

Consumer Food Trends in the Baltic Area

Thematic Expertise TE-1

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1 The purpose of this report

This report is produced as an input to a development project for the food industry – baltfood. The aim of the work package to which this report belongs is to stimulate the transnational cooperation in product and process development involving SME's food industry as well as know how providers in the BSR.

To do so, a methodology is developed enabling specifically SMEs without dedicated R&D departments to identify future transnational food trends. This includes the development of an easy-to-use electronic tool, called the baltfood Trend Radar, for trend identification as well as a gap analysis. Considering the potential food trends as well as the optimized support structures required to turn the trend findings into marketable products, scenarios will be developed for accessing transnational food markets to position such products.

As a first step in this process it is necessary to identify what the food trends are among consumers in the Baltic area. It is also important to see if these food consumption trends mirror international or global trends or if the Baltic countries are unique somehow.

2 Research activities and methodology

In this project we have studied the present research results on international food consumption trends. We have also conducted a focus group with experts from the food industry and from the research community. On April 22, 2009 a group of approximately 30 people gathered in Copenhagen for a focus group discussion on food trends. The day was organized by the Skåne Food Innovation Network, in cooperation with Baltfood.

In attendance were a wide range of participants involved in food business, research and networking, from companies and universities in Denmark, Finland, Germany, Sweden and Poland. The purpose of the focus group meeting was to identify food trends in a current and in a future perspective, on a global and a regional level, and to specify a few main trends.

We have also conducted a web questionnaire (Appendix 1) which was sent to experts in the food industry, to researchers and to highly qualified consultants. We sent the web questionnaire to 81 experts in Finland, Sweden, Denmark, Lithuania, Poland and Germany. We received 36 answers, which is a response rate of 36 %. A fair amount of answers came from Denmark, Finland and Sweden. However, we received very few answers from Germany, Lithuania and Poland. Therefore it has not been possible for us to compare data from different countries in the Baltic region in this study. We believe, however, that interesting differences between the countries exist and that a thorough understanding of these differences is an important key to understanding the Baltic food market.

Later parts of the Baltfood projects must address this issue. What we can do in this report is to compare the trend results from the Baltic area with the international trends and also compare with the trends identified in the focus group discussions. The response rate of 36 % is for this purpose not a problem in this context. In the questionnaire we have gathered the opinions from 36 well renowned experts in the food industry and in consumer research, representing a large knowledge base. Their opinions can very well be compared with the results from international research.

It should be noted that we have not interviewed consumers directly. Instead we have interviewed persons who in their daily work are involved in measurement and exploitation of consumer trends. It is always a point to be discussed if the experts understand the consumers. In this study we believe that they do. Our experts represent different kinds of knowledge, different backgrounds and different nationalities. Still their responses are quite coherent.

We have performed statistical analysis for the data obtained from the questionnaire. The statistical methods used were Kruskal-Wallis's and Mann-Whitney's U tests. The statistical program used was SPSS 16.0 for Windows.

3 The contents of this report

We start with a rather brief presentation of the results from the questionnaire and the focus group discussion, The presentation of the results will reveal that three areas are more important than other areas to understand in order to capture the thinking of the Baltic consumer. The areas are a) Food and Health, b) Food and Sustainability and c) Food Consumption as an extension of self. These three areas will be presented in separate sections.

In the final section we use the various kinds of research inputs in an analysis where we identify areas of utmost importance for the food industry, areas in transition, knowledge areas needed to be mastered in order to be successful innovators and also areas where new business logics may create large opportunities for technological and commercial innovation and success.

4 Food Trends – outcome from the workshop and questionnaire

4.1 The most important criteria for the consumers

In the food debate many views are circulated concerning what consumers regard as most important when they buy food. Depending on situation, topic and participants in the debate, many different answers come out. Therefore we asked our respondents in the questionnaire how important different criteria will be for the consumer in the years to come. From the responses we learn that our experts do not believe in major changes. We asked them to rank the three most important of the following factors; price, healthiness, environmental friendliness, origin, safety, functional properties, outlook, taste and easiness to use.

The two top criteria were taste and price followed by healthiness. Healthiness was considered much more important than safety, origin or environmental friendliness. The two top criteria remain unchanged. However we can note that healthiness has taken a step forward in the share of the consumers mind.

From the focus group discussions we learned that healthiness does not only relate to food products that can support good health for the consumer. In this category we also notice stable growth for body enhancing products, both in the share of the consumers mind and in development activities in food companies. These products are meant to support the look of your body. In this category we also find combinations of products that you eat and drink and lotions that should be applied to the body. The basic consumer need here is not being healthy but feeling beautiful. *Searching for healthiness is primarily driven by inner motivation, while searching for beauty is driven by a social ambition.*

4.2 Impact from technological progress

In the questionnaire we also asked the respondents in which area they thought that technological progress would have the most significant impact of food industry SME: s in the coming years. The choices were Packaging technology, Production/processing technology, GMO, Biotechnology, Nanotechnology, Logistics and IT. The respondent gave the picture that *technological progress will have a significant effect on the food industry SME: s in the coming years, most factors being ranked between 6 and 7 on a scale 1-10. The most significant impacts were expected in the biotechnology, nanotechnology, logistics, production technology and packaging areas.* This impact was expected to the same extent in the Baltic countries as in the rest of the world.

We find one technology where the impact is believed to be low. This technology is GMO, genetically modified organisms. Here we find that the respondents have a lower estimation of the impact. The impact of GMO compared to other technologies is lower. The difference is

statistically significant ($p < 0.05$) We also find that our respondents believe that the impact in the Baltic countries will be significantly less compared to the rest of the world. ($p < 0.05$)

We found an explanation that can shed some light on these results in the focus group discussion. There it was out forward that Genetically Modified organisms had been presented in such a way to the consumers that they did not appreciate the positive sides of the technology and rather referred it to the profit hunger and insensitivity to consumer wants and needs in parts of the industry.

Another question regarded gene manipulated food, and Lotta Törner responded that from their perspective it was not even a question in Europe anymore, as negative reports in the media had “killed it”. Though the industry stood by to begin production, not much has happened since 1996. The only thing she could see that could save these products was environmental issues, but there are few speakers for this cause. Someone remembered how genetically modified products were part of the youth movement to “save the world” and “save the hungry”.

In the focus group discussion quoted above we can follow the arguments around the technology from the consumer perspective. We learn that technologies used in food production must seem reasonable and to some extent understandable from e consumers’ point of view. If this is not the case, the consumer will abstain from buying products based on that technology.

We can also find explanations for the difference between the Baltic countries and the rest of the world. The GMO debate has been very strong in Europe. The respondents believe that there are parts of the world where that debate has not been so intense, e.g. Asia, Africa. In those regions the “save the hungry” argument is believed to have a stronger impact. This means that the gains in productivity in the farming that can be achieved under some circumstances using GMO grain have a stronger voice than the voice of the consumer. It is also possible that the debate around these issues have not reached all consumers, but is certainly has reached the Baltic consumer.

4.3 Drivers for sustainability

We asked the respondents about the most important drivers for sustainability in the coming years. The choices were Pressure from consumers, Pressure from retailers, Pressure from suppliers, Pressure from shareholders/other stakeholders, Keeping up with competitors, Cost savings in energy or raw materials and the Need to differentiate products / create a competitive edge.

The three most important drivers identified were *cost savings*, *keeping up with competitors* and *a need to differentiate*. The *consumers* were considered to be the most important sustainability driving group, that is more important than retailers, suppliers, stakeholders or shareholders.

These answers reflect interesting aspects of the sustainability challenge. It comes from two directions. One important driver is the need for the company to stay competitive. This is done with the help of resource effective, material saving, waste reducing technologies as well as improved or innovative production and distribution methods.

But there is another driver that our respondents consider to be of equal importance, the need to differentiate the products, the need to be appreciated by the consumers as an environmentally friendly, fair and socially responsible company.

The lesson from this is that it is important to develop sustainable purchasing, production and distribution. But it is equally important to communicate to the consumers that the company and its product are different, because they are more advanced from a sustainability perspective. Thus, sustainability becomes a matter for the whole company, its production, management, its role in the value added chain and in the building and development of the company's identity and profile. If the consumers understand and believe the profile, the sustainable image will match the sustainable company.

From the focus group we learned that a strong consumer trends in this area is the interest for local food. The consumer is asking for *organic, natural and closely produced* raw materials and products with clean, natural ingredients.

A call for consistent information, in the form of *labeling*, was also made. To maintain environmentally-friendly food consumption the consumer needs varied and extensive information.

A dilemma was also pointed out. Consumers' perception of sustainability may differ from a scientifically defined sustainability. Locally produced is not always the best environmental choice. For example, locally produced tomatoes in the winter have a larger carbon footprint than imported ones, especially if they are organic. There is thus a need to keep this in mind when communicating with consumer regarding the effects of different choices in their consumption.

The main emphasis in the focus group discussion on sustainable food was the need for consistent and reliable labeling on the products in order to make environmentally-friendly consumption easier and quicker for the consumer. It was understood that labeling would be more advanced in the future, articulating more and sometimes contradictory aspects in the production of organic and sustainable food. Online resources, where consumers can receive thorough information about the products might be a future possibility.

It will also be important to make sustainable production the most beneficial alternative for the food industry. The incentive for the industry to increase its environmental concerns would be both because of measures that make sustainable production the most cost efficient, and because of consumer trends.

Decentralization of the food markets was also perceived as a crucial element to increase the consumption of locally produced food and make it easier for the consumer to choose products with at lower carbon print.

In a longer perspective it was stated that it might be necessary for consumers to completely revise the way they are eating, in order to eat less but more nourishing food.

4.4 Sustainability efforts

We also asked the respondents to outline what concrete actions that the food industry will take in the coming years to improve sustainability. The choices that we offered were the following: Start using bio-degradable packaging. Start using less packaging. Reconsider package size to reduce food waste. Set sustainability demand for suppliers. Calculate carbon-footprints or food-miles for products. Adopt new methods to inform consumers about the environmental impact of the products. Streamline production system in order to produce less waste. Reconsider waste management system to better utilize waste and side-flows. Adopt an environmental management system (e.g. EMAS or ISO 14001). Obtain eco-labeling for products.

The only clear information in this question was that our respondents believed that eco-labeling would be more used in the Baltic region than in the rest of the world. ($p < 0.05$)

Otherwise the answers were that most measures would have an “average or limited use” and that the respondents thought that all concrete actions would be used equally much.

We can interpret this information from experts in the food industry and in the research community in two ways. The first interpretation is that our respondents know, but they do not want to inform us. The second interpretation is that *the respondents don't know*. We have chosen the latter interpretation and will come back to this in the analysis and conclusions.

In the focus group the focus was to a large extent on primary production. A fear of the lack of food globally, to feed the entire population of the Earth was believed to become more prevalent. In response to this an increase in local and homegrown production, articulated in community support for *local agriculture* was highlighted, as was more advanced *labeling*, such as life cycle analysis labeling and the eco footprint, in order to embrace all parts of sustainable production.

It was questioned whether organic food would become mainstream or a luxury, with the response that the organic movement would have to accept certain measures that can enhance production, although make it less organic. Instead of having organic agriculture as it is today, three new forms of sustainable food was articulated; *green agriculture*, *purely organic agriculture* and *industrial agriculture*.

We also asked what would be the reason for consumers not to buy sustainable products. There were two main reasons put forward. The first reason was the following; If consumers find the sustainable products too expensive, they will not buy them. This result points to the linkage between the two drivers of sustainability. If the production process is not efficient and the offerings are not competitive, it does not help to have a consumer with a positive attitude towards sustainable product.

The second reason for not buying sustainable products is the brand loyalty of the consumer. If a consumer trusts a brand and that brand does not offer a sustainable alternative, the chance is high that the consumers will stay with his preferred brand. This result means that there are

opportunities for strong brands to enhance their superiority by adding sustainable qualities to the product and to the message to the consumer. A second consequence of this result is that the frustration in the focus group concerning bad and conflicting eco-labeling is a real problem. This is especially relevant since the respondents to the questionnaire believed that eco-labeling would have growing importance in the Baltic countries compared to the rest of the world.

These results are in contrast with some other surveys. A global green consumer survey conducted by Boston Consulting Group in July 2008 surveyed approximately 9000 consumers aged 18-65 in Canada, France, Germany, Italy, Japan, Spain, UK and US through an online questionnaire. From a data of 4000 survey respondents, the survey concluded that the most significant reasons for consumers not to buy sustainable products are that they are unaware of sustainable products and that there are not enough green product options to choose from. Price and preference of another brand did not come out as very significant factors, unlike in our survey. The BCG survey even found (from a data of 1000 survey respondents) that quite a lot of consumers buying sustainable products would actually be willing to pay a premium of at least 10% compared to ordinary products in the same category. This was especially so for fresh meats, seafood, fruits and vegetables, eggs, dairy and children's food. The reasons explaining why price and brand loyalty did not come up in BCG survey while they did in ours, might be explained by a worsened economic situation, consumers' attitude-behavior gap (read more about this in chapter 5.2.3) and consumers' possible unawareness or unwillingness to recognise their own brand loyalty.

4.5 Food consumption trends – ranking

In the next question we asked the respondents to judge how important various kinds of consumer food trends would be compared to each other. We asked about Organic Food, Locally produced Food, Seasonal food, Fair Trade products, Reducing meat consumption, Community supported agriculture and farmers' markets, Online shopping, Eating out, Eating on the go, Food available to order 24/7, Using less time to prepare food, Using more time to prepare food, Price consciousness, Unique qualities and tailor-made products, Constructing one's identity and confirming social status through consumption, <origin of food and story related to it, Exotics food, Domestically produced food. Strong steering of consumption by legislation, Labels and certificates, e.g. health, sustainability, origin,

We found two statistically significant results among the answers. The two least important trends were "Using more time to prepare food" and "Strong steering of the consumption by legislation. ($p < 0.05$)

Among the *most important trends* we find "*Constructing one's identity and confirming social status through consumption*", "*Origin of food and the story related to it*", "*Eating on the go*", "*Locally produced*" and "*Less time to prepare food*". These results are not statistically significant, but visible in the results of the questionnaire and correspond well with the focus group discussions where the following strong trends were identified: *Healthy food is more popular*, *People should be more thoughtful about what they eat*, *There is huge trend in*

individualization and the slogan, "I am special" is today's trend. There is a trend in eating more ecological food, sustainable food etc. The consumers are paying attention to what they serve.

The question was brought up in the focus group if these trends are relevant to the whole population. One of the respondents stated that there are trends in separating the waste. He stated that this trend of waste sorting at home is more located at the general population and the more highly educated, and regards the waste sorting as a *social class* issue.

One of the female participants commented that it does not matter what education you have, even the poorest person would buy *Starbucks* coffee. It is a matter of expressing oneself. Furthermore, she stated that the motivation to express oneself is enormous and that people buy what they cannot afford only to be seen with a famous brand such as *Starbucks*.

A focus group participant stated that only 5 to 10 per cent of the population would choose the lowest *price* when buying a food product. (In studies made at the School of Economics and Management, Lund, the segment size of the price hunters has been measured to 22 % in London and 26 % in Liverpool.) She also stated that some people always want to make a bargain. Moreover, she commented that *income and level of education* would always affect what people choose to eat.

One of the respondents commented that there are important *identity markers* sent to other people when the consumer is eating a certain type of food. The workshop participants agreed that these types of markers are important.

The group concluded that the higher income a person has, the higher the chances are that the person is consuming products in a sustainable manner. Additionally, if a person lives for example close to a university area, they will probably tend to be more aware of environmental issues.

The *geographical* argument was discussed, that depending on where a person resides, their consumption behavior will be affected to a certain extent.

The participants concluded that the consumers wish to *express different identities*. As the consumers wish to choose an exact identity which they believe suits them, they want to be able to select from different types of foods and be able to have different alternatives in food. The perception that *"I am special"* is a strong trend.

Taking a stand on what to eat was also perceived to be a strong trend in food. Ethics and quality are important factors here. One trend could be more *individualized products*. Even in natural products such as milk there are different types, such as lactose-free milk. The workshop members stated that it has come to almost a trend to be lactose intolerant, as that makes one special.

Since consumers more and more thing of themselves at the experts, it is important for producers to end up in *the "I need" category* of products. Key words for this were authentic, local, natural, tasty, convenient, healthy, low fat, low sugar, trendy and ethical. Consumers' list on important aspects in food choices is long and differs from consumer to consumer.

4.6 Food and Health

We asked the respondents to rank a number of health related food trends to see which trends that are expected to be the strongest in the coming years. These were the choices presented: Food with health benefits; Free from products (e.g. gluten free, lactose free, sugar free); Foods enhancing looks and beauty; Foods with less additives; Diet products (low fat, low sugar); Less carbohydrates; Less refined products, Products with functional food labels; Products for weight control; Naturally healthy food (e.g. berries, vegetables)

Food with health benefits, foods with less additives and naturally healthy foods are the strongest trends ($p < 0.05$) The same trends are expected in the Baltic countries as in the rest of the world.

In a separate question we asked the respondents about the importance of various R & D areas. We wanted to have indications about where the industry would benefit from allocating its R & D resources in the coming years. We did not get any clear answers from our respondents to this question. Again we notice that ideas for future investments in development are not very clear. The answer pattern resembles that of the answer pattern for question 4 where we also asked about suitable investments in research and development.

The difficulty to predict the future concerning the development of foods with health benefits emerged also in the focus group discussions. However, when the further future was considered all the participants agreed that our diet will become increasingly personalized based on our individual needs and genetic background. Individualization of our eating patterns is of course not a new thing. Food processors have developed number of different products for people suffering from e.g. lactose intolerance, celiac disease, different allergies, high blood cholesterol and hypertension and success of this kind of products is believed to continue. Further in future, personalization of our eating habits could mean on one hand growing assortment of products with added value e.g. foods for fighting against age-induced diseases and weight management. On the other hand especially developments in the field of nutrigenomics which studies the interactions between our genes and diet will probably produce novel functions for natural or existing products such as low glycaemic index products for diabetic people. In a wild future scenario, which develops further a German innovation about make-your-own-müsli concept mentioned in focus group, future consumer could select functional müsli components based on his/her personal needs e.g. fermented protein powder to reduce blood pressure, crab shell extract to treat aching joints and pieces of chocolate to keep away depression.

Consumers' interest towards locally produced products, organic food, naturally healthy foods and foods with less additives was also raised up in the focus group. Together these topics remind us about two different angles related to healthiness of food. On one hand consumers are interested in products that can help them in maintaining or improving their physical and mental health and well-being but on the other hand they are worried about the safety of their diet.

