Benefit differences between five types of vegetables

Perceptions differ across types of vegetables. Overall, there are no negative perceptions, implying that these vegetables all score positive on perceptions like healthy, convenient, not expensive and familiar. In addition, carrots are the vegetable products that generally received the most positive scores on the different product benefits, whereas mushrooms generally received the lowest scores. Some noteworthy differences can be found between products when it comes to the different product benefits. For example, tomato and carrots are perceived as more convenient, carrots received relatively high scores on 'Not expensive' and tomato received highest scores on familiarity.

Benefit perceptions for different types of vegetables



The role of personal characteristics

Consumers differ in many ways, and some of these differences are relevant in understanding consumers' vegetable consumption. The main consumer characteristics that determine vegetable consumption at different consumption moments are shown below. Consumers that are open to try new foods, having a routine in vegetable consumption, and having a younger age consumed vegetables more frequently at different moments. In addition, country differences are important (not shown in the Box below). Striking is the huge impact of countries on vegetable consumption at lunch, indicating that the cultural habit to eat vegetables at lunch plays an important role.

Box 2: Determinants of vegetable consumption in order of importance

Breakfast

Vegetables are more often consumed at breakfast by:

- younger people
- people who are more health oriented
- people who are more open to try new foods

Lunch

Vegetables are more often consumed at lunch by:

- people who have a routine in eating vegetables

Snack

Vegetables are more often consumed at snack by:

- younger people
- people who are more open to try new foods
- people who found important what close others (e.g., family and friends) think they should eat

Dinner

Vegetables are more often consumed at dinner by:

- people who have a routine in eating vegetables
- people who are more open to try new foods



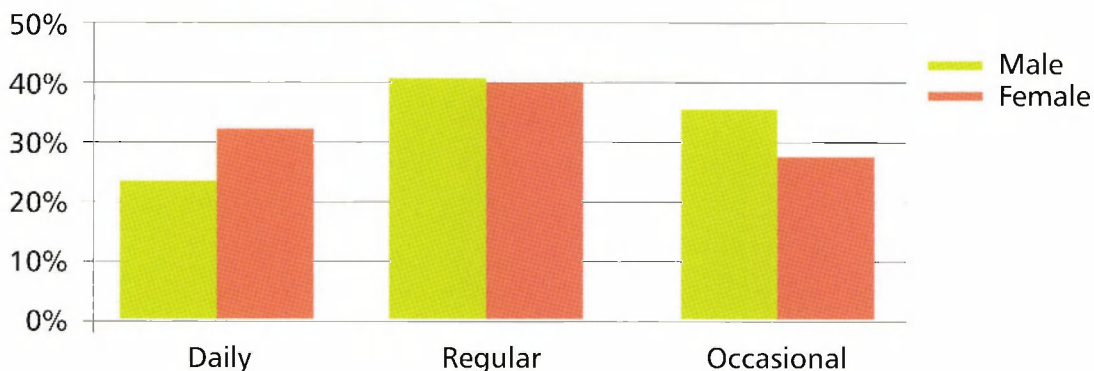


Females and higher educated people are most likely to consume vegetables daily

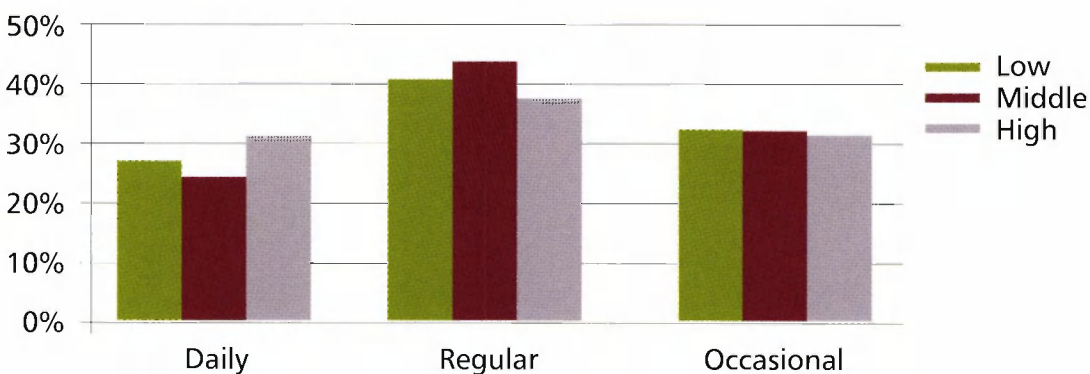
Demographic characteristics are related to the frequency of vegetable consumption. Females more often consume vegetables daily and males more often consume vegetables occasionally. Highly educated people consume vegetables more often daily than those with a middle education level. However, those with a middle education level more often consume vegetables regularly than those with a high education level. In addition, those with a high income more often consume vegetables daily and those with a low income more often consume vegetables occasionally.

