Food scenarios 2025

Drivers of change between global and regional

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Food scenarios 2025: Drivers of change between global and regional

Abstract
This article presents the results of a future study of the food sector. Two scenarios have been developed using a combination of: 1) a summary of the relevant scientific knowledge, 2) systematic scenario writing, 3) an expert-based Delphi technique, and 4) an expert seminar assessment. The two scenarios present possible futures at global, national (Denmark) and regional (Zealand, Denmark) levels. The main scenario is called 'Food for ordinary days and celebrations' (a combination of 'High-technological food production – The functional society' and 'High-gastronomic food – The experience society'). A less likely scenario is called 'The reappearance of the sea – The aquarial society'. The purpose of the scenario writing has been to provide strategic tools for societal actors who wish to create economic growth and jobs. In particular the research is aimed at regional governments and firms. Suggestions concerning regional industrial policy and firm actions are included in the article.

Keywords: Food, scenarios, Delphi technique, regional development

1. Introduction

1.1. The scope of the article

This article presents a future study of the food sector. The development of two scenarios for the sector is described. The article thus provides new knowledge about two scientific issues. One concerns how the food sector as a business sector might develop by 2025; systematic scenarios are presented. The other is the methodological issue of how to develop plausible future scenarios using a combination of four techniques: 1) a summary of scientific knowledge, 2) systematic scenario writing, 3) an expert-based Delphi technique, and 4) an expert seminar assessment.

The scenarios were developed as part of a research and development project called GRO (2014). The project investigated the potentials for growth in the food sector and creating innovation activities in food firms in one region, namely Region Zealand of Denmark. While, the scenarios emphasize developments in that particular region, national (Danish) and global developments were also included in the study. These broader developments are important for understanding regional possibilities because they define the future market for regional products and food services. Thus the scenarios can also be used to inform us about future international trends that are relevant to industrial policy and firm development in any country which also will be dependent on the global food market and production trends. The scenarios were created in 2013.

1.2 Aim of the study

The goal for the study (as part of the GRO development project) was to provide one or several alternative scenarios for the future development of the food sector. Such scenarios should not be presented as predictions (Popcorn, 1997; Ono and Wedemeyer, 1994; Bas and Guillo, 2012), but as probable situations based on actual tendencies. Forecasting is difficult; however, the attempt to forecast can be a useful strategic instrument (Jantsch, 1967; Ono and Wedemeyer, 1994; Popcorn, 1997; Amer et al., 2013). The food scenarios are not intended to express a desirable future but a realistic one that has a strong probability of occurring. The scenarios are thought of as strategic tools for societal actors that aim to create economic growth and jobs. These actors are, for example, firms within food-related businesses that look for new market trends and governments, regions, and municipalities that form industrial policy. The scenarios can be used as tools to identify sub-areas and market trends that have growth potential within the food sector. Firms, political authorities, and other relevant actors can thereby identify areas they could support and promote innovations and factors (such as training and investment, and improving public frameworks, such as physical infrastructure, export agencies, and research) that help generate growth.

The project was action-oriented and included experiments relating to the development of innovation and business plans in firms (cf. Sørensen et al., 2013). The research group also combined the scenarios with concrete suggestions for policies and interventions and with suggestions concerning market actions for firms. The suggestions, in addition to the scenarios, are based on the GRO project's investigation of food firms' innovation activities (Sundbo et al., 2013) and development of new business models (Osterwalder and Pigneur, 2010). The suggestions are detailed and will only be presented in a compressed form in this article.

1.3 The region and food production

Region Zealand was created in 2007 as part of a municipal reform and covers most of the island of Zealand (excluding the capital, Copenhagen, and north Zealand) and some minor islands south of Zealand. Historically, the region has been farmland and has some of the most fertile soil in Denmark. However, during the last century, farming has diminished in economic importance, and hence jobs in the industry have declined in number,. Industrialized farming and manufacturing have moved farther away to more peripheral regions. Despite its proximity to Copenhagen, the region is both economically and socially the least developed Danish region as is revealed by several indicators (Monsson 2014). The region is to a large degree a commuter and service-providing region to Copenhagen. As a response to this situation, the regional government is seeking to create new food production, not only in primary industries such as farming, fishing and gardening, but also in related food industries and service business (such as restaurants, distribution etc.). This is in accordance with Danish industrial policy that attempts to develop Danish farming, fishing and food industries (Vaekstteam Foedevarer, 2013). Danish farming is very industrialized and the food industry is standardized. Food products account for about 17% of the country's exports. However, some new forms of more gastronomic food production and food and services have also come onto the agenda, primarily trigged by the internationally successful New Nordic Cuisine movement (Sundbo et al., 2013). Thus food scenarios are relevant both for Region Zealand's and national industrial and labour market policy. In addition, there is a growing national interest in peoples' health and gastronomic experiences as part of peoples' quality of life (e.g. Petrini, 2001; Jacobsen, 2008).

1.4 Structure of the article

The article begins with a definition and discussion of what is understood as `the food sector. This is followed by a description of the research methods employed. Finally, the impact of the study will be discussed. Highlights regarding basis-scenarios and questions to experts in a Delphi investigation are listed in appendix A.

2. The food sector

The food sector as presented here is defined broadly. It includes agriculture and fishery (primary business activities), the food industry and mass distribution system, such as supermarket chains. All these are parts of the traditional food sector. Such an industrial supply chain approach (Bozarth and Hanfield, 2013) does not cover all the future possibilities related to food. The food sector also includes the gastronomic or experience aspects of food (Svejonova et al., 2007; Jacobsen, 2008; Sundbo et al., 2013). In accordance with experience economy theory (Pine and Gilmore, 1999; Boswijk et al., 2007; Sundbo and Darmer, 2008; Sundbo and Sørensen, 2013), this area of the food sector has high value for customers who demand experience or gastronomy based food products and activities and are willing to pay a high price for these. According to experience economy theory, experience defines future growth areas.