According to the questionnaire use of GMOs in food production was not perceived as a very probable direction of development. However, GMOs were brought up in the focus group as an alternative method to increase the safety of food e.g. by developing pest insect resistant crops

and, thereby, reduce the residues of pesticides in foods. Because of other issues concerning the safety of GMOs this doesn't seem like a very presumable development in the near future.

Consumers' fear towards some artificial food additives reminds us also about the importance of informing the consumers. In today's world, the amount of information available is enormous and finding the right, reliable and realistic is not a trivial task. Therefore, the whole food chain has a challenging task to find the right and best ways to distribute the information about properties of food products in an understandable consumer-friendly way.

4.7 Effect of macroeconomic factors

Finally we asked the respondents about the effects on the food industry of some macro economic factors. From this we learned that the *effects on the food market stemming from growing incomes in China and India will be more important in the international perspective* than in the Baltic States. The effects of the economic downturn are expected to be limited. The respondents do not believe in major changes imposed by legislation to hygiene and control. Pandemia will on the whole not affect the food consumption patterns.

5 Food Trends – outcome of the desktop research

5.1 Food and health

5.1.1 What is healthy food?

This is a question that has probably been on the lips of majority of the consumers during the past few years. During this time we have faced number of food related crisis e.g. melamin found in milk, pieces of glass found in different foods, high dioxin concentrations found in pork meat, bad cheese used as raw material for production of processed cheese just to mention some of them. These incidents have established and reminded us all that healthy food is food free from chemical, physical and microbiological contaminants. It has also reminded us about the importance of control of the whole food chain from farmer to consumer.

Definition of healthy food depends also on the individual giving the answer. Incidences of food allergies and intolerances are increasing partly because improvements and novel applications made in the field diagnostics and more frequent testing and partly because of their increased prevalence. However, food free from contaminants and other harmful substances is not necessarily healthy and may cause a threat to human health. This brings us to definition of healthy food through its nutritional quality and content.

In Nordic countries, healthy food based on its nutritional quality has been defined for the first time already in 1968 by medical societies of Denmark, Finland, Norway and Sweden. The first official Nordic Nutrition Recommendations were published in 1980 and the latest 4th edition was published 2004. Nordic Nutrition Recommendation have been used a basis for national nutrition recommendations published in Finland and Sweden for example. Similar recommendation have been produced in also other countries, for example, Germany, Austria and Switzerland have produced their own recommendations titled “D-A-CH Reference values for nutrition” in 2002. The latest recommendations have broadened the content of nutrition recommendations to cover also other areas related to human wellbeing. Nordic Nutrition Recommendations published in 2004 integrated recommendations for physical activity and Swedish National Food Administration (1) is publishing national recommendations (Environmentally-smart Food Choices) that take also into account impacts of food to environment. Nutritional recommendations give detailed guidelines about the intake of total energy, macronutrients, vitamins and minerals on a population level for different age groups. Nordic recommendation for intake of macronutrients for adults are presented in Table 1 as an example.

Table 1. Nordic Nutrition Recommendations for intake of macronutrients for adults.
(Source: 13)

Macro-nutrient		Share of total energy intake (%)
Fat	Total fat	25-35 %
	Saturated + trans FA*	approx. 10 %
	cis-MUFA**	10-15 %
	PUFA***	5-10 %, including 1 % n-3 FA
Carbohydrates	Total	50-60 %
	Fibre	25-35 g/d
	Refined sugars	< 10 %
Protein	Total	10-20 %

* fatty acids, ** monounsaturated fatty acids, *** polyunsaturated fatty acids

5.1.2 Major issues related to health the food industry needs to consider

5.1.2.1 Ageing

Ageing of populations in European countries is a well recognized phenomenon. It results mainly from falling fertility rates and increasing life expectancy. In the whole EU area the share of population over 65 years is estimated to rise from current 17 % to 25 % in 2035 and 30 % in 2060 (2). In Baltic Sea Region, the share of population over 65 years is estimated to be the biggest in Germany (30 %) and Finland (26 %) in 2035 whereas in Denmark, Lithuania, Poland and Sweden the share is estimated to be around 24 %. The main burden of chronic diseases is observed at older age and, therefore, ageing of population will inevitably lead to increase in incidences of different chronic diseases such as cardiovascular diseases, type 2 diabetes, osteoporosis, cancer, arthritis etc (3). Problems related to mental health are also common among elderly and severe depression is forecasted to be the second most burdensome health condition worldwide in 2020 (4).

5.1.2.2 Obesity/Overweight

According to definition, a person is classified as obese when the persons Body Mass Index (BMI) is over 30 whereas overweight persons have BMI in the range of 25.0-29.9 (5). Prevalence of adult obesity and overweight varies widely within the EU and Baltic Sea Region.

In BSR countries, the current situation is the worst in Germany and Finland where over 20 % of adult population have been reported to be obese (6). In Baltic Sea region, the share of overweight men and women ranges from 39 to 53 % and from 27 to 36 %, respectively. Even more alarming is the number obese children. According to a review by Lobstein et al. (7) the problem is the biggest in southern EU countries where the prevalence of overweight children ranges between 20 and 35 %. In northern EU, the prevalence ranges between 10 and 20 %. The percentage of overweight children in Sweden, Denmark, Germany and Poland was reported to be range between 15 and 18 %.

Obesity, like aging, is an important risk factor for number of different chronic diseases and there are only few organs where severe obesity has no effect. Obesity increases prevalence of cardiovascular diseases, type 2 diabetes and osteoarthritis (8). The recent review by the International Agency for Research of Cancer (IARC) also concluded that there was clear evidence of a relationship between onset of obesity and cancer risk (9). The greatest health problems related to childhood obesity will be seen in the next generation of adults as a result of the present childhood obesity epidemic. For example, metabolic syndrome (a cluster of cardiovascular risk factors in adulthood –including hypertension, hypertriglyceridaemia, low HDL cholesterol and hyperinsulinaemia) is especially common among obese adult who were obese also as children. In the worst case the problems maybe transferred to next generation since, for example, maternal diabetes increases the risk of having an overweight child.

There are number of reasons behind the increased prevalence of obesity such as inherited disorders, certain specific conditions (physical disabilities, adolescent type 1 diabetes etc.), ethnic background, parental obesity, maternal diabetes, smoking during pregnancy, diet etc. When the diet is considered the main reasons for increasing prevalence of obesity are change of our diet to more energy dense products (high in fat and low in unrefined carbohydrates), increased consumption of sugar-sweetened soft drinks, changed eating patterns (grazing/snacking) and increased portion size. As a result, the total energy intake per capita in industrialized countries has raised from 2947 to 3380 kcal/capita/day in the period of time from 1964 to 1999 and is estimated to still rise up to 3500 kcal/capita/day until 2030 (9).

In order to change the pattern of food consumption and increasing overweight/obesity problem, experts working in this area have suggested that efforts to prevent obesity should include measures involving actions, such as: provide clear and consistent consumer information e.g. on food labels; encourage food companies to provide lower energy, more nutritious foods marketed especially for children; develop criteria for advertising that promotes healthier eating (9).

5.1.2.3 Diet and chronic diseases

From the text above it is clear that both ageing of population and increasing prevalence of overweight lead to increase in prevalence of chronic diseases in the future. In many cases, unhealthy diet is at least partly behind the problem. Often adverse effects can be at the minimum alleviated with balanced, healthy diet.

The changed eating patterns and quality of diet are leading to high intake of energy are among the main reasons behind obesity and chronic diseases following.

The average European intake of saturated fat is well above the recommended maximum intake, 10 % (10). Since intake of saturated fat has been established to increase the risk of chronic diseases like type 2 diabetes and cardiovascular diseases (9) attempts to reduce intake of saturated fat have to be continued. On the other hand, intake of certain polyunsaturated fatty acids is too low. Human body is able to metabolize all other fatty acids except linoleic acid (LA, 18:2 n-6, omega-6 fatty acid) and alpha-linolenic acid (ALA, 18:3 n-3, omega-3 fatty acid). Diets containing eicosapentanoic acid (EPA, 20:5 n-3) and docosahexanoic acid (DHA, 22:6 n-3) are also recommended because of limited conversion of ALA to these omega-3 fatty acids. Number of studies have shown that intake of omega-3 fatty acids should be increased which would reduce the risk of heart disease (11).

Opposite to fat, the European intake of carbohydrates (about 40 % of total energy (12)) is well below the recommended intake, 50 % (13). Increasing the intake of carbohydrates in the expense of saturated fat helps in weight-management in the long perspective and further reduces the risk of obesity associated chronic diseases. This is probably due to lower energy content of carbohydrates compared to fat. Intake of non-starch and low-glycemic index carbohydrates also appears to protect form type 2 diabetes and colorectal cancer. (12)

In addition to unsaturated fat and some carbohydrates, many other food components have been reported to decrease the risk of certain chronic diseases. Table 2 shows the recently reviewed available scientific information on the role of diet and nutrition in prevention of chronic diseases.

Diet has also been associated with mental health. The link between diet and mental health is currently not very clear but at least adequate intake of n-3 fatty acids and folate has been associated with reduced risk of depression.

WHO report (9) lists also food components and products that have been shown to increase the risk oh chronic diseases. High intake of total fat, saturated fat and trans fatty acids has been associated with increased risk of diabetes. Intake of myristic acid, palmitic acid, trans fatty acids, sodium and dietary cholesterol have been reported to be risk factors for cardiovascular diseases whereas intake of sugars, soft drinks and vitamin C deficiency have been linked with higher risk of dental diseases.

Table 2. Foods and food components and strength of evidence associated to their role in reducing the risk of certain chronic diseases. (Source: 9)

Strenght of evidence	Convincing	Probable	Possible	Insufficient
Type 2 diabetes	-	-NSP*	-n-3 fatty acids -low glycaemic index foods	-vitamin E -Cr, Mg
Cardio-vascular disease	-linoleic acid -EPA and DHA -fruits and vegetables -potassium	- α -linolenic acid -oleic acid -wholegrain cereals -NSP* -plant sterols and stanols -folate	-flavonoids -soy products	- Ca, Mg - vitamin C
Cancer	-	-fruits and vegetables	-fibre -soya -n-3 fatty acids -fish -carotenoids -some B vitamins -C, D and E vitamin -Ca, Zn, Se -flavonoids -lignans	-fibre -soya -n-3 fatty acids -fish -carotenoids -some B vitamins - vitamin C, D and E -Ca, Zn, Se -flavonoids -lignans
Dental diseases	-Fluoride -vitamin D	-hard cheese -sugar-free chewing gum	-xylitol -milk -fibre	-antioxidants

*non-starch polysaccharides

5.1.2.4 Progress in technology and science

The effects of improvements in technology and science on food production and processing are not easy to foresee. When the healthiness of food is considered there are some interesting topics that are perceived as promising research areas. The following chapters gives a short general review to these topics.

Genetically modified organisms (GMOs)

Genetically modified organisms meant for food are mainly plants (corn, cotton, rape seed, soy, sugar beet) that have a foreign gene or genes inserted to their genome. This inserted gene gives the plant new properties which it otherwise wouldn't have. All GM food and feed products accepted to EU markets are designed to better tolerate pest insects or herbicides (14). Although the development of genetically modified foods has so far focused mainly on productivity of crops the technique also enables development of novel functional foods (e.g. probiotics) and foods or feeds with improved nutritional quality. An example of such foodstuff is A vitamin rich rice also called golden rice.

EU has so far kept its hard line and only few GM foods are allowed in EU market. The main obstacles that have decelerated GM foods arrival to EU markets are related to their possible adverse influences on human health (production of allergenic proteins, gene transfer to human cells or gastrointestinal bacteria, and outcrossing to conventional plants) and environment. However, GM foods are produced in large amounts on American and Asian continents. For example, 94 and 65 % of soya production of big soya producers and exporters Argentina and Brazil, respectively, is genetically modified and the number is expected to rise (15). As a result, UK authorities have reported about problems in supply and higher price of non-GM foods. They suggested that EU should start applying lighter policy for new GM foods and consider the implications of current strict policy also from the angle of trade.

Nutrigenomics

Nutrigenomics means investigation of interactions between diet and genes using modern technological tools of science. What it has to offer us in the future could be something as follows. "A person with a family history of cardiovascular disease comes to nutritionist to obtain a nutrition and lifestyle advice. Nutritionist collects family and diet histories, makes physical and blood biochemistry measurements and, finally, reads electronic card containing the persons DNA profile. Based on this information, the nutritionist gives the person recommendations for diet and exercise." There is naturally a long way to before that is reality. However, research of interactions between genes and our diet can provide us more useful results already in the near future. One of the best-described examples is the relationship between folate and the gene for MTHFR - 5,10-methylenetetrahydrofolate reductase. There is a variant in the gene for MTHFR that produces a less efficient form of the enzyme. Those individuals with the unstable enzyme and low dietary folate have a higher risk of vascular disease and premature cognitive decline. The problem can be easily solved by supplementing with folic acid or increasing their intake of folate from food sources.

Nanotechnology

Nanotechnology is a field of applied sciences and technologies involving the control of matter on the atomic and molecular scale, normally below 100 nanometers. Nanomaterials may exhibit different physical and chemical properties compared with the same substances at normal scale, such as increased chemical reactivity due to greater surface area.

We are already today using products that have been produced with the help of nanotechnology e.g. cosmetics, paints, sunscreens, pharmaceuticals etc but food products are still under development. Food processing, food packaging, quality assurance, health benefits, disease prevention, and "nano foods" are among the areas related to food and health that are under research.

Smart packaging systems that will result in better protection of food, improve traceability and help to maintain food fresh are being developed. Nanoparticles with antimicrobial properties, and dirt-repellent surfaces, are also expected to have widespread application for packaging materials and in machines used in food production processes.

Further in the future are materials that can adjust their properties according to conditions, such as temperature, and those that can repair themselves. Another innovative idea is the use of embedded nanosensors in packaging, which can alert the consumer by changing colour e.g. when the food is spoiled.

New food systems are being developed with enhanced functional properties. In the future we may be able to enjoy taste of salt without health concerns due to low sodium foods that still taste salty due to interactions with the tongue. In the wildest scenarios, nanosensors could detect an individual's personal taste, smell and health profile and based on this trigger the release of appropriate molecules from the product. In this way, foods could be customised according to the specific taste and smell preferences of the consumer, along with their needs related to health status, nutrient deficiencies or allergies. (16)

Functional foods

Functional food is defined as a food that is satisfactorily demonstrated to affect beneficially one or more target functions in the body, beyond adequate nutritional effects, in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease. According to EC's legislation (1924/2006), European Food Safety Authority (EFSA) is currently evaluating available scientific evidence behind all existing and new over 4000 health claims. European Commission approves or declines the claim after EFSA's evaluation.

Gathering scientific evidence to support a health claim is long and expensive project which a SME can not often afford. From the perspective of SME, the new legislation makes life a bit easier. In the future, an approved health claim may be used in equivalent products without additional scientific evidence from that particular product.

EFSA has applied strict standards in evaluation of health claims and about 80 % of the 69 claims evaluated so far have been rejected. EFSA has accepted claims concerning cholesterol lowering effect of plant sterols' and stanols', effect of calcium and vitamin D on bone health, effect of DHA on eye health and effect of tomato extract on blood circulation (76).

Free-from products

Knowledge food components' health effects, improvements in medical science and diagnostics, and progress of food technology has opened new markets for so called free-from products (lactose-, sugar- and fat-free) and without a doubt will do that in future. Fat- and sugar-free

products have been available for quite some time but their success can be assumed to continue when people are struggling with overweight and obesity problem and are trying to find lighter alternatives to their diet. However, appreciation of for example fat-free products seems to vary between countries. According to consumer research made by Consumer Compass, Polish consumers did not value fat free products very high whereas in Germany and Finland they were often regarded as healthy (17).

Increased information about adverse health effects of salt has raised consumers' interest for low-salt foods in USA (18). Food companies worldwide have started to answer for this need since number of new low-salt products has increased 115 % from 2005 to 2008. In Baltic sea region, the main sources of salt are bread, meat products, cheese and fish and intake of salt in most Baltic countries is reported to about double compared to recommendations (19).

Another increasing market at least in some European countries is gluten free products. Although share of populations suffering from coeliac disease is usually estimated to be only 1 or 2 % the number of new gluten-free products launched to European markets in 2008 was almost 4000 entitling to 10th place on the list of most frequent claims made on new products (20). Market of gluten-free products has grown approximately 29 % annually during the last five years and is still estimated to nearly doubly by the end of 2012 (77).

5.1.2.5 Demand for safe food

Similar to trading in general, trading with food has become more and more global activity. As a result, consumers have drifted further and further from the origin of food i.e. farmers and food process. At the same time, food processing has faced many negative incidents related to food safety (e.g. melamin milk) from different parts of the world leading to large withdrawals of food products from markets. These incidents have raised the question about safety of food and traceability and transparency of food chain have been in the center of active public debate. Food scandals have created a counter force to globalization and awaken large group of consumer who are interested in origin, quality, environmental and sustainability issues related to farming and food processing. This has further increased consumers interest towards locally produced and organic foods.

5.1.2.5.1 Organic food

Organic farming is an agricultural system that seeks to provide the consumer with fresh, tasty and authentic food while respecting natural life-cycle systems. This is typically achieved by crop rotation, very strict limits on use of chemical synthetic pesticides and synthetic fertilisers, livestock antibiotics, food additives, processing aids and other inputs, prohibition of GMOs, selection of resistant plant and animal species to disease and adapted to local conditions etc. Organic farming and food processing is strictly regulated in EU. EU regulations for organic production and labeling have been recently revised (EC 834/2007). The new regulations define clear goals, principles and general rules for organic production. According to new regulations, foods may only be marked as "organic" if at least 95% of their agricultural ingredients are

organic. The use of genetically modified organisms (GMO) and of products manufactured from GMOs is prohibited in organic production. Although use of pesticides, fertilisers, food additives etc is limited use of some products is accepted. European Commissions (EC) new regulations for organic food production (EC 889/2008) list permitted products for organic farming and food production including 47 additives permitted for organic food products.

According to their own words, consumers prefer organic food because of its taste, healthiness, safety and friendliness to environment and farming animals (21, 22). When organic products are viewed from the angle of nutritional science their healthiness compared to conventionally produced food is not clear. There are some studies indicating higher C-vitamin, mineral and phytonutrient concentrations in organically grown foodstuffs (23). Two recent reviews on nutrient content of organic foods have ended up to totally opposite conclusions. Based on critical analysis on available scientific data by UK's Food Standards Agency there is not enough evidence to establish superiority of organic foods over conventional foods when nutritional quality is considered (24). On the other hand, recent French study (78) concludes that organic plant products contain more dry matter, minerals and antioxidant polyphenols. Data on carbohydrate, protein and vitamin levels was in their opinion insufficient. Organic animal products were also seen to have more polyunsaturated fats.

