THE PAST, PRESENT AND FUTURE OF EATING MEAT IN FINLAND

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Tammela, Tampere, 31st of December, 2009

Markus Vinnari

PREFACE

I am a vegetarian. I believe that the rest of society should be too, because I have not heard any sensible explanations as to why this should not be the case. Even though I have found sensible arguments in favour of vegetarianism many see it as somehow peculiar. When I have presented my area of research at seminars many arguments and reasons have been presented for why a devoted vegetarian should not do research about the role of meat consumption in modern society. These arguments usually say: "your views could be biased" or "you cannot be objective". I personally do not believe that anybody can do objective research about our societies; all the social sciences are affected by some form of bias. Donna Haraway describes it well: *Facts depend on the interpretive framework of theory, and theories are loaded with the values of the theorizers and their cultures.* (Noske 1997, 101)

We do not often hear people say that medical researchers should not be doing research with humans because they might be biased. We do not often hear people questioning the idea of medical doctors trying to invent drugs or other methods that would allow more people to live longer, even though many researchers see an increasing population as very harmful for the earth. However, a vegetarian promoting vegetarian views with the long-term interests of the planet and all the life at heart is considered liable to produce biased views. Nevertheless, I believe that it is more important to be fascinated by your area of research than trying to present yourself as unbiased. The important thing is to try to find new insights into your area of interest.

Before stating one's opinions about animal rights one should try to understand the basic principles of our world and evolution. I was not the brightest student in my high school, but there was this one time when I was, at least in my own view, able to ask a reasonable question. Our biology teacher was presenting us with "facts" about animals and said that mosquitoes and chickens are stupid. I did not take the fact as given and asked for some evidence. The teacher stated that it was evident because both species had such small brains. When I asked if that meant that people with big heads had big brains (I have always had a big head) were smarter, he had to concur that it was not as simple as that. When we try to estimate human intelligence it seems to be related to the volume and location of grey matter in the brain. However, this is highly debatable and much disagreement continues to exist about the nature of intelligence. Intelligence is apparent in many ways in humans and at

least logical, musical, linguistic and spatial intelligence has been detected. If we do not understand human intelligence, then how can we make definitive assumptions about animal intelligence if we do not understand what type of intelligence is beneficial for them (for more discussion see: Masson and McCarthy 1995, Noske 1997, Bekoff 2007). The more I understand evolution and natural selection the more certain I am that there are many factors in addition to intelligence that can be beneficial to animals from an evolutionary perspective and which will eventually demonstrate that we have been ignorant about animals when we try to rank them and their capabilities. Something else that started to become clear to me at a young age was that society plays a major role in determining what we can and cannot do. We are taught to eat in a certain way and we are told to act in a certain way.

In Finland we, as a Western society, have left animals at the mercy of the modern agricultural system that is very good at placing the responsibility for our actions onto others. Thus, we have become so used to the way animals are treated that many believe it is the only possible way farming can be carried out. Most consumers would probably not be prepared to treat animals in the way they are currently treated in factory farms, but at the same time they are prepared to eat the meat that comes from those animals. Most of us are capable of understanding that humans are suffering in less developed countries because they do not have enough water to drink, or that if humans were locked inside small cages they would suffer. Often we hear how the freedom to choose our actions is our greatest asset. We also take it for granted that killing humans is wrong. When animals are treated in this fashion it is considered normal and something that we "have to do", even though the arguments in favour of these actions are insufficient as they rely on arguments such as taste, tradition, etc. I regard the modern way of treating animals to be an absurd mode of production, and the way in which it is conducted as one of the clearest manifestations of the things that are wrong in our societies.

Even though my view of the current situation in the world is not a very positive one, I hope and believe that the direction in which societies are developing can be a preferable one. By this I mean that the diffusion of scientific knowledge in societies can help humans to understand their prehistoric roots and their position in the social, political and cultural systems that we live in. I hope this is true because the other direction, the one in which we see animals and nature only as resources, does not engender great prospects for sustaining life on earth. I wish to generate, in the work that follows, discussion about our human perceptions of nature and animals. Hopefully, this will be noticed by decision makers and citizens who will see the possibilities that we now have for making the world vegetarian. Much action is needed, but the possibilities are almost limitless.

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1 INTRODUCTION

> “All normal people love meat. If I went to a barbeque and there was no meat, I would say, "Yo Goober! Where's the meat?" I'm trying to impress people here, Lisa. You don't win friends with salad.”
> - Homer Simpson cartoon character

1.1 Background

What humans eat is influenced by many factors such as availability of foods, preferences, price, what peer groups eat and what kind of values people want to reflect when deciding what food to eat. Throughout the world the changes in the availability of different food stuffs are still largely dictated by traditional food choices. In different regions different foods stuffs are available due to reasons of climate or soil conditions or the selection of suitable animals for farming or hunting. With globalisation and for example better transport systems humans now have a greater range of foodstuffs to choose from than ever before. This does not however mean that availability would have been a dominant factor even in earlier times because human food consumption has always been at least partly influenced by human beliefs and preferences. With this wider range of available food to select from, or maybe just because of the possibility, food consumption decisions are becoming more debated in modern societies. As a result some food consumption decisions are starting to become more clearly environmental and ethical decisions. Such changes in human values can have profound implications on the selection of food stuffs that are used in the future.

Societal transformation towards making societies egalitarian has been quite rapid in the Western World over the last few hundred years. Humankind has for example outlawed slavery and granted voting rights to all men and women. Discussions about the role of men in childcare have emerged and laws have been passed and efforts have been made to ensure that females have the opportunity to advance in the career of their choices. These actions have occurred only very recently, especially when we think that humans, as a species, have walked on this planet for well over one hundred thousand years. There might have been more egalitarian times also in human early history, but our near history has been characterised by inequality.

Not only has there been a development in attitudes towards fellow humans, but there is also some evidence that attitudes towards nature are changing, albeit slowly. For instance, the oldest natural parks and preservation areas are now a little more than 100 years of age and there are even some discussions about the rights of plants. Ecuador for example is taking things further by making a law that states that nature has: "*...the right to the maintenance and regeneration of its vital cycles, structure, functions and evolutionary processes"* (Nield 2009). A similar development has been taking place in the case of animals where court cases are underway with regard to giving rights to other primates than just humans (Stinson 2008).

While these developments are taking place humankind is still sharing this planet with billions of other life forms, but their number is declining at an ever increasing speed (Hanski 2008). The variety of these species is enormous and humans are just starting to understand the vast diversity of animals, the ways in which they communicate, the mental and physical capabilities that they have, and how they have adapted to different habitats. Previously though, humans from the Western cultural tradition have valued only the capabilities that they themselves possess and those of our other earthlings[1] have been seen as inferior.

Fellow earthlings can be roughly divided into at least three different groups based on the level of their utilisation by humans: wild animals, pets and production animals. Wild animals are the ones that are free to walk, fly or swim as they please. These are the "natural" untamed animals. Pets, most often meaning cats and dogs, are animals that exist in order to bring companionship to their owners. These are the animals that people think are the happiest creatures on earth, because they can "enjoy" their life and the companionship of their wonderful "owners". Most of these animals are however treated in a way that if humans were treated in the same way their "masters" would end up in jail[2]. Production animals (including laboratory animals) are the ones whose existence most consumers do not even want to acknowledge. Most people eat these animals or their unborn offspring daily; they wear their skin on their feet or as coats or trousers. They also use the bones and brains of animals (gelatine) in sweets and to clarify wines, or for use in experiments in laboratories where they can be used for such research as developing a new shampoo.

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[1] Inhabitants of the planet earth. Term used in a documentary film Earthlings (2003) written, produced and directed by Shaun Monson and co-produced by Persia White

[2] These animals are left inside for hours, they are only allowed to urinate at certain times, they are taken outside in collars and they are treated in a way that makes them totally dependent on another species (humans)

In addition to these three groups there is one additional group that consumers do not often consider to be animals at all: *homo sapiens sapiens*, the human. Neglecting to view ourselves, humans, as animals is due to the fact that many human societies have created classification systems in which humans are considered so superior to other animals that they are not conceived of as inhabiting the same category. Animals are thus defined as distinct from humans and as such they can be viewed as the ‘‘other”. (Tester 1991)

This research aims to find out whether there is any change taking place in the classification described above. The opportunity for this change should now exist as societies have gained knowledge about different animals and because all human races are now seen as equally intelligent, at least by most people. In addition, humans in general no longer think of different races as being inferior nor do they always see animals as being inferior. Instead most humans recognise their differing abilities as being the result of adaptation to unique environments and are thus reclassifying how humans see other species and to the rest of the natural world. It will be interesting to see what effect this development might have with regard to the eating of animals. Eating animals has been chosen as the focal point of this research because it can be stated as one of the most fundamental actions in which humans utilise other species and yet accord them so little value. On the issue of change, there is some anecdotal evidence that vegetarianism is becoming more ubiquitous; this is manifested for instance as an increase in the number of vegetarian restaurants, shops selling vegan footwear, or magazine articles on the topic. Also, in some Western countries governments have started to promote a reduction in meat eating. For example, in Germany the government is urging people to only occasionally eat meat because of the greenhouse effects that meat consumption has on the earth’s climate (Alter 2009).

This work concentrates on Finland, which is a small nation with only a little over five million inhabitants. However, it has a fairly large national GDP per person ($40,197 in 2005, 12th largest in the world). Finland is known for its commitment to environmental sustainability and has ranked as first out of 146 countries in the Environmental Sustainability Index (Esty et al. 2005). Finland was also ranked the second most competitive economy in the world according to the Global Competitiveness Report 2006-2007 (Porter et al. 2006). Finland is also a technologically advanced country and as a part of the Nordic countries it is often considered to be more egalitarian and have more equality between the different genders than most other nations.

1.2 Research Objectives

This work aims to discover if there is a larger movement taking place towards adopting vegetarianism in Finnish society and if there are presently observable factors that can be seen as influencing this development in the future. More specifically, the research examines the direction the supposed development of excluding meat from the human diet is taking. Thus, the ultimate aim is to examine societal transformation. Both the total amount of meat consumption and the number of vegetarians are analysed in this research. This is because vegetarianism and meat consumption are considered to be two sides of the same coin (Fiddes 1991, 4). Changes in the number of vegetarians will unavoidably have an effect on meat consumption if their numbers continue to rise.

The first objective of this work is to increase our understanding of the development of non-meat consuming households on a national level. Non-meat consuming households were chosen as a proxy for the estimation of the development of meat avoidance. There is no long term data available on the number of vegetarians, but non-meat consumption can provide some insight into this development. Even though some consumers in the non-meat group identified in this research can and do eat meat products outside their homes they are probably more likely to eat at least less meat than average consumers.

The second objective of the work is to increase our understanding of the difficulties in defining vegetarians and evaluating their number and at the same time trace how many vegetarians there have been in the recent past. These two objectives are important in order to understand the historical development of vegetarianism and to gain a better understanding of the current situation.

The third objective is to outline the possibilities that modern societies have in front of them with regard to meat consumption. The fourth objective of this work is to increase knowledge about the future images that consumers and experts have of meat consumption. This is especially important if actions to influence consumers' meat consumption practices are to be seen as belonging to different consumer segments, which can then be influenced in different ways. The fifth and final objective is to outline possible ways that development towards vegetarianism could take place. These scenarios are based on the material gathered and the interpretation made during the research.

1.3 The Structure and Scope of the Research

This thesis work consists of four articles and a summary. The summary is divided into six different chapters and the four independent articles are attached at the end of this work as appendices.

This summary starts with a short presentation of the history of the animal issue. To paraphrase George Orwell: To know your future you must know your past. A very short introduction to the development of our planet earth and the evolutionary development of the human species is presented. This is done to remind readers of this work that humans are just one species among many others that inhabit this earth. This can be seen as something that "everybody" knows or at least should know in the Western world, but still people see themselves as something totally different to other species (Dawkins 2006). A better understanding of our position in evolution can have profound effects on our ethical thinking and on our treatment of other animals (Rachels 1990). What humans believe about their history directs their beliefs about the future (Bell 1997, 88). As such constructing the past from the scientific perspective is crucial if evaluations or recommendations about the future are to be made.

It is also considered important for the reader to become familiar with the animal welfare and animal rights arguments that have been developing for more than two thousand years, before the current situation is evaluated, and especially before any future possibilities are discussed. An overview of this historical development is presented in the second chapter, although it is understood that this topic in itself could form a thousand-page thesis[3]. This is important since, for example, in everyday conversations it is often stated that vegetarianism is a new movement when in actual fact it has a long historical development behind it, which people are often not aware of. Such popular but mistaken beliefs also emerged during the research process when some interviewed experts stated that vegetarianism is a new movement and will diminish in the future as rapidly as it has risen. As it is a relatively small movement its recent history, especially in Finland, is not well known, even among some of the experts that deal with food issues.

The second chapter then presents the arguments used in the case of meat consumption from three different perspectives: from the animals', nature's and human perspectives. The final sub-chapter in the second chapter presents the harm benefit analysis of adopting vegetarian practises on a societal level in the short and long term from these three different perspectives.

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[3] Actually a whole book series has been written about the issue (see Kalof and Resl 2007)

The third chapter of this thesis introduces the concepts that guided the formulation of research questions for this work: Deep Ecology, Deep Vegetarianism and Ecological Modernisation. As this work belongs to the field of Futures Studies it is of utmost importance to outline what values it is trying to promote (Bell 1997, 97). The Deep Ecological principle states that the human perspective towards nature and animals should change towards one which sees animals and nature as having value inherently and not being valuable only as material resources or by the wellbeing they provide to humans. Deep Vegetarianism argues that humans have the moral duty to become vegetarians. These concepts were used as starting points for the formulation of the main research question. These concepts were considered as relevant because the limits to growth are becoming clearer and clearer and as such there is a need to find paths for sustainable development with regard to food consumption in the future. According to the Ecological Modernisation theory advancements in human capabilities, that act as a driver for technological development can be seen as answers to environmental problems. Thus, the modernisation process is not only desirable, it is necessary.

Following the reasoning of the Ecological Modernisation theory several follow up questions were formulated. As such this work asks the question: Is there a movement towards vegetarianism in Finland? This question is answered in the descriptive section of this thesis. Secondly, the study asks: What are the possibilities of such change occurring in the future? This is the normative section of this thesis.

In the fourth chapter of this thesis the methodology of the research is presented along with the motivation for the methods used and why the results are presented in a certain order. Some notions of the historical development of these methods are presented as are the ways in which they were developed to suit the needs of this research. The fourth chapter also introduces the qualitative and quantitative datasets utilised in the research.

In the fifth chapter each of the individual articles and their most important findings from the perspective of this work will be outlined. After the results of the two first articles are presented the third sub-chapter presents some reasons for why the transformation or even the acknowledgement of the need for change towards vegetarianism is likely to be a slow process (if it to be occur at all). The final sub-chapter of chapter five analyses three possible ways in which further development towards a vegetarian society could proceed. In this sub-chapter the information gathered during the research process is synthesised and some possible development paths are discussed. As it so often is when future studies methods are utilised the final outcome of the work is scenarios (or stories about the future) (Bell 1997, 317). The sixth chapter presents the conclusions and discussion.