The field dealt with in this article could, more precisely, be called the food and meal sector. This sector is also understood from a consumer and societal perspective and not only from a production perspective.

Other aspects of importance to people as citizens and consumers are also included in the food sector as defined here. These encompass health and ethical issues (animal welfare, the environment and climate change) and are taken into account in the scenarios.

The business sectors that these scenarios cover are included in the industrial supply chain and more experience-oriented sectors. The latter are, for example, restaurants, take aways, farmers' markets, and tourism- and leisure-oriented sectors such as festivals, attractions and other events where meals play a role. Small local producers and farmers and meal services such as food e-commerce, firms that bring meals from restaurants to people's homes, enterprise lunch rooms and public food delivery are also included in the food oriented business sector. Even the media are a relevant sector as a quite large part of media content is about food and meals, including the chefs who are media stars.

In relation to the traditional understanding of the industrial supply chain (Marsden et al., 2000; Ilbery et al., 2004) of the food sector, this broad definition has been adopted because the aim of the study was to provide a basis for economic and job growth. The experience aspect of food and meal businesses is supposed to be where job growth can occur because of the demand for experience products and services and because experience business activities is more labour intensive than the industrial food supply chain, which is very technologized. Further, alternative high-gastronomy production can be developed in peripheral regions where industrialized food production has closed down. A further aim of this study was to investigate the development potentials for geographically peripheral or underdeveloped regions. However, industrialized and high-tech based food supply chains are also part of the food sector in this study.

Other studies of food sector futures have emphasized special aspects of food, such as meat (Vinnari and Tappio, 2009). Gomez-Limon et al. (2009) have published scenarios about the agricultural sector and regional development using a method similar to the one used in the present study. However, the Gomez-Limon et al. study was not based on forecasting consumer behavior, it only concerned the development of production in the agricultural sector. The study referred to in this article has, consequently, a wider interest and catches newer developments, such as the local food movement. Some scenarios for rural areas (Schoute, 1994; Andersen, 2002) touch on the food sector but do not include consumption.

3. Method

3.1 Development of the scenarios

The scenarios have been developed through a combination of four techniques in a step-wise process (a method that has been used before, e.g. Sundbo, 1991; Gomez-Limon et al., 2009). The process was carried out in five steps because the scenario writing was carried out in two steps: First, alternative scenarios were formulated which where then assessed by a group of Delphi experts. This, in turn, led to an elaboration of the first versions of the scenarios. The research group of the GRO project functioned as editors of the scenario writing and leader of the scenario writing process. The five steps and the four techniques were: 1. A summary of scientific knowledge; 2. Systematic scenario writing 1; 3. Expert-based Delphi technique; 4. Systematic scenario writing 2; 5. Expert seminar assessment. They will be described further in the below paragraphs.

3.1.1. Summary of scientific knowledge

The study was carried out by a group of ten researchers representing different disciplines (sociology, anthropology, management, marketing, consumer research, chemistry and biology). The research group collected existing knowledge about trends in food consumption and production (e.g. Ofek and Wathieu, 2010; Du and Kamakura, 2012). The research included scientific literature, popular literature such as newspaper and magazine

articles, research investigations, interviews with food actors (producers, consumers, chefs, journalists, experts), and observations of food festivals and meetings in food networks. The GRO project provided much information from qualitative case studies about practical trends and how practitioners look at the actual and future food trends. The research group went through the identified trends, assessed which trends seemed to be the most important drivers and the most important trends of future food development. The drivers were formulated as dimensions having two poles; thus, one might assess where between the extreme poles the future development will be.

Examples of the drivers and poles are:

Health is decisive for food and meal habits	———	Food is hedonic
High technological (industrial) food production	———	Back to the roots (old production methods – terroir[1] as a principle, Jacobsen, 2008)

The drivers were classified in six classes:

1. Sociological drivers (lifestyle, attitudes, behavior, etc.)
2. Technology
3. Distribution systems
4. Climate, environment, energy
5. International market competition
6. Urbanization

3.1.2. Systematic scenario writing 1

Based on the most important drivers identified and other results from the trend analysis, the research group wrote several scenarios (Börjeson et al., 2006; Soetanto et al., 2011; Amer et al., 2013). These scenarios were cohesive narratives that describe a future situation with a general logic and coherent trends. Such scenario writing is a combination of the composition of the ascertained trends and construction of coherent narratives. The goal was to construct alternative scenarios that experts in a Delphi study could assess. In this case five alternative scenarios were constructed.

The scenarios were not thought of as predictions, which have been discussed in the future study literature as difficult (OECD, 1999; Amer et al., 2013). The scenarios were thought of as tools for decision makers (politicians, planners, firm managers and others) to create industrial policy or firm strategy (Popcorn, 1997; Glenn, 2009; Lindgren and Bandhold, 2009). The scenarios were set up as looking forward to 2025. It is, of course, impossible to envisage the precise situation in 2025, but the tool is a pedagogical means to enable the Delphi panel a more informed assessment of the situation in 2025 (Sundbo, 1991; Al-Saleh et al., 2012).

All the scenarios were described using the same systematic approach:

1. Global situation
2. National situation (Denmark)
3. Regional situation (Region Zealand)

[1] Terroir is a notion (stemming from French) used in gastronomic literature about the character of the soil and climate where vegetable or animal food has grown. The character of the soil and climate is supposed to influence the taste of the food.