Demographic characteristics and vegetable consumption frequency

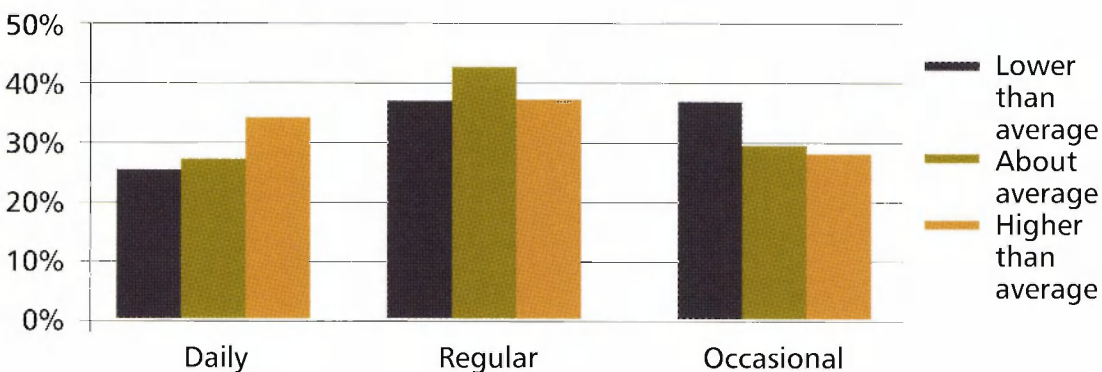
Gender and vegetable consumption



Education and vegetable consumption



Income and vegetable consumption



Box 3:
Comparison of vegetables
and fruit

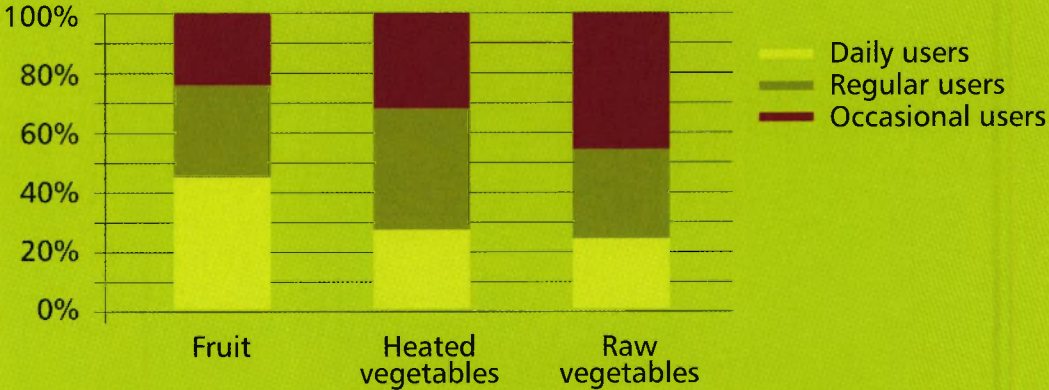
Vegetables versus fruit

Vegetables and fruit are often combined as one food group, but the question remains whether this is justified. Clear differences are found regarding consumption, consumption moments and beliefs and motives related to vegetables and fruit. These differences are also found among the different types of fruits and vegetables that are incorporated in this study.