This study is located at the nexus of several disciplines, as the perspective of the social sciences is complemented with philosophical discussion. Previous sociological analyses have acted as the basis of the work and sociological methods have been combined with the methods of Futures Studies. The work combines positivistic research with a strong normative perspective.

2 THE DEBATE ON MEAT CONSUMPTION

> "Animals share with us the privilege of having a soul."
> -Pythagoras (circa 569-475 BCE) philosopher

As this work examines societal transformation the possible arguments driving this change are first examined in more detail. This chapter first describes the origins of humans and our diet. The purpose of this discussion is to link human actions to the actions of other animals and to present the origins of human food choices. As humans are just one animal among many others it is important to understand the evolutionary basis of food consumption decisions. The discussion is followed by the presentation of the centuries old development of vegetarianism as a movement and the argumentation supporting it. This is done with the help of quotations from some of the most important thinkers[4] that have lived. From these quotations it can also be observed how man's perspective of himself in the natural system has changed. The third sub-chapter presents the current arguments used against meat eating from three different perspectives: from the perspective of the animals, the environment and humans. These perspectives are considered relevant and possible drivers of any transition to vegetarianism due to the rising importance of environmental and moral discourses within modern society. The last sub-chapter draws together the arguments by forming a harm benefit analysis of changing diet away from meat eating.

2.1 The Development of Homo Sapiens Sapiens and Our Diets

In order to understand the debate around meat eating there is a need to understand its historical background. In many cases it seems that humans are somehow trapped in short historical time spans, which limits their ability to see the large changes that have already taken place or the vast possibilities for further transformation. There is now scientifically acquired knowledge available that the universe was created about 13 billion years ago (Bennett et al. 2003) and that the Earth is estimated to have been formed around 4.5 billion years ago (Dalrymple 1991, 2). There is also good evidence that life

[4] At least in the human population

evolved on the planet around 3.5 billion years ago (Dawkins 2005, 8) and that a small ape living around five million years ago is assumed to be the last animal whose descendants would include both modern humans and their closest relatives, the chimpanzees (Dawkins 2005, 9). It is also well established that anatomically modern humans originated somewhere around 200,000 years ago and that they first appear in the fossil record about 160,000 years ago (Gibbons 2003). Historically our anatomy has been developing from the start of the first life forms.

Most biologists agree that like their ancestors humans are animals who can consume both plant and animal products (omnivorous). It has been noted that humans and our ancestors have coped with very different types of diets. These diets have been affected by varying climate conditions in different times and in different locations, and by available food-processing technologies, not to mention the foods available (Garn and Leonard 1989, 337). Due to the fact that humans have the capability to use various sources of food the human diets are prominently reflected through local culture (Garn and Leonard 1989). Sources of human nutrition and calories vary tremendously around the world and the division and selection between different calorie sources is guided by many different factors, such as the cultural meanings given to different products.

Other animals have been important to humans from the beginning of civilisation. The first cave paintings found in Europe that date to around 30 000 years ago pictured animals. It is not known why early humans painted them, but as those are the earliest visual messages it can be assumed that the animals were significant to them. Hunting animals was a very demanding task for the earliest hominids and there is good evidence and consensus that their diet was primarily plant based (Bunn and Stanford 2001, 356).

Humans have utilised meat as a source of energy and especially as a protein source for a very long time. Understanding the value of meat as a source of nutrients and energy has probably been known by humans from very early times, based on the notion that humans' closest relatives, the baboons, utilise a vast variety of different animals as energy sources. Baboons are known to eat 47 different types of animals, including large animals such as gazelles and antelopes. Chimpanzees, on the other hand, are known to eat at least 23 species of mammals including baboons, pigs, rats, and chimpanzee and even human babies (Harris 1990, 37). It is, however, important to remember that for most of human history meat has been an occasional food. For most non modern societies, which lived mainly by hunting and gathering, meat contributed only a limited amount to their total nutritional consumption (Franklin 1999, 145).

With the development of agriculture after the last ice age, probably about 13 000 years ago, human relationships towards other animals started to change (Diamond 1997). Humans no longer had to always hunt for the animals that they wanted to eat because animals were raised or herded, or followed in a loose herding manner with the purpose of killing them when needed. The development of agriculture was a slow process that took a very long time (Pinhasi et al. 2005, Dawkins 2005, 28). The domestication of animals was part of this process and happened at different times in different parts of the globe. There was considerable variation in the way that interaction between different animals and humans originated (Diamond 1997). That was due to the variation in natural animals around the globe and because different animals were domesticated in different parts of the world. Plant domestication and animal domestication did not necessarily take place in the same places at the same time (Blainey 2007). The domestication of animals was an important step in human history and it had profound implications not only for our diet but also for the socioeconomic structure of our society (Bellwood 2004). This allowed for the diversification of tasks within societies and in the long run it also enabled population growth.

To summarise, it can be learned from human history that humans are able to utilise a vast variety of products as a nutrition source. It is also evident that meat has only contributed a small amount of the total calorie contribution to humans for the most of human existence. Food consumption decisions have been driven in part by cultural factors during human past.

2.2 A Short History of Vegetarian Arguments

The first evidence of humans choosing to follow a vegetarian diet dates from around 3000 years Before the Common Era (BCE). Some sources state that the origins of the practice were in Egypt (Vegetarian Society 2008), while according to others they were in India (Stuart 2007). Vegetarianism was, in its beginning, related to religious beliefs (Walters and Portmess 1999, 11). Pythagoras (circa 569-475 BCE), one of the first philosophers of ancient Greece, was known to be a vegetarian and he is also cited as the first to follow vegetarianism based on ethical reasons (Walters and Portmess 1999, 12). Some believe that he adopted the idea from the Indian Hindus who had had the idea for much longer (Stuart 2007). Pythagoras believed in reincarnation and for that reason dismissed eating animals (Walters and Portmess 1999, 11). His ideas lived among the Pythagorean School in ancient Greece and Rome for hundreds of years after he had passed away. At that time there was no name

for a diet that did not use meat and because of the influence of Pythagoras this type of diet was known as a "Pythagorean diet" (Spencer 1995, 33).

Aristotle (circa 384-322 BCE) also understood the close similarities between man and animal when he famously described man as a "political animal" *(*Aristotle 1990, 6). Aristotle, however, did not believe that animals could think. They had in his opinion only sensation and hunger to guide their actions (Spencer 1995, 91).

Plutarch (circa 45-125 CE) was the first philosopher to defend animal rights on the basis of the feelings of animals. He stated:

> *"I am astonished to think what appetite first induced man to taste of a dead carcass or what motive could suggest the notion of nourishing himself with the flesh of animals which he saw, just before, bleating, bellowing, walking, and looking about them."* (Plutarch 2004, 9).

Plutarch clearly saw animals as feeling creatures that have rights. He also argued that if humans treat animals as inferior creatures and in cruel ways, this can lead to the cruel treatment of fellow humans (Plutarch 2004).

Porphyry (c. 232 - c. 304 CE), living several hundred years later, wrote the earliest surviving book about vegetarianism, *On Abstinence from Animal Food*, where he explicitly deals with the moral worth of animals, the effects of meat-eating on health, and the natural abhorrence of humans to meat (Porphyry 1965).

The rise of Christianity and its notion that creatures were created for humans to utilise made vegetarianism difficult to justify in the Western world in the centuries following its rise. Some have even gone as far as stating that from the times of Porphyry until the eighteenth century vegetarianism almost completely vanished (Walters and Portmess 1999, 12). This can be at least partly be explained by Christianity's strong distinction between humans and nature, as humans were seen as being created in god's image on earth. The Bible[5] also commanded man to

> "*Be fruitful and multiply; fill the earth and subdue it; have dominion over the fish of the sea, over the birds of the air, and over every living thing that moves on the earth."* (Bible 1996, Genesis 1:28),

[5] As there are many different versions of the Bible this text refers to the 1996 New English Translation version. The basic message of interest in here is similar in many Bible versions.

indicating that man is ordered to have mastery over the natural world. In the next sentence, "God" is quoted as stating:

> "*See, I have given you every herb that yields seed which is on the face of all the earth, and every tree whose fruit yields seed; to you it shall be for food."* (Bible 1996, Genesis 1:29).

This sentence has not, however, become as popular as the first one and for centuries the desire to have dominion over nature has driven humans in the Western World. The idea that humans have dominion over other creatures has been characteristic of the Christian world's treatment of animals (Fiddes 1991, 206). The Old Testament, which included Genesis, showed at least some concern for animal suffering, but the New Testament lacked any consideration of animal suffering or other animal interests (Singer 2002, 191). In particular, the New Testament can be interpreted in a way that "God's creatures" are created for man to use as he pleases (Thomas 1983, 24).

In the Renaissance era between the 14th and 15th centuries, some knowledgeable scientists noted the special role that meat, as food, played in society. With a growing interest in the ancient writings of the Greek philosophers, and a more open relationship to art and science, arguments around vegetarianism were further developed. One of the best known advocates of vegetarianism during the Renaissance era was Leonardo da Vinci (1452-1519), a known vegetarian, was the first to envision the world as totally vegetarian:

> *The time will come when men would look upon the murder of animals as they now look upon the murder of men* (Spencer 1995, 343).

This type of thinking clearly shows that, according to da Vinci's reasoning, there are steps in human development and humans will eventually broaden their moral circle to include animals.

Renaissance times might not, however, have been easy for the majority of those advocating animal rights. For example, philosopher, astronomer and mathematician Giordano Bruno (1548-1600) was burned alive for insisting that humans were worth no more than ants. Yet development did take place and for the first time in more than a thousand years, animals in the Western World were accorded spiritual values. (Spencer 1995, 197) At the beginning of the 16th century ideas about the world and technology started to develop at a faster pace as Galileo Galilee (1564–1642) revolutionised the existing world view with his heliocentric model. People started to believe that nature could be

explained with the help of physics and mathematics but this initially reinforced the view that human beings were above everything else in the world.

René Descartes (1596-1650) developed the Cartesian view of the world which claimed that souls and bodies are of different origins. Descartes was sure that only humans possessed souls and animals were just machines that had no feelings and could not feel pain (Walters and Portmess 1999, 47). Descartes founded his argument on the fact that animals did not speak and as such they were unable to communicate thought (Spencer 1995, 202). As such there was no need to treat animals well and this led to conduct that would not be acceptable by modern standards. Scientists for example nailed animals onto a table when they did research on them and explained that the sound that the animals made was just a reflex (Voltaire 1924).

This division which stated that only humans, especially men, had souls because they had been created to reflect God's image and that animals were nothing but matter was adopted by followers of the Cartesian view and this provided the moral basis for humankind's ascendancy over nature. Such segregation based on the concept of people having a soul was heavily connected to religion and especially Christianity. It is no wonder that the Western form of Christianity has been called the most anthropocentric religion in the world. (Noske 1997, 46) Whether or not anthropocentricism was the purpose of the original authors of Bible is not relevant here. What is relevant is the way the Bible was interpreted during that period (Thomas 1983, 25).

At the beginning of the 17th century, the world was about to change once again as Humanism and the Age of Enlightenment began their rise. John Locke (1632-1704) was one of the first scientists to break the Cartesian mechanistic view of the world. Locke was more in favour of direct observation and made his conclusions based on such observations. When he observed animals, he noticed that they had feelings and that they communicated with each other (Spencer 1995, 224). Locke preferred to examine the empirical evidence in an effort to discover to what degree animals may be capable of engaging in behaviour that required them to think on their own. (Locke 1690/2008, Essay II, 19). Locke thought that intelligent observations mark the distinction between animals and plants. Locke also noticed that the sensory abilities of each species are appropriate to the practical needs for that particular animal. Since there are such large differences between different people's intellectual capabilities, Locke speculated that the abilities of some animals may exceed those of the most empty-headed people (Locke 1690/2008, es. II 11-15). Locke also held the view that:

> "*Children should from the beginning be bred up in an abhorrence of killing, or tormenting any living Creature."* (Locke 1693/2008, section 116).

Locke thought that maltreatment of animals would lead to equally poor behaviour towards other humans.

At the end of the 18th century and the beginning of the 19th century, vegetarianism began to take root as one possible way of eating in Western societies. On the other hand, the rise of modern agriculture and the fact that more people lived in cities made it easier for humans to forget the role of animals in food production. Scottish philosopher, writer, and social critic John Oswald (1730-1793) points out very clearly the possible side-effects that witnessing the slaughter of animals might have on humans:

> "*From the practice of slaughtering an innocent animal, to the murder of man himself, the steps are neither many nor remote. This our forefathers perfectly understood, who ordained that, in a case of blood, no butcher, nor surgeon, should be permitted to sit in jury".* (Oswald, 1791/2008, chap. 27).

In this paragraph Oswald makes a direct link between brutality towards animals and brutality towards other humans. He also states that thinking upon this line was well acknowledged much earlier and that humans, at some level, acknowledge that butchering can be harmful to their morals.

One of the first philosophers of modern times to take animal issues seriously and put forward the possible perspective of animals was Jeremy Bentham (1748-1832). Bentham, who was one of the founders of modern utilitarianism, wrote probably one of the most well known and most quoted paragraphs related to animal issues:

> "*The day may come when the rest of the animal creation may acquire those rights which never could have been withholden from them but by the hand of tyranny. The French have already discovered that the blackness of the skin is no reason why a human being should be abandoned without redress to the caprice of a tormentor. It may one day come to be recognized that the number of the legs, the villosity of the skin, or the termination of the os sacrum are reasons equally insufficient for abandoning a sensitive being to the same fate. What else is it that should trace the insuperable line? Is it the faculty of reason, or perhaps the faculty of discourse? But*

> *a full-grown horse or dog is beyond comparison a more rational, as well as a more conversable animal, than an infant of a day or a week, or even of a month, old. But suppose they were otherwise, what would it avail? The question is not, Can they reason? nor Can they talk? but Can they suffer?*" (Bentham 1789/2008, chap. XVII, sec. 1).

In this text, Bentham introduced two very important ideas. First, he made it clear that it was not important how intelligent a creature was in determining how it should be treated. He also noted that no single characteristic of a being, such as the ability to speak, should be a determining factor in how we accord its status. In Bentham's opinion, an important factor was the capability to suffer; if a creature suffered when it was treated in a particular way, that type of treatment should no longer be conducted. This was a major development from Descartes' view of animals in which it was said that they could not feel pain. The second important factor in this text is that Bentham sees that there is social evolution taking place in society and that there will be a time when animals have rights. What Bentham understands with rights, though, is not straightforward. It has been claimed that by rights Bentham mainly refers to protection from human actions (Singer 2002, 8).

One of the first classic books on the subject of animal rights since the work of the ancient Greeks was published in 1894 by the great humanitarian Henry Salt (1851-1939). In his book, Animals' Rights: Considered in Relation to Social Progress, Salt asks:

> "*Have the lower animals "rights?" Undoubtedly, if men have… It is proper to forbid every kind of cruelty towards animals, whether by way of amusement, or to gratify gluttony. Cock fights, bull-baiting, hunting hares and foxes, fishing, and other amusements of the same kind, necessarily suppose either the absence of reflection or a fund of inhumanity, since they produce the most acute sufferings to sensible beings, and the most painful and lingering death of which we can form any idea. Why should the law refuse its protection to any sensitive being? The time will come when humanity will extend its mantle over everything which breathes...*" (Salt 1894/2008, Chap. 1).