The five scenarios that were formulated were called:
High technological food production – The Functional society
High gastronomy – The experience society
Nature and animal welfare – The ethical society
The reappearence of the sea – The aquarial society
Stagnating food production – The recessive society

3.1.3. Expert-based Delphi technique

Next experts were involved by using the Delphi technique (Jantsch, 1967; Linstone and Turoff, 1975; Helmer, 1977; Ono and Wedemeyer, 1994; Rowe and Wright, 1999). A panel of experts from all over Denmark was selected. These experts were defined in terms of categories with a knowledge about food trends, either because they have a practical relation to food (production, distribution, serving or consuming food) or a general knowledge about food trends (researchers and food journalists). One hundred experts (between ten and sixteen in each of the below categories) were selected based on nominations from the research group, interest organizations, firms, and other institutions. The experts represented the following nine categories (the number of selected and answering experts stated in brackets):

Primary producers (farmers, gardeners, etc.) (10 experts selected, 4 answered)
Distributors – wholesale, retail (10 experts selected, 6 answered)
Food industry (10 experts selected, 3 answered)
Restaurants (10 experts selected, 5 answered)
Researchers (16 experts selected, 10 answered)
Other experts (e.g. journalists, food bloggers, authors of cookbooks) (13 experts selected, 5 answered)
Interest organizations (10 experts selected, 3 answered)
Consumers and consumer organisations (11 experts selected, 8 answered)
Tourism experts (since gastro-tourism was included as a field of interest) (10 experts selected, 8 answered)

A description of the five scenarios and the selected drivers formulated as questions that the experts should answer was sent to the selected experts via e-mail. Highlights of the scenarios and the questions are presented in appendix A.

The experts answered the questions via a web-based standard questionnaire (Survey Monkey). All experts were sent a reminder after two weeks. Fifty-two experts (52%) answered the questionnaire. The respondents represented all the above categories thus the answers can be considered fairly representative (Representativity understood as a quantitative representative sample has no meaning in future scenario writing because it is the deep insight into trends that counts more than formal representativity).

The panel was used to assess the scenarios, e.g. how likely each scenario and each situation within each scenario (global, national, regional) was to occur. The experts could say ‘very likely’, ‘perhaps likely’, or ‘unlikely’. They thus could indicate that several scenarios were likely and that, for example, the global situation of a scenario is likely while the regional situation as described in the scenarios is not. They could also suggest the merger of two or more scenarios. Further, they could make comments about the scenarios.

In addition to the five scenarios, the research group formulated 46 questions about the most important drivers or trends expressed as the situation in 2025 compared to today. The experts in the Delphi round were asked to answer the questions. The questions were all formulated with three possibilities for answers following the principle of 'more than today – as today – less than today.' For example: 'In 2025 we visit restaurants more often – the same as today – we eat less in restaurants'. The experts should indicate which of the three they found most likely.

3.1.4. Systematic scenario writing 2

The next step was to develop the final scenario(s). The research group analysed the experts' answers to the scenarios and the questions with the aim of seeing which scenario(s) was/were deemed probable by the experts and whether their comments suggested the merger of some scenarios thus the highest degree of consensus about the scenarios was achieved. The research group would characterize scenarios that few experts assessed as likely to be, or not be, realistic and deleted them from the final scenario or set of scenarios. The whole research group was involved in this analysis and selection process. The experts' assessment of the five scenarios can be seen in Table 1.

Table 1 The experts' assessment of the five scenarios in the Delphi Investigation

Percentage of experts who assess whether the scenarios are likely or not (N= 52)

Scenarios	Assessed Very likely	Assessed Maybe likely	Assessed Not likely
High technological food production – The functional society	25	65	10
High gastronomy – The experience society	33	55	12
Nature and animal welfare – The ethical society	25	48	27
The reappearence of the sea – The aquarial society	8	52	40
Stagnating food production – The recessive society	8	51	41

Highlights of the scenarios can be found in appendix A.

The research group's analysis ended with two of the scenarios that most experts voted for – 'High technological food production – The functional society' and 'High gastronomy – The experience society' – being merged even though they might seem contradictory. However, several experts noted that these two scenarios could both be right. The individual consumer could demand both types of food, or some social groups will demand

the one type simultaneously as others groups demand the other type. As several experts pointed out, consumers demand industrialized standard food in some situations, for example in a busy weekday, and the gastronomic food in other situations, for example, in the weekends when they have time to create complex meals or go to restaurants. The research group called the new scenario, which was seen as the main scenario: 'Food for ordinary days and celebrations'.

Many experts felt 'Nature and animal welfare – The ethical society' will not be a realized scenario on its own, but should be included in all other scenarios. Therefore, the research group placed nature care and animal welfare within the 'Food for daily day and celebrations' scenario.

The 'Stagnating food production – The recessive society' scenario was not considered realistic by many experts, so that scenario was dropped.

'The reappearence of the sea – The aquarial society' was pointed to by a number of experts as a possible, however not as likely as 'Food for ordinary days and celebrations,' particularly not for Region Zealand. The scenario 'The reappearence of the sea – The aquarial society' was therefore seen as having a low probability.

The answers to the driver or trend questions (about the situation in 2025 compared to today) were used by the research group as more exact specifications of the two selected scenarios. The answers were added to the scenarios where they, according to the logic of each scenario, might belong.

The research group formulated support and initiatives that the region might implement on the basis of the scenarios and the other GRO project studies' suggestions for action.