Another angle of healthiness of organic food is related to pesticide residues. According to a recent report by European Food Safety Authority (25), organic products in EU market contained less pesticide residues compared to conventionally produced foods. However, organic products were not free from residues but the number of samples exceeding the legal maximum residue levels was clearly smaller (1.24 % for organic products and 3.99 % for conventionally produced products). In principle, this is not surprising since EC regulations for organic production permit the use of some pesticides e.g. pyrethrins when they are from natural origin. Contamination of organic products may have also occurred from persistent chemicals present in soil or spray drift. According to EFSA (25), long-term exposure to pesticide residues at levels reported now does not raise concern about consumer's health. However, EFSA's toxicological analysis also showed that short term exposure for number of pesticides may risk the consumers' health in the worst-case scenario.

Organic products are often marketed as healthier, more sustainable and tastier choice. In the light of the latest scientific evidence, a question about organic products being healthier than conventional products remains unanswered. According to new research by British market research organization IGD, 10 % of UK shoppers have found cheaper products that have the same benefits as organic products in their eyes and 8 % don't know anymore what organic stands for (26). As a result, organic food sector needs to do more to inform the consumers about benefits of organic products. Despite of the recent "negative" news for organic food, organic foods were ranked second on the list of new products with claims launched in Europe last year (20).

5.1.2.5.2 Locally produced

Compared to organic food which is strictly regulated and has clear framework defining organic farming, processing and products, locally produced food is poorly defined (no official definition exists) and the whole “locally produced” concept is unclear for many consumers. In recent Finnish study by Finnish National Consumer Research Centre (21) consumers, representatives of industrialized kitchens and municipal decision makers’ defined locally produced food as Finnish food produced close (< 100 km) to place of its purchase. Methods used for production of local products are the same as in conventional food production. The reasons to buy locally produce food products include high quality, friendliness to environment, healthiness, traceability (21, 22). These arguments are closely attached to short distance from field to the consumer. Short chain from farm to fork makes the food chain more transparent, traceable and also improves the safety.

5.1.2.5.3 Food additives

Food additives are defined as “any substance not normally consumed as a food in itself and not normally used as a characteristic ingredient of food whether or not it has nutritive value, the intentional addition of which to food for a technological purpose in the manufacture, processing, preparation, treatment, packaging, transport or storage of such food results, or may be reasonably expected to result, in it or its by-products becoming directly or indirectly a component of such foods” (89/107/EEC). Food additives have been used for centuries to preserve, flavor and color food. As a result of developments in food science and technology their use has increased dramatically during the last 50 years. Nowadays, hundreds of different food additives have been accepted to be used in foods and many currently conventional food product would be impossible to produce without additives e.g. margarines and sausages. The most frequently used food additives are antioxidants, colours, emulsifiers, stabilisers, gelling agents and thickeners, flavour enhancers, preservatives and sweeteners.

Use of food additives is strictly regulated. All food additives must have a demonstrated useful purpose. They undergo a rigorous scientific safety evaluation (including information about absorption, distribution, metabolism, toxicity, technological data, manufacturing process, value to consumer, proposed applications, levels of use and estimated exposure) by European Food Safety Authority (EFSA) before they can be approved for use (27). Based on safety evaluation EFSA defines each additive an acceptable daily intake value (ADI) which defines the amount of additive in mg/kg body weight that can be ingested daily over a lifetime without health risk. EFSA also re-evaluates the safety of accepted food additives when new scientific information is available. Currently, EFSA is gathering information for re-evaluation of 45 colours that were among the first additives evaluated under EU legislation.

Despite of general acceptance of safety of food additives, some studies have indicated that some additives (e.g. azo dyes, some preservatives, antioxidants and flavor enhancers) may have adverse health effects. For example, two recent studies by McCann et al (28) and Batemann et al (29) reported that some azo dyes and a preservative, sodium benzoate caused hyperactivity in some children. Results from animal experiments by Soffritti et al (30, 31)

indicated that a sweetener, aspartame, may have carcinogenic effects. Evaluations of these findings by EFSA have concluded that based on all currently available evidence consumption of these compounds is safe and there is no reason to alter current ADI values. However, many consumers have doubts especially about the safety of artificial additives despite of authorities' safety evaluations. As a result of adverse health effects of above mentioned food additives, some consumers try to avoid all possible additives. Recently, some public institutions have also decided to stop the use of certain additives. For example, Espoo, the second biggest city in Finland measured by population, has decided to quit the use of monosodium glutamate in its school kitchens because of its possible adverse effects (32). Similar decisions have been made also in Sweden although no scientific basis for sodium glutamates harmfulness exists. Also food companies have started followed consumers' request, because foods without additives/preservatives were the clear number one on the list of new products with claims launched in Europe last year (20)

5.1.2.5.4 Quality systems

Number of different quality system for food safety such as ISO 22000, BRC:2008 and IFS:2007 are available. They all contain detailed description of company's generic management system and hygienic requirements for food safety (including HACCP) and are certified and in regular intervals inspected by an external direction. Food safety standards are often a necessity when products are exported and also some big food buyers demand quality systems from their suppliers. The problem concerning quality systems is that different systems are preferred in different countries.

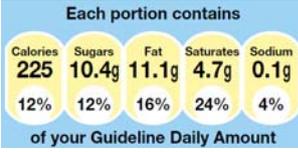
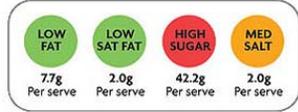
5.1.2.6 Consumers' demand for information

Nowadays, food industry produces huge number of different food products to the market. It has been estimated that for example in Germany more than 240 000 products are available on market (33). Consumers wandering in the middle of this product jungle want to be confident that the food they purchase is safe, they need to know what is in the product and information about the origin, characteristics, quality and nutritional properties of the food item. Consumers living with certain health conditions, intolerances or allergies have additional needs for information about food products in order to meet their health constraints. This information is usually provided by the producer, distributor and/or retailer of the food and distributed in various markings and labels printed on the food package. The same space is used by the producer to form a desirable image for the product in the consumers mind, market their product and compete with competitors products. Due to on one hand the extent of available products and on the other hand the consumers' growing demand of information the consumer has a challenging task to find enough and right information when making the decision which product to buy.

All packaged food product contain the general information required by EU and national legislation (name of the product, quantity of content, producer, ingredients, nutrition table and information about allergenic components, shelf-life etc). In addition, different national and

international voluntary labels give information about nutritional characteristics (see table 2). The idea of all labels presented in Table 3 is to give the consumer information which helps in making a healthy choice. Recently, European Commission (EC) published a proposal which defines general guidelines for labels giving nutrition information on food packages. The guidelines state that the energy, total fat, saturated fat, carbohydrates with specific reference to sugars and salt content and the proportion of these substances to the reference intakes must be presented. If the EC proposal is accepted it means that, in the future, a label similar to GDA label will be seen in all food packages.

Table 3. Food labels giving nutritional information used in EU countries.

Countries using the label	Name	Label	Information
All European countries	GDA = Guideline Daily Amount		Gives information about energy, total and saturated fat, total carbohydrate, sugar, protein, sodium/salt and fiber content of one food serving and their proportion of recommended daily intake.
UK	Traffic light labelling		Gives information about amounts of total and saturated fat, sugar, protein and salt in one food serving. Color-codes indicate whether the amount relative to recommended daily intake in this serving is low, medium or high.
Sweden, Norway and Denmark	The keyhole symbol (Nyckelhål symbol)		Helps consumer make healthier choice. Takes into account: -quantity of total and saturated fat, sugars, sodium and fiber
Finland	Heart symbol (Sydänmerkki)		Helps consumer make healthier choice. Takes into account: -quality and quantity of fat -quantity of sodium -in some product groups also quantity of cholesterol, sugars and fiber

Use of nutrition labels in five different food product categories was recently studied in all 27 EU countries plus Turkey (34). According to this study, GDA labels and nutrition claims are the most common form of voluntary nutrition information available in food packages marketed in Europe. On average, on every fourth food package had either one or both of preceding nutrition information but variation between countries was high. GDA labels were most commonly used in UK (63 % of products) and least used in Turkey (2%). The use of nutrition claims ranges from 12 % in Estonia to 37 % in Ireland and Portugal.

Although all the labels help the consumer in decision-making the problem of all labels giving information about a single food product is that they don't tell much about the whole diet. Therefore, products offering nutritional information on the level of whole diet would be welcome. To answer this need, Finnish retailer Kesko, has launched service called Nutrition Code for its regular customers. The service collects information about consumer's groceries, compares the nutritional data to Finnish National Nutrition Council's recommendations and evaluates the healthiness of groceries.

Box 1. Warning sticker for bad food?

Finnish Food Safety Authority is considering to make complaints about food quality sold in grocery shops public. For example, a sticker with a figure of crying face by the entrance door of a grocery shop could be used to inform the consumer about complaint given to shop. Similar system is already in use in some Danish restaurants.

Box 2. Food-related information to your mobile

iPhone has developed novel applications that can be used to get food-related information when ever e.g. while you are shopping. One of their new applications, called E numbers, "decodes" one of over 500 E codes and gives the user a safety ranking, from 1 meaning 'good' to 5 meaning 'dangerous'.

A representative of European Food Information Council has already expressed her concern about the overall message this sends to the consumer. Without committing oneself on the content of this application, this is an interesting example of new possibilities for providing information to the consumers.

http://www.foodnavigator.com/Financial-Industry/E-numbers-scrutinised-via-iPhone-apps/?c=5fBAzmWahwQIBGBhK3v4rg%3D%3D&utm_source=newsletter_daily&utm_medium=email&utm_campaign=Newsletter%2BDaily

5.1.3 What can we conclude from all of this?

The scenario of increasing overweight and obesity seems inevitable. Success of different diet products has continued for some time already but no end is in sight. Diet products with reduced or no sugar or fat ranked high on the latest Mintel's list of the most frequent claims made on new food products launched in EU market (20). On one hand this means that much is done already but on the other hand it shows that the entrepreneurs believe that this is something worth investing. Overweight, and especially overweight of children, is not just a problem for the person being overweight but also for the whole society. As a result, Denmark and Finland have decided to introduce excise taxes for candies and soft drinks to steer the consumption to healthier alternatives. Therefore, products for (children's) weight management are foreseen to have a bright future.

Increased prevalence of chronic diseases as a result overweight and ageing will increase demand for functional foods. Also the greying European population has more money to spend on these usually slightly more expensive products. Present evaluation of health claims by EFSA and also final decisions of European Commission will probably have a strong influence to the future of functional foods at least in the short run.

Consumers want more information but, on the other hand, some consumers perceive the current amount of information so huge that they have difficulties to manage it and find the right information. Therefore, informative simple labels in food packages and other sophisticated novel applications for information distribution are needed.

Origin, traceability and safety of food are becoming more and more important for the consumer. This has roused interest towards local and organic production interest being the biggest in Denmark, Sweden and Germany. Private consumers and also bigger food purchasers have started to demand foods with less additives because of possible adverse health effects of certain additives. Food companies have already started to answer this request although scientific ground for these fears is weak. This reminds us that the old truth from service sector "the customer is always right" is also valid in food processing.

5.2 Food and sustainability

As food production is extremely closely tied to the availability and quality of various natural resources, the concept of environmental sustainability as a whole has great implications for food industry. To get the full picture of how food production affects — and is affected by — the environment, we need to start from the primary production, agriculture and aquaculture. Subsequently, we will proceed to take a look at the concept of sustainability, and how it translates to practice when it comes to food production. Finally, we will discuss the implications and opportunities sustainable food production can have for food industry SME's.

5.2.1 Major environmental issues the food industry needs to consider

At least three major areas can be identified, which significantly influence and are influenced by food production: climate, energy and water. Each of these areas will be discussed below.

5.2.1.1 Climate

Food production is a major contributor to climate change. About 12% of the 36 billion tons of annual worldwide greenhouse gas (GHG) emissions come from agriculture (see Figure 1). Surprising as it may seem, agriculture is responsible for approximately as much of the global GHG emissions as transport. (35)

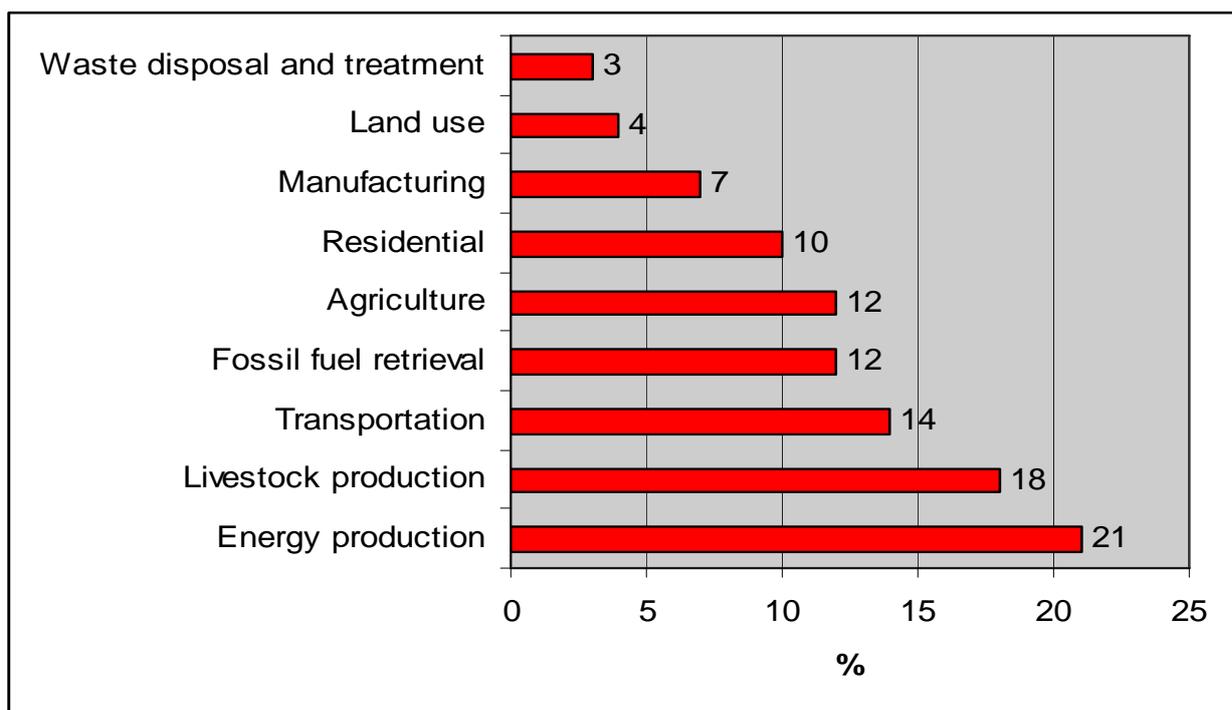


Figure 1. World greenhouse gas (GHG) emissions by sector (source: 35)

Livestock production, i.e. beef, chicken and pork, alone is calculated to be responsible for 18% of global GHG emissions measured in CO₂-equivalents (36). Concerns have been raised regarding the sufficiency of environmental resources to cater for the ever increasing population of the world (37), and especially world's increasing demand for meat (38), as well as the environmental impacts of intensive meat production (39). The problem with especially beef production is that bovines are relatively ineffective in transforming calories they get from their feed into meat, requiring 7 kg of grain to produce 1 kg of beef, whereas for porks the ratio is 4:1 and for chickens 2:1. In a typical American feedlot system, a little more than one-half of the cattle's feed is grain, which translates into a fossil energy input of about 35 kcal/kcal of beef protein produced. (40). Of the GHG emissions beef production causes, 40% come from feed crops through forgone absorption of GHG, 32% from cattle and their wastes, 14% from fertiliser production for feed crops and another 14% from general farm production (35).

Food production not only contributes to the aggravation of climate change, but is also greatly influenced by it (see Figure 2). Unpredictable and extreme weather events, rising sea levels, droughts, damages to sensitive ecosystems, new insects, weeds and fungi all have their effect on the availability and price of food.

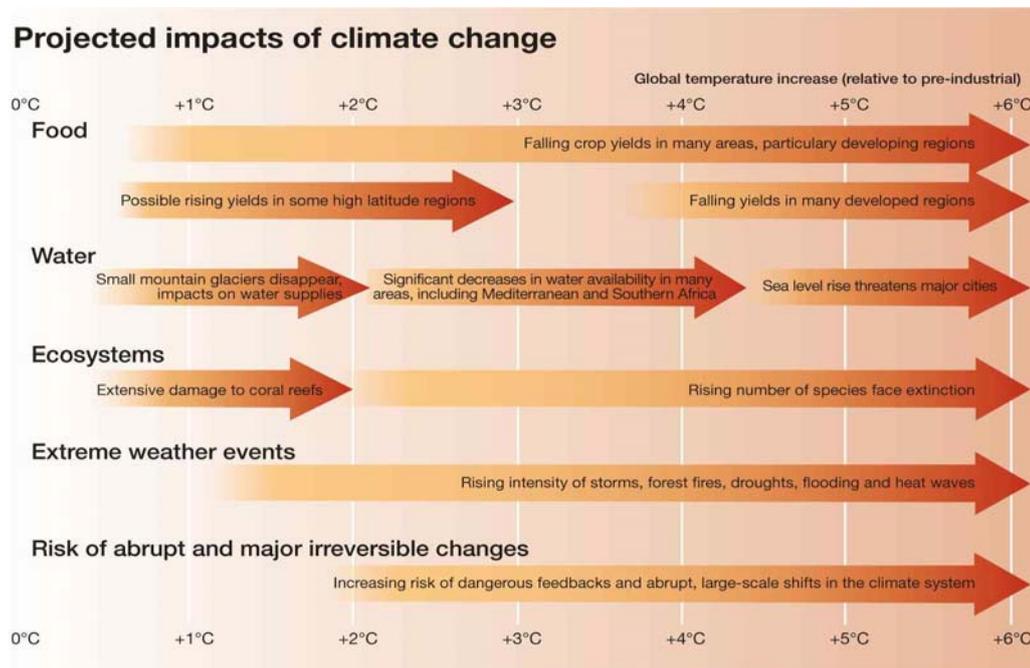


Figure 2. Projected impacts of climate change (source: <http://www.grida.no>)

Climate change is projected to benefit agricultural productivity in countries in the Baltic Sea region, especially the Nordic countries (see Figure 3). However, many countries in the world will most likely see a decline in their agricultural productivity due to climate change. It is noteworthy that large parts of the United States, as well as South-America and Africa are projected to be among the sufferers of the declining productivity. The United States, Brazil and Argentina are all among the biggest agricultural producers and exporters worldwide, so major changes in their productivity could also imply major shifts in world trade of food products. Africa, on the other hand, is projected to have a considerable population increase simultaneously with the decreasing agricultural productivity, which is likely to cause famines and turn people into food refugees.