Salt follows closely Bentham's ideas on animal rights in his writings by arguing that the pleasure that humans attain from their treatment of animals cannot be used to justify that treatment. In other words, when the utility of the human being is evaluated against the suffering of animals, it is clear that

animals should not be treated badly. Salt also follows in the footsteps of da Vinci as he states that in the future beings other than humans will be protected and valued as individuals.

To summarise, philosophical evaluations for the justification of eating other animals can be traced as far back as there is written material available. Discussions conducted in different eras reflect the positioning that humans have had towards nature and how they position themselves in the world. This development starts from the kinship arguments used in antiquity and moves towards emphasising the meaning of diet in relation to human character in the eighteenth century. In the twentieth century the perspective can be interpreted as moving more towards questions related to rights and a global perspective. (Walters and Portmess 1999)

2.3 The Current Debate around Meat Consumption

> "I am in favour of animal rights as well as human rights. That is the way of a whole human being."
> -Abraham Lincoln (1809 -1865) President of the United States

2.3.1 Zoocentric Arguments

In modern era questions related to the treatment of animals can be approached from at least three perspectives: the zoocentric, the biocentric and the anthropocentric. The zoocentric view is a philosophical perspective in which the issues, concepts and values of animals are central. Similarly in the biocentric view the issues, concepts and values of nature are important (Vilkka 1997). With regard to the zoocentric view, the debate concerning animal welfare or animal rights questions has intensified during recent decades. This modern debate can be seen as starting in the 1960s (Ryder 1989, 4). The philosophical argumentation around the issue gained its largest interest in the UK, in the form of debate in the so called Oxford Group that debated the status of animals. This group consisted of university members and it made Oxford the starting-place for the modern animal rights movement (Vero 2008). During that receptive time the Australian born philosopher Peter Singer published his book *Animal Liberation* (1975), which has been acknowledged by many as the starting point of the large scale animal welfare movement in Western countries. Singer brought to wide attention the importance of animals and he particularly emphasised the equal consideration of the interests of different animals. Singer used utilitarian arguments which traditionally argue that calculating the greatest amount of pleasure to be

gained for the least amount of pain would be the morally right course of action in any situation.

Utilitarian arguments, from the perspective of Singer and including animals, follow the reasoning that humans do *not* give moral value to other humans because they have higher intelligence (Singer 2002, 4). This becomes evident when it is considered that moral value is also given to humans with inferior mental capabilities, such as children and those who, for some reason, are handicapped. Moral value is also not given based on a person's capability to make moral decisions, because if this were the case value would not be given to people with a limited sense of morality such as criminals. According to Singer's arguments it is impossible to find any particular human capabilities that could justify the different treatment of animals that is practised in current societies (Singer 2002, 5).

From the utilitarian perspective of Singer the key factor of why humans give moral consideration to humans is that they can suffer (Singer 2002, 7). However, because animals can also suffer it would be illogical to treat other animals differently than humans treat the members of their own species, Homo sapiens sapiens. If humans would treat other animals differently they would be irrational and at the same time they would carry out speciesism. Speciesism is a term developed by Richard Ryder, who was a member of the original Oxford Group, in 1970 and it means the unequal consideration of interest based on the species of the creature (it is a term that is used in a similar way to racism) (Ryder 2009). Singer's argument is that when the utility of the animals is considered, their consumption as food is unreasonable from a utilitarian point of view. The suffering that an animal experiences in food production cannot be justified by human beings' preference for meat because the suffering caused to animals is too large when it is compared to the pleasure that humans feel when they are eating flesh (Singer 2002, 171). Singer, in other words, applies utilitarian (Benthamian) ideas to the case of animals. What Singer concludes based on the utilitarian view is that humans should transfer to vegetarianism as animals suffer in food production so much that the pleasure gained by humans when eating them does not compensate it.

The animal rights perspective entered the debate among the wider public after the utilitarian perspective. In his book *The Case for Animal Rights* (1983), philosopher Tom Regan develops the ideas of animal rights by claiming that non-human animals that are so-called "subjects of a life" are bearers of rights like humans. By "subject of a life" Regan means animals that have for example desires, beliefs and a sense of the future, which according to him many animals have (Regan 1985a, 243) Regan asks for the abolition of moral double standards, between humans and animals (Regan 1993). The perspective outlined by Regan, which takes into consideration the inherent

value of animals, has similarities with Immanuel Kant's perspective of inherent value. Kant did not, however, give inherent value to animals, but believed that animals have only instrumental value (Kant 1990, 126). From Kant's perspective humans have only indirect duties to animals, whereas Regan states that animals have inherent value and as such humans should not be viewed as having only indirect duties towards them (Regan 1985b). In other words Regan's perspective widened the Kantian argumentation and applied it to animals. The conclusion that Regan draws from his theory is that animals should not be used for food production and he therefore promotes vegetarianism (Regan 1985a, 350).

Many other perspectives on animal ethics have been developed. For example the Finnish animal philosopher Elisa Aaltola has presented several different types[6] of philosophical perspectives on animals (Aaltola 2006). These are partly developed or differentiated from the two main perspectives presented by Singer and Regan. Within, for example, the utilitarian and rights perspectives ideas can differ quite a lot, which becomes evident when the division of animal welfare perspectives presented by Sztybel (1998) is examined. Sztybel presents six different categories of animal welfare. The first category includes the so called animal exploiters´ animal "welfare" where the idea is that producers treat animals well because they need to maximise their income. The second category is common sense animal welfare, which is understood as what the average person considers to be the good treatment of animals. In this category, if animals get water and food and are treated in non violent ways their level of welfare is supposedly sufficient. In the third category, called humane animal welfare, only limited animal exploitation is approved (e.g. hunting is banned as is the farming of fur). The fourth category is the animal liberationists´ animal welfare in which only a very limited amount of animal exploitation is approved (such as laboratory animal usage, if new cures for deadly diseases are required). The fifth category is new welfarism in which the promotion of animal welfare is seen as a step towards a better world. The last category is the animal rights/animal welfare category in which the concern is the suffering of others and as such it is very close to the inherent value argument presented in the animal rights perspective.

In addition to the above, when one thinks about one's position towards animals it is important to also consider the capabilities that different animal groups have. For example from an animal welfare standpoint an important concept is the capability to suffer or to feel pain. Marc Bekoff, a biologist specialised in cognitive ethology, argues that animals do feel pain, and even

[6] These include the utilitarian approach, the rights view, contractual ethics, virtue ethics, coherentialism and identification ethics

animals like fish and lobsters have nervous systems that can and do feel pain (Bekoff 2007, 69). The way different animals react to pain can differ, but they do feel it and there are at least three arguments as to why this should be the case: Their reaction as they feel pain when hurt, the structure of their nervous system and the evolutionary usefulness of pain (Singer 2002, 235). Animal consciousness as a capability is much debated. Some researchers state that animals ranging from bees to dolphins are conscious. This has become more apparent with the advancement in cognitive neuroscience (Griffin 2001). Animals do also present a wide variety of emotions such as fear, love, grief, and even compassion (Masson and McCarthy 1995) and if these are qualities that one values then animals should not be harmed.

As the vast majority of animals used for animal production are mammals (cows and pigs), birds (fowl) or fish, the explicit line that is drawn between sentient[7] animals and non-sentient beings is not very relevant when evaluating current animal usage as it is usually considered to be somewhere around the evolutionary level of clams, oysters and mussels (Singer and Mason 2006, 276).

Different stages can be discerned in the categorisation of animal welfare. The levels in the categorisation can be seen as rising steps that lead to animal rights arguments as the arguments include stricter and stricter demands from the perspective of the animals. Different types of factors ranging from suffering to the inability to justify killing can be observed as the guiding principles of these different philosophical standpoints towards animals. As these standpoints are based on animal capabilities and qualities further development in human understanding of animals due to advances in science can have an influence on the human treatment of other earthlings.

[7] Sentience means the ability to feel subjectively

2.3.2 Biocentric Arguments

> "Until we establish a felt sense of kinship between our own species and those fellow mortals who share with us the sun and shadow of life on this agonized planet, there is no hope for other species, there is no hope for the environment, and there is no hope for ourselves."
> -Jon Wynne-Tyson (1924-) author, publisher, activist and pacifist

Advocates of biocentrism consider that all life is equally valuable. They do not limit their perspective to only life, but see the whole universe as valuable. The key idea of biocentrism is that humans or humanity are not centres of existence. In the biocentric world view humans are "just" part of the very complex network of life on planet earth (Zimmerman et al. 2001, 73-74). It also includes the belief that organisms have inherent purpose and humans are not incomparable creatures.

If one wants to understand the biocentric world view, one has to first understand the fact that humans are only one of the many animal species on this planet. This can, however, be very difficult for many because humans are often influenced so much by societies that people have the tendency to think that they possess the most perfect combination of capabilities of all species (Herder 1990, 34). This is of course not true since other animals can have capabilities that human beings do not possess and at the same time they have needs that humans do not have (Herder 1990, 35). The biocentric perspective does not only concentrate on animals, but takes a much broader perspective that also includes non-animal life forms. Based on that perspective planet Earth can be seen as a living organism as described in the Gaia theory (Lovelock 1979), or then the emphasis can be more about the value of life as such.

From the biocentric perspective how humans fill their daily calorie and nutritional needs, is extremely relevant because the production and consumption of food is one of the most polluting activities that we humans conduct. In the seventeenth century Thomas Malthus pointed out that food production would demand vast amounts of land if the earth's population continued to increase (Malthus 1798/2008). In the 1970s vegetarian diets began to be promoted in order to reduce the environmental effects of food production (Lappé 1971). Food production and consumption has many kinds of effects on both free living animals and plants as well as on soils, water and air. This becomes evident when the collective impacts during a product's life cycle are considered (Carlsson-Kanyama et al. 2003). Some researchers claim

that due to their large environmental effects food consumption patterns are at the core of all human ecology (Dietz et al. 1996).

The large environmental impacts related to meat as a consumption commodity include the large land areas required for pasture for herding animals or the area needed to grow animal feed (Schlesinger 1997, Tilman et al. 2001). Additionally, the production of meat needs energy during its different stages e.g. for the fertilisers used or irrigation (Pimentel and Pimentel 1996). Grain-fed beef is estimated to need thirty-five calories of fossil fuels for every calorie of beef (Horrigan et al. 2002). The share of meat production of the total greenhouse gases emitted is accounted to be 18 percent according to the most cited calculations published by FAO (Steinfeld et al. 2006). This amount has been however questioned and it has been stated that livestock and its byproducts would account for more than 51 percent of all man originated green house gas emissions (Goodland and Anhang 2009, 11).

The amount of water required to produce meat differs enormously globally and partly because of that estimating its actual usage is difficult. Estimates of water consumption per kilogram of beef vary from around 15 thousand litres (Chapagain and Hoekstra 2004, 41) to as high as 100 thousand litres (Pimentel et al. 1997). For the least water consuming meat, chicken, the estimate is four thousand litres per kilogram (Chapagain and Hoekstra 2004, 41). There are further pollutants involved, such as ammonia as well as various other emissions and wastes (Dietz et al. 1996). Meat consumption is environmentally unfriendly because of animals' inefficiency at converting plant protein into animal protein, which is estimated at about six kilos of plant protein needed to yield one kilo of animal protein (Pimentel and Pimentel 2003, 661).

When a plant based diet is compared to the traditional Western meat based diet studies confirm that the former is more environmentally friendly (Pimentel and Pimentel 2003, Baroni et al. 2007). The environmental unfriendliness of animal based products was also confirmed by the MIPS (material input per service) calculations made in Finland. These concluded that the lowest material efficiency was for products originating from animals (Kauppinen et al. 2008).

One very often used argument to promote the use of animals is that humans need this production to "save the animals" and that animal production can be efficient, for example, in pasture lands. When humans use animals in food productions they "give" them the possibility to exist and it is better for these animals to exist and then be butchered than not to exist at all. This argument is known as "the Logic of the Larder". It has been countered by arguing that humankind would actually save more animals by giving up animal farming,

because there would actually be more space for the wild animals (Matheny and Chan 2005, Matheny 2003).

Animal breeding has been guided by economic principles for most of the 20th century and the welfare of animals has not had much of an influence on that. Production animals are chosen because of their capability to produce meat or other "products" and they are deprived of their possibility to develop as creatures. This development runs contrary to the usual trend of nature, which is based on natural selection and evolution. It is not known if the Earth has already peaked in its complexity[8], but it can be argued that this development towards less biodiversity is not desirable, nor should humans accelerate it (Wilson 2002).

When one construes the evolution of life on Earth as an increase in complexity, then the increase in the complexity of human civilisation certainly represents its crowning achievement (Palmer 1993, 271). This, however, limits all other creatures' possibilities to promote their own evolution as they are denied space to grow and live in by humans. More complex animals usually need more resources such as space, a hunting ground and biological ecosystems supporting them in order to develop, and this is a relevant factor from the biocentric perspective when decisions about food choices are made.

2.3.3 Anthropocentric Arguments

> "The greatness of a nation and its moral progress can be measured by the way its animals are treated."
> -Mahatma Gandhi (1869-1948) political and spiritual leader of India

Anthropocentrism is a philosophical perspective in which the issues, concepts and values of humans are central. Humans are considered to be the centre of the world, of reality in this view (Vilkka 1997). Many opinions informed by the anthropocentric view have been presented with regard to animal issues. Due to the long history of development between humans and other animals their lives have become interconnected. However, human conflicted emotions regarding the utilisation of animals have always been a feature of this relationship between humans and other animals (Arluke and Sanders 1996, 187).

Before animals can be eaten, humans have to change their views about them so that they can be murdered and utilised. Humans fry, boil or grill animals before consuming them, and for example in the English language animal

[8] This might actually have happened millions of years ago (Ward and Brownlee 2002)

meats are not even called by their common names, e.g. the meat from cattle is called beef or veal and from swine it is called pork or ham. The transformation process from a living, feeling animal to a piece of meat is long and it has many steps. (Vialles 1994) To become food animals must be reconstructed as food. They must be "…*deanthropomorphized so that they become lesser beings or objects that think few thoughts, feel only most primitive emotions, and experience little pain.*" (Arluke and Sanders 1996, 173). This transformation of the human perspective of animals in order to be able to eat them can have profound effects on the human mind.

For example, Thomas Aquinas and Immanuel Kant long ago argued that violence towards animals can lead to violence towards members of one's own species (Regan 2001, see also the quotations of Locke and Oswald in chapter 2.2 of this work). Meat eating has also been linked to violence and wars (Patterson 2002). If humans accept that animals "need" to be killed so that they can enjoy a certain taste then this can lead to thinking that the suffering of others is justifiable as long as somebody receives pleasure as a result.