3.1.5. Expert seminar assessment

The scenarios and suggestions for actions were discussed in an expert seminar that followed the previous step. The Delphi experts and some representatives from the regional administration were invited 24 people participated. The researchers presented the scenarios and suggestions for action, which were discussed in groups with representatives for the different expert groups, the regional administration and the researchers.

A few corrections to the scenarios were presented, but generally speaking this seminar did not lead to much new input – neither to the scenarios nor to the suggestions for action. This might also be seen as a validation of the whole scenario process.

3.2 Validity and reliability

The issue of validity and reliability has another aspect when we talk about futurology (Jantsch, 1967; Helmer, 1977; Lindgren and Bandhold, 2009). The research results cannot be compared to another version of the reality to test validity and reliability. The validity issue in scenario writing is a matter of writing scenarios with a coherent logic supplemented with relevant information that most involved persons agree on thus consensus is achieved. This was assured here via the long process of scenario writing where a consensus among experts and the research group was sought. This complex process aimed to ensure future-research validity understood as coherence and consensus (Jantsch, 1967; Helmer, 1998). Different methods of achieving consensus and validity have been used.

The researchers' selection of scientific knowledge was controlled via involvement of the whole group of researchers in the project. They individually selected trends and scientific knowledge and these were discussed by the whole research group.

The validity was assured via the final seminar where researchers, experts, and practitioners met and discussed the result of the scenario-writing process.

Reliability was assured by keeping the experts' answers anonymous. The research group compared each expert's answer to the trend questions with their answers to the scenarios to see if any large inconsistencies existed. The experts also had time to consider their answers since they had a month to answer the questions about trends and the scenarios. Further, the instruction to the experts was carefully formulated and tested before the scenarios were sent out.

4. The scenarios

This section presents the scenarios for the food sector in 2025 resulting from the scenario-writing process. First, the character of these scenarios will be discussed, then the main scenario will be presented and finally the minor one.

4.1 The character of the scenarios

As was said earlier, these scenarios are extensions of existing trends with some elaboration of the trends added; each scenario becomes a more holistic story. The trends may change if new situations emerge either globally or locally. Public knowledge of the scenario may even in itself change the trends if decision makers, firms or people as customers use the information to influence the situation – as is the purpose of the scenarios as mentioned. The scenario is a picture of the actual development trends.

The scenarios were developed to have three levels: global, national (Denmark), and regional (Region Zealand). This makes the scenarios specific, however, they may be relevant to other countries and regions. Further, the method demonstrates how one can work with the scenario technique to differentiate such levels. Each geographic level can have different developments within the scenario's framework.

The scenarios will in the following sections be described as a kind of narrative about how the situation could be in 2025 – and will be if the trends that the research group and the experts have emphasized continue.

4.2 The main scenario: Food for ordinary days and celebration. High-tech food production combined with high gastronomy

4.2.1 Background for the scenario

The scenario combines industrialized, high-tech trends with gastronomic and experience trends. The industrialized, high-tech trends have been much emphasized in analytical literature (Roger, 2002; FAO, 2013) and industrial policy in, for example, Denmark and the EU (the EU Horizon2020 program, EU, 2014). The gastronomic trends have not been emphasized as much (Murdoch and Miele, 1999; Murdoch, 2000). They include, among others, growth in small, often organic, producers, farmers markets, restaurants, and take aways, urban gardening and new gastronomic interest movements (such as the New Nordic Cuisine, Sundbo et al., 2013). This latter movement has been seen as part of the experience economy (cf. Pine and Gilmore's,1999, identification of experience economy as a business and economic independent sector; see also Sundbo and Sørensen, 2013; Mossberg, 2007, about the experience economy). The arguments for the high-tech, industrialized food production are that this is necessary to feed the world's growing population and provide safe and cheap food and mass products. The high-gastronomy trend is suggested by the growing middle class that both increasing their wealth and an

interesting life where gastronomy is highlighted (for example, the many TV broadcasts that in one or the other way have food as a theme) (Sundbo et al., 2013).

These two trends, or one may term them systems as they express different principles for the whole supply chain from 'soil to table', might be seen as antagonistic. The high-tech, industrialized one includes the use of high-tech and rational production systems in farming and industrial manufacturing and results in cheap standard products that have the same taste all over the world. The gastronomic one emphasizes the origin of the product (Jacobsen, 2008; Hinrichs and Charles, 2012; Sundbo, 2013), special products (such as apple juice made of one type of apples), and being 'in harmony with nature' (organic, using wild plants and berries etc.). The gastronomic trend also includes food and meals as a leisure interest. Sometimes the gastronomy movement expresses political attitudes that are hostile to the high-tech food industry. However, many experts in the scenario process described here pointed out that both trends, or systems, might be used by the same customers in different situations: the industrialized one for every day meals where it must be quick, easy and cheap, and the high-gastronomy one in the weekends or on particular occasions where there is time to display the gastronomic interest and have meal and food experiences, even if they are expensive. The experts also pointed out that each trend, or system, might be a basis for different social groups' food and food-related purchase and activities in the future. Thus, the two trends or systems should not be seen as antagonistic, but as complementary. Further, care for peoples' health, animal welfare, and nature have been emphasized in the public discussion in many countries and was considered by the experts in this scenario process as important both to the high-tech industrialized food production and to the gastronomic, often small-scale production. This will be a central element in the combined high-tech – high-gastronomic scenario.