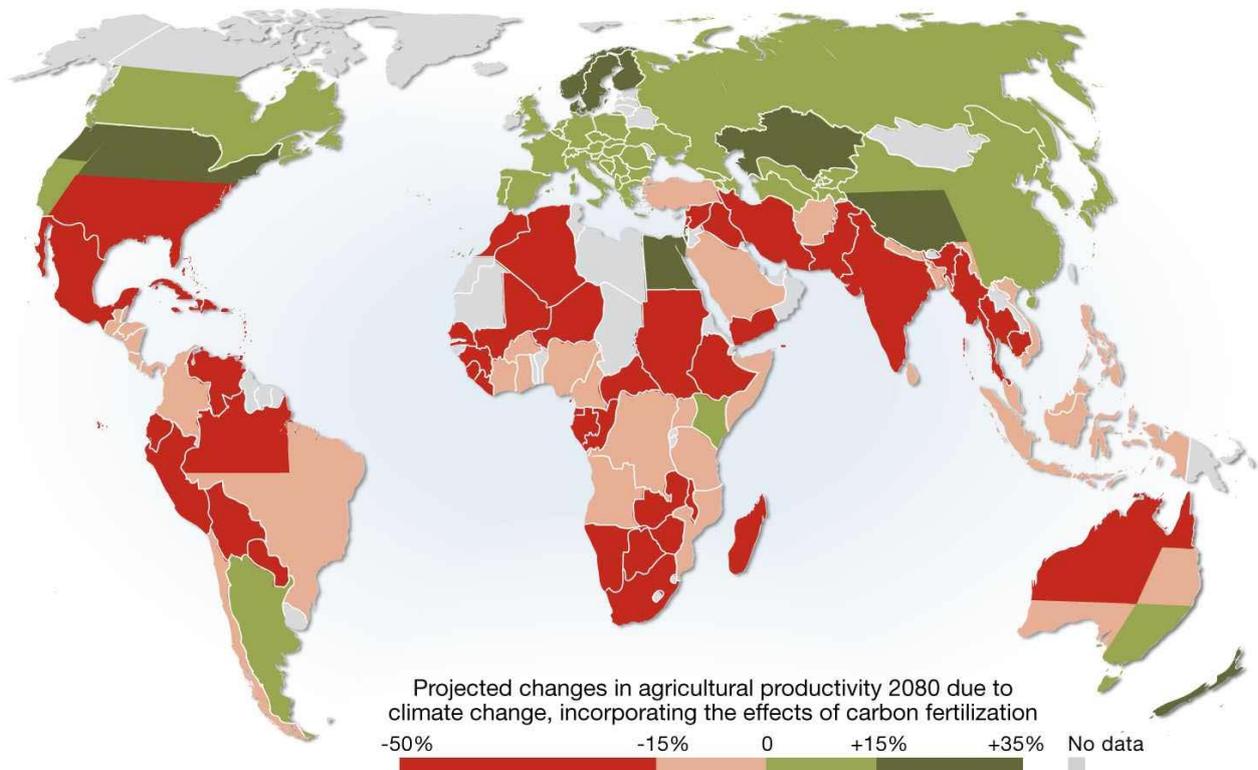


Figure 3. Changes in agricultural productivity due to climate change (source: <http://www.grida.no>)

5.2.1.2 Energy demand and supply

Energy demand and supply have remarkable impacts on food industry. The modern food production system has been built on, and relies heavily upon, cheap and abundant energy. Mineral fertilisers are manufactured from fossil fuels (natural gas), which are getting increasingly scarce and a lot more expensive than previously. Farm vehicles and infrastructure have remarkably contributed to the continuous increase in agricultural productivity during the 20th century – and they run on fossil fuels. The backbone of modern industrialised food production

has been built on the continuous availability of cheap fossil fuels. During the last few years this backbone has been weakened; crude oil prices have hit new record highs, and the currently known reserves of fossil fuels are projected by some to last only decades. (41.) Dr. Fatih Birol, the chief economist at International Energy Agency (IEA) has predicted that global oil production is likely to peak in about 10 years and start declining after that, which is about twice as soon as previously predicted (42).

Demands for the use of renewable energy are constantly increasing globally, as the GHG emissions are becoming unbearable. The EU set in its 2008 climate and energy package a target to increase the share of renewables in its overall energy mix to 20%, including a 10% biofuel target for transport by 2020, along with targets to reduce GHG emissions by at least 20% from 1990 levels by 2020, and to save 20% of energy consumption by 2020. Policy changes to favour renewable energy sources and measures to curb GHG emissions are also to be expected in the United States, with president Obama vowing to take serious action to tackle climate change.

During the past few years, the demand for biofuels has sky-rocketed (see Figure 4). This has already had a significant impact on food production. Many of so-called first-generation biofuels are manufactured from food or feed crops such as corn, soy, rapeseed, wheat and sugar cane. The sudden spike in demand for these crops caused by biofuel production raised their prices and made it more profitable for farmers to grow crops for biofuel production rather than for food production.

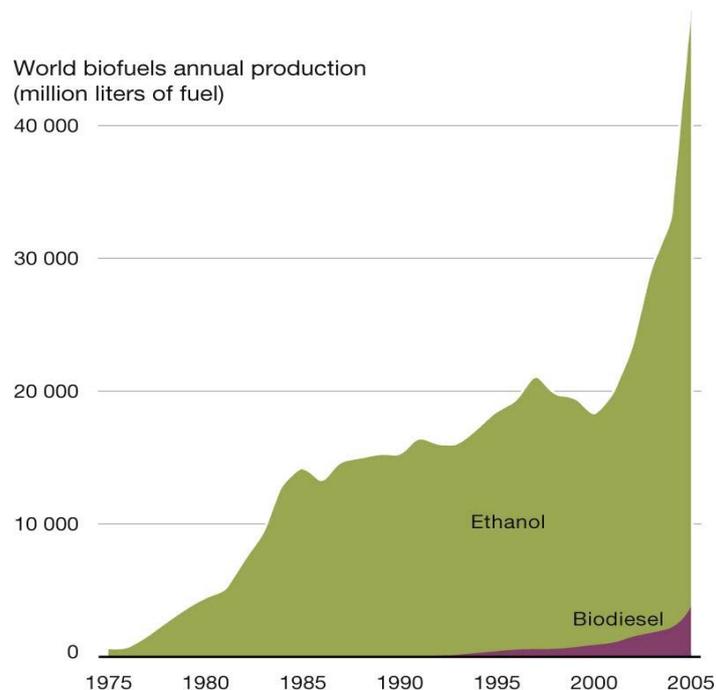


Figure 4. World biofuels annual production (source: <http://www.grida.no>)

Production of first generation biofuels – along with extreme weathers and subsequent crop failures, high oil prices affecting fertilizer use, food production, distribution and transport as well as speculation in the food markets and trade barriers – contributed to the rising food prices and eventual food riots and crisis in 2008 in different parts of the developing world (43,44). So-called advanced biofuels, i.e. second and third generation biofuels, on the other hand, are not in direct competition with food production, but can rather be seen to complement it. Second generation biofuels use non-food crops and waste biomass as raw material. This provides an opportunity for agriculture and food industry to decrease its environmental impacts. Third generation biofuels use algae as raw material.

5.2.1.3 Water demand and supply

Water demand and supply is yet another area, which has an effect on food production and to which it contributes. Agriculture is by far the largest consumer of freshwater — approximately 70 % of all freshwater withdrawals go to irrigated agriculture (45). All the food that is produced contains so called virtual or embedded water, i.e. the amount of water it has taken to produce these goods. For many agricultural and food products the amount of virtual water is quite high (see Table 4).

Table 4. Virtual water embedded in some agricultural products

Product	Water demand (litres/kilogram of product)
Wheat	1 300
Soybeans	1 800
Rice	3 400
Cheese	5 000
Chicken	3 900
Pork	4 800
Beef	15 500

Source: <http://www.waterfootprint.org>

The water footprint of a nation refers to the total amount of water that is used to produce the goods and services consumed by the inhabitants of the nation. The total water footprint of a country includes two components: the part of the footprint that falls inside the country (internal water footprint) and the part of the footprint that presses on other countries in the world (external water footprint). Global average water footprint is 1 243 m³/capita/year. (45.) As can be seen in Table 5, the water footprints of Denmark, Finland, Germany and Sweden all exceed

the global average, which tells us about consumption of goods with a lot embedded water in them. What is also remarkable is that considerable percentages of these footprints fall outside of the country, indicating a dependency on the adequacy of foreign water resources.

Table 5. National water footprints in the Baltic Sea region, the US, China and India

Country	Average waterfootprint of the country (m ³ /capita/year)	Part of footprint falling outside of the country (%)
Denmark	1 440	60
Finland	1 727	41
Germany	1 545	53
Lithuania	1 128	38
Poland	1 103	29
Sweden	1 621	53
US	2 483	19
China	702	7
India	980	2

Source: <http://www.waterfootprint.org>

Aquifers, ground water reserves, are becoming an increasingly scarce natural resource. Water scarcity occurs when the amount of water withdrawn from lakes, rivers or groundwater is so great that water supplies are no longer adequate to satisfy all human or ecosystem requirements, resulting in increased competition between water users and other demands (see Figure 5.).

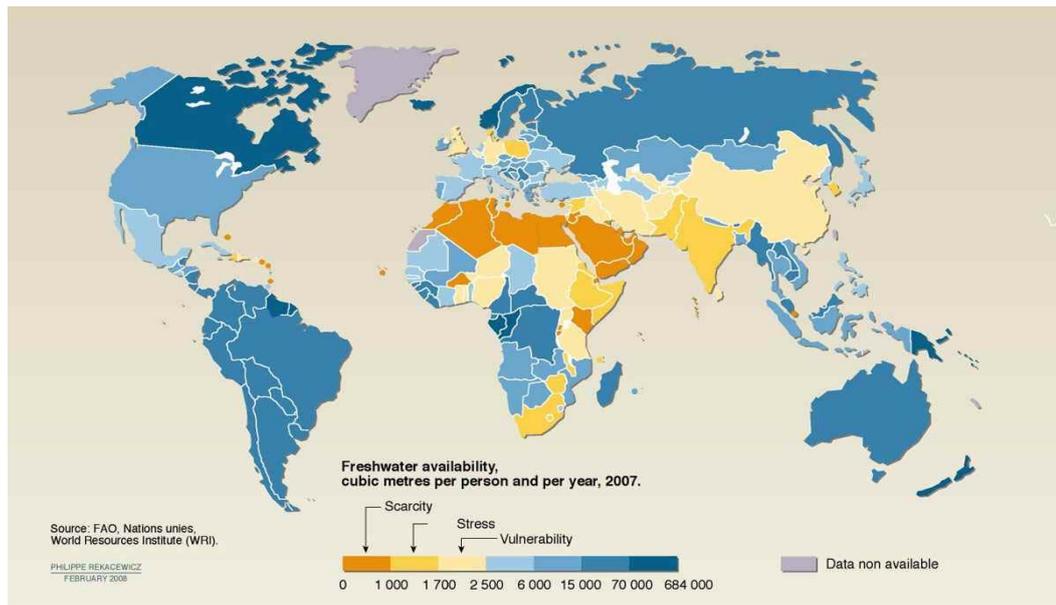


Figure 5. Global water stress and scarcity (source: <http://www.grida.no>)

Figures 5. and 6. illustrate interesting and even surprising facts about Baltic Sea region countries. Denmark and Poland are classified as “stressed” countries when it comes to water stress and scarcity, while Germany is “vulnerable”. Simultaneously, Germany and Poland are classified as countries, who withdraw their renewable water resources slightly excessively. It seems water scarcity is not just a problem of the developing countries.

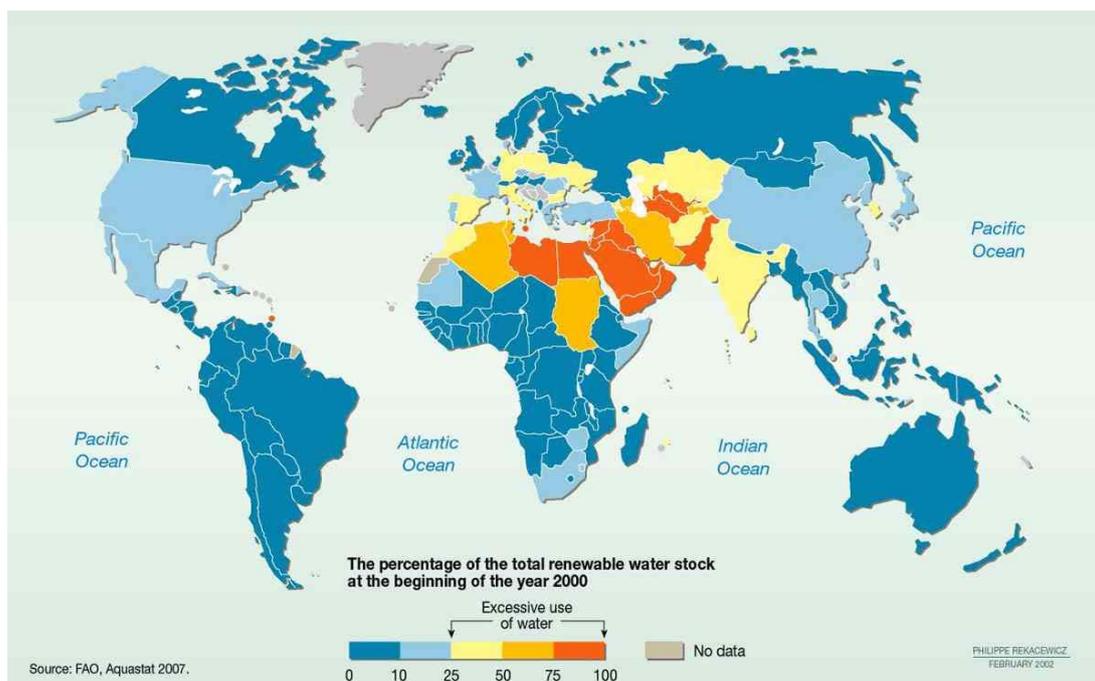


Figure 6. Excessive withdrawal of renewable water resources (source: <http://www.grida.no>)

Considering the constantly rising demand for food due to population growth and especially the demand for food that embeds a lot of virtual water — meat production requires 8 to 10 times more water than cereal production — it is quite clear that the equilibrium between water demand and supply is going to be increasingly hard to find. The simultaneous depletion of ground water aquifers, eutrophication of waterways, droughts and rising sea levels caused by the changing climate imply that access to water may even contribute to causing wars in the future.

5.2.1.4 Other environmental considerations

Other environmental problems are also connected to industrial food production — problems that can locally be very serious. *Soil degradation* and *erosion* are in part caused by excessive use of fertilisers and consistent monoculture of cash-crops with no rotation of cover-crops in between. This results in a treadmill of more and more fertilisers needed and used. When fertilisers are applied excessively, and especially to land which is already degraded, the land and plants are not capable of utilising the nutrients fully. Instead, they leach into waterways causing *eutrophication*. Some 70% of the annual nitrogen and phosphorus loads to the Baltic Sea come from waterborne discharges, half to two-thirds of these are associated with agriculture (46). Large-scale, consistent monocultures have also made it possible for insects and weeds to form strong populations and become resistant to the commonly used pesticides. This also causes a treadmill, more and different kinds of pesticides constantly have to be developed and used. *Pesticide residues* in food products are a common worry among consumers worldwide, as are residues from *antibiotics* routinely administered to many animals because of ill-fitting diets and close captivity.

5.2.2 What does sustainable actually mean when it comes to food products?

All the environmental concerns presented in the previous chapter can frankly seem rather daunting. Maybe the best solution would be to avoid eating altogether? Many a concerned voices have been heard during the past few years about the environmental, social and cultural sustainability of the global industrial food production system, such as Michael Pollan's *The Omnivore's Dilemma: A Natural History of Four Meals* (2006), Paul Roberts' *The End of Food: The Coming Crisis in the World Food Industry* (2008) and Raj Patel's *Stuffed and Starved: The Hidden Battle for the World Food System* (2008), and lately also by government officials such as Hilary Benn, Environment, Food and Rural Affairs Secretary of the United Kingdom (see Box 3.).

Box 3. Rethink of food production in the UK

The UK will need to radically rethink the way food is produced and processed, stated Environment, Food and Rural Affairs Secretary Hilary Benn mid-August 2009:

"Globally we need to cut emissions and adapt to the changing climate that will alter what we can grow and where we can grow it. We must maintain the natural resources – soils, water, and biodiversity – on which food production depends. And we need to tackle diet-related ill health that already costs the NHS and the wider economy billions of pounds each year.

And because we live in an interconnected world – where the price of soya in Brazil affects the price of steak at the local supermarket – we need to look at global issues that affect food security here.

That's why we need to consider what food system should look like in 20 years, and what must happen to get there. We need everyone in the food system to get involved – from farmers and retailers to the health service, schools and consumers."

<http://www.defra.gov.uk/news/2009/090810a.htm>

While it is true that the entire global system of food production and consumption may indeed need to be reconsidered, some quite sustainable options exist already now. In this chapter some of these options are discussed in more detail.

5.2.2.1 Organic

Generally, organically produced food is considered to be a very sustainable option, if not in fact the primary sustainable option. The European Commission lists key benefits of organic production, including:

- Organic production contributes to a high level of biodiversity and the preservation of species and natural habitats.
- Organic production makes responsible use of energy and natural resources.
- Organic production takes account of local and regional balances and encourages the use of on-site resources.
- Organic production enhances soil life, natural soil fertility and water quality.
- Organic production promotes animal health and welfare.
- Organic production meets the specific behavioural needs of animals. (47.)

Major critique towards organic production usually consists of doubts about the productiveness and yields of organic agriculture, the quality of the products and the higher price. It is true that organic production may require longer production times, sometimes greater labour requirements, careful separation from conventional products, smaller scale food processing and distribution, more stringent controls and certifications than conventional production, and this in turn is reflected in the higher price of organic products. It is commonly thought that organic agriculture produces less yield than conventional farming, but evidence has also been found to indicate that organic agriculture would in fact not be more ineffective than conventional agriculture. Pimentel et al. (2005) found that organic farming produces the same yields of corn and soybeans as does conventional farming, but uses 30% less energy, less water and no pesticides (68). As for the quality of organic food, it is produced to the same food safety standards as other foods and must comply with EU General Food law. One issue, which causes concern and confusion among consumers is the existence of multiple parallel labels for organic products. While the national and private logos, being well known by the consumers in their own country, continue on the products, the use of the EU organic logo will be mandatory as of 1 July 2010. (47.)