The relationship between meat eating and chauvinism has been extensively researched. It is claimed that patriarchal attitudes in modern societies are strongly linked to our meat eating practices (Adams 1999). This is, for example, outlined in the way that men can describe a woman by using terminology used by butchers e.g. "a piece of meat" (Fiddes 1991). The argument is that this form of patriarchal objectification makes the objectification of animals easier. Furthermore, if there is no equality among the genders there will be no equality between humans let alone other animals. This means that any increasing equality between humans and other animals will also increase equality between the different genders.

Meat eating has in its part been blamed for world hunger and social injustice (Lappé 1971). As presented in the previous chapter meat production is quite a resource intensive method of food production and because of diminishing fresh water resources throughout the world the transition towards a more meat based diet can mean more hunger. Thus, even though the world hunger problem is a very diverse one, covering for example political corruption, inadequate educational resources and overpopulation, meat consumption is an inefficient usage of resources and does contribute to hunger (Fox 1999, 96).

From the anthropocentric point of view, it has also been debated as to whether or not the vegetarian way of eating is actually a better option from the perspective of human health. Meat consumption has grown rapidly, which has been linked to the rise of many diseases (Key et al. 2006). However, no large differences in the health of vegetarians and omnivores have been detected (Sabate 2001).

2.4 Harm Benefit Analysis of Adopting a Vegetarian Diet

From the perspective of this work the arguments presented in the previous chapters may not be relevant as such for the consumers or decision makers. What may be more relevant for them is what would be gained and lost if they would change their behaviour in the case of meat consumption. When the benefits and harms of adopting a vegetarian diet are articulated to decision makers, consumers and other interest groups, it can make it easier to evaluate the consequences when they are divided into short term and long term effects presented in the form of a futures table (Table 1).

When the short term harms to humans in the specific case of excluding animal based food stuffs are considered, the harms include factors such as the need to learn new tastes and experience new food textures and the taking away from people of the possibility to act "traditionally" and see "traditional" fields and landscapes. Short term benefits consist of lessening the discomfort caused by animal treatment and by the exclusion of the direct health effects caused by e.g. pig manure to farmers and farm neighbours.

From the animal perspective the short term harms include losses for the animal breeds that would have been chosen as production animals by taking away from them the possibilities to enjoy life at least to some degree. On the other hand, benefits include the loss of at least some amount of the unavoidable discomfort that those animals would experience in the production system. In the long term the animal species that would otherwise have been chosen for breeding would disappear because their possibility to breed and produce descendants will have been taken away. Furthermore, in this case one's gain is another's loss, because if animals are used for food production on a global scale it means that there is less space for wildlife and less animal breed evolution can take place. That process would of course be reversed in a vegetarian society.

From nature's perspective continuing animal production maintains "traditional" pastures and gives certain animals an ecological living space. This type of "traditional" agricultural land area seems especially important to some environmentalists and they see it as a gain for nature. The benefits would include fewer emissions to water, air and land. From the natural perspective the long term benefits would include a gain in natural land and more diversity, which would occur when there are less monocultures.

Table 1 Futures table of some possible benefits and harms of the vegetarian diet, short and long term, in a modern country

		People		Other animals and nature	
		Producers	**Consumers**	**Animals**	**Biota (Nature?)**
Short term (0-30 years)	Benefits	Gaining mental harmony, less direct pollution (for example: ammoniac from manure), possibilities for new products	Lower energy prices, cheaper food, gaining mental harmony, less overweight people	Less acute harm to animals in production systems	Less acute pollution of water, air and land
	Harms	Loss of traditional habits and views, need to learn new practises, initial costs from new products, need to buy more fertilisers since they are not available from animals	Need to learn new tastes and textures, need to learn new cooking and eating practises, lower selection of food products, need to admit that previous generations have acted amorally, requirement to eat nutritional supplements (B_{12})	Fewer domesticated animals	Loss of some pasture, "traditional" countryside animals and plants
Long term (>30 years)	Benefits	Less threats to cultivated land	Less moral considerations about killing, more "natural" landscapes available, less global warming side effects, more food available	Gaining more wildlife animals as part of evolution in areas where more land becomes available	A more diverse selection of animals and plants, less eutrophication of waters, less global warming, less emissions
	Harms	Need to buy more fertilisers since they are not available from animals	Eating nutritional supplements (B_{12})	Loss of domestic animals that sustain their population	Loss of some biotas related to domesticated animals

The list presented in Table 1 is by no means exhaustive and more analysis is needed for possible other harms and benefits, both in the short and long term as well as different interest groups' perspectives on these harms and benefits. The important thing outlined in the table is to analyse not only the effects on humans but also on other animals and nature when the future outcomes of different actions are considered.

3 FORMULATING RELEVANT QUESTIONS

> "All progress depends on the unreasonable man. The reasonable man adapts himself to the world. The unreasonable man persists in trying to adapt the world to himself."
> - George Bernard Shaw (1856-1950) author

Finding relevant questions to study is the key to good and influential science. This chapter uses philosophical perspectives and sociological discussion to identify what such questions might be. The first sub-chapter presents Deep Ecological principles, which state that all life is valuable and asks humans to give inherent value to all animals and nature. This introduction is followed by an explanation of Deep Vegetarianism, which is based on Deep Ecological principles and analyses the moral basis of vegetarianism. Deep Vegetarianism emphasises that the human decision to eat meat is much more than just a dietary choice; it is also a choice in relation to deciding what one's position towards nature is. These concepts are then used to formulate the main research question. The second sub-chapter starts with an introduction to modernisation process as it is understood in this work and possible areas in which it might be taking place in Western societies. The chapter next presents the Ecological Modernisation theory that is widely used for analysing the transformations that are taking place in modern societies. The chapter presents the development that Ecological Modernisation theory has had after its initial introduction and some criticisms that it has faced. Based on the Ecological Modernisation concept more specific research questions were formulated and they are presented in the last sub-chapter.

3.1 Deep Ecology and Deep Vegetarianism

The Norwegian philosopher Arne Næss developed the Deep Ecological perspective in the early seventies with the core message being that all life is valuable (see Næss 1989). Deep Ecology states that because humans as a species have some special capacities, such as reason and moral consciousness, they also have a responsibility to secure the flourishing of other species (Glasser 2001, 4041). The principles of Deep Ecology state that humans should change their views from seeing nature as only a source of materials to viewing it more as a companion. For example the human ranking of animals is

not in this view possible as humans are not able to know what qualities are valuable to animals. The Deep Ecological principle criticizes the shallow environmental principles that emphasise anthropocentric values (Capra 1995, 20), which are often considered in the utilitarian perspectives.

Næss criticizes the Kantian way to give inherent value only to humans and asks for inherent value also to be given to other animals, as well as plants, landscapes and the whole planet (Cruickshank 2009, 103). As such Deep Ecology connects non-anthropocentrism with a strong environmental and social critique. Humans are seen as part of a larger system and it is thought that they should act accordingly in their daily lives. This perspective can be illustrated with the following example: If humans give inherent value to the panda, it would mean that it is not valuable only because it is valuable to humans but because it would have intrinsic value. It is important to note that differences occur in the way the panda is seen among those researchers who think it has inherent value. Others see the panda as a valuable creature which increases biodiversity and others see each panda as a valuable entity. As such intrinsic value is a very complex and much debated term (see Zimmermann 2007).

The solution to environmental problems according to Næss is not (only) technological development, but there is a need for people to ask deeper questions about their existence (Bodian 1995, 32). This principle of asking deeper questions, as opposed to shallow ones, requires taking into consideration the inherent value of nature and animals. Shallow questions consider nature valuable only from the anthropocentric point of view. The deeper questions that need to be asked include for instance, why are high levels of consumption so important? An adequate answer is not that abstaining from consumption would have negative economic consequences, but that there is a need to consider if our consumption fills the need for love, security and access to nature. There is also a need to consider if our consumption patterns are beneficial to all life on the planet. (Bodian 1995, 27)

It is important to make a distinction between Deep Ecology as a theory and Deep Ecology as a social movement. It has been argued that Deep Ecology is also a theory (Fox 1990), but in this work it is considered to be a social movement. The basis of Deep Ecology as a social movement consists of eight principles that form a platform. This platform includes normative claims about humans and their relationship with the environment (McLaughlin 1995, 85). These eight points are the following (Næss 1995, 68):

1. *The well-being and flourishing of human and nonhuman life on Earth have value in themselves (synonyms: intrinsic value, inherent worth). These values are independent of the usefulness of the nonhuman world for human purposes.*

This principle states that not only anthropocentric interests are relevant. Hence when making decisions the end result of their effects on other animals and nature should be evaluated. This is because there is good evidence available of the environmental consequences of meat eating and strong arguments in favour of giving intrinsic values to production animals. Adhering to this principle would lead to vegetarianism.

2. *The richness and diversity of life-forms contribute to the realization of these values and are also values in themselves*.

This principle asks for the ending of the use of only a small selection of plants or animals for food production. Monocultures as such are not beneficial from the perspective of this principle. When making decisions about (food) consumption it is thought that one should also consider its effects on the richness and diversity of life.

3. *Humans have no right to reduce this richness and diversity except to satisfy vital needs.*

This principle states that humans should limit their influence on natural systems and that humans should eat foods that are located on a lower level in the food chain as their influence grows and as they consume products from higher levels in the food chain.

4. *The flourishing of human life and cultures is compatible with a substantially smaller human population. The flourishing of non-human life requires a smaller human population.*

As the human species' population is expected to grow to nine billion by 2050 (United Nations 1999, 5) our consumption practices cannot continue as they are.

> 5. *Present human interference with the non-human world is excessive, and the situation is rapidly worsening.*

As there is more and more evidence, for example, about climate change it is obvious that humankind is taking risks by continuing its excessive overuse of natural resources and that this may have calamitous consequences (see Pachauri and Reisinger 2007).

> 6. *Policies must therefore be changed. These policies affect basic economic, technological, and ideological structures. The resulting state of affairs will be deeply different from the present.*

Environmental changes will probably change human practices more than it is currently possible to imagine. As such there is a need to identify influential policy factors from a very broad perspective, so that future influences can be anticipated and relevant actions taken.

> 7. *The ideological change will be mainly that of appreciating life quality (dwelling in situations of inherent value) rather than adhering to an increasingly higher standard of living. There will be a profound awareness of the difference between bigness and greatness.*

The food production sector has been dominated by growth and efficiency goals for the last decades and farm sizes and production amounts have grown at ever growing rates. Some notions exist that this could be slowly changing and that examples of such change would include the growing interest in organic foods.

> 8. *Those who subscribe to the foregoing points have an obligation directly or indirectly to try to implement the necessary changes*.

As there are possibilities that humankind and all other life will be faced with catastrophes in the form of climate change caused by environmental degradation and as the number of animals slaughtered in the agricultural sector are staggering action needs to be taken to avoid catastrophic consequences. The use of more efficient forms of food production i.e. not meat would help avoid such environmental degradation. For example in the US the amount of cattle slaughtered during 2005 totalled 32 million heads and the slaughter of swine totalled 104 million heads (USDA 2006). In 2008 about 9 billion poultry animals were slaughtered (USDA 2009). In Finland in 2005 the

amount of cattle slaughtered was approximately 300,000, the amount of swine 2.4 million and the amount of poultry 55 million (Tike 2006).

The deep ecological platform can be acknowledged as an attempt to spark large social changes in modern societies (McLaughlin 1995, 92). The platform does not give a precise description, as such, but it expresses important points which its followers accept (Næss 1995, 67).

Not everybody of course welcomes this type of world view. Deep Ecology has sometimes been seen as a dangerous movement and it has even been compared to Nazism (Ferry 1995). This is because it gives inherent value to nature and does not see humans as incomparable. These views have been heavily criticised and it has been stated that they lack the ability to show what the harm to societies would be if we gave inherent value to nature (Bratton 1999, 19).

There are debates about whether the deep ecological perspective can be linked to the animal rights discussion, where inherent value is given to animals (Zimmerman 2001). Others see this as an "*unholy marriage"* (Sagoff 2001) and others welcome the idea more happily (Callicott 2001). Differences in the interpretation of the goals in the animal rights and in the Deep Ecology movements can be found (Noske 2006). Others think that animal liberationists and environmental ethicists are on the same side of the transition. Some even go as far as to state that animal liberation is an environmental ethic (Jamieson 1998, 50). Some sociologists have stated that the animal rights movement is just one part of the environmental movement (Konttinen and Peltokoski 2004).

Based on the principle of Deep Ecology Michael Fox developed the Deep Vegetarianism theory, which made a clear link between the animal rights discussion and Deep Ecology (Fox 1999). Fox's theory similarly argues that as the deep ecological principle asks us to abandon our perspective of nature as only a source of resources we should also acknowledge that the human decision to consume meat is not just a dietary decision, but that it is also a moral decision which has an effect on our awareness of how we affect other beings on the planet. According to the Deep Vegetarianism theory the decision to consume a vegetarian diet would contribute to a better future for people and for the environment (Francione 1999). Based on material from historical, cultural and philosophical perspectives Fox argues that vegetarianism is not acceptable from the zoocentric, anthropocentric or biocentric perspectives (see chapter 2.3 of this work for the arguments used). Similarities with Fox' work and that of the anthropologist Nick Fiddes are evident. Fiddes argues in his study that meat as a product is a symbol of human dominance over nature and that abandoning its usage could have profound implications for the human perspective towards nature (Fiddes 1991, 233).

When applied to Deep Vegetarianism, the deeper questions principle advocated by Næss can be applied in the following form: Why do humans need to consume animals as food? The shallow answer would be that they taste good or that humans have always done it. When the deeper answer is considered it should be evaluated as to whether or not that consumption fills the need to give inherent value to animals, and whether or not the answer would be that;" there is no reason to consume animals as food". Thus, the shallow question from the environmental perspective (How can humans reduce the negative environmental consequences of meat consumption?) would not be sufficient or relevant from the Deep Vegetarianism perspective.

3.2 Modernisation and the Ecological Modernisation Theory

Human values and beliefs are constantly developing and these changes can have profound implications for human action. As values and beliefs develop they can act as driving forces for the modernisation of societies (Inglehart and Welzel, 2005). Modernists promote the idea that humans should become subjects and objects of modernisation, that is, they should change the world that is changing them and at the same time make the world theirs. This becomes evident for modernists as they look at past development which has been, for the most part, created by human action and acts as a proof for them that the future is there to be made. (Berman 1992, 33) This type of reasoning is very characteristic of Futures Studies (Bell 1997, Kamppinen et al. 2003) and this type of perspective is also promoted in this work. Modernisation is understood in this work as the idea that societies could be heading towards ever greater levels of development and civilisation. This would mean that it is likely that social and technological development will continue as human knowledge levels continue to increase.

As part of this development it has been argued that Ecological Modernisation would take place, meaning that the development in human capabilities could be seen as an answer to the environmental problems that the exponential growth of the human population and rising consumption rates have caused. Consequently, Ecological Modernisation can be described as both a theory of societal development as well as a political strategy (Varho 2007, 10). In its most basic form the aim of the theory has been described as a way "*… to analyze how contemporary industrialized societies deal with environmental crises*" (Mol and Sonnenfeld 2000, 5). The theory has been characterised as one where its proponents see continued industrial development as offering the best option for escaping ecological crises (Fisher and Freudenburg 2001, 702).