The main scenario should not be seen as the high-tech and the high-gastronomic trends or systems totally merging. It might be that aspects of one influence the other. Some supermarket chains have introduced a local farmers' market corner, and gastronomic distribution systems have become global and mass based (such as 'Just Eat' (a service firm that brings meals from restaurants to peoples' home and has been established in several European metropolis) or gastronomic restaurants that become chains). However, according to the scientific knowledge and the Delphi experts, the two systems will remain independent, at least until 2025. Fundamentally, they have different supply chains, and the firms have different business models (even though each system absorbs elements from the other). However, they are complementary as the same consumers use both systems.

4.2.2 The scenario

The scenario can be expressed by a narrative of the situation in 2025:

4.2.2.1 Global

In 2025 climate and environmental problems have increased globally. Rural communities will decline in economic terms. We will live in both a functional society with an emphasis on industrial food and in an experience society with an emphasis on gastronomic experiences. The market will demand industrial, healthy and cheap food that is easy to use on ordinary days where we are busy. The market will also demand high-gastronomic special food that we will use, either at home or in restaurants. The latter might be on weekends or at special occasions.

The functional and industrial aspects imply that technology has developed; thus, food production is efficient and large-scale. Global economic prosperity and a focus on

technology and solutions to climate, energy, health, and environmental problems exist side by side with global supermarket chains. Large companies are successful on the world market. Some global service firms, such as ISS or Compass, have established global enterprise lunchroom companies. The daily meal must first and foremost be functional, fast and at the same time healthy.

The experience aspects imply that food has become an experience field. Industrialized and high-gastronomic food sectors exist side by side. In the urbanized and globalized world food culture has become an important part of individual and social identity. The meal is a cultural and social experience field and local food (terroir) has become a field of awareness. A growing gastro tourism means that people travel internationally to experience food and meals, also for short breaks that have become popular among the middle class. Meals have become a central part of an international urban lifestyle for the cities' fast-growing middle class. Food and meal experiences are considered an important part of a good life. The interest for gastronomy in media and social media is great. The meal is a social event as symbol of family well-being. The meal is also a social experience in restaurants, food festivals, and exclusive farmers markets. Restaurant visits flourish.

Convenience food such as take-aways and delivery to homes of fresh gourmet products or ready-prepared dishes and ready meals are/will be normal; meals are often consumed quickly and 'on the way', but often also served as fast meals in homes. People cook less themselves. The purchase of ready-prepared meals, take-away and use of restaurants and enterprise lunchrooms form a larger part of the meal consumption. Simultaneously interest for gastronomy and fine cooking has increased, particularly among the rapidly growing middle class, and cooking is often carried out as a hobby during the weekends. Meals are also often great social and experiential events. The meal experiences and the social get together play as big a role as the food itself. This implies a great interest for furniture, light, kitchen equipment, dinner sets, etc., which has resulted in new growth for design and arts industry, and for groups of friends going together on gastronomic short breaks.

There is an emphasis on healthful and slenderizing food with larger consumption of vegetables, less consumption of meat from animals, cakes, lemonade and candy.

The high-gastronomic food sector lives in symbiosis with the media sector. The turnover of high-gastronomic food is completely dependent on the media interest for food and meals. New gastronomic movements are created by media.

Nature, environment and animal welfare is important thus elements from the one of the first scenarios, 'The ethical society – Nature and animal welfare', are integrated in this main scenario. Both the high-tech, industrial and the experience-based high-gastronomic movement have respect for nature; sustainability and animal welfare become keywords in food production. Both industrialized and high-gastronomic food products must be healthy and environmental and animal welfare friendly.

People purchase more via the Internet. The retail distribution of food is globally concentrated in few international supermarket chains. The purchase of discount food is a strong trend, however, the share of daily food bought in supermarkets has slightly decreased. E-commerce has increased tremendously within the food field. People also buy more high quality locally produced food in farmers markets and special shops. The share in meals of wild resources from nature (herbs, berries, game) has increased. There is a focus on food waste, which has been reduced.

4.2.2.2 Denmark

Danish farming and fisheries have become large scale and dominated by high-tech. Denmark is doing well economically in the high-tech food sector because of the advanced Danish environmental and energy technologies. Danish food export is increasing in some regions, but decreasing in others. Both large-scale (industrialized) and small-scale (high-gastronomic) production have increased in farming. The production of raw food (farming and fishery) is not very profitable; the profit is in manufacturing and distribution and in large-scale catering. The food sector creates many jobs, however, they are concentrated in a few geographical areas, mostly industrial centres. Arla and Danish Crown, the two biggest Danish global food corporations, are doing well on the world market, but the raw material is not always Danish.

The high-gastronomic sector includes special primary producers and special distribution systems, such as new types of retail shops, farmers' markets, and so forth. Restaurants flourish and the turnover and profits increase. Thus Denmark is, compared to the situation in 2015, characterized by a relatively larger turnover and employment in the gastronomic food-experience sector. Tourism is characterized by visiting restaurants, special food shops, and food and meal experiences; many foreign tourists come to Denmark to experience local food and the – in 2025 old – 'New Nordic Cuisine' (Sundbo et al., 2013). The food media and social events, such as food festivals, represent a larger economic turnover than the traditional food sector including manufacturing and primary food production. Food has to a larger degree than before become an experience area.

New gastronomic trends are: Ethnic food has become a stronger tendency. Re-vitalised traditional cooking ('grand mama food') and New Nordic Cuisine are still trends, but weakened. Molecular gastronomy has nearly disappeared.