In order to qualify as organic, production has to meet certain criteria. According to the European Commission, typical organic farming practices include:

- Wide crop rotation as a prerequisite for an efficient use of on-site resources.
- Very strict limits on chemical synthetic pesticide and synthetic fertiliser use, livestock antibiotics, food additives and processing aids and other inputs.
- Absolute prohibition of the use of genetically modified organisms.
- Taking advantage of on-site resources, such as livestock manure for fertiliser or feed produced on the farm.
- Choosing plant and animal species that are resistant to disease and adapted to local conditions.
- Raising livestock in free-range, open-air systems and providing them with organic feed.
- Using animal husbandry practices appropriate to different livestock species.

Before operators can start farming organically or manufacturing organic products they must first apply to an organic inspection body or authority in their Member State. Their premises and production methods have to be inspected and acknowledged by the inspection body or authority. Organic farms also have to undergo a conversion period, before they can sell their products as organic. Each EU Member State has designated a number of public authorities and/or approved private inspection bodies to carry out the inspections. (47.)

Globally, 32.2 million hectares of agricultural land are currently managed organically (see Figure 7.). In addition to the agricultural land, there are 0.4 million hectares of certified organic aquaculture. In North America, approximately 2.2 million hectares are managed organically, representing approximately 0.6% of the total agricultural area in North America. In Europe 7.8 million hectares are managed organically, which constitutes 1.9% of the European agricultural area and 4% of the agricultural area in the EU (for organic production area and share of total agricultural land by country in Europe, see Figure 8.). In Africa, there are almost 900.000 hectares of certified organic agricultural land, in Asia nearly 2.9 million hectares, and in Latin America and the Caribbean 6.4 million hectares. The highest share of organically managed land can be found in Oceania (i.e. Australia, New Zealand and island states such as Fiji and Papua New Guinea). 12.1 million hectares are under organic production, which constitutes 2.6 percent of the agricultural land in the area. 99% of the organically managed land in the region is in Australia. (48)

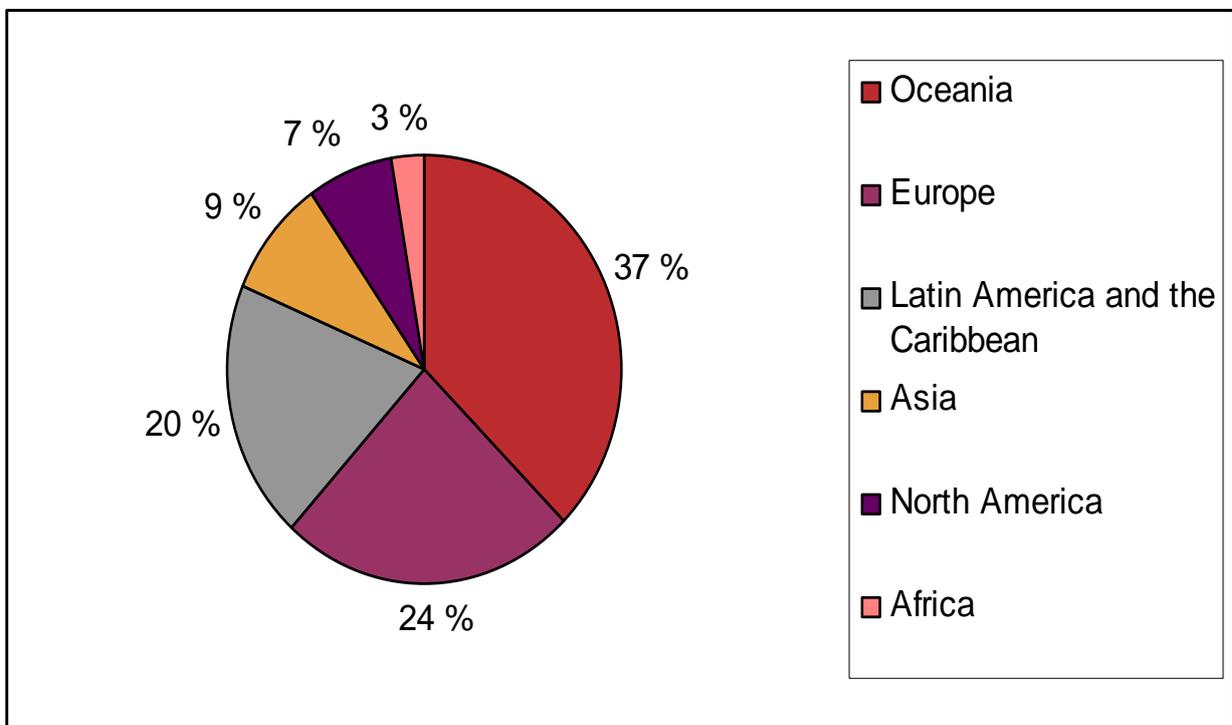


Figure 7. Global distribution of organic crop area in 2007 by continent (source: 48)

Organic farming in Europe

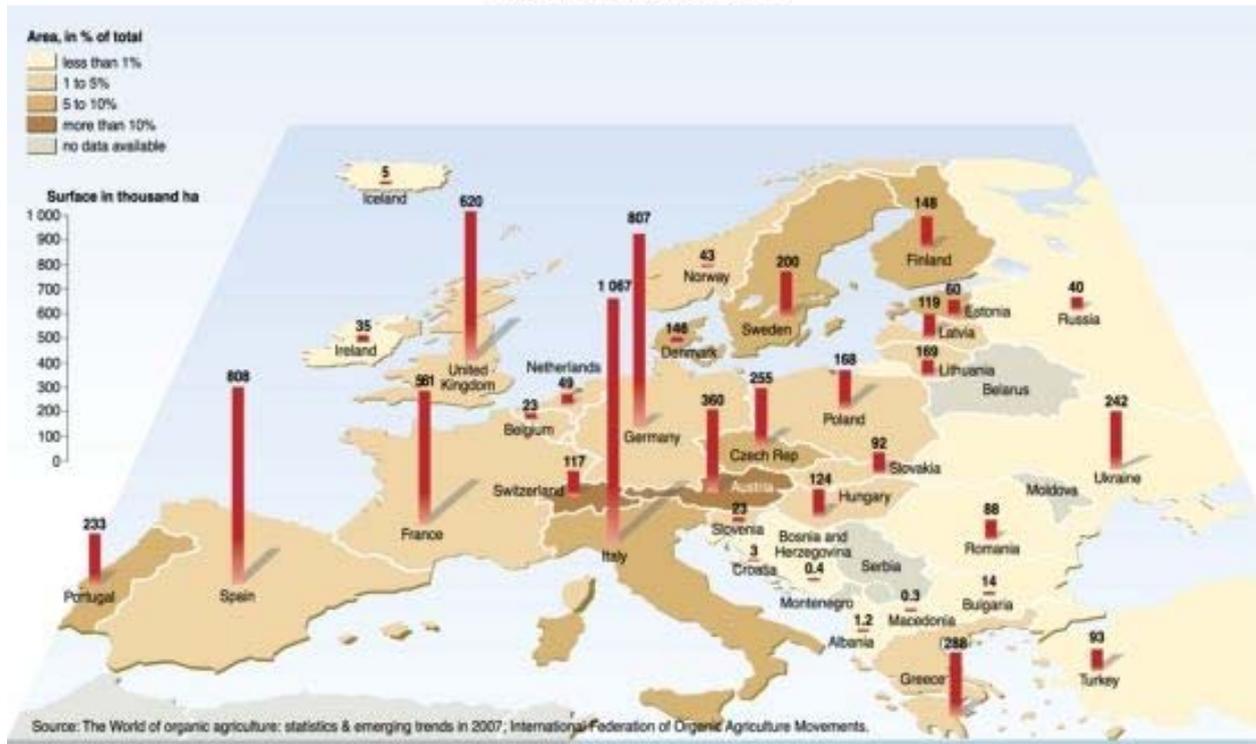


Figure 8. Organic farming in Europe 2007, surface area by country (source: <http://www.grida.no>)

Global sales of organic food and drink products in 2007 amounted to \$46 billion, with an average annual growth of \$5 billion over the last decade. The EU accounts for 54% of this and the US for 43%. Although at a much smaller scale, the Asian market is experiencing double-digit growth rates of 15-20 percent per year, fueled partly by concerns over food safety. (49.) Some BSR countries are well-known for their good sales figures of organic: Denmark has the highest per capita consumption of organic food in Europe, while Germany and Sweden also rank good (see Figure 8.). It also has to be noted that while the organic crop area in Finland is quite high, 6.5% of the entire crop area in 2007, organic share of the entire food market, as well as its turnover is low.

The global financial turmoil of the past year or so has slowed down the growth rates of organic sales figures in some countries. For instance in the US, growth in sales of organic in December 2008 was 5.6% compared to same time previous year, while in December 2007 it was a much more considerable 25.6%. (50.) However, e.g. in Finland, the growth in sales of organics from 2007 to 2008 was 19%, while the growth from 2006 to 2007 was 10% (51). Similarly, organic food sales from supermarkets and department stores in Denmark rose to €671m in 2008, marking a 29% vertical rise on the year before (52).

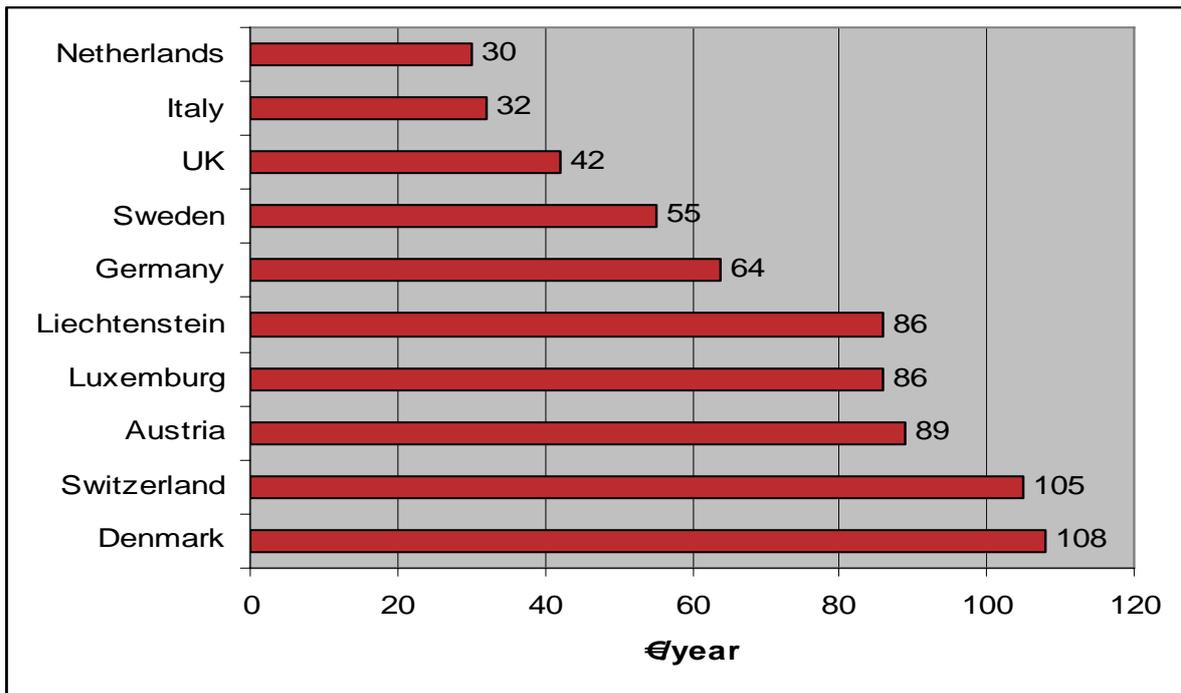


Figure 8. European countries with the highest per capita consumption of organic in 2007 (source: <http://organic-world.net>)

Table 6. Organic food in the Baltic Sea region

Country	Number of registered organic operators 2007	Share of total agricultural land 2007 (%)	Share of the entire food market 2007 (%)	Turnover of the organic food market 2007 (M€)
Denmark	3 584 ¹	5,2	6,0	580
Finland	4 380	6,5	0,9	62
Germany	26 820	5,1	3,1	5 300
Lithuania	2 881	4,5	:	:
Poland	:	0,5	:	:
Sweden	3 317 ¹	9,9	3,0	487

Sources: Eurostat, Ruokatieto, organic-world.net, organic-europe.net

¹ data for year 2006

: data not available

Box 4. Nutritional value and health benefits of organic?

There is little difference in nutritional value and no evidence of any extra health benefits from eating organic produce, claim researchers from the London School of Hygiene and Tropical Medicine in a recent study published in the *American Journal of Clinical Nutrition*. The researchers looked at all the evidence on nutrition and health benefits from the past 50 years, and found no differences in most nutrients in organically or conventionally grown crops, including in vitamin C, calcium, and iron. The review did not, however, look at pesticides or the environmental impact of different farming practices. The study was commissioned by The Food Standards Agency, an independent UK government department set up to protect the public's health and consumer interests in relation to food.

The Soil Association, a UK charity campaigning for organic food and farming, criticised the study and called for better research. The Soil Association says that although the researchers say that the differences between organic and non-organic food are not important, due to the relatively few studies, they report in their analysis that there are higher levels of beneficial nutrients in organic compared to non-organic foods. The Soil Association also calls for large-scale, longitudinal research, as well as more research on the long-term effects of pesticides on human health.

<http://news.bbc.co.uk/2/hi/health/8174482.stm>

5.2.2.2 More conscious food choices

One of the most effective ways to eat in an environmentally sustainable way is for consumers to make more conscious food choices. In effect, this means dietary changes — not merely choosing e.g. the organic or eco-labelled option, but also choosing entirely different food items. To simplify, this would mean reducing items with higher environmental impacts, such as beef and rice, from the diet and including more food with low environmental impact, such as seasonal fruits and vegetables. It has to be noted, though, that single food items cannot be straightforwardly classified as “bad” or “good”, as a good deal of the environmental impacts depend upon the production methods. A classic example are tomatoes: generally it is a good idea to increase the amount of vegetables in your diet to decrease the environmental impact of your food consumption, but if it is wintertime, and you happen to live in a country with colder climate, and you choose tomatoes produced in your local greenhouse, which happens to use fossil fuels to heat up the greenhouse, what you thought was a green choice is in fact not very sustainable at all.

During the next decades the global population is projected to grow substantially, especially in the developing countries. By 2050 the global population is projected to have surpassed nine billion, with the largest population increase projected to occur in Asia, particularly in China, India

and Southeast Asia, accounting for about 60% and more of the world's population by 2050. Central America as well as Central and part of Western Africa are also still projected to experience relatively high rates of population growth. (43.)

Simultaneously the GDPs of many of these developing countries are also projected to increase. The income elasticity of demand for meat and other livestock products is high, i.e. as incomes grow expenditure on livestock products grows (43). While the diets in developing countries have traditionally been very vegetarian, due to higher price of meat, more disposable income usually means more meat consumed. China is a shining example of this; per capita meat consumption was almost five times higher in 2002 than it was 1972 (see Figure 9.). With the European average on annual per capita meat consumption being 74.3 kg year 2002, Finland and Lithuania were the only BSR countries to stay below that. Notably, Denmark ranks very high in meat consumption, topping even the US. Concerns about the environmental effects of meatier diets worldwide have been presented (38).

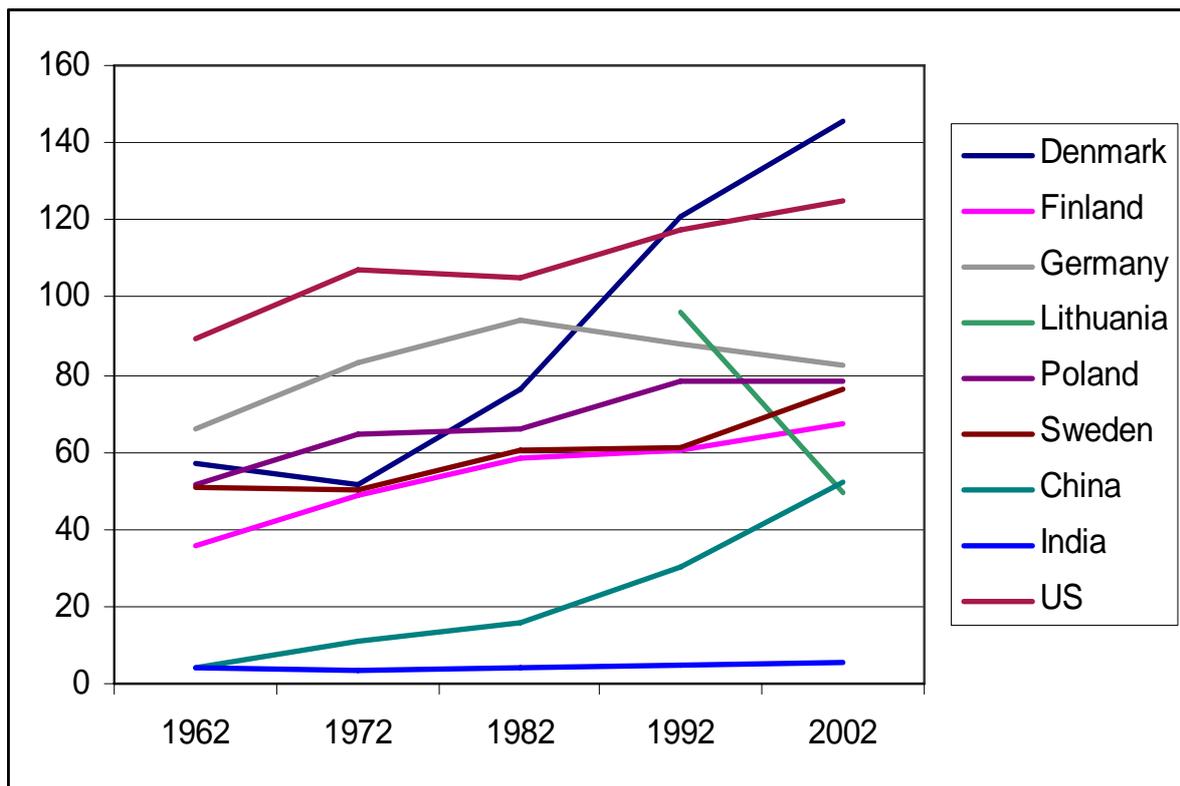


Figure 9. Per capita meat consumption in BSR countries, China, India and the US (Source: EarthTrends)

The overall per capita calorie intake has been increasing during the past century, and is projected to continue doing so (see Figure 10.). As nearly half of the world's cereal production is used to produce animal feed, the dietary proportion of meat has a major influence on global food demand (38). With global meat consumption projected to increase from 37.4 kg/person/year in 2000 to over 52 kg/person/year by 2050, cereal requirements for more intensive meat production may increase substantially to more than 50% of total cereal production. In general, the rapidly increasing global population together with the changing dietary patterns mean that global food production needs to rise by 70% by 2050 to meet the demands (43). It seems quite evident that this kind of increase cannot be obtained without severely affecting the environment and natural resources, unless there is some sort of change in global dietary patterns to favor foods with less environmental impacts.