Consumption

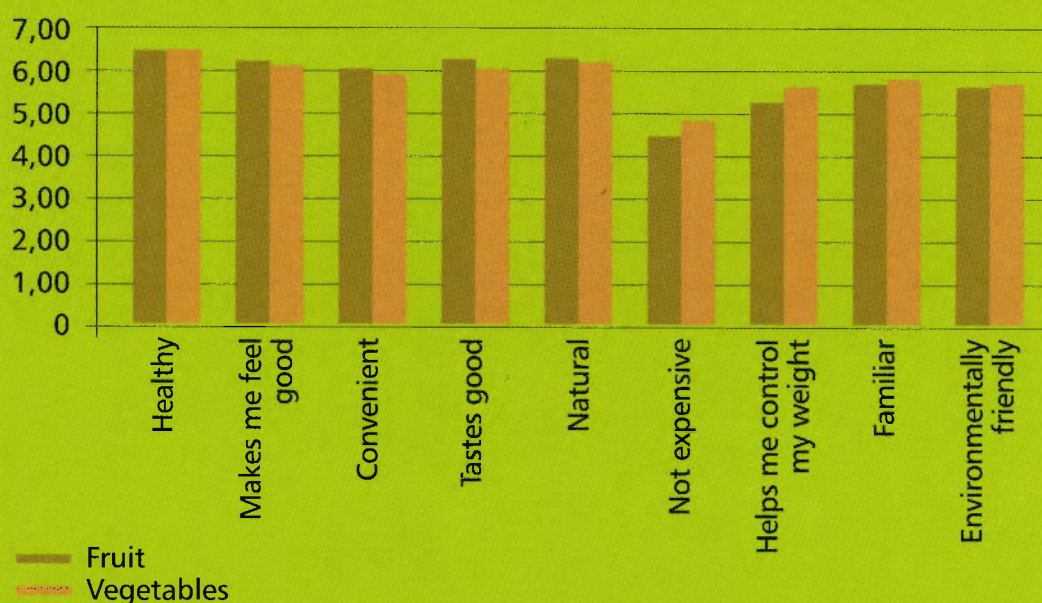
- Vegetables are less likely to be consumed on a daily basis than fruit.



- The differences in consumption frequency of fruits and vegetables in East European countries, especially Serbia, stands out. East Europeans are most likely to have the highest consumption frequency and amount of vegetables, while this only applies for the consumption amount of fruits, but not for the consumption frequency.
- Vegetables are mainly consumed as part of a main meal, while fruits are more likely to be consumed as a snack.

Perceptions

- Consumers' perceptions of the benefits are very similar for vegetables and fruits.



- However, also significant differences between vegetables and fruit were found. Vegetables are seen as less expensive, helping to control weight and somewhat more familiar. In contrast, fruit is perceived as providing a better feeling, slightly more convenient, having a better taste and evokes higher perceptions of naturalness.



Challenges and opportunities for vegetable consumption across Europe



Highlights

This study provides the following insights:

- Vegetable consumption (raw and heated) differs across countries, though vegetable consumption is still generally below recommendations of 200 grams a day.
- Serbia and Croatia are heavy vegetable users for both raw and heated vegetables.
- Frequency and amount goes hand in hand: Daily users of vegetables are more likely to consume more servings of vegetables when eating vegetables than occasional users.
- Tomatoes are the most frequently consumed vegetables.
- Vegetables are mainly consumed during lunch or dinner and least likely consumed as part of breakfast.
- Cultural differences in consumption moment of vegetables; countries differ based on whether lunch or dinner are the dominant moments to consume vegetables.
- Vegetables are associated with healthiness and naturalness; differences in perceived product benefits of vegetables are found across countries and across types of vegetables.
- Importance of different product benefits differ among the consumption moments.
- Consumers' existing routines with regard to eating vegetables and their openness to try new foods appear to be important determinants of vegetable consumption across the different consumption moments.
- Those that consume vegetables daily are more often: female, highly educated and having a high income.



To increase vegetable consumption targeted concept development and/or interventions are needed based on:

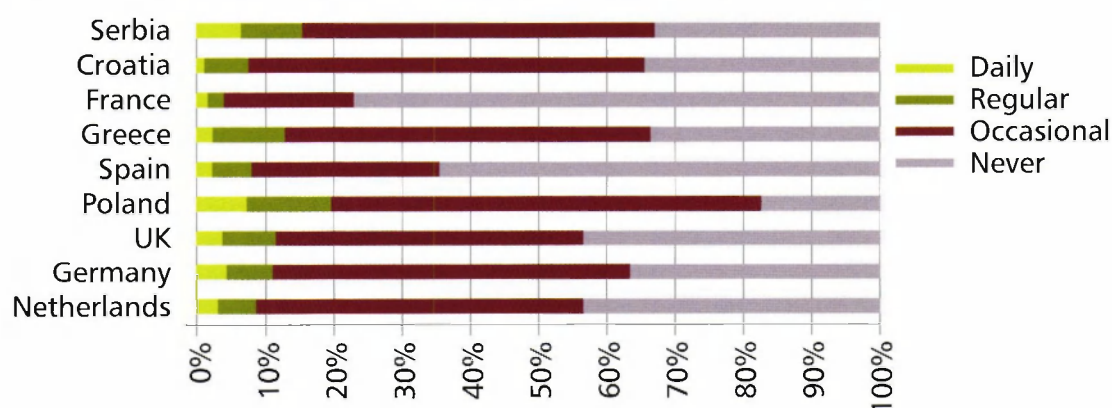
- ➔ Consumption moment (time and place)
- ➔ Different consumer groups (based on their personal characteristics)
- ➔ Differences between countries, traditions and cultures

Below, one specific concept that deserves further development will be elaborated: Vegetables as a snack.

Vegetable consumption as a snack

Generally, only about 11% of the study population eats vegetables as a snack on a daily or regular basis (i.e., more than 3 times a week). This implies that on average almost 90% of the population in the different countries never or occasionally eats vegetables as a snack.

Vegetable consumption frequency as a snack by country



Note: Occasional users = less than 3 days a week; Regular users = 3-6 days a week; Daily users = daily consumption

Differences across countries

Vegetable consumption as a snack differs across countries. The French are least likely to consume vegetables as a snack; 77.1% of the French population never consumes vegetables as a snack. In contrast, Polish people are more likely to consume vegetables as a snack on a daily or weekly basis. When comparing daily or regular consumption of vegetables as a snack (i.e., at least 3 days a week) in increasing order the countries are ranked: France, Croatia, Spain, Netherlands, Germany, United Kingdom, Greece, Serbia and Poland.

Snacking nowadays

Last decades, the number of eating occasions increased among children, adolescents and adults. People tend to eat approximately one snack more (Piernas & Popking, 2010). In addition, the number of snack occasions increased steadily.

This study shows that only few European consumers are familiar with snacking vegetables in between meals. This is in line with previous research on vegetable consumption. For example, only 13% of Dutch population ate vegetables on another moment than dinner (Borgdorff- Rozenboom 2013). The same study showed that the top 3 of most eaten vegetables eaten as a snack in the Netherlands was: Tomato, cucumber, carrot (Borgdorff-Rozeboom, 2013).

Stimulating vegetables as snacks

The following challenges and opportunities need to be taken into consideration when stimulating vegetables as snacks:

- Personal and cultural preferences should be taken into consideration in positioning and targeting vegetables as snacks. Unique sample/concepts for different countries need to be developed.
- Health is a less important product benefit for snacks. This implies that vegetables as snacks should be positioned on other benefits such as convenience.
- This study shows that taste and 'makes me feel good' are also important product benefits that determine consumption of vegetables as snacks. Development of 'vegetables as snack' concepts should take these aspects into consideration. For example, ready to eat salad, freshly cut/prepared vegetables.
- Take into consideration other products that are consumed as a snack when designing vegetables for snack purposes. For example, focus on vegetables that can be combined with other products that are eaten or drunken at snack moments, like salty snacks, soda or beer.
- Increased availability can stimulate vegetables as snacks as well. For example, focus on outlets that are suited for 'on the go' consumption, like airports or railway stations. Another option is to focus on online availability. These distribution channel might be suitable for concepts like 'fresh from grower'.
- Vegetables fit within the trend of fresh food: "The shift to fresh and refrigerated foods is unstoppable. Nearly nine in ten adults (87%) feel that fresh foods are healthier, and 80% believe that they are tastier; 78% of consumers are making a strong effort to eat more fresh versus processed foods (Technomic 2014a; MSI 2014)." Over the past 10 years, consumption of fresh foods grew 20% to more than 100 billion "eatings" per year. The NPD Group (2014) projects fresh foods will exceed 120 billion per year by 2018.
- A lot of attention is paid to stimulate vegetable consumption among kids. This could be a very interesting target group to focus on with snack concepts.