4.2.2.3 Region Zealand

Region Zealand profits mostly from the high-gastronomic experience movement. The region has not managed to develop major high-tech food industries and industrial farming (except grain production) or mass food distribution systems. However, the region has developed comprehensive experience-based food production, services and events. Many small and medium-sized producers and distributors have developed, new farms, shops and farmers markets have emerged, just as new restaurants and gastro-hotels. Food festivals and other food events flourish and local groups of people organize new associations for purchase and distribution of local food. The region's development is mostly determined by its proximity to the Copenhagen metropolitan region. The gastronomic food products are mainly sold in Copenhagen and the guests in region Zealand's restaurants, hotels, food events and food markets are primarily inhabitants or foreign tourists from Copenhagen.

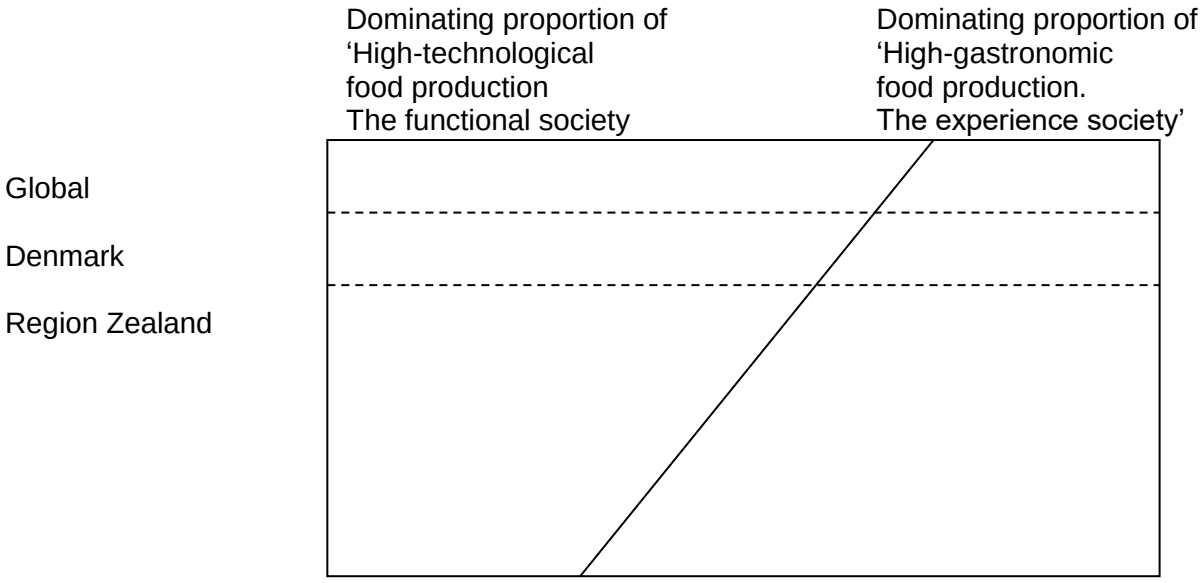
4.2.3 The scenario's two tendencies are differently developed at different geographical levels

Based on the scenario process including the Delphi stage, the two tendencies are predicted to have a different development at the global, Danish and regional (Zealand) level. Globally the high-tech tendency will be stronger, based on the fact that the world's population will grow dramatically and demand much food, i.e., industrial mass products. As far as possible, the food industry will meet the demands of animal welfare and taking care of nature. According to the Delphi experts Denmark will be dominated by the high-

gastronomic trend than the world in general because it is one of the wealthiest countries in the world and gastronomic interest has increased recently. Further the industrial Danish food production and farming is predicted to move to other countries because of the high production costs in Denmark. Region Zealand is characterized by much high-gastronomic entrepreneurship and focus on delivering gastronomic products to the Copenhagen area and a greater decline of industrialized food production than the rest of the country. This different development of the scenario's two aspects is expressed in Figure 1.

Figure 1 Different development of the food scenario 'Food for ordinary days and celebrations' at different geographical levels

The scenario's two aspects develop differently globally, in Denmark and in Region Zealand in 2025.



4.2.4 Suggestions for action

Based on the scenario and other studies within the GRO project, the research group formulated a series of suggestions for industrial development strategy for the food sector and actions that Region Zealand and food firms in the region could implement. The most conspicuous suggestions are summarized briefly below:

The suggestion for strategy is to emphasize high-gastronomic, experience-based food production. The region is strong in this sector (and weak in high-tech industrialised food production and distribution). Its proximity to the metropolis capital region of Copenhagen provides possibilities for supplying high-gastronomic expensive food products, services (such as farmers' markets), and gastro-tourism to Copenhagen. However, future possibilities of supporting high-tech industrialized food production and distribution that pop up should not be overlooked.

The region and the firms should emphasize local food (Futamura, 2007; Hinrichs and Charles, 2012; Eriksen, 2013) and authenticity (Gilmore and Pine, 2007).

The region should ensure that the service and high-value processing part of the e-business and convenience food activities will be carried out in the Zealand region (and not in the capital region).

The region could use public institutions more to promote and encourage innovation in local food production and distribution.

The firms should utilize the possibilities of being part of a high-gastronomic region placed near the Copenhagen metropolis to sell more.

Firms could be more innovative in developing experience parts of food production and deliveries.

Tourism firms could be more active in connecting to a regional high-gastronomic brand.

4.3 The minor scenario: The reappearence of the sea – The aquarial society. The sea as the resource for food

4.3.1 Background for the scenario

The first development of this scenario was based on observed trends toward the increased utilization of the sea's animal and vegetable resources (such as fish farming, but also experiments with producing food from algae and seaweed). The Delphi experts pointed to this scenario as a possible, but not so likely, future for Denmark, and particularly not for region Zealand. This assessment may be influenced by the conventional knowledge in Denmark of the country being an important agricultural country; thus, the potentialities of utilizing the sea is not so much in focus for Danish experts (as they were defined in this Delphi). In fact, Denmark is the largest fishery nations in Europe. However, Denmark has neither a large fishery manufacturing industry nor fish farming as some other countries. In, for example, northern Norway the 'Reappearence of the sea' scenario is almost a reality that for example is described in popular magazines, while the 'Food for ordinary days and celebration' might seem a little strange.