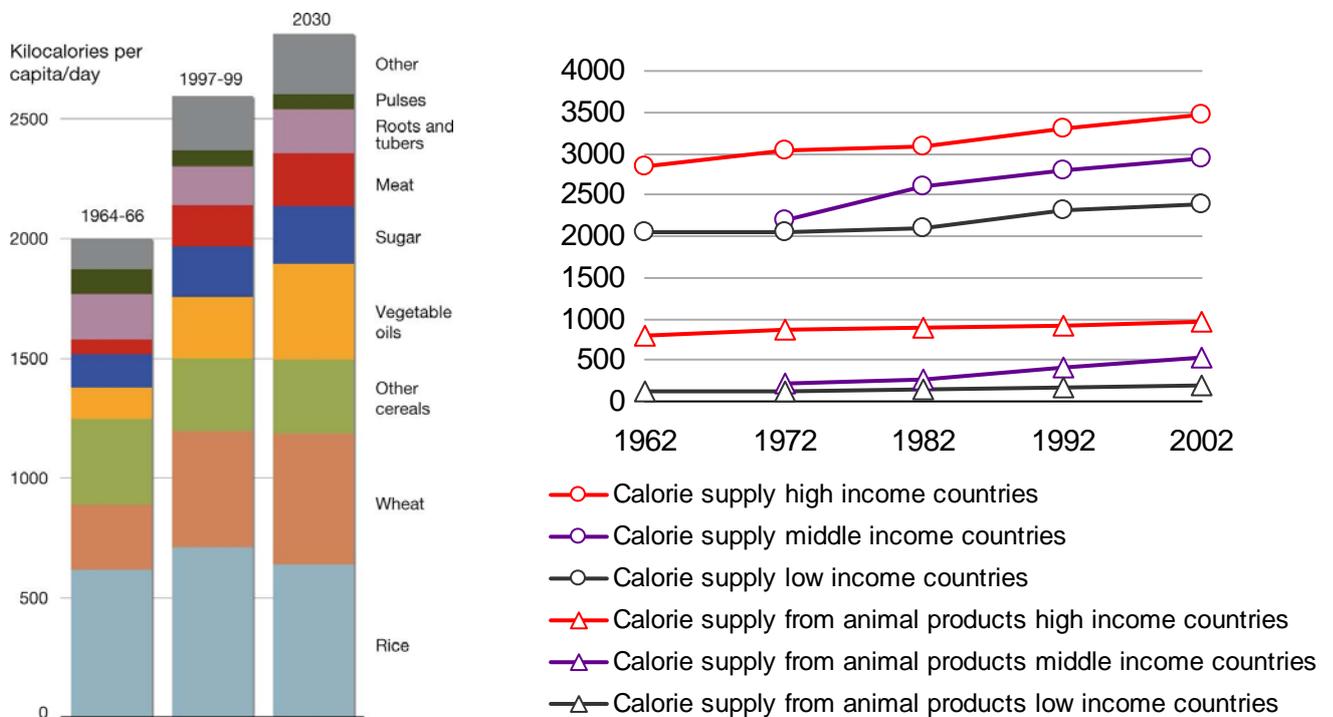


Figure 10. Dietary changes, occurred and projected (source: <http://www.grida.no>; EarthTrends)

Swedish National Food Administration and Swedish Environmental Protection Agency have jointly developed guidelines for climate-friendly food choices. The Swedish authorities are the first in Europe to develop such recommendations. They have been sent out in May 2009 to other EU countries to gauge reactions before being released. Provided there are no serious objections, the process should be completed in the autumn of 2009. The guidelines cover meat, fish, shellfish, fruits, berries, vegetables, legumes, potatoes, cereal, rice, cooking fat and water, and are designed to help consumers realise the environmental impacts of different foods. The Swedish authorities recommend citizens e.g. to reduce their meat and rice consumption, to eat seasonal and locally produced food, and to choose organically produced food. (1.)

World Wildlife Fund WWF, on the other hand, has created consumer guides for sustainable seafood in co-operation with the Seafood Choices alliance. Of the Baltic Sea region countries these guides currently exist for Denmark, Finland, Germany and Sweden. The guides help consumers avoid species that are overfished or whose cultivation has considerable environmental impacts. Among the species to be avoided are e.g. tropical shrimps, fresh tuna, swordfish, redfish and wild trout. (53.)

Box 5. Meat-free Thursdays

Belgian town Ghent embarked on a radical experiment in May 2009, seeking to make every Thursday a day free of meat and of the fish and shellfish for which the city is renowned. Every restaurant in the city is to guarantee a vegetarian dish on the menu, with some going fully vegetarian every Thursday. From September, the city's schools are to make a meat-free meal the "default" option every Thursday, although parents can insist on meat for their children. At least one hospital is planning to join in.

The city council says it is the first town in Europe and probably the western world to try to make the entire place vegetarian for a day every week. Tom Balthazar, the Labour party councillor pushing the scheme, said: "There's nothing compulsory. We just want to be a city that promotes sustainable and healthy living."

<http://www.guardian.co.uk/environment/2009/may/13/ghent-belgium-vegetarian-day>

5.2.2.3 Local or regional food

A lot of environmental discussion has been circulating around *food miles* during the last couple of years. Locally or regionally produced food is often presented as a more environmentally sustainable choice, as the transport from the point of production to the point of purchase is shorter. However, it has been established that the greatest transport-related environmental impact occurs when the consumer transports himself to the point of purchase, and not from transport during the production and storage phase (54). How the consumer travels to the store, how often and for how many products makes a huge difference. Coley et al. (2009) have come to the conclusion that if the consumer drives a round-trip of more than 7,4 kms in order to purchase organic vegetables, the carbon emissions are likely to be greater than the emissions from the system of cold storage, packing, transport to a regional hub and final transport to the consumers doorstep used by large-scale vegetable box suppliers (55). This would indicate the need to consider more extensive home-delivery and online ordering systems for food purchases.



Some retailers, notably in the UK, have taken on to label their air-freighted products. Tesco seeks to restrict air transport to less than 1% of its products and marks all air-freighted products with a label (56). Likewise, in the spring of 2007 Marks & Spencer started to label the air-freighted food products it sells with a similar airplane label as Tesco does. Some criticism has, however, been presented towards retailers' decisions to not stock air-freighted goods or to label them separately. Obviously, it is not irrelevant how long a journey the product travels before it reaches the consumer, and it does make a difference whether it is air-freighted or e.g. transported by a ship. But what makes the real environmental difference are the methods of production. It might as well be that a product produced further away is produced using much less pesticides, fertilisers and fossil fuel operated vehicles than a similar product produced locally or regionally.

5.2.2.4 Eco-labelled food



Worldwide, not too many products bear carbon footprints yet. In Europe, the UK seems to be leading the way in labelling initiatives, with UK-based Carbon Trust working in co-operation with companies such as Coca-Cola Company, Tesco and Tropicana to bring carbon footprint labels to products. The Carbon Trust has worked with companies on more than 65 product carbon footprinting projects and 3 000 individual product lines.

The main problem regarding carbon footprint labelling of products is the lack of commonly agreed criteria and calculation methods. The Carbon Trust and Defra (UK Department for Environment, Food and Rural Affairs) have co-sponsored the publication by the British Standards Institution of PAS 2050, the product carbon footprinting standard. PAS 2050 provides a method for assessing the GHG emissions arising from products across their life cycle, from initial sourcing of raw materials through manufacture, transport, use and ultimately recycling or waste. This new standard is the first widely-consulted method that specifically addresses the emerging interest of both organisations and consumers in understanding the carbon footprint of goods and services. PAS 2050 may be used for a variety of formal and informal processes for improving and communicating the GHG performance of products and services. Pas 2050 is one effort to standardise product carbon footprint labelling — as long as the situation remains such that no commonly accepted standards are used, different carbon-footprint labels are not comparable with each other and thus might even be considered miss-leading to consumers.

Another big issue is the consumers' lack of knowledge to make consumption choices even with labels. A mere carbon footprint label with the words "220g CO2 per carton" printed on it, is not very informative for the average consumer. The consumer would have to be informed enough to know, which emissions are taken into account. And even this is not enough; the consumer would also have to be able to place this information in a larger context i.e. be able to compare the GHG emissions resulting from the production of one carton of juice with something totally different, e.g. the production of a washing machine or a sweatshirt or a return flight to Thailand.

This would, first of all, require a comprehensive amount of data of life-cycle analyses of different types of products and services, and secondly, educated consumers.

The labelling mania does not end with carbon footprint labels. As virtual water has increasingly been recognised as another area of environmental impacts, on which products differ significantly, discussion is heating up on the need for water foot-print labels. Not to mention the countless other eco-labels that currently exist, e.g. those of Rainforest Alliance and Marine Stewardship Council, and the labels that some companies have created for themselves (see Box 6. for a Finnish example of a food industry company's own carbon foot-print and water foot-print labelling effort). No wonder the poor consumer is confused and even mistrustful of the various labelling efforts.

Box 6. CO₂ and H₂O labels of Raisio Group



The calculation model for the indicator developed by Raisio is based on research carried out by MTT Agrifood Research Finland. For calculation purposes, the ISO 14040 and ISO 14044 life cycle assessment standards were used for life cycle modelling and data collection, as well as the general principles of the Intergovernmental Panel on Climate Change IPCC. The indicator can be compared to the Linux computer operating system - all those who want to can use it as long as they observe the scope required by the indicator in emissions labeling.

As a European pioneer and the first Finnish company Raisio added a label indicating the CO₂ emissions of its Elovena oats and snack drink, and, at the same time, created a new indicator for the labelling system. The company will now determine the CO₂ emissions of its other products and add the label to other consumer products in order to further develop the new indicator.

Raisio is the world's first food company to add an H₂O label to product packaging, indicating the total water consumption of the product. The label was added to Elovena oat flakes. In addition to climate matters, water consumption is one of the biggest global environmental challenges. Clean, drinkable water is becoming a scarce resource worldwide, and the lack of water will affect all of us directly or indirectly.

<http://www.raisioaroup.fi/www/paage/Ecoloav>

Box 7. Carbon footprint guidelines for dairy industry

Dairy UK, the trade group for the dairy industry, announced in the beginning of August 2009 that it is to team up with the Carbon Trust to develop a new guide for measuring and reporting on the carbon footprint of dairy products.

The project, which could pave the way for carbon labels appearing on a bottle of milk or block of cheese, will see dairy farmers, processors and retailers work with the Carbon Trust to develop a single set of guidelines for measuring the industry's carbon emissions.

<http://www.guardian.co.uk/environment/2009/aug/07/farmers-milk-carbon-footprint>

5.2.2.5 Fairtrade



® Fairtrade is also usually counted among sustainable consumption choices. Fairtrade is an alternative approach to conventional trade and is based on a partnership between producers and consumers. It seeks to address the imbalance of power in trading relationships, unstable markets and the injustices of conventional trade. Fairtrade means that the primary producer in a developing country is guaranteed a certain and considerably fair amount of money in exchange for his products, and also that the products are produced according to some environmental standards as well. According to the Fairtrade Labelling Organizations International, Fairtrade criteria require sustainable farming techniques, and offer a higher price for organic products. Moreover, Fairtrade Premiums are often used to train producers in organic and sustainable techniques like composting and integrating recycled materials. (57.) Thus, Fairtrade deals mostly with the social and financial dimensions of sustainable development, but also to some extent with the environmental dimension.

Most Fairtrade labelled products are food products: coffee, tea, cocoa, fresh fruit, honey, juices, rice, sugar, wine, spices and herbs. Fairtrade products are sold in over 60 countries worldwide, Poland being the only EU member-state in the Baltic Sea area that does not yet have a Fairtrade organisation. For Lithuania, it is the Association for Promoting Fairtrade in Finland that licenses companies to use the Fairtrade Certification Mark. Fairtrade producers are located in Africa, Asia and Latin America and the Caribbean. (57.)

The growth in Fairtrade sales has been quite remarkable lately. Global Fairtrade sales grew by 22%, as consumers spent an estimated 2.9bn € on Fairtrade products. Major growth was experienced across all main Fairtrade product categories, while global sales doubled for Fairtrade tea (112%) and for Fairtrade cotton products (94%). As the products with the highest sales volumes, Fairtrade coffee sales increased 14% to 66,000 metric tonnes (MT) and the market for Fairtrade bananas grew by 28% to 300,000 MT. Fairtrade sales grew by at least 50% in seven countries, including Australia and New Zealand (72%), Canada (67%), Finland (57%), Germany (50%), Norway (73%), and Sweden (75%). The largest markets for Fairtrade products continued to experience strong growth, as sales of Fairtrade certified products increased by 43% in the United Kingdom and 10% in the United States. (57.)

5.2.2.6 GM food

Transgenic food — or what is often commonly and slightly miss-guidedly known as genetically modified or GM food — is a controversial issue, raising strong opinions for and against. Genetically modified organisms (GMO) are organisms whose genetic material has been altered using genetic engineering techniques. Transgenic organisms represent one type of genetically modified organisms, having DNA from a different species inserted in them.

EU legislation requires food containing GMOs to be labelled. In the case of pre-packaged products consisting of or containing GMOs, Regulation (EC) No 1830/2003 requires operators to state on a label that "This product contains genetically modified organisms". In the case of non-pre-packaged products offered to the final consumer, these words must appear on, or in connection with, the display of the product. Until 18 April 2004, GM food was regulated as novel food in the EU, and food derived from eighteen GM events have been approved so far (essentially maize and soy derivatives, oilseed rape oil and cottonseed oil). There was no specific legislation covering GM feed, but nine GM events (five maize varieties, three rape varieties and one soy variety) have been approved under the EU environmental legislation so far, and these approvals include the use as or in feeding-stuffs.

Globally the use of GM is very different from Europe. In the US, 85% of all corn and 91% of all soybeans planted in 2009 were genetically engineered (58). According to James (2008) the global GM crop area was 125 million hectares in 2008. The US is globally the largest producer of GM crops, with Argentina, Brazil, Canada, India and China being the other principal adopters of GM crops globally. Soybean continued to be the principal GM crop in 2008, followed by corn, cotton and canola (see Figure 11.). (59.)

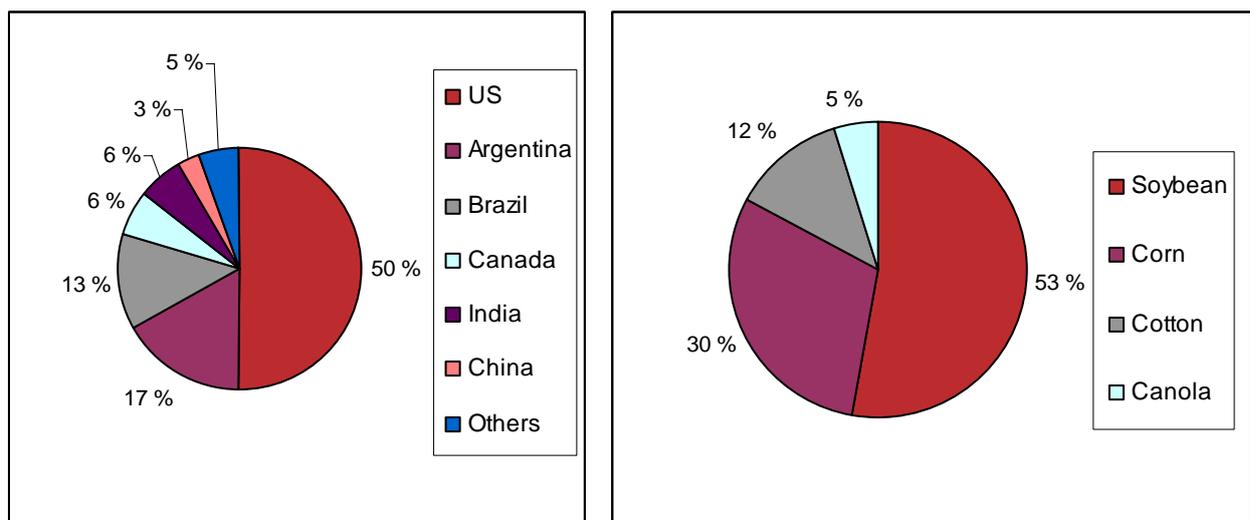


Figure 11. Global GM crop production in 2008 by country and crop (source: James 2008)

Interestingly, while the area under GM production globally is increasing every year and is many times larger than e.g. the area under organic production, our survey respondents considered advances in GM technology to bear a less significant impact on food industry SMEs than other areas of technology included in the survey (packaging, production, biotechnology,

nanotechnology, logistics, IT). The respondents deemed advances in GM technology to have little impact especially in the Baltic Sea region. This probably reflects the current legislative status within the EU, and the respondents do not seem to anticipate any major changes.

The main criticism towards GM food consists of concerns about inadequate research on the long-term health and environmental consequences of GM food. Critics say that GM crops have not been tested adequately for their safety as food, and that they will contaminate neighbouring crops, particularly those of organic farms. They claim there will be risks of damage to wildlife, and the emergence of tough weeds and insects resistant to pesticides. (60.) The fact that trade on GM seeds is often considered to benefit large multinational agribusiness companies hugely, while putting farmers especially in developing countries in a tight spot, is also a cause for much criticism. Consumer awareness groups have criticised the fact that, unlike in Europe, in the US it is not mandatory to specifically label a food product containing GM. Yet another source of criticism towards large multinational agribusinesses is that usually their user agreements explicitly forbid the use of the seeds for any independent research. In most cases, scientists cannot test the seeds to explore the different conditions under which they thrive or fail, nor can they examine whether the genetically modified crops lead to unintended environmental side effects and publish their results without the consent of the companies.

While GM food is heavily criticised, it is acknowledged to also possess the potential to relieve famines and help adjust to climate change. GM crops can offer many advantages, in terms of reduced pesticide use, resistance to drought or salinity, greater yield, and better, more nutritious food. (60.)

5.2.3 Why wouldn't consumers buy sustainable products?

When it comes to taking sustainability into consideration in shopping, a so-called attitude-behaviour gap can often be identified (61,62). This means that consumers state their willingness to purchase sustainable products, but this does not translate into action when purchases are made. Valor (2008) states that the obstacles for consumers to buy responsibly can be grouped into three categories: motivational, cognitive and behavioural obstacles. (63.)