The Ecological Modernisation theory is over three decades old and was originally presented by Huber in the mid-eighties (1985, 1991). After its original introduction the Ecological Modernisation theory has gained much publicity and has been discussed extensively (Spaargaren and Mol 1992, Mol 1995, Mol 1997, Spaargaren 1997, Mol 2000, Spaargaren 2000, York and Rosa 2003). The theory has become very influential and it has been at the centre of environmental discourse since the 1990s (Varho 2007, 10).

The Ecological Modernisation theory has evolved since it was first introduced. This evolvement can be divided into three steps (Mol and Sonnenfeld 2000, 5). In the first stage of the development of the Ecological Modernisation theory, it was argued that environmental problems can best be solved through further advances in technology and industrialisation (Spaargaren and Mol 1992). Some think that market forces alone are capable of finding the most ecologically beneficial ways and others state that governmental interaction is sometimes beneficial (Jänicke 2008, 1). At the second stage of development more emphasis was given to the institutional and cultural dynamics that societies might develop to promote more environmentally beneficial practices (Mol and Sonnenfeld 2000, 5). The third phase of development can be seen as taking place in the transformation of consumption towards more environmentally friendly products (Mol and Sonnenfeld 2000, 5).

Much discussion about the nature of the Ecological Modernisation theory is available. Some argue that it is not a theory at all and others consider it to be *praxis* (Fisher and Freudenburg 2001, 703). Some authors state that the Ecological Modernisation theory is more of a tool that can be used to detect desirable and feasible paths for environmental reform (Christoff 1996; Dryzek 1998).

The Ecological Modernisation theory can be useful from two different aspects: descriptive or normative (Mol 1995). When approached from the descriptive direction the emphasis is on the development of society and the ways in which society is tackling the challenges that ecological distress is inflicting upon it. In the descriptive approach the emphasis is also on seeing the future development of the changes in society (Tirkkonen 2000, 45). The normative approach focuses more on showing the direction in which society or one of its sectors or systems should be developing (Tirkkonen 2000, 45). Even though there are some differences in these perspectives, it can be difficult to totally separate them from each other. Acknowledging this type of division when approaching the Ecological Modernisation theory can assist in understanding and accepting the theory or praxis debate.

There are many arguments about whether or not a phenomenon that could be called Ecological Modernisation is taking place at all. It has been for

example stated that Ecological Modernisation may be taking place in modernised countries, such as the Netherlands and Germany, but it is not a reality in less developed countries. A main criticism of the theory has been that it is usually not investigated on the macro level and when it is there is no evidence supporting it (York and Rosa 2003, 278).

While the Ecological Modernisation theory has been heavily criticised it has also been claimed that it can be very useful, because the theory can help us understand possible changes in the interaction between humans and the rest of nature and to better identify the needs for further development. What is suggested is that the theory needs further theoretical development together with further research in order to make it even more effective (Fisher and Freudenburg 2001, 707). It has, for example, been suggested that the Ecological Modernisation theory should be linked more heavily to other existing theories of historical development and social change (Buttel 2000, 64).

3.3 Concepts Guiding the Formulation of the Research Questions

Knowledge about the origins of human beings has been profoundly transformed during the last hundred and fifty years. The theory of evolution has changed the way humans should consider themselves to be located in the universe and the conclusion is that should be that humans are not some divine creatures. Human species, *homo sapiens sapiens,* is one species among other species and this inevitably leads to questions about suitable moral standards for the treatment of other species. With the mounting evidence about the vast environmental consequences of human meat consumption practices, especially in Westernised countries, social and political action is likely. As such Deep Ecology and Ecological Modernisation theory were considered as relevant starting points for the research. It has been previously stated that there is evidence of modernisation in line with Ecological Modernisation taking place in the animal sector. This modernisation process is stated to also incorporate an ethical aspect. (Roe and Higgin 2008, 251) The link between Sustainable Development and Deep Ecology has been previously made in the case defining preferable development paths in the academic field of Futures Studies (Kuusi 1996, 9-27). Because of the previous examples it was considered justified to link these two concepts in this work.

According to the American Association for the Advancement of Science (2009) a scientific theory is:

> "*a well-substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment. Such fact-supported theories are not "guesses" but reliable accounts of the real world."*

It is much debated whether it is possible to construct such theories in social sciences. According to some there are no "hard", predictive, theories in social sciences. Because human activity cannot be reduced to a set of rules there cannot be theories, because rules are at heart of theories. (Flyvbjerg 2001, 46) And because social science could not have theories in the same sense as natural sciences it cannot be predictive us such. It has been stated that the goal of social sciences should be, rather than to formulate theories, to answer the following questions (Flyvbjerg 2001, 60): *1) Where are we going? 2) Is this desirable? 3) What should be done? and 4) Who gains and who loses?*

The Deep Vegetarianism or Ecological Modernisation theories are not considered as theories in this work. Deep Ecology is understood here as a movement that has some theoretical foundations and it was used as a roadmap in order to provide some directions for society to develop in, if its principles were considered. It can also be used to formulate deeper research questions. Deep Vegetarianism was treated as a collection of arguments as to why modern societies should develop towards vegetarianism. The main research question was formulated by observing the arguments in Deep Ecology. The question deemed to be of utmost importance was; What is the key change needed, if development towards people giving inherent value to animals and nature is to be actualised? To this question the answer was considered to be abandoning meat eating (see Fiddes 1991; Ryder 1989; Fox 1999). Deep Vegetarianism argumentation was used for checking and consolidating the importance of the main research question. The Ecological Modernisation theory was considered as a tool that can be used to detect feasible and desirable development paths from the environmental perspective. In order to formulate the specific sub-questions the knowledge gathered during the development of Ecological Modernisation was utilised.

The main research question is: **Is Finnish society heading towards a vegetarian future?** This question was approached from two perspectives: Firstly, historical information regarding changes in the number of vegetarians and total meat consumption amounts from large quantitative datasets were analysed. Secondly, the possibilities for such development in the future was outlined through the utilisation of expert information. Such an approach is in line with the four steps that are one way of performing research in Futures Studies: The first step is to analyse the recent and the present, the second step

is to project possible future developments, the third step is to analyse the possible actions to be taken and the last step is to evaluate the most desirable development path (Bell 1997, 12). Consequently, the more specific research questions asked in the different articles are the following:

1. How has the number of non-meat consumers developed in Finland?
2. How many vegetarians are there in Finland?
3. What factors may affect meat consumption in the future?
4. What are the consumers' and experts' perspectives on the need for change in meat consumption?

As such this work has the underlying idea that different scientific disciplines are suitable for different purposes. The strength of the use of philosophy is in its ability to explain the world and in the forming of arguments for how things should be. This is especially the case around the issue of interaction between humans and other animals as the argumentation so far has been very much led by philosophers (Ryder 1989, 6). As this is research belonging to the social sciences and especially Futures Studies this thesis is more suited to describing whether the changes asked by the philosophers are taking place and in what ways this transition could be promoted. It is not the purpose of this work to try to show that the arguments presented in the Deep Vegetarianism principles could result in a movement towards vegetarianism, but to investigate whether this kind of change is taking place and by what means it could be accelerated. As this work promotes a belief in modernisation it also promotes the idea that the future is there for people to make.

This work analyses whether there is a change towards vegetarianism and if there is a change towards the situation outlined in the Deep Ecological platform. This has been done by analysing whether there has been any development in the number of vegetarians and discovering what the possibilities are for increasing their number in the future. As such this work benefits from the development of the Ecological Modernisation theory. In this thesis both descriptive and normative perspectives of the theory are utilised. The figures for the changes in the total amount of meat consumption are presented and from the normative standpoint the possible areas in which vegetarianism could be advanced are examined. In addition different consumers' views about preferable and probable future images regarding meat consumption are identified in order to find ways that would allow these images to be influenced.

The purpose of utilising Deep Vegetarianism and Ecological Modernisation theory in this work was to have a starting point from which to analyse whether or not contemporary societies are starting to give inherent value to nature and

animals and if not, the follow-up aim was to present ways so that this could be enabled in the future. From the principles of Deep Ecology this work draws on non-anthropocentrism, man's responsibility for other living species and the intrinsic value of other life forms and this is seen as one driving force that could enable a vegetarian world and provide justification for this work. Similarly to the Ecological Modernisation theory technological development is seen as a driver of modernisation, but at the same time it is acknowledged that social and cultural innovations are also needed.

In the case of meat consumption it is assumed that the actualisation of Deep Vegetarianism would mean that within a certain time span meat would be excluded from the human diet. The assumption is that there would be a growing number of vegetarians and that the development of institutions, social practices, technologies and human values would enable such a change. Together these principles provide the Deep Modernisation standpoint that this work promotes.

4 METHODOLOGY AND RESEARCH MATERIALS

> "You can use all the quantitative data you can get, but you still have to distrust it and use your own intelligence and judgment."
> - Alvin Toffler (1928-) writer and futurist

This chapter presents the main methods used in this research. The chapter starts with an introduction to trend analysis that was utilised in the first part of the research. In this sub-chapter the emphasis is more on the difficulties of identifying and utilising the data than on the actual calculations. This perspective was chosen because the former were the main responsibility of the author during the research process. This is also the step in a research process which in the author's opinion does not usually get adequate attention i.e. the identification of the secondary data and an analysis of its suitability regarding the research questions. The first sub-chapter also discusses the data used. The second sub-chapter presents the methodological framework used in the research. This framework was used in different parts of the research for example in helping in the selection of the experts, in the interviews to broaden the expert answers and in the categorisation of the factors included in the future images. As there is such a close link between the framework and the futures table method and scenario process utilised at the end of the work, these methods are also presented here. The third sub-chapter presents the expert interview method and the ways in which it was used in this research. The last sub-chapter presents the combination of the methods used in the research and their contribution to the whole research process.

4.1 Trend Analysis

Some of the most basic methods in the economic and social sciences which gather information about the future are trend analysis and trend extrapolation methods (Metsämuuronen 2005). The basic idea in trend analysis is to observe a pattern in the utilised time series data, which consists of multiple observations taken over time (Williams and Monge 2001). In social sciences this data can include social statistics, which can be gathered by polling or observing a group of people. Often when utilising trend analysis in social

sciences, the secondary analysis of survey data is used. Secondary analysis can be defined as the further analysis of an existing dataset. These analyses can present knowledge, interpretation or conclusions that are additional to or different from the first analysis (Hakim 1982).

Some of the advantages of using secondary analysis include its potential for resource saving and its ability to go around data collection problems (Kiecolt and Nathan 1985). When using large national survey data the questionnaires have often been developed and tested by very qualified groups of researchers and the data gathering has been conducted by experts. Other reasons for using secondary data include the ability to provide data consistency over many years, have a large sample size and gain a representative national sample (Dale et al. 1988).

When estimating changes in very long time periods, there often is no ready-made time-series. In this case it is possible to link data from several different archival sources (Dale et al. 1988). Hence it is important to try to find similar types of data and try to be explicit about the data sources, if multiple data sources are used. Furthermore, if the data has been gathered by some other actor it can be that utilising that data is not straightforward. Raw data may not be accessible or many preparatory actions may be needed before it is usable for a different research purpose. In order to use secondary data at least three steps must be completed (Kiecolt and Nathan 1985). Firstly, the data needs to be located. Secondly, the data needs to be evaluated. Thirdly, it needs to be verified.

When using secondary data the location of a suitable dataset is critical. This usually means that a researcher needs to contact different institutions that may have suitable datasets and try to evaluate with limited access to the data its suitability for his/her own research. Because the researcher is not able to influence the questions utilised in the data collection process, he or she may be required to use long periods of time to find relevant datasets that are also of good quality. Even when the data has been located one usually needs permission to utilise the data and sometimes the people originally responsible for the data collection, the primary researchers, can be reluctant to share their data (Kiecolt and Nathan 1985) and this can influence the formulation of the research questions. The researchers involved in the data collection may also have their own research interests that need to be acknowledged when the final adjustments to the research questions are done.

After the data has been located and is ready to use the researcher needs to evaluate its quality. Very often the evaluation of the errors made in the original surveys such as survey non-response, item non-response, measurement error, instrument error, interviewer error or respondent error are no longer visible (Kiecolt and Nathan 1985). Usually, the secondary data is

not exactly suitable for the research questions and they then need to be fitted to the data.

After the evaluation, the data needs to be verified, which means that it is observed from the point of view of its suitability after the calculations have been made. When a researcher for example wants to study a specific subpopulation there may be few cases for data analysis. In such a case the pooling of survey data is an option. Pooling can reduce the sampling error by increasing the sample size (Kiecolt and Nathan 1985).

The sample characteristics can be described for example in terms of mean and standard deviations for the continuous variables, and frequencies (percent) for the categorical variables. Prevalence estimates adjusted for age, gender and the year of the study can be estimated using a linear model (Cohen and Cohen 1975).

There are many more complex ways to estimate future developments than trend analysis, but sometimes the difficulties with these models are that they are not very transparent. As the models become more complicated it also enables the use of these models as instruments of authority, since not all actors have a similar understanding of these models (Luukkanen 1994).

In this research the goal was to use the secondary datasets to identify changes in meat consumption and in the decision not to consume meat. It is well known that consumption practices differ among different consumer groups (Warde 1994, Räsänen 2003). It is also known that different socio-demographic variables influence human food consumption. These include for example income level, sex, marital status, educational level and age (Toivonen 1997, Kearney et al. 1999). These variables also affect human meat consumption and attitudes towards meat (Guenther et al. 2005; Verbeke and Vackier 2004). Previous studies have identified vegetarians as likely to be female, well educated and living in the larger cities (Keane and Willets 1996). It is also often assumed that there is a higher prevalence of vegetarianism among women because of the perceived masculinity of meat as a food (Twigg 1983). A better understanding of these personal and socioeconomic variables behind consumer behaviour is crucial if effective actions are to be taken to guide dietary change (Kearney et al. 1999). This is especially true in the case of meat consumption as consumers' perspectives of the importance of meat vary so much and range from its supply of iron to the more general idea of its overall necessity to the human diet in the different socio-demographic groups (Lea and Worsley 2001).

To the author's knowledge there is no long-term data available in Finland that would contain information about the vegetarian status of consumers. It also became evident during the research process that vegetarianism was a term that different people and interest groups understood very differently. For these

reasons it was decided that non-meat consumption, meaning that consumers who do not buy meat, could be used as a proxy when estimating the trend in abandoning meat eating. The data for examining this type of change is available in the Finnish Household Budget Survey[9] gathered by Statistics Finland. This data is especially suitable as it is available for a relatively long time period, in fact the first Household Budget Survey was gathered in 1966 (STAT 2008). In this research all the available datasets were used from years 1966, 1971, 1976, 1981, 1985, 1990, 1995, 1998, 2001 and 2006. The older data sets from the first four studies are not fully comparable with the later surveys and they were only used in part of the study. There are also some limitations with the data, such as the fact that single households, as well as households in the lowest income groups are underrepresented in the data (Räsänen 2003, 130). This limitation was tackled by using a weight coefficient in the statistical analyses of the Household Budget Survey data.