4.3.2 The scenario

This scenario can be briefly described as a narrative of the situation in 2025:

4.3.2.1 Global

Globally traditional forms of food production, such as plant and animal production, have led to increased prices and this production can not feed the growing world population. These production forms also have great negative implications for the environment and climate. Therefore, the sea's resources – fish, sea animals and plants – are increasingly utilized. New industries and communities including tourism have emerged around these resources.

Seafood is demanded by the population because it is healthy, inexpensive, and produced in environmentally and climate friendly manner. Fish farming is normal and fish has to a large degree replaced meat from animal farming as the greatest meat food source. Fish farms with fish and shellfish have replaced agriculture as the main producer of food raw products. The sea's vegetable resources (plankton, algae, seaweed) have been utilized, and they have widely replaced garden products. A new manufacturing industry that utilizes the sea's vegetable resources has emerged. New primary producer and distribution systems for sea products have emerged globally, including a quick-cooling distribution. Supermarkets and retail shops have adapted to the distribution of sea products.

4.3.2.2 Denmark

As a great coast and fishery nation, Denmark also profits from this development. Fish farming and a new fish industry has emerged. The seafood sector employs many people. Restaurants emphasize fish, shellfish and sea products on the menu. This influences tourism, which uses the sea as a theme (however, not sun and bathing purposes).

4.3.2.3 Region Zealand

Fish farms and sea vegetable industry are also developed in Region Zealand, which, as consisting of islands, has a long coastline. This development has been basis for new communities by the sea in the region.

5. Conclusion concerning the impact of the scenarios

This study has contributed knowledge about actual trends within the food sector. Although the scenarios were made from a particular interest in providing a strategic tool for one region, they say something about global developments. However, the most adequate scenario(s) for a given country or region may depend on the national and local conditions. The particular contribution of these scenarios is that the development of them has led to the idea of complementary scenarios where two seemingly opposite developments are seen as coexisting.

The study has also contributed by developing and testing a method for scenario writing that combines different techniques. Such methods have been used earlier (Sundbo, 1991; Gomez-Limon et al., 2009; Al-Saleh et al., 2012); however, multiple rounds have extraordinarily been used here. The method has appeared to be successful as it has led to quite surprising scenarios that can be told as homogenous narratives.

The success of this method and the result of the scenario process can also be seen from its impact on practice. The Zealand region uses the scenarios in its industrial policy planning. The Danish Ministry of Food is interested in using the scenarios for future policy building, and the whole ministry has had a day in the research group to be informed of and discuss the scenarios. The region and the ministry have taken the suggestions for concrete actions that the research group developed based on the main scenario and the results from project (GRO, 2014) into their political considerations. Food-related firms – particularly in Region Zealand, but also from the whole of Denmark – have used the scenarios as a basis for strategy formulation in several innovation workshops for food-related firms based on the main scenario.

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Appendix A Highlights of the first scenarios and questions presented to the experts in the Delphi investigation

Scenarios - highlights

High technological food production – The functional society

Technology and industrial food production is more developed today than in 2013 thus food production can be large-scale and more efficient. Global economic prosperity and a focus on technology and solving climate and environmental, health and energy problems. Global supermarket chains dominate retail. People consume pre-prepared meals to a large extent. Danish food firms are doing well in the world market. Many jobs are created in the food sector, but they are concentrated in a few geographical areas. Region Zealand is not doing so well, but quite a lot of people are employed in the convenience food sector.

High gastronomy – The experience society

Food has become an experience field. Meals and food culture have become an important part of cultural identity. Gastro-tourism is common and people travel for food events and tasting local food. Interest for food is expressed in the media. Local fresh food products are bought via e-commerce and brought to peoples' homes. Food and meals have become part of the experience economy in Denmark and many new restaurants and food markets have emerged. Region Zealand has become a major producer and provider of gastronomic food and new hotels, restaurants, food markets and food events have been developed.

Nature and animal welfare – The ethical society

Sustainability and animal welfare are keywords in global food production. As a reaction to global food surplus and food waste, the industrial system has been replaced by food production in harmony with nature. The supply chain from producer to consumer has become shorter and primary food production is carried out on the local nature's conditions. Supermarket chains are often replaced by smaller local shops. Some areas in the world have difficulties in producing enough food to be self-supporting. In Denmark the food industry has decreased, but farm shops and food markets have increased in numbers. Region Zealand has a flourishing local food sector.

The reappearence of the sea – The aquarial society

Agricultural farming has led to increasing prices and cannot supply the growing world population; it has also severe impacts on the environment and climate. Therefore the resources of the sea are utilized to a greater extent. Fish and sea-plants are used and sea-farming has become much more usual. New distribution systems for fresh fish have been developed. Tourism is more oriented towards experiencing sea and coast (not bath- and sun holidays). Denmark and region Zealand are doing well; new local communities have developed along coasts and they are economically successful.

Stagnating food production – The recessive society

The actual problems continue: Environmental and climate problems are growing, dubious food products are distributed from Asia and Africa and innovation in the food sector is stagnant. Discount supermarket chains are growing in number, which means cheap, but low-quality products. The world's growing population cannot be fed. The food sector is

neither a growth field nor a prioritized area in Denmark. Local communities are decreasing in Denmark and region Zealand, the remaining inhabitants are commuters, who complaints about smell and other inconveniences from farming.