Motivational obstacles mean that consumers simply do not feel any ethical obligation to buy sustainably, and do not see any added value in doing so. Not all consumers see themselves as performing any sort of political action when shopping, and therefore do not consider their purchase decisions to have any wider impact on the society as a whole — purchases serve merely as satisfying the individual consumer's needs. Even if consumers do recognise their purchase behaviour having some impacts beyond their own lives, they could still lack the motivation to shop sustainably. This could be e.g. because consumers do not feel their purchase choices are effective in impacting the way they would like them to be, or because they feel it's unfair if they dedicate their time and money to shopping responsibly while others do not (the so-called free rider problem). (63..) Careful marketing and branding of sustainable products as well as public awareness campaigns can address this to some extent, but naturally not all consumers are ever going to feel wider responsibility for their consumption choices.

Cognitive obstacles mean that consumers lack sufficient or relevant information to make sustainable purchase choices. Consumers need to be informed about the sustainability of a certain product, and they also have to be able to evaluate this information and make sense of it. This can be problematic, as consumers do not necessarily believe all the sustainability information submitted to them by manufacturers, can be overloaded with information coming from different sources or confused by conflicting information. (63.) In part this obstacle could be addressed through eco-labelling efforts (read more about eco-labelling in chapters 5.2.2.4 and 5.2.4.2), but for consumers to trust the labels and be able to evaluate them, joint efforts are needed from the food industry, research and authorities.

Behavioural obstacles mean that even when consumers are motivated and informed to buy sustainable products, they may have trouble finding these products or they may consider the costs associated with these products too high (63). The Boston Consulting Group has concluded in their recent study (64) that consumers are willing to pay a premium for some sustainable products, depending on the product's category and perceived benefits. Notably 15-30 percent of consumers surveyed in BCG's study indicated a willingness to pay a premium of at least 10 percent for sustainable ingestible products, depending on their specific category. At the same time, many consumers also indicated that they perceived sustainable products to be of higher quality than conventional alternatives especially when it came to ingestible products. For instance, sustainable fresh meat was considered to be of higher quality than conventional options by about 65 percent of those surveyed by Boston Consulting Group. As already discussed in chapter 4.4, our survey brought out slightly differing results from that of Boston Consulting Group's; price and brand loyalty were considered to be the most significant behavioural obstacles in our survey. To some extent, price can be affected by trimming the production process more effectively. Brand loyalty can play favourably for established, strong brands; if they can offer a sustainable option, it will only make the consumer more committed to the brand. Analogously, the consumer is unlikely to switch to another brand for the lack of sustainability efforts by his favourite brand. A sustainable brand will have to be tempting in other ways than mere sustainability — it will have to support the consumer's effort to construct his identity (read more about this in chapters 5.2.4.4 and 5.3).

5.2.4 What does all this imply for food industry SME's?

Now we've come to the point where food industry SME's - quite rightfully - ask the question "What now then? What are we supposed to do with this information? How should we change our products or our processes in order to be more sustainable? Is it even worth it?" Well, here are a few areas of interest you might consider.

5.2.4.1 Analyse your products' life-cycle – get to know your products and processes

Regarding sustainable food production, one measure seems to be the inevitable basic tool — life-cycle analysis on a product level. Life-cycle analysis is carried out in four distinct phases: defining the goal and scope of the analysis, carrying out an inventory analysis i.e. collecting

quantitative data on the inputs and outputs of the process, assessing the impacts the product has on contributing to various environmental problems such as climate change or eutrophication, and finally interpretation of the previous stages, and making conclusions on whether the goals can be met and what should be done.

As stated earlier, perhaps the biggest problem with LCA is that no commonly accepted and agreed upon international standards currently exist as of yet on how to calculate LCA's, and especially on how to define the system boundaries (65, 66). Problems may also arise because of inadequate systems for collecting and verifying quantitative data on e.g. GHG emissions.

Life-cycle analyses on product level can be used as basis for eco-labelling efforts, and also for streamlining production processes and thus finding cost-savings (see Box 8.). When it comes to food products, the production of raw materials, i.e. agriculture, represents a significant part of the environmental impacts of products. Many food processors will find that in order to reduce their environmental impacts, they will have to go upstream on the supply chain (see Box 9.).

Box 8. Non-frozen ice cream

Unilever, one of world's biggest ice cream makers, is reportedly trying to develop an ice cream that is made, shipped and sold warm, with the consumer taking the final step of actually freezing the product. The goal of the so-called ambient ice cream is to reduce energy and emissions caused by keeping ice cream cold throughout the supply chain.

Unilever's own scientists are said to be working in co-operation with researchers from Cambridge University to come up with the right kind of product. The ice cream programme is part of Unilever's company-wide efforts to minimise the environmental impact of its products.

http://business.timesonline.co.uk/tol/business/industry_sectors/consumer_goods/article6807139.ece

Box 9. New diet for cows

UK chocolatemaker Cadbury has taken on initiatives to cut down its carbon emissions in the early stages of its products' life-cycle, upstream in the supply chain. When auditing its carbon emissions with the Carbon Trust, Cadbury found out that a whopping 60% of the carbon emissions of its chocolates originated from the milk used as raw material of the chocolate.

Cadbury is now working with its 65 dairy farmers in Wiltshire to reduce the emissions of their animals. The company has sent the farmers a guide for low carbon dairy farming, which includes advice on changing the diet of the cows to reduce their belching. The altered diet changes the way that bacteria in the stomachs of the animals break down plant material into waste gas.

<http://www.guardian.co.uk/environment/2009/feb/17/cadbury-dairy-milk-cows>

5.2.4.2 Streamline your processes – don't waste your waste

When it comes to sustainability matters, the number one option when streamlining production processes is of course greater material efficiency and waste reduction. This is also the way to cost savings in the long run, although initially it might require investments in new equipment or facilities. Less inputs — energy, water, other raw materials — will translate to less money spent.

Adopting an environmental management system such as ISO 14001 or EMAS (EU Eco-Management and Audit Scheme) can help companies in their efforts to manage their environmental impacts. For SME's, environmental management systems are at best tools for optimising the use of raw materials, packaging, transport, water and energy, and reducing the volume and toxicity of waste, used water and air emissions. At worst, it can be an extra burden with little perceived benefits, especially if the organisation as a whole is not truly committed, or environmental management efforts are done for mere PR reasons.

Although waste reduction is the primary goal, waste and side-flow re-use can offer interesting opportunities. Waste from food industry is not just something to be disposed of — it is now valuable raw material. Biodegradable masses from food processors can be utilised as in the production of renewable energy (see Box 10.).

Box 10. Fuel from food industry waste

Finnish energy company ST1 has launched Refuel, a new kind of fuel produced from bio-degradable waste. Production of Refuel is based on a decentralised system, where ethanol is produced in units established in connection with food industry production facilities. The bio-degradable waste, a sideflow of food production, is put to new use in the backyards of e.g. bakeries and breweries. As opposed to first generation biofuels, no food crops or other possible raw material for food production are used for Refuel production. ST1 is hoping to start exporting the production model of Refuel; large market potential could be found e.g. in China or India. Refuel decreases the CO₂ emissions by 80%, and is currently available from five gas stations in the Finnish capital region.

<http://www.st1.fi/index.php?id=2798>

Box 11. Energy from packaged food waste

UK retailer Sainsbury's announced that it is planning to divert all UK food waste away from landfill to a biomass plant by this summer. The supermarket giant is fast-tracking the plan at its 28 Scottish stores, BBC reports.

Under the plan, all of the unsold food from Sainsbury grocery stores will be sent to a biomass plant to be turned into electricity. The move is expected to prevent 42 tones of waste a week from landfills, the company said at the Zero Waste conference in Edinburgh.

The company said that the way it will collect food waste will take about 336 trucks off the road.

<http://www.environmentalleader.com/2009/01/22/sainsburys-to-generate-power-from-unsold-food/>

5.2.4.3 Eco-label your products – or preferably find a better solution

Once you've found out your product's environmental impacts, and trimmed them to be as minimal as possible, you will of course want to let the consumer know about your efforts and your product's environmental sustainability. The problem of course is which way to turn. As discussed earlier, there is a plethora of different environmental labelling schemes, and some companies even decide to create their own. Bear with it — once there is enough reliable data and information on the environmental impacts of food production, and more importantly enough discussion on what the criteria is and what is the best way to inform consumers, there will quite likely be a consensus on the labelling issue. As more and more companies start using the same solution, it will become the mainstream, almost obligatory, thing to do, as witnessed by the

widespread use of GDA labelling. And it doesn't even have to be a label on the package. New IT-based solutions are being developed, so that consumers could scan products with their mobile phones to receive sustainability information, or information could be recoverable from customer loyalty cards (see Box 12.).

Box 12. Climate Bonus

The key purpose of Climate Bonus, a joint research project by five Finnish research institutes and several companies, is to assess the possibilities and effectiveness of a bonus system for households, which incites them to consume in such a way that GHG emissions are reduced and incites retailers to offer a product portfolio that advances the choice for low GHG solutions by households. The researchers anticipate that within five years consumers can obtain information on the climate impact of their consumption through customer loyalty cards, and also be rewarded by their retailer for climate friendly shopping behaviour. Europe's largest retailer Tesco is known to be working to develop a similar system on its own.

http://uutiset.ruokatieto.fi/WebRoot/1043198/X_Uutistenhallinta.aspx?id=1107199

<http://extranet.vatt.fi/climatebonus/>

Box 13. Consumers seem to want it

According to the latest Eurobarometer survey, released in September 2009, two out of three European consumers want carbon footprint labeling to be mandatory in products. Approximately 60% of consumers consider the environmental impacts of products when making consumption choices. However, almost half of consumers do not trust the environmental labeling currently existing in products.

http://ec.europa.eu/public_opinion/flash/fl_256_en.pdf

5.2.4.4 Brand your product attractive – fit the consumer's identity

Keep in mind that consumers construct their identities through consumption (read more about this in chapter 5.3). Even if the ultimate goal of environmentally sustainable products is to ensure clean and healthy environment now and for future generations, the consumer does not necessarily get all excited about the visualisation of this ideal. What the consumer wants is to make consumption choices that make him feel a socially more acceptable person, and he also wants others to instantly recognise the image of cool, socially responsible, educated, wealthy or

whatever the consumer attributes to the product. Most consumers do not fill their shopping baskets with, let's say, organic products purely out of altruistic concern for the environment, or even perceived health benefits. They also do it because of the image and identity that rubs on to them from these products.

Therefore, when branding your product, do not think of the tree-hugging hippie — think of the LOHAS consumer instead. LOHAS is an acronym for Lifestyles of Health and Sustainability, a market segment focused on health and fitness, the environment, personal development, sustainable living, and social justice. This is a growing segment, who wants to consume ethical products and services, which look and appear good and even add a bit of luxury into their lives. The keyword here is consumption, not denial (see Box 14.).

Box 14. An innocent brand



A company that manufactures healthy fruit and berry smoothies and juices from 100% natural ingredients, sourced responsibly, packaged in 100% recycled or renewable materials using as little packaging as possible, and on top of it all donates 10% of its profits annually to charity, UK-based Innocent is a LOHAS dream come true. It has managed to create a healthy and ethical brand, without appearing too “alternative” and therefore appeals to the mainstream masses.

Starting from its choice of name, Innocent has managed to press all the right ethical and social buttons, and this really seems to pay off. Currently, Innocent's market share is 82%, turnover around £100m, it sells two million smoothies a week and has a staff of 275 people.

<http://www.innocentdrinks.co.uk/>

5.2.4.5 Know thy retailer – fit in with their policies

It is a well-known fact that in most countries retailers hold great power in the food chain (see Box 15.). Big global retailers, such as Wall-Mart and Tesco, have taken up environmental issues strongly (see Box 16.). The same can be seen in BSR too. In Denmark, Irma is known to be the supermarket chain with the highest relative organic sales in Denmark; almost 20 percent of the turnover refers to organic products. Coop Danmark also puts a lot of focus on organic and other sustainable food. In Finland, Kesko has taken on environmental and ethical responsibility quite strongly, and in Sweden ICA is in the forefront. In Germany, of the leading retail chains

especially Rewe and Edeka can be seen to have invested in organic, with their own Rewe Bio and Edeka Bio Wertkost product lines. (67.)

Of course yet an entirely different story are retail chains such as Whole Foods, who only stock organic, seasonal and locally produced goods. US-based Whole Foods, who also has stores in the UK, offers the kind of shopping environment that appeals to the LOHAS consumers; they are not dowdy, home-spun or “alternative” places, but proper grocery stores. In BSR countries, individual stores only stocking sustainable food can be found especially in larger cities, but retail chains focusing purely on sustainable food are still very few. Alnatura, Basic and Füllhorn are German retail chains focusing on sustainable food. Although not nation-wide, and generally only found in bigger cities, they offer an interesting channel for producers and consumers of sustainable food.

Box 15. No battery eggs in the UK

UK retailers Waitrose and Marks & Spencer stopped stocking caged eggs some time ago, and in the spring of 2009 Sainsbury's also stopped selling them. Morrisons are planning to make the same decision in 2010.

The number of free-range eggs sold is expected to rise to 2bn a year by October 2009 to match declining battery farm sales, according to the market research firm TNS. In the future, it is going to be increasingly difficult to find battery eggs in the UK.

<http://www.guardian.co.uk/environment/2009/may/15/free-range-egg-sales-increase>

Box 16. Tesco's footprinting effort

Supermarket giant Tesco has become the first UK retailer to display the full carbon footprint of milk — one of the top-selling products in its stores. From mid-August 2009 on, all Tesco own-label full-fat, semi-skimmed and skimmed milk ranges will display the carbon footprint label as part of an on-going drive to help shoppers make more sustainable purchasing decisions. It has pledged to "footprint" 500 products by the end of the year. The new labelling will not apply to organic milk, where greenhouse gas emissions are generally much lower than for conventional milk.

The move comes alongside new research which found that 50% of customers surveyed now understand the correct meaning of the term "carbon footprint", compared with only 32% of people surveyed in 2008. The research also revealed that customers increasingly want to be green. Over half said they that would seek lower carbon footprint products as part of their weekly shop, compared with only 35% last year.

<http://www.guardian.co.uk/environment/2009/aug/17/tesco-milk-carbon-footprint>

5.2.4.6 Wrap it up – packaging is still what catches the consumer’s eye

Although packaging has been proven to have a relatively insignificant contribution on the product’s environmental impact, when considering the entire life-cycle (54), it is still something that consumers consider important. This is likely to be so, because consumers are unaware of the relative insignificance of the packaging considering the entire life-cycle of the product, and also because packaging is the consumer’s point of contact to the product. It communicates about the sustainability of the product and also the company in general. Consumers know that excessive packaging is burdensome for the environment, and require materials used to be recyclable and bio-degradable (see Box 17.).

Another issue connected to packaging and sustainability, is package size. A study published in the spring of 2008 by WRAP (Waste and Resources Action Programme, an initiative backed by UK government) estimated that in the UK £10bn worth of food is thrown away each year by households. Some of this is of course due to the fact that consumers simply purchase more food items that they can or want to use. Retailers’ “buy one, get one free” offers are one factor in piling too much food into the consumers’ fridge. And then the factor, on which the food industry has an impact on: the super-size packages.

Box 17. Sustainable packaging

A report from market research company Datamonitor identifies sustainable packaging as a growing consumer issue, driven by issues such as ethics, economics and environmentalism. “Sustainable packaging has the potential to become the new breakthrough consumer issue of its time, in the same way as organic food or fair-trade products a decade or so previously”, says Matthew Adams, consumer analyst at Datamonitor.

Sustainable packaging will grow to 32% of the total global packaging market by 2014, up from just 21% in 2009, according to a study from Pike Research. Plastic-based packaging, which represents 35% of all materials used, will be the fastest-growing sector of the sustainable packaging market over the next five years. Metal-based packaging, will continue to be the sector with the highest percentage of sustainability – by 2014, more than 63% of metal-based packaging will be environmentally friendly.

<http://www.environmentalleader.com/2009/07/07/sustainable-packaging-gains-traction/>

5.3 Food consumption as an expression of self

5.3.1 Major consumer lifestyle issues the food industry needs to consider

Consumption is seen as an increasingly important tool in defining our self-identity. Social theorist Anthony Giddens (1991) suggests that individuals are reflexively and consciously building a coherent lifestyle. (69.) Food consumption is an important part of this lifestyle and the social presentation of the self as what you eat has the potential of showing who you are in social settings.

But what you eat affects the body in a directly physiological sense. At the same time it affects the individuals' perception of his or her own body. A person that has recently been able to control his weight can feel very content and happy with the body. The individual has a feeling that control and maintenance of the own body is a big responsibility and for many it is a worthy mission in life. Monitoring the body and consumption habits has for a growing number of individuals become a moral responsibility. As a result, people who eat too much or those who eat unhealthy food may feel guilty and experience that they are bad in comparison with other individuals. For some consumers the situation is the opposite. They create and defend a lifestyle that has as a very important ingredient not to care about the nutritional qualities or the quantity of their food intake.

Consumers are reflexively constructing a coherent lifestyle. Therefore people define themselves through the messages they transmit to others by the goods and practices they possess and exercise. To create and sustain a self-identity, consumers use appearances and actions in order to produce a coherent self-narrative.

This narrative is in turn reflexively monitored over time and tested out under different circumstances. There are a seemingly endless number of choices that a person has to make and many of these choices, especially concerning food, are made among the huge selections of products available on the market.

The food products are no longer simple commodities. Instead, they more and more signal special qualities. It may be locally grown, free from..., fair trade, Grand Cru, DOC, Organic and many other things. Dealing with choice thus becomes critical. Increasingly, individuals are willing to choose food that will match and reinforce their identities. The outcomes of one's choices will be scrutinized by friends, relatives and professional colleagues. This is particularly true for food, but for food yet another factor is at play.

Eating is risky also for the reason that the chosen food can be bad and harm your body. The consumer then has two reasons for choosing food carefully. One reason is that the choices and signals to the surrounding society about his or her life style, ethical standing and on occasions also about political standpoints, the other reason is wellbeing and protection of the body.

The protection of the own body is in a next step also a part of the signalling to the rest of the society about what kind of person the consumer is. Many people therefore experience food choice, cooking and eating as problematic activities. The choices made have effects on their creation and expression of self as well as how other people experience them:

The ethic of self-control combined with the dominant protestant/Lutheran ethic leads to the notion that there should be no excess in eating or drinking - thus there is often some degree of asceticism combined with self-control (compare Giddens, 1991, p. 104). Obesity and bodily dysfunction have traditionally been regarded as the result of a weak mind. Throughout the history of Western culture, the state of one's body has been interpreted as a material sign of the moral character within (Thompson and Hirschman, 1995, p. 144). The pursuit of religious values often stipulates following certain kinds of physical regimes, such as asceticism, involving fasting and other forms of bodily deprivation (Giddens, 1991, p. 62).