The Finnish Household Budget Survey data is gathered by interviews, diaries and purchase receipts kept by households (STAT 2008). As the data does not have information about food stuffs eaten in restaurants or elsewhere outside homes it is not quite clear what foods people actually consumed during the research period. The data is also problematic because there are categories for readymade foods that may or may not have meat in them, such as pizzas. The logic was that people who do not pay for any clean meats or meat products (such as sausages) during the time examined are more likely to be non-meat consumers. As the main reason for executing the analysis of non-meat consumption was to see if there were any trends this was not considered a problem.

It was evident at the beginning of the research that the prevalence of vegetarians on a national level was not very high and large data sets were needed if the socio-demographic factors related to vegetarians were to be investigated. The National Public Health Institute gathers information about the vegetarian status of people as a part of its very large health surveys. Even though the datasets gathered by the National Public Health Institute are quite large, the pooling of the data was considered necessary in order to obtain substantial research material. To obtain a large dataset the research utilised the latest available datasets from FINRISKI and the Health 2000 Health Examination Surveys. FINRISKI research data was utilised from the years 1997 and 2002 and the Health 2000 data was gathered in 2000 and 2001. The 1997 study sample comprised 12,500 persons aged between 25 and 74 years. The main data comprised 11,000 people and it was gathered by utilising

[9] Previously known as Finnish Household Expenditure Survey (this name was also used in Article I)

stratified random samples drawn from five areas in Finland. Of the 11,000 people chosen for the sample, 7,159 (65 %) people participated in the study. A further random sample of 1,500 persons aged between 65 and 74 years in two administrative areas in Finland was also included, and 1,288 (86 %) of them participated in the study. In total, data for this research was available for 8,477 persons (Vartiainen et al. 1998). The research questionnaire that was used as research material in this study was filled by people in their homes before they arrived for health check-ups.

In the Health 2000 Health Examination Survey the sample was comprised of 10,000 people. Out of the participants in the age group 30 years and over, 89 percent took part in the home interviews and among the age group 18 to 28, the total was 80 percent. In total, data for this research was available for 6,366 persons. The research was done in eighty different regions in Finland, containing 15 larger cities. The interviews were conducted between August 2000 and February 2001 (Heistaro 2005). The research questionnaire that was used as research material in this study was filled by professional interviewers from Statistics Finland based on the answers given by the respondents during the home interviews. In addition, Food Frequency questionnaires were filled by the informants after the interviews (Aromaa and Koskinen 2004).

In the FINRISKI 2002 research the sample was comprised of 13,437 persons of which 9,581 (71%) people participated. Of these, 8,799 people filled the research questionnaire and participated in the health check-up and only 782 returned the research questionnaire. Between 73.7 and 67.3 percent of the people invited to take part participated in the research. The amount varied according to region and the person's gender. The research was conducted in six different regions in Finland. The main research material consisted of people aged 25 to 64 years. In addition, a sub-sample of the population aged 65 to 74 was drawn from three survey areas. The research was implemented between January and April 2002 (Laatikainen et al. 2003). The filling in of the research questionnaire followed the same procedure as in FINRISKI 1997.

By combining these three datasets there was data available from a total of 24,044 individuals. As such the pooling of the data was justifiable as the data was gathered by the same institution and the data gathering methods were well outlined. However, there were differences in the wording of the question related to the vegetarian status. Also the FINRISKI food frequency section included forty foods or food items, while the Health 2000 included 128 food items. As such these limited lists can only give a limited view of food consumption practices.

In this work two large secondary datasets were used to identify possible trends in the development of the prevalence of non-meat consuming

households and vegetarians. In the location process time consuming sidesteps were taken by acquiring datasets that in the end proved to be of low quality because the datasets were not gathered to answer the research questions formulated by the researcher. These datasets were not then used. Consequently, there was even some need to adjust the research questions to suit the good quality data available.

4.2 Tracking the Decision making Landscape

> "There are times when a battle decides everything, and there are times when the most insignificant thing can decide the outcome of a battle"
> -Napoleon Bonaparte (1769-1821) French general, politician and emperor

Trend analysis does not necessarily give a correct outlook of the future. This can occur if no developments in the factors affecting the trend are included in the trend analysis. Usually some way of gathering information about the possible factors influencing the issue at hand can make the estimates of future outcomes more realistic. In this research the STEEPV-framework (i.e. Social, Technological, Economic, Environmental, Political and Value-based – STEEPV) was used to identify relevant factors in the decision making landscape. STEEPV analysis is a method that can be used to clarify a phenomenon's current and future condition (Rubin 2003, 897). As such it can be described as a classification method that can be utilised when mapping the relevant factors that may influence an issue in the future (Metsämuuronen 2005, 301). The STEEPV method evolved from ideas developed by Johnson Research Associates in the early 1960s because there was a need to have a tool that would help in identifying the decision making landscape. The method was first developed as the STEPV framework in the early 1970s. This process was extended in 1975 into STEEPV (Loveridge 2006).

A close link between the STEEPV-framework and the futures table method can be observed. (Metsämuuronen 2005) The futures table is a method that can be used to classify information of relevant factors that may influence the future and their realisation possibilities in a table format (Metsämuuronen 2005, 292). This method can be used for example by a group of experts that collect ideas about possible futures for the table, and which then uses them as the basis for building future images (Rubin 2003, 904). As such the futures table and STEEPV can give a very static view of the future as they do not have the dynamic qualities that for example scenarios have (Metsämuuronen 2005, 295).

In this work the characteristic of futures tables only giving a static view of the future was tackled by developing an additional generational perspective.

The idea was to identify factors that first and second generations could see as benefits or harms regarding the issue. The idea for this was generated because generations can forget some factors of an issue and on the other hand some aspects of a change can be easier for a second generation as they have not learned certain practices and therefore there is no need for them to give up former practices. As the first generation thinks the change from the perspective of the second generation it can also open new perspectives on the issue. Limiting the number of possible factors that may influence the future can be another problematic factor when using the futures table method as there is an infinite number of factors that influence the future (Metsämuuronen 2005, 295). However, this characteristic of the method can be tackled by combining a large expert Delphi with the utilisation of the futures table. The futures table was also used at the end of the research, so that all the information gathered during the research process could be used when employing the method.

One way to gather relevant information for the futures table is to use a backcasting method as starting point. In backcasting the idea is to first envision a desirable future and then track actions that would lead to that particular future state. Backcasting is a suitable method or approach for situations where desired change is complex (changes are needed in many sectors and levels) and the changes needed are major. Also the time horizon for the changes should be long enough to allow for large changes to take place. Backcasting is a suitable method for use, when current trends lead in the opposite direction to the desired vision. (Dreborg 1996) The purpose of the backcasting approach is not to introduce the most likely future, but to illustrate the feasibility of a certain future (Robinson 2003). A backcasting method was used in this work in combination with the futures table method and the STEEPV-method.

The STEEPV categorisation is a rough tool, but it can help in diversifying the perspectives on an issue that needs to be examined from multiple perspectives. Due to the fact that there is an infinite amount of possible factors that can influence consumer decisions some method is needed in order to organise the available information into categories that can be more easily understood and handled. STEEPV is one framework that allows a critical analysis of current and possible future factors affecting an issue in society related to different aspects of reality. Criticism of this type of categorisation is that it can limit creative thinking because it directs ideas towards some areas and not others (Ritchey 2008, 5). This problem can be overcome by giving users the possibility to first give ideas without limits and when this process slackens, offer the STEEPV as a possible source for developing further ideas.

4.3 Expert Interviews

> "If the world should blow itself up, the last audible voice would be that of an expert saying it can't be done."
> -Peter Ustinov (1921 - 2004) actor, writer, dramatist and raconteur

The Delphi method is traditionally seen as a forecasting method that utilises expert information. Even though some state that the origins of the method date from the early part of last century (Churchamann 1948 according to Metsämuuronen 2005, 282) most sources state that the method was developed in the 1950s by Dalkey, Helmer, Gordon and Kaplan in the Rand Corporation (Sackman 1975, xi). They published the idea in the 1960s (Dalkey and Helmer 1963). The Delphi may be defined as a group communication process method through which experts can deal with a complex problem (Linstone and Turoff 1975, 3). In other words the idea is to carefully collect a knowledgeable and relevant group of experts and let them answer questions in two or more rounds in order to collect future oriented information. Traditionally the purpose has been that the experts learn from each others' arguments and then they can reach and form a better perspective on the future. Delphi has been described as a last resort method that is used when traditional forecast methods such as trend analysis are regarded as insufficient. It is also suitable when intuitive changes are expected to occur in an examined situation (Linstone and Turoff 1975, 4; Tapio 2002, 60).

Originally the target of the Delphi process was to reach consensus on an issue. After its original introduction, the method has been developed in many different directions. The policy Delphi was developed to obtain more diversity for the final outcomes of the method and to allow opposing views to be included in a policy issue (Turoff 1975, 84). Other examples of the development in the method include the so called Argument Delphi (Kuusi 1999), where the interest is more in the arguments used by the experts than in the final outcome, and Disaggregative Policy Delphi (Tapio 2003), where the goal is to see a diversity of perspectives. One Delphi method that collects this type of non-consensual information during the process was already developed in the 1970`s (Tapio 2002, 63). In the Disaggregative Policy Delphi, cluster analysis is used as a tool by which the quantitative answers given by the experts involved are clustered and these clusters are then used as a basis for the different scenarios. The method can be used to collect the different perspectives that experts have about a specific issue (Rikkonen and Tapio 2009).

The Delphi method was chosen as the main method for the second round of this research because of its strengths in finding turning-points that are not visible, when only using trend material. Secondly, in bringing information and perspectives not pre-thought to be evaluated by other experts. Thirdly, because it can help in avoiding authority problems and enable broader perspectives to be considered because it is a process carried out anonymously. Finally it is also used because of its ability to connect qualitative and quantitative material. (Metsämuuronen 2008)

Critical phases in a Delphi study include, for example, the selection of experts for a panel and the selection of questions for the first round of the Delphi in question (Sackman 1975, 35; Metsämuuronen 2008). Many different methods have been developed for selecting experts for the interview. For example in the snowball method the first expert can nominate the second expert and so forth. The problem with this type of selection method is that the selection of the first expert can be crucial. The novel idea developed in this study was to utilise the STEEPV-categorisation in the selection of the experts. In this method researchers in the project could recommend experts for different categories of STEEPV and then in a group selections were made according to the expertise level of the person. The research team presented appropriate experts for the different categories; researchers; people belonging to nongovernmental organisations (NGO), civil servants and politicians; and corporate representatives. The diversity between the views was kept and promoted by selecting experts from different age groups, from different educational backgrounds and from among both genders. The idea was to collect a group of experts that were not like-thinking individuals but represented different areas of thought. This method was named the STEEPV-Delphi.

To tackle the problem of formulating unsuitable questions in the first round the experts were presented with the historical trend material for the consumption amounts of different food products[10] per year per person in Finland for the last hundred years. They were then asked to sketch how the consumption would continue in probable and preferable cases. The experts were asked to evaluate the possible directions of the trend in preferable and probable futures up to the year 2030. Of special interest to the researcher were the reasons that the experts gave for the possible developments they sketched. If there were difficulties in attaining explanations, the experts were asked to use the STEEPV classification to think about possible factors affecting the development of future consumption patterns. Formulating strict questions in

[10] These included different grains, milk, fresh fruits and vegetables, potatoes, sugar and different meats

the first round was avoided, because the intention was to generate a very broad perspective of possible factors that might influence the question in hand. In other words semi-structured interviews were utilised and trend material was used as a basis for the interviews. The main interest was what kind of trend levels the experts saw as preferable and probable, but of even more interest were the factors that might influence the trend.

In the second round the experts were presented with the factors affecting consumption which had been obtained during the first round and they were asked to evaluate the factors' importance. The second round was carried out with the Webropol-Internet service. The second round included questions that aimed to elaborate upon the answers given in the first round of questions regarding the factors seen as affecting food consumption. Three factors from the categories of economic, social, technical and environmental, and ethical were presented in the first round and were chosen for the second round questionnaire. There were many factors that were left out of the second round questionnaire because factors affecting meat consumption were only part of that questionnaire. Based on the second round questionnaire future images were constructed with the help of cluster analysis and the quantitative analysis was combined with qualitative material in order to make the future images livelier. The Delphi method used in this research has close similarities with the Disaggregative Delphi method developed by Tapio (2003).

4.4 The Combination of the Methods Used in this Research

> "Not to be absolutely certain is, I think, one of the essential things in rationality."
> -Bertrand Russell (1872 - 1970) philosopher, historian, logician, mathematician and pacifist

In Futures Studies the methods can be divided into three categories: trend analysis, expert information and multivariable methods (Millett and Honton 1991). Many other types of divisions can also be presented. (Masini 1993; Malaska and Mannermaa 1985) In order to gain a broad understanding of previous development and also a better perspective on future possibilities, a multi-method methodology was adapted in this research.

When generating future oriented knowledge, it is important to first try to track the historical development so that the preknowledge that the researcher has can be ratified (see Table 2.).

Table 2 Methods used and their contribution to the research

	Methods used	**Research perspective**	**Research focus**	**Why?**
Article I	Trend analysis	Historical development (1966-2006)	Finland	To understand the development and the connection to other trends
Article II	Statistical analysis	Recent past (1997-2002)	Finland	To understand where we are
Article III	Trend analysis Expert interviews Factor analysis	From past to futures (1900-2030)	Finland/ Western countries	To understand the possibilities in front of us
Article IV	Delphi Consumer survey Cluster analysis	Futures (2005-2030)	Finland/ Western countries	To understand where we may go
Sub-chapter 5.6 of the introduction	Backcasting Futures table with generational perspective	Futures (2005-2055)	Finland/ Western countries	To outline ways in which to reach the preferred future and to open discussion of the ways in which to reach it
Introduction	Literature research Conceptual development	From past to futures (3000 BCE-2055 CE)	World/ Finland	To formulate and sharpen the research goals To analyse the desirability of the path and analyse who would gain and who lose

In order to sharpen the preknowledge that researchers usually have, in the social sciences, statistical information can be analysed to gather a more scientific perspective of the historical development of an issue (see Article I).

To strengthen this perspective a review of the relevant literature can be used to gain a broader understanding of the factors affecting a historical development. Usually it is beneficial to use time series data when analysing historical development and this usually means that finding applicable sources of secondary data become the key factor. Once a researcher has knowledge about a historical development, it is then important to try to observe the current situation. This can be done by combining qualitative and quantitative information (see Article II).

The perspective in this research was that certain types of research questions can be best answered by applying different types of material that have been gained through different research methods, both qualitative and quantitative. The future part of this research utilises material that is more qualitative and more descriptive. In the quantitative part of the future oriented articles the qualitative data are used to open up the perspectives of possible futures that the experts see as relevant (see Article III). The future oriented part of this has been conducted in order to allow policymakers and other relevant actors to see possible future outcomes and use those extrapolations in their decision making (see Articles III and IV).