Stimulating different moments for vegetables during the day might be possible. The following Box shows three potential 'vegetables as a snack' concepts targeted at different groups.

Box 4:

Three different 'vegetable as a snack' concepts



Quick and convenient snack in afternoon
40-60 years
Convenience oriented
At home or at work
Alone
Supermarket or on the go



Vegetables during meeting
With tea or coffee
30-40 years
Health oriented
Out of home
Colleagues
Work or supermarket



Vegetables at school
With cereals or bread
10-25 years
Health and convenience oriented
At school
With class mates
Supermarket or on the go

Appendix: Study design and sample

An online survey study was conducted among consumers in the Netherlands, Germany, France, the United Kingdom, Poland, Spain, Greece, Croatia and Serbia. In total, 2,998 participants completed a self-administered questionnaire on consumption behaviour and beliefs and motives with regard to vegetables and specific types of vegetables (i.e., tomatoes, sweet pepper, carrots, green beans and mushrooms). Also a number of relevant personal characteristics were inquired. The survey was administered by a professional market research company. In all countries, the study samples were representative of the specific country in terms of age and gender. For an overview of the participants see the table below .

Demographics of the sample in nine EU countries

	Total	Nether-lands	Germany	UK	Poland	Spain	Greece	France	Croatia	Serbia
N	2998	349	353	343	318	315	311	326	333	350
N(%)		11.6	11.8	11.4	10.6	10.5	10.4	10.9	11.1	11.7
Gender										
Male (%)	50.9	50.1	49.9	50.1	51.6	51.9	51.8	51.2	50.2	51.1
Age										
Mean	43.7	44.6	44.1	44.4	43.0	43.6	42.3	44.4	42.9	43.9
SD	14.6	15.4	15.1	15.6	14.9	14.1	13.3	15.1	14.1	13.9
Income level (%)										
Lower than average	30.1	31.8	26.6	33.4	32.3	28.6	30.9	30.9	30.3	31.8
About average	56.1	51.9	61.8	50.9	50.2	61.3	60.1	53.2	53.1	51.9
Higher than average	13.8	16.3	11.6	15.7	17.6	10.2	9.0	15.9	16.6	16.3
Family composition (%)										
Married/living together with children	32.7	24.6	21.8	26.8	32.8	38.7	37.4	31.6	39.9	42.3
Married/living together without children	26.2	37.8	36.5	31.2	24.6	23.2	19.0	29.1	15.6	17.4
Single with children	6.5	6.0	5.4	5.5	8.2	6.0	6.8	6.1	7.5	6.9
Single without children	29.5	25.5	33.7	34.1	30.6	23.8	30.6	29.1	27.6	30.3
Other	5.0	6.0	2.5	2.3	3.8	8.3	6.1	4.0	9.3	3.1



Colophon

This publication is a collaboration between Fresh Produce Centre (GroentenFruit Huis) and Wageningen University & Research (Wageningen Economic Research) and part of the project Market Intelligence Fruit & Vegetables. The study is co-funded by the Ministry of Economic Affairs through the Topsector Tuinbouw & Uitgangsmaterialen (Horticulture and Starting Materials) (Programme Horticulture Market Intelligence). No rights can be derived from the contents of this publication.



Fresh Produce Centre represents fruit and vegetable production and trade, and speaks with one voice on behalf of the fruit and vegetable sector towards politics and society. Fresh Produce Centre is organized around four themes: Nutrition and health, Food safety, Market issues and statistics and Logistics and ICT.



Wageningen Economic Research is an independent and internationally leading socio-economic research institute that offers governments and companies (socio) economic insights and integral advice for sound policies and better decision-making in an innovative way. Their research relies on high-quality market and chain knowledge, a wide and international knowledge network, and unique data and models from the micro to the macro level.

More information about this study is available from the authors.

Authors: Machiel Reinders, Ireen Raaijmakers, Siet Sijtsema and Muriel Verain (Wageningen Economic Research).

Contact: Machiel Reinders, machiel.reinders@wur.nl, +31 703358104

For questions or more information, please contact:

Fresh Produce Centre: www.groentenfruihuis.nl/home/english

Wageningen Economic Research:

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