In contemporary consumer culture, moral responsibility does not end with monitoring the physical appearance of the body. There is also a moral obligation to carefully control the foods, substances and environmental conditions to which the body is exposed (Thompson and Hirschmann, 1995, p. 144). Contemporary cultural discourses, be they scientific texts or marketing promotions, that articulate an association between illness and personal responsibility have engendered a form of self-understanding. It has become natural to experience feelings of guilt about eating incorrectly, not exercising and being overweight, and, reciprocally, to view these kinds of behaviour as signifying a lack of will, discipline and self-control (ibid). Many consumer actions are motivated by culturally sanctioned knowledge claims regarding how consumption can be used in order to control the health and/or appearance of the body. (70.)

Many consumers facing all the options, choose to reduce the complexity and adhere to a life style or ethical sets of rules constructed by other consumers. Such packages of values and advice for choices will make life easier since it saves the consumer from a number of comparisons that would make life more complicated. The consumers decision making process runs quicker in the retail store and in the restaurant. Another value is that the providers of the life style also provide a blueprint for the narrative of the self. If the consumers make statements like "I am a vegetarian", "I only buy Swedish meat", "I only buy Fair Trade products", "I never buy from Lidl", "I eat GI-food" it means that they have simplified choices. Likewise, since they have an established label and a banner under which they can walk through life, their social positioning becomes easier. As a comparison, think of a person who does not like fish and mutton, only likes beef from Argentina and who likes genetically modified rice. He does not have a well recognized banner to hold and will have more work with his building of self.

It is not the products alone that create the image, production process and technology are also important factors. One example could be the above mentioned example with genetically modified rice. Another example is milk. During the 19th century quite a few children, especially in the cities, were taken ill because they drank milk. Milk was even described as "The White Poison". However, when Pasteurization and modern hygienic methods had entered the dairy business, the view of milk changed and it was quickly regarded as the most healthy food product available. (71.)

5.3.2 Eating in the arena

One interesting way of describing and analyzing the consumption process and its social setting has been introduced by Goffman (72). In his analysis food is consumed on a stage in an arena. The consumer eats a meal in the arena. It is important to realize that eating a food product or a couple of food products is not enough for a meal. A meal is an act in constant interaction with the surrounding circumstances, the circumstances that frame the meal and give it a social meaning (73.) A common characteristic for most definitions of a meal is that they focus on the importance of the social relations. The food, the time, the place and the social relations between the involved individuals are the ingredients that form the meal. On the scene some things are, e.g. the food and drink that is being served, but other things are created e.g. the social relations that are a result of the meal.

The scene and the arena may be located in a consumer's home. It can also be the place where the consumer works or some other location e.g. restaurants, a picnic etc. In the arena where the meal is acted, there are direct actors, those involved in the meal, but also actors behind the scene, such as suppliers, service providers, the management if the meal is at work, but also role models and peer groups influence the choice of life style and meal behavior.

For the food producers and the retailers, this analysis of the individual's consumption gives clear indications that many aspects go together in the consumer's choice of food. Not only the product itself, but also the origin, the production method, the distribution and sales of the product and the values and visions of the companies involved matter. Actually they matter a lot, because if the consumer can produce an interesting and image building story at the meal, his or her social standing and reputation is built strongly.

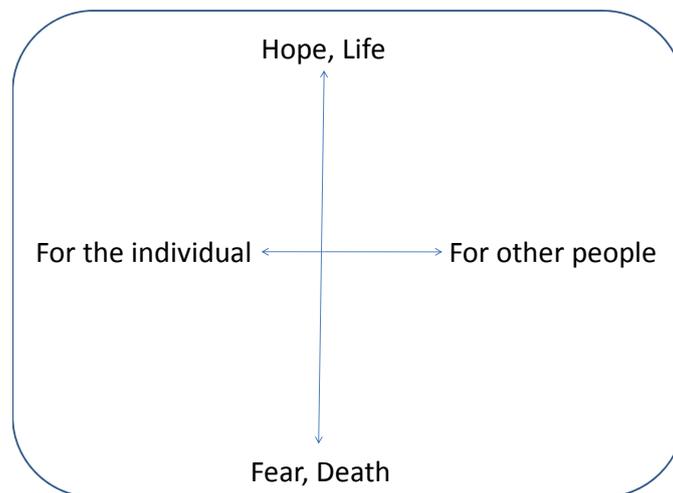
Therefore the communication around the product and service become vital as positioning tools for the products and services. They become positioning tools for the individual in the next step. In this competition for the share of mind of the consumers, those actors and companies that are value driven have an advantage. They have a clear message to send. The message in a value driven organization is well anchored in corporate processes and management procedures. Those who are value driven and have the ability to communicate that in an efficient and consequent way have an advantageous position.

As a summary, responsible foods are required. They are VALUE DRIVEN PRODUCTS. These VDP's are socially responsible products, creating higher consumer satisfaction, and take into concern the environment. (74.)

What kind of messages will reach the consumer and be well received? As we have indicated in this report there is a complexity of interrelated factors, the importance of which vary in the chosen life style. If we leave this complexity aside for a moment and try to make things simple, we can deduce the following from what has been said in this section:

Consumers are driven by two opposing forces when it comes to choice of food. One is the ambition to make a good impression on other people. The other driving force is caring for one's own body. In the choice between food products some choices are made by fear. The

consumers fear for their health or social status. The consumer can also be driven by hope that the food product or service will improve himself or herself and that this be noted by others.



In the communication with the consumer it is important to notice that the precision in the message is important. The contradiction of unhealthy food consumption is not healthy food consumption, instead it is not unhealthy food consumption. (75.) This means that the consumption habits and the purchasing behavior of a person that is trying not to eat unhealthy food is different than the consumption habits and purchasing behavior of a person who is trying to eat in a healthy way. Therefore it is not self-evident that healthy food products are bought and consumed by consumers who are trying to avoid unhealthy food products.

A thorough understanding of the consumer's habits and ways of thinking is therefore more important than just information about the consumer's food choices.

5.3.3 Examples

Box 18. The next big thing

In the 1990's opposing fur used to be the hot thing for celebrities to do, with PETA (People for the Ethical Treatment of Animals) recruiting a group of supermodels, actors and other celebrities to appear nude in their famous ad campaign "I'd rather go naked than wear fur". Nowadays, it seems that food related campaigns are all the rage among celebrities. For instance, ex-Beatle Paul McCartney is famous for being vegetarian, and has also launched a campaign called "Meat Free Monday" to persuade people to reduce their meat consumption. Well-known British TV-chefs such as Jamie Oliver, Hugh Fearnley-Whittingstall and Gordon Ramsay have campaigned for local and organic food, as well as animal welfare within the food industry.

<http://www.guardian.co.uk/environment/2009/jun/14/greta-scacchi-ethical-eating-fur>

Box 19. Identity construction through consumption with a twist

A slightly different kind of example of identity construction through consumption and a reverse way of consumer activism can be seen in the Carrotmob. A movement originating from the US, Carrotmob offers businesses incentives - carrots if you will - to green up their act by guaranteeing more customers. Businesses compete with one another to see who can do the most good, and then a mob of consumers turns up to buy products in order to reward whichever business made the strongest commitment to improve the world.

<http://carrotmob.org/>

Box 20. It sells

"Natural" claims, as a group, were the most common on food and beverage launches last year, according to the Mintel Global New Products Database. Natural claims--including "all natural," "no additives/ preservatives," "organic" and "whole grain"--were featured on 23% of all F&B launches globally (up from 20% in 2007) and 33% of U.S. launches (up from 27%), Mintel reports. beverages launches last year. Ethical or environmental claims increased from 2% to 5% globally, and from 3% to 7% in the U.S.

http://www.mediapost.com/publications/?fa=Articles.showArticle&art_aid=98562

6 Analysis and Conclusions

6.1 Local food and global retailing

One trend that came up in all directions was that there is a clear trend towards more local food production. Consumers value locally produced food and they even consider it to be healthy. Representatives of food industry, researchers and consultants believe that locally produced food and food with an origin and a story are important for the consumers. According to them, consumers also give high value to “Naturally healthy” products. We know that consumers consider products grown close to them to be more naturally healthy than other products. The results of this study indicate that this trend is slightly stronger in the Baltic countries than globally.

At the same time, there was an agreement that the food retailing will be operated more on a large scale, will be international, and for some companies a truly global business. The results showing that consumer, retailers, competitors and need to differentiate are the key drivers in the industry support this.

A globalizing retail business with a need to differentiate will most likely listen to the consumers' demand for local products; products with an origin and a story. If we foresee these two trends, one inevitable conclusion is that the systems for procurement, storage, transportation and logistics will have to change. New information and communication technology will open doors to radically new systems and also open up for new distribution concepts. This will probably lead to a situation different from today, in which powerful retailers try to design and control efficient flows of goods and information in systems controlled by them. Such rigid systems will probably share the fate of General Motors and be out-competed by flexible solutions opening for many entries and many delivery points. Design of concepts that meet these requirements will open for new possibilities to differentiate versus consumers seeking variation and self fulfillment.

The expected change resulting from these two trends will also have important impact on the sustainability of food production, delivery and sales. Choices of vehicles and transportation patterns have environmental effects. It is possible that large retailers addressing regional logistical needs see the opportunities of co-organizing distribution concepts and sharing transportation carriers. Online shopping and home delivery might also be factors, which could fit in with the consumers' hectic lifestyles and focus on sustainability.

6.2 Product identity versus product image

Another important observation from this study was that the experts complained about what consumers believe and what is actually the truth about the actual food product. Consumers assume that some products are healthy even if that is not scientifically proven. The experts complained that the consumers have misunderstood vital aspects of genetically modified organisms and that the actual differences between organic food and conventionally grown food products can be very small. This is supported by the finding of this study that consumers trust in

brands and sensitivity to too high prices for sustainable food are the main explanations to why people would abstain from choosing sustainable products.

Consumers trust in labels and certificates, not as much as they trust brands, but enough to make the label and certificate issue important. At the moment there is an abundance of various quality-assuring labels. We have labels for organic food, for healthy food, for fair trade food, for carbon-dioxide friendly food, for local food and from controlled origins. We have food indicating how much the consumer is offered in terms of daily intake for a normal woman with office work and we have labels for sustainable fishing. The problem with these labels is that they are produced and marketed by organizations specializing in one special health, social or environmental effect. They form a heterogeneous bunch of messages that the consumers have to interpret and understand. If effective communication is to be achieved, co-ordination must take place, either initiated from the political sphere or by the important industrial players. As it is now, the consumers would like to trust labels, but they cannot handle the complexity and the technically difficult messages. Therefore, the consumers trust brands and the brand builders are the winners, even though experts on health and sustainability want to get their messages through. What has been proven effective to promote special aspects is a spectacular media debate. According to this study, the GMO-debate in various media has given the GMO technology such a blow, that it is unlikely that consumers in the Baltic area will appreciate GMO-product in the near future.

6.3 The two consumption societies

The polarization of food consumption habits was brought up in several cases in the focus groups, in discussions about identity, the individualization of food consumption, and price sensitivity. Especially in the light of the financial crisis, a trend toward price-sensitivity was expected, while other consumers were expected to want to pay more for products in line with the many trends.

The results support the identification of these conflicting trends. We found price consciousness to be a strong driving force. At the same time we see strong drivers for convenience, products with services included, products with special qualities, tailor made, available 24 hours per day 7 days a week.

We believe that we see emerging trends of two consumption societies. In one of these societies, price is king. The main problem for the consumer is to get value for money

In the other society, self-expression, service and social consumption are important. You are prepared to pay for convenience; you abstain from certain products or retailers because they would ruin your social image. You buy brands and labels that build your self-image.

We believe that understanding these two societies is of vital importance for the food producers and retailers. However one should be aware that the definition of the members of the two societies is difficult. We suggest this as an area for future research. Of course, consumers with low incomes should pay more attention to value for money. However earlier research has

shown that poor consumers not always use the most cost efficient outlet. Sometimes they also prefer to pay a lot for something they really appreciate. We also know that wealthy individuals can be very cost-conscious for some things but not for other products. We know that when we discuss value for money, the concept of value is very interesting. Value for real consumers is different from the value for the “economic man” and it is tied to gender, age, ethnicity and ideology. Empirical studies on these matters can give advanced knowledge from the baltfood project.

6.4 Peripheral vision and thinking

Technology was an important theme of this study, a theme that reappeared throughout the work, especially in relation to sustainability challenges, and health demands in individualized societies. When we relate these findings to the findings from our questionnaire, we find something very interesting. When we asked experts from the business community, from academia and from well renowned consultants what they thought the industry would do most in the coming in order to become more sustainable they answered that everything was equally important. We do not find any significant differences to explore. Our interpretation of these two results together is that the experts in the food industry do not know. We are sure that there are enlightened individuals in different areas, but as a group, our respondents said: “We don’t know.”

This takes us to another important conclusion. In order to find and understand new trends the actors and organizations must develop their peripheral vision. The key competence for those who have peripheral vision is to look at knowledge sources that are not common and everyday praxis. On an organizational level this is a demanding strategic action. We would recommend the players in the food industry to improve their peripheral vision by entering to project, joint ventures and alliances with companies in the clean tech sector and to find the interesting key developers in sustainable business hubs.

6.5 Opportunities

- Customized, profiled food, with the help of technology
- Expression and construction of identity through individualized and self-selected food products
- Reconsidering primary production in terms of purely organic agriculture, green agriculture and industrial agriculture
- Eating smaller amounts of food, but more nourishing
- Local food produced with green energy, perhaps involving environmental government restrictions

- Legislation or health insurance companies playing a more active part in consumers' eating habits in general
- Optimizing our resources and health, consuming less and recycling unused food
- Online/mobile food information, comparable to today's pharmaceutical information and online interaction in meal planning and information management

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8 Appendixes

Questionnaire to representatives of industry, researchers and consultants

1. How important are the following criteria for the consumer when selecting food during the next couple of years? Rank the three most important criteria, 1 for the most important, 2 for the second most important and 3 for the third most important criterion.

- _____ **Price**
- _____ **Healthiness**
- _____ **Environmental friendliness**
- _____ **Origin**
- _____ **Safety**
- _____ **Functional properties**
- _____ **Outlook**
- _____ **Taste**
- _____ **Easiness of use**

2. In which of the following areas would you consider technological progress to have the most significant impact on food industry SME's during the next couple of years? (10 = maximum impact 1 = minimum impact)

Packaging technology

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Production/processing technology

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

GMO

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Biotechnology

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Nanotechnology

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Logistics

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

IT

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

3. How strong would you consider the following drivers for sustainability efforts in food industry SME's to be during the next couple of years? (10 = maximum, 1= minimum)

Pressure from consumers

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Pressure from retailers

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Pressure from suppliers

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Pressure from shareholders / other stakeholders

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Keeping up with competitors

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Cost savings in energy or raw materials

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Need to differentiate products / create competitive edge

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

4. How likely do you think food industry SME's are to do the following during the next couple of years? (10 = most likely, 1= not at all likely)

Start using bio-degradable packaging

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Start using less packaging

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Reconsider package size to reduce food waste

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Set sustainability demands for their suppliers

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Calculate carbon-footprints or food miles for their products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Adopt some other method to inform consumers about the environmental impacts of their products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Streamline their production system in order to produce less waste

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Reconsider their waste management system and services to better utilise waste and side-flows

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Adopt an environmental management system (e.g. EMAS or ISO 14001)

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Obtain eco-labeling for their products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

5. What would you consider to be the most significant reasons for consumers *NOT* to buy sustainable products? (10= most important reason, 1= least important reason)

Consumers don't think sustainable products are relevant for their shopping needs

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Consumers are unaware of the existence of sustainable product options in a certain category

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Consumers have no access to or can't find sustainable products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Consumers feel there are not enough options within sustainable products to choose from

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Consumers prefer a certain brand over a sustainable option

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Consumers don't trust sustainability claims of products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Consumers think sustainable products are of lesser quality than ordinary products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Consumers think sustainable products are too expensive

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

6. How strong would you consider the following trends related to food consumption to be during the next couple of years? (10= very strong, 1 = very weak trend)

Organic food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Locally produced food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Seasonal food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Fair-Trade products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Reducing meat consumption

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Community supported agriculture and farmers' markets

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Online shopping for food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Eating out

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Eating on the go

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food available to order 24/7

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Using less time to prepare food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Using more time to prepare food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Price consciousness

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Unique qualities and tailor-made products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Constructing one's identity and confirming social status through food consumption

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Origin of food and the story related to it

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Exotic food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Domestically produced food

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Strong steering of consumption by legislation

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Labels and certificates (e.g. health, sustainability, origin)

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

7. How strong would you consider the following trends related to healthiness of food to be during the next couple of years? (10= very strong, 1 very weak)

Foods with health benefits

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Free-from products (e.g. gluten free, lactose free, sugar free)

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Foods enhancing looks and beauty

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Foods with less additives

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Diet products (low fat, low sugar)

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Less carbohydrates

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Less refined products

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Products with functional food labels

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Products for weight control

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Naturally healthy food (e.g. berries, vegetables)

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

8. How important R&D areas would you consider the following to be for food industry SME's during the next couple of years? (10= most important 1= not important at all)

Food and cardiovascular health

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and type 2 diabetes

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and metabolic syndrome

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and alzheimer's disease

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and mood

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and hypertension

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and regulation of eating

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and immunity

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and allergy

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food and gut health

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food for children

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Food for elderly

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

9. How strong an impact would you consider the following drivers to have for food industry SME's? (10= very strong impact, 1=no impact at all)

Growing disposable incomes in developing countries (e.g. China and India)

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Current economic downturn

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Legislation and regulations related to hygiene and control

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

Pandemic outbreaks (e.g. avian flu, swine flu)

Globally	1	2	3	4	5	6	7	8	9	10
In my country	1	2	3	4	5	6	7	8	9	10

10. Name one really excellent food product or service

11. Explain why you chose this product or service

12. Where do you look when you search for inspiration and new ideas for your professional life?

13. Which would you consider to be the single most important trend in food consumption that will affect the food industry of tomorrow?

Please tell us some background information about you:

14. Country

Denmark Finland Germany Lithuania Poland Sweden

15 Working in

Food industry SME Academia Consultant

16 Gender

Male Female

17 Age _____ years

Optional:

18 Name _____

Email _____

Phone _____