Sub-chapter 5.6 of this introduction presents additional research to the previously published articles. The backcasting method is used to outline three different scenarios of how to reach a vegetarian Finland in the next 50 years. Backcasting was chosen as a method for this part because of its particular suitability in finding normatively ways to reach preferred future (Robinson 1982). As so often the outcome of doing futures research scenario work was considered to be the best way to conclude the analysis that started by analysing the historical and current situation. The backcasting was done by using futures tables with a generational perspective. After the future possibilities were analysed the scenarios were formulated in order to stimulate debate about the desirability of the outlined futures. As a Finnish futurist Mika Mannermaa once stated: *A futures study which does not have any kind of direct or indirect impact on the development of society is totally useless, and cannot really be called a futures study* (Mannermaa 1986, 662).

5 TOWARDS A VEGETARIAN FUTURE?

> "Civilization advances by extending the number of important operations which we can perform without thinking of them."
> -Alfred North Whitehead (1861-1947) mathematician, philosopher

This chapter presents the main findings of each individual research article from the perspective of the whole work, each in its individual sub-chapter, and connects the findings into a larger perspective. The first sub-chapter analyses the trend in the total amount of meat consumed in Finland from 1900 to 2005 and the number of non-meat consuming households from 1966 to 2006. The second sub-chapter presents the current number of different types of vegetarians. The third sub-chapter analyses some possible reasons why the intentional transformation towards vegetarianism has not taken yet place at a larger scale in society. In the future oriented part of the chapter, starting from the fourth sub-chapter, some examples of the institutional development that has already taken place are first presented. Then the factors identified by the experts that may affect meat consumption in the future are presented. The fifth sub-chapter presents what kind of future images experts and consumers currently have related to meat consumption. The last sub-chapter draws together the information gathered during the research process and presents specific scenarios how one particular future image, the vegetarian one, could become reality.

5.1 Trends in Meat Consumption (Article I)

The growth of meat consumption in the Western world has been very rapid mainly because of the development of agriculture during the last hundred years. In 1904 Britain was an average consumer and used about 45 kilograms of meat per year as compared to 55 kg in the USA, 37 kg in Germany and 30 kg in France (Franklin 1999, 150). In the year 1900, meat consumption in Finland totalled about 45 kg (Laurila 1985). Before that the consumption might have even been smaller as it has been estimated that from 1831 to 1840, the average Briton ate only 32 kilograms of meat per year (Perren 1978).

In the year 2002, the average Briton consumed 80 kilograms of meat in comparison to 124 kg in the USA, 82 kg in Germany and 102 kg in France (FAOSTAT data 2005). However, in Finland the growth has been more

modest and meat consumption in 2002 was about 67 kilograms (FAOSTAT data 2005). Per capita meat consumption was about 30 kilograms per year in Finland until the beginning of the 1960s, with the exception of the Second World War (see Figure 1.). The main meats in Finland have traditionally been pork and beef and only very small amounts of mutton, although horsemeat, reindeer meat and game have also been consumed. Poultry entered the Finnish markets only at the beginning of the 1970s. After the 1960s agricultural production became more efficient and in particular pork production increased rapidly. This was partly because new processed foods and canned foods entered markets and partly because reduced production costs, influenced by increasingly industrialised agricultural production methods and more efficient fertilizers, permitted higher yields of the grain used as pork fodder.

Pork has been the main source of meat in Finland because beef has been mostly obtained as a by-product of dairy production and beef production as a separate production has been almost nonexistent (Maula 1995). As a result of their very cheap production costs the consumption of poultry has grown very rapidly and is already almost as high as beef consumption. Another reason for the rapid growth in poultry consumption is that it is seen as a healthy and low fat option (Maula 1995).

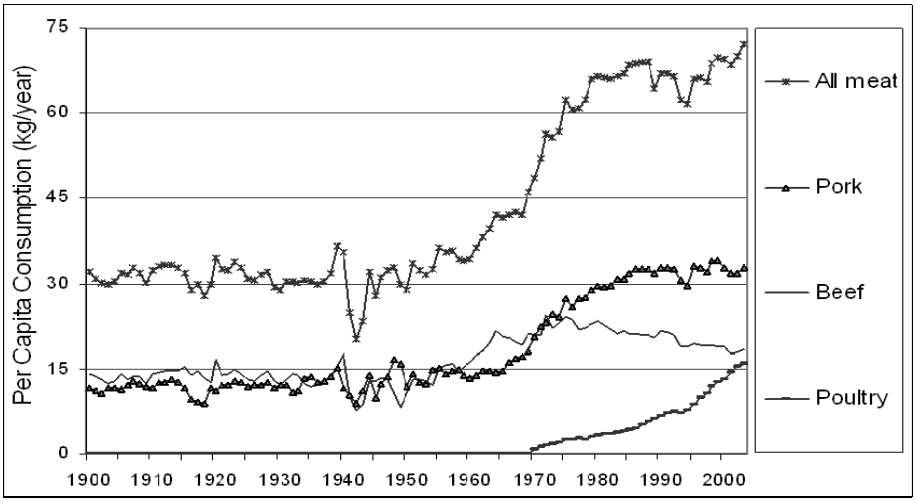

Figure 1 Per capita meat consumption of different types of meat in Finland 1900-2004 (data gathered from Laurila 1985, Laurila 1987, Statistics Finland 1982-2005)

When meat consumption in Finland between the years 1980 and 2004 is observed more carefully it can be seen that consumption has somewhat stabilised during recent decades (see Figure 2). Beef production, which has the

highest environmental consequences, has started to decrease but increased poultry consumption has kept total meat consumption at its previous level. Part of the reason for the decrease in beef consumption is probably that the number of cattle has decreased in Finland as milk production per cow has risen substantially.

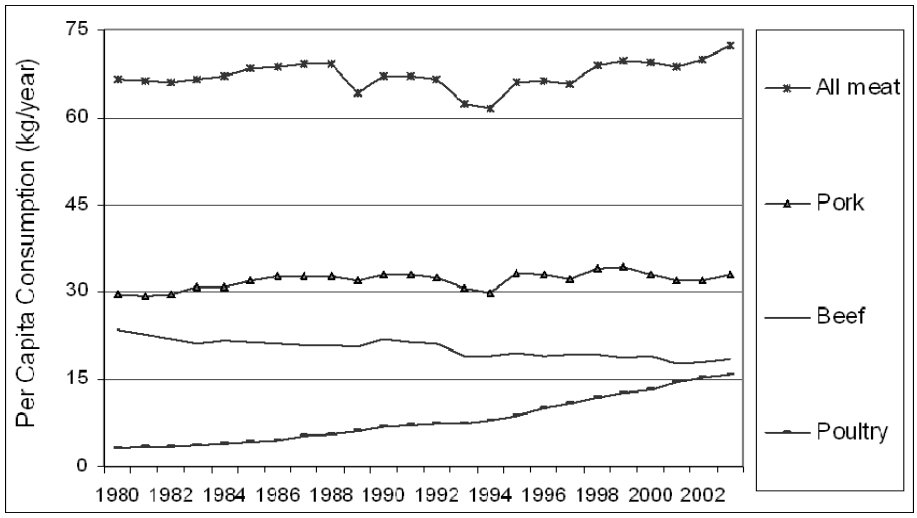

Figure 2 Per capita meat consumption of different types of meat in Finland 1980-2004 (Statistics Finland 1982-2005)

What can be noted is that the macro level data from Finland does not support any development towards vegetarianism. Consumption is levelling off but it has not started to decrease. The consumption of the most harmful meat from the environmental perspective, beef, has started to decrease but it has been replaced by poultry.

However, what was noted in the first article was that this growing meat consumption does not give the whole picture of the issue. It should be noted that the data used in the following analyses was secondary data and as such it should be interpreted with caution, because the research questions were not totally suitable for this research. It was not, for example, possible to attain information about the amount of meat consumed in convenience food items, such as pizzas or hamburgers, in this research. This may have an effect since the amount of readymade meals has grown very rapidly in Finland during the research period.

According to the data used Finland has growing amounts of households that do not buy meats (see Table 3.). There has been a large increase in non-meat consuming households since the beginning of the 1980s, although the growth

rate has stabilised and the number of households not consuming meat is currently around six percent. It was noted that while non-meat consumption has become more prevalent, it has also become more clearly a middle-class phenomenon. What has happened is that a major part of the Finnish population has been increasing their meat consumption during the last hundred years and a small group of consumers have at the same time stopped buying meat for household use altogether. There seems to be a division happening in this respect.

Table 3 Percentages of non-meat consumers and semi-vegetarian households (Vinnari et al. 2008)

	1966	1971	1976	1981	1985	1990	1995	1998	2001	2006
Sample size	3260	2986	3348	7368	8200	8258	6743	4359	5495	4007
No meat	1.29	0.80	0.33	3.88	5.46	5.36	5.01	6.86	5.11	5.81
Semi-vegetarian[#]					6.13	5.62	5.96	7.27	6.35	7.81

=households in which meat products comprised less than 10 percent of the food consumption

Several reasons may account for the growth in the number of non-meat consuming households: it can be partly explained by the fact that these households use meat products outside their homes and do not want to prepare meat in their homes. It can also be that the non-meat consumers contacted in this research use products that are not considered meat products in the Statistics Finland categorisation, such as pea soup, which may or may not contain meat. It can also be that the development of meat replacing products has already made eating vegetarian products quite easy, so more people are prepared to change their eating practices.

Finnish eating habits are still traditional in a way that, for example, so called grazing, where people eat many small meals during the day, is not common in Finland. Finland is also dominated by the habit of eating a few hot meals during the day (Mäkelä et al. 1999). This may be due to the organisation of school lunches, which are very common, and also the fact that Finnish men usually go to military service where eating is very organised. Also the fact that Finland is a relatively newly industrialised country makes it probable that agrarian eating habits are still common. As eating is very organised in Finland it can be said that group pressure and people's urge to eat the same thing as other people can make abnormal food stuff choices more difficult. It is well

known that food choices are not made in isolation, but that they are affected by other people and groups (Fiddes 1991, 33).

When the changes in the socio-demographic characteristics of the non-meat consuming households were analysed it was revealed that changes have taken place. Previous studies have stated that vegetarians are predominantly female, younger and live in the cities. Similar characteristics describe the non-meat consuming households. However, some changes during the decades were detected; for example elderly people living in rural areas that were in the group of non-meat consumption in 1985 had disappeared. This may be because they now had money to buy meat and this was an involuntary group of non-meat consumers at that time. Another trend characteristic is that the education level among the non-meat consumers has been increasing.

Semi-vegetarianism, meaning households that consume less than ten percent of their total food consumption on meat products, was not very large in this research. This group was especially characterised by the large share of females as the highest earner in the household.

This research does, however, raise some interesting issues. The low amount of semi-vegetarians in all households in Finland is one. It could be argued that this is because when a woman moves together with a man she starts to consume the same foodstuffs as the male in the household does and this influences their total meat consumption. Also as the decision to consume meat is made it then becomes automatically part of most meals. Also the notion that households with children consume meat more often than general households was observed to be true. This may be explained by parents' desire to make sure that their children consume the same foodstuffs as everybody else's children and ensure that no "mistakes" are made in feeding their offspring.

It is important to remember that when trends in societies are observed there is no guarantee that any of the trends visible today will exist in the future or keep their course. Even though there seems to be a growing trend in the non-meat consuming households from 1966 to 2006 it does not mean that this trend will continue.

The purpose of the first article was to observe the past development that has taken place in the number of non-meat consuming households. From the perspective of the whole work the goal was to examine if there has been any development towards increasing amounts of non-meat consumption and as such also towards vegetarianism. As such the article was descriptive. Some evidence was gained from a longer time period that supported the presumption that some change is taking place.

5.2 The Generality of Vegetarianism (Article II)

> "I am not a vegetarian because I love animals; I am a vegetarian because I hate plants. "
> -Whitney Brown (1952-) writer and comedian

A straightforward answer to the question of how many vegetarians there are is not easy. This can be observed when estimates about the number of vegetarians are analysed. There is a large variation in the different estimates of the number of vegetarians in the Western World (see discussion in Article II).

The difficulties in estimating the number of vegetarians arise partly from the many different ways in which the term is understood. Generally the term is used to refer to a person who eats for example fruits, nuts, seeds, and other plant matter. A more traditional way to define a vegetarian is to define what he or she excludes from his or her diet. In the nutritional literature it is generally accepted that a person is a vegetarian when he or she does not eat any beings that have breathed, walked or swam. This excludes beef, pork, game, poultry and fish from the diet.

There are many different combinations of raw materials that consumers could, in principle, use as a basis for their diets (see Table 4.). Also the definition that consumers have in mind when they use the term vegetarian can differ quite a lot from the generally accepted definition among researchers.

Table 4 Labels given in the Western world to different types of human diets

Diet name	Humans	Cats, Dogs (varies culturally)	Red meats (beef, pork)	Poultry	Fish	Eggs	Dairy	Honey	Vegetables
Cannibals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Omnivore/ Carnivore	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Semi-vegetarians or Flexitarians	No	No	Some	Some	Some	Yes	Yes	Yes	Yes
Pollotarians	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Pesco-lacto-ovo-vegetarians or Pescetarians	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Lacto-ovo-vegetarians	No	No	No	No	No	Yes	Yes	Yes	Yes
Lacto-vegetarians	No	No	No	No	No	No	Yes	Yes	Yes
Vegans	No	No	No	No	No	No	No	No	Yes

Even foodstuffs that people do not generally want to think about have been used as a source of human nutrition during our history. For example cannibalism may have been more common than people generally think among their ancestors (Pennisi 2003). This practice is highly debatable and some researchers do not agree with the generality of the practice (Roach 2003). What is certain is that it has happened in many cultures around the globe (Roach 2003). There are many reasons why people practise cannibalism from religious rituals to starvation. One well known case where people were forced to eat human flesh in recent history in order to survive was when Uruguayan Air Force Flight 571 made an emergency landing to the Andes in 1972 and the passengers did not have anything else to eat except the corpses of their fellow passengers.

Even though the term omnivore, meaning literally the eater of everything, is often used to describe the "normal" diet in the Western world there are actually strict rules about what humans are generally not supposed to eat. People do not for example eat humans in normal situations (not even the mentally challenged or foetuses that have been produced in miscarriage). Also the eating of dogs, cats or other pets is often considered to be questionable. The usage of insects is also very limited in Western type diets. From the red and white meat categories only three meats are used on a large scale in the Western world; beef, pork and poultry.

The actual number of foodstuffs used in these different categories can vary enormously. There are over 7,000 plants that humans use for food globally, but over 50 percent of people's daily calorie and protein intake comes from just three plants: maize, wheat and rice. On the global scale only 150 crops are used in significant amounts. (Jaenicke and Höschle-Zeledon 2006, 7) Furthermore, only about 10 percent of the varieties developed in history are still cultivated. There is a rapid decrease taking place in the usage of different crops and animals as sources of human nutrition (Millstone and Lang 2003, 54). As such the omnivore diet is becoming very limited.