Questions (drivers and poles)
Inclusing the experts' answers (in percentage) (N = 52).
The questions were formulated as statements about 2025. The experts were asked to assess the statements. There were three possible assessments for each statement.

1. Meal habits
People cook more themselves 14 % | As today 24 % | People buy more pre-prepared food 63 %

2. At work
People eat more often in the canteen 65 % | As today 35 % | People bring their own food more often 0 %

3. Restaurants
People eat more often in restaurants 59 % | As today 39 % | People eat less often in restaurants 2 %

4. People's cooking competencies
Have increased 26 % | As today 29% | Have decreased 45%

5. Local communities in rural districts
Have economically progressed 18 % | As today 22 % | Have declined economically 60 %

6. Food prices (compared to average income) have
Increased 60 % | As today 28 % | Decreased 12%

7. The proportion of food bought in supermarkets has
Increased 20% | As today 42 % | Decreased 38 %

8. The proportion of food bought in special food shops has
Increased 43 % | As today 39 % | Decreased 18 %

9. The proportion of food which is locally produced and bought at food markets has
Increased 69 % | As today 26 % | Decreased 6 %

10. The proportion of food bought via the Internet has
Increased 98 % | As today 0 % | Decreased 2 %

11. Large compared with small scale production in agriculture and gardening
More large scale production 40 % | As today 20 % | More small scale production 40 %

12. Conventional compared with organic products
More conventional products 10 % | As today 22 % | More organic (biodynamic) products 69 %

13. Consumption of functional food (gene-modified, vitamin-enriched etc.) has
Increased 59 % | As today 29 % | Decreased 12 %

14. Consumption of local and home grown food (kitchen garden, urban gardening or other ultra-local production) has
Increased 65 % | As today 28 % | Decreased 8 %

15. Efficient distribution systems of fresh and cooled fish have been developed

To a large degree 31 % To some degree 61 % Not at all 8 %

16. Food products have been more standardized
To a large degree 26 % As today 24 % No (more varied food products) 51 %

17. The proportion of wild resources from the nature used (game, mushrooms, berries etc.) has
Increased 51 % As today 41 % Decreased 8 %

18. The proportion of traditional farming resources (meat, cereals etc.) in food has
Increased 20 % As today 57 % Decreased 22 %

19. Fish farming has
Increased 61 % As today 33 % Decreased 6 %

20. Consumption of fish and shellfish has
Increased 44 % As today 48 % Decreased 8 %

21. The sea as a resource for vegetable products (seaweed, algae etc.)
An important part of vegetable food is produced in the sea 56% As today 38 % The sea is almost not utilized 6 %

22. Climate and environmental conditions are
Improved 23 % As today 25 % Worse than today 52 %

23. Transport distances for food products are
Increased35 % As today 29 % Decreased 35 %

24. Long distance transport is
Cheap and not making environment worse 20 % As today 45 % Expensive and aggravating the environment 35 %

25. The quantity of food waste has
Increased 12 % As today 35 % Decreased 53 %

26. Food culture
Food and food culture is very interesting for consumers 55% As today 43 % Food and food culture is of less interesting for consumers 2 %

27. Community and individuality around meals
People have permanent communities (family, school meals etc.) 41% As today 41 % Individualism – each individual has individual meals 18%

28. Experiences in general
There is much demand for cheap standard experiences 6 % A mixture of cheap and expensive experiences 84% There is much demand for expensive special experiences 10 %

29. IT: The Internet is used for food purposes (receipts, spotting new food etc.):
Very much 92 % To some degree 8 % To a very low degree 0 %

30. International tourism has
Increased 63 % As today 29 % Decreased 8 %

31. Farm tourism (staying overnight, visiting farmer's shop etc.) has
Increased 49 % As today 49 % Decreased 2 %

32. Restaurant tourism (to visit restaurants) has
Increased 57 % As today 35 % Decreased 8 %

33. Media's interest in food
Food and meals has high priority in media 51 % Food and meals are to some degree prioritied by the media 47 % Media has become tired of food stuffs 2 %

34. Vegetables' proportion of the fare has
Increased 75 % As today 25 % Decreased 0 %

35. Meat's proportion of the fare has
Increased 6 % As today 45 % Decreased 49 %

36. Bread's, pasta's, rice's and potatoes' proportion of the fare has
Increased 4 % As today 74 % Decreased 22 %

37. Soft drinks containing sugar's proportion of the fare has
Increased 12 % As today 41 % Decreased 47 %

38. Vegetables' proportion of the fare has
Increased 75 % As today 25 % Decreased 0 %

39. The New Nordic Cuisine movement is
Very strong 34 % Weak 48 % Has disappeared 18 %

40. Slimming diet food's proportion of the fare is
Very strong 69 % Weak 29 % Has disappeared 2 %

41. The Molecular Gastronomy movement is
Very strong 18 % Weak 39 % Has disappeared 43 %

42. The 'Back to grandma food' movement is
Very strong 31 % Weak 65 % Has disappeared 4 %

43. Ethnic food movement is
Very strong 69 % Weak 31 % Has disappeared 0 %

44. Discount (in supermarkets, restaurants etc.) is
Very strong 65 % Weak 33 % Has disappeared 2 %

45. Gene-modified food products' position on the market is
Very strong 20 % Weak 71 % Has disappeared 10 %

46. Raw food as a movement is
Very strong 10 % Weak 61 % Has disappeared 29 %