In Article II the number of vegetarians was estimated by using an operationalised definition (meaning that the food stuffs that the consumers reported eating were checked) and also according to self-definition. The operationalised definition was given a lower prevalence than the self-identification (meaning that there was a question about whether the respondent was a vegetarian). According to this study the number of vegetarians was 0.43 percent of the population. Self-identification gave a much higher prevalence, 3.3 percent (see Table 5.).

Table 5 The prevalence of vegetarianism in three nationwide surveys (Article II)

	Prevalence (%)		
	All (n = 24 393)		
Type of vegetarian diet	Men	Women	Total
Vegan or lacto-vegetarian* (n=44)	0.10	0.26	0.18
Vegan or lacto-ovo-vegetarian† (n=104)	0.18	0.65	0.43
Vegan or lacto-ovo-vegetarian or pesco-lacto-ovo-vegetarian‡ (n=332)	0.65	2.0	1.4
Self-defined vegetarian (n=783)	2.5	3.9	3.3

* Meat products, eggs or fish less than once per month, † Meat products, fish less than once per month, ‡ Meat products less than once per month

There can be many different explanations for these differences. People may not know what is meant by vegetarianism or they define it quite differently compared to the generally accepted meaning in scientific literature. On the other hand there may also be bias in the other direction: some people may report that they eat products that traditionally have meat in them, but which can also be produced without meat. For example pea soup may be produced either with or without meat. Also some people may be very strict in their definition of vegetarianism: they may for example exclude themselves from the vegetarian group if they eat meat products once a year when they visit relatives.

When the self-defined vegetarian status is used as a basis for seeing if there is a change in the trend of the number of vegetarians between 1997 and 2007 there is no clear pattern (see Table 6). The amount of self-defined vegetarians was 4.1 in 1997 and in the newest available FINRISKI data of the year 2007 (that was not available for the article) the number of self-defined vegetarians was 4.1 (Peltonen et al. 2008, 485). In all the vegetarian groups vegetarianism was more prevalent among women than among men.

Table 6 The prevalence of vegetarianism according to self-defined vegetarian status in four nation-wide surveys (Article II and Peltonen et al. 2008, 485)

		Prevalence (%)		
		Men	**Women**	**Total**
Self-defined vegetarians	FINRISK 1997 (n = 8 447)	3.8	4.5	4.1
	Health 2000 (n = 6 366)	1.3	2.7	2.1
	FINRISK 2002 (n = 9 580)	2.1	4.3	3.3
	FINRISK 2007 (n = 7377)	3.0	5.1	4.1

Even though the numbers are not very large the meat industry has taken this development seriously. In New Zealand the government even commissioned a research project about the threats that the vegetarian movement may have to their meat industry (Gregory 1997). In Finland the meat industry has been closely following the development of vegetarianism (Pohjalainen 2003).

The second article sheds light on the current state of vegetarianism. When the knowledge from the first article was combined with this information a better understanding of the factors affecting the probability of a person to be a vegetarian was gained and it was found that vegetarians are usually highly educated females. What also can be concluded from the two first articles was that vegetarianism is related to marital status as single people were more likely to be vegetarians. It will be interesting to see if the development of rising education levels among women might also advance the rise of vegetarianism. The current advancement from the perspective of the vegetarian movement is marginal, although it can be argued that there is a group of early adopters that are critical for the advancement of the transformation process as they can develop the social practises and institutions needed for other social groups to accept their way of conduct.

From the perspective of the whole work, it became evident that that there are not abundant amounts of vegetarians. Nor can it be said that vegetarianism has made great advances or inroads into society.

5.3 Constrainers of Development towards Vegetarianism

When examining if there is evidence that movement towards the large scale adaptation of vegetarianism would be taking place, or if it has possibilities to be actualised in the future it is important to try to understand why such

intentional transformation may be difficult. Food has a very special place in human consumption as it becomes part of people when they consume it. Food choices also mean many other things to humans besides just consuming calories and receiving adequate amounts of nutrients. The things that are eaten for example determine humans' belonging to a certain social group (Lupton 1996, 25). One way to identify oneself as a certain type a person is to eat the same things that those people that one wants to relate to eat (Lupton 1996, 26). This means that giving up certain food products can be socially demanding as that also means that one has to differentiate oneself from groups that one wants to belong to.

An especially important ritual in which to act accordingly in the case of food consumption is the meat eating ritual. Meat and especially red meat is generally thought of as being socially the most valued type of food (Fiddes 1991; Lupton 1996; Allen and Hung Ng 2003). This superiority is very much male driven. Women support this idea because the majority of them think that men need more meat than women (Lupton 1996, 105). Partly because of these reasons, men, for example in Australia, eat two times as much meat as women and there are two times as many vegetarian women in UK than there are vegetarian men (Lupton 1996, 111).

Consumers explain their meat consumption by stating that people have always eaten meat, that they like the taste of meat, that humans need meat to survive and that animal farming is economically very important (Yount 2008). Also other factors can forestall changes in meat consumption practices, such as socially established meanings attached to consumption choices and institutional inertia (Frank 2007).

One factor that could derail a change towards vegetarianism is that even though consumers might hold negative beliefs towards animal farming these feelings would not lead to behavioural changes. The analysis of human behaviour has revealed that individuals holding inconsistent beliefs or performing acts that are in conflict with their beliefs, experience dissonance, and the elimination of this dissonance can motivate behavioural and cognitive change. This theory of human psychology is now known as cognitive dissonance (Festinger 1957). It is well known that consumers in modern Western societies show negative attitudes towards animal farming (Miele and Evans 2006; Maria 2006; Vanhonacker et al. 2008) and some researchers have even stated that negative feelings towards animal farming are widespread in the Western World (Holm and Mohl 2000, 281), but no significant decrease in total meat consumption can be detected (FAOSTAT data 2005). Human attitudes do not seem to actualise in their behaviour. One possible explanation could be the human capability to turn a "blind eye". It has been stated that humankind's current treatment of animals is a good example of a field where

cognitive dissonance exists (Rabin 1994, 178) as there is growing evidence of negative feelings towards meat eating, but at the same time consumers are continuing or even increasing conduct that causes them negative feelings.

Modern versions of the dissonance theory emphasise issues of self-esteem and the desire to rationalise one's actions. (Oxoby 2003, 367) When people are faced with situations where they have inconsistent beliefs they can simply choose to live with these perceived behavioural inconsistencies (Thogersen 2004, 101) or they can even conduct more of the behaviour inducing the cognitive dissonance in order not to feel like a hypocrite (Rabin 1994, 189).

Sometimes the explanation for human behaviour can be much simpler. Humans just do not think about the moral implications of their food choices (Singer and Mason 2006, 3). Decisions could be changed, in many cases, if they were adequately challenged by other alternatives or obstacles or even if the issues involved were merely brought to a person's attention (Gronow and Warde 2001, 226-227). People can make their food choices with limited information and in many cases do what they are accustomed to doing because they think it is the correct manner of conduct.

Even though consumption decisions are often understood only as matter of choice they are bounded by socio-technical frameworks (Røpke 1999). In addition to socio-technical frameworks, the environmental constraints and surrounding discourses can start to have an effect on citizens' consumption decisions, as pointed out by the Ecological Modernisation Theory. The development can, in other words, be driven by social, technical, economic, environmental, political, and value factors and all these need to be examined if a comprehensive perspective on the issue is to be formed.

5.4 The Seeds of Change (Article III)

> "Nothing will benefit human health and increase chances of survival for life on earth as much as the evolution to a vegetarian diet."
> - Albert Einstein (1879 – 1955) theoretical physicist

In Westernised countries meat has had a dominant position as a food for at least the last two thousand years. It has been difficult to shake this position, but little by little new institutions, such as societies that reflect collective human choice, food shops that are specialised in vegetarian foods, vegetarian restaurants and literature that can affect consumer customs and behaviour, have started to appear. Evidence of changes taking place in humans' attitudes towards animals has started to become visible also in the Western World during recent decades as we can see from the two previous articles sub-chapters.

When observing the development in the Western World societal development has been occurring for more than a hundred years. In The United Kingdom the first Vegetarian Society was established in 1847. It did not start as a very large organisation and during its first year, it had 478 members (Vegetarian society 2008). The Vegan Society followed almost a hundred years later in 1944 (Vegan Society 2006). This development of a division between the promoters of vegetarianism and veganism started in 1909, when the ethics of consuming dairy products was debated within the vegetarian movement. The difference between vegetarianism and veganism is that vegetarians usually exclude meat from their diet, while vegans exclude all animal products from the diet, such as meat, dairy products and eggs (see Table 4. in the previous chapter). This diversification of the vegetarian movement into vegetarians and vegans happened even though there were many well known vegetarian figures that were not willing to even consider a dairy and egg free diet (Vegan Society 2006). Even among the vegetarian movement questions were raised regarding the ability of humans to live completely without animal food stuffs.

In Finland the development has been much slower. The first animal welfare organisation in Finland was the Animal Welfare Society of Helsinki (HESY) which was established in 1870 (Vinnari and Vinnari 2005). There had, however, already previously been movement around animal welfare issues and the first vegetarian influences are estimated to have arrived at the end of the 1800s (Streng 1994).

The Finnish Vegetarian Society was established in 1913 and the first vegetarian restaurant in Finland opened during the same decade. Vegetarianism however remained a movement among a very limited number of practitioners. Vegetarianism on a larger scale was introduced in the 1930s by Are Waerland, who had been educated in the universities of Helsinki, Edinburgh, London and Sorbonne and given honorary doctorates by many American universities. Waerland was sure about the health effects of a vegetarian diet and he lectured about that around Scandinavia. Waerland conducted his first lecturing trip in Finland about the health benefits of a vegetarian diet in 1939 (Lehtonen 2003). However, as a result of the world war the vegetarian movement remained small in Finland over the next decades. In the 1950s the vegetarian restaurant Vegeta was running in Helsinki, followed by Rouva Mäkkösen (Mrs. Mäkkönen's) vegetarian restaurant in the 1960s, so the vegetarian movement was alive during these years (Broo 2007). The Vegan Society was established in Finland as late as 1993 (Vinnari and Vinnari 2005).

To see if vegetarianism and veganism will become more prevalent and what possible factors might promote them a future oriented perspective was

conducted. In order to gain this perspective, this research utilised the Delphi method. The first Delphi round consisted of semi-structured interviews that were related to different food stuffs. The experts were presented with data about the historical development of the consumption of different food stuffs and asked; What would be the preferable and probable consumption amounts in the year 2030?" In addition to the amounts that they presented by drawing trend lines on paper, the arguments that they used when presenting their own views were of special interest.

The key idea was to try to identify factors that may affect meat consumption in the future (see Article III Table 4.). In the article a broad perspective on the issue was promoted by using the STEEPV- categorisation. Of course this type of listing cannot include all factors. For example, material concerning the "development" of more environmentally friendly animals (for example by genetically modifying the food processing of cows to induce less methane) was not presented by the interviewees as a possible factor that may affect meat consumption. Additionally, more futuristic ideas, such as the possibility for people to leave their bodies and upload their consciousness to a virtual world were not presented, which can be explained by the fact that in the Delphi method experts were asked to outline only possibilities for the year 2030. Even though the listings were not comprehensive there are more factors included than any one person can usually name. The key idea in gathering the list was to present the vast number of possible factors that can affect the issue.

There were a large variety of possible factors mentioned by the experts including social factors such as increasing knowledge in preparing vegetarian meals, technological factors including the development of artificial meats and the development of novel protein sources as well as economic reasons, such as a decreasing price in alternatives to meat products. From the environmental perspective many experts mentioned that growing competition for natural resources could influence meat consumption. Furthermore, possible changes in the political climate were also seen as resulting in a decrease in meat consumption if subsidies were to be decreased (for more discussion see Article III).

The end result gathered together factors that could influence meat consumption in the future with the aim of promoting a societal transformation process towards consumption practices. This was done in line with vegetarian principles, and in that way should help actualise vegetarianism by giving ideas about the issues that should be considered and worked upon. It became evident in the first two articles that a transformation process has begun but that many actions are needed before vegetarianism can advance in society. However, it became clear when preparing the third article that there are many possible combinations of action that could be taken to promote vegetarianism.

5.5 Future Images of Meat Consumption (Article IV)

> "People are born free, but are everywhere in chains"
> -Jean-Jacques Rousseau (1712-1778) philosopher, literary figure, and composer

The last article utilised the results from the second round of the Delphi in combination with a consumer survey. Questions were included that were hoped would elaborate upon the answers given in the first round of Delphi questions regarding the factors seen as affecting food consumption. Three factors from the categories of economic, social, technical and environmental and ethical, which were presented in the first round, were chosen for the second round Delphi questionnaire. The experts expressed their views on both the probable and preferred future of meat consumption up to 2030. The second round was carried out with the Webropol-Internet service (Webropol 2007).

This final research for the last article was conducted in order to observe the type of future images consumers and experts have. This was considered relevant, because when analysing the research material it had become evident that there are many different directions for development to go in. As there are as many futures images as there are people (and probably even as many as there are animals), this diversity somehow needs to be limited, if any perspective is to be gathered. It was not possible to include all the factors presented by the experts in the consumer survey questionnaire as that might have taken respondents too long to answer.

It was noted when the answers were analysed that both consumers and experts considered laboratory grown meat as an option that was not preferable. This might be due to the fact that they consider the meat to be artificial. It has also been stated that meat as a product is much more than the ingredients that it is made of and that some consumers would continue to consume animal based meat even if exactly the same taste and texture were to be produced (Fiddes 1991). However, the reality, when the products actually came on the market, could be completely different as tastes change over long periods of time (Fiddes 1991, 32).

It was also noted that in general both consumers and experts thought that it would be very likely that the number of vegetarians would increase in the future and regarded health factors as a probable and, in particular, preferable reason for this increase. When interpreting these answers, it should be noted that some respondents may have meant that it would be beneficial if people ate more vegetables, not that they should shift to vegetarianism completely. This is supported by the second article in which it was noted that what people actually understand by the concept of vegetarianism differs quite a lot.

Based on the clustering of the results five future images were constructed: A Traditional Approach, Business as Usual, Humans First, Wellness, A Vegetarian Society. The purpose of outlining these future images was to help stimulate the discussion around animal based food production and to help different interest groups see what kind of future images exist. Whether any of these will actualise is irrelevant, what is relevant is sharing the information that humankind can choose the direction it wants to develop in with regard to meat consumption and vegetarianism.

These future images are relevant to acknowledge if actions towards vegetarianism are to be taken. For example the holders of the image of the Traditional Approach could be influenced by outlining the long historical background of the vegetarian movement and connecting it to human traditions. To the holders of the Business as Usual image a slow introduction of vegetarian meals in schools and workplaces could work as it would give them time to adapt to future changes.

From the perspective of the Humans First group, development in the product quality of vegetarian food was seen as a key issue. In addition, public discussion about the qualities and capabilities of animals might ease any such transformation towards vegetarianism. For holders of the Wellness future image the key would be to conduct more research about the health effects of vegetarianism and the development of healthier vegetarian meals.

From the point of view of the Vegetarian Movement the article attempted to foresee what type of possible futures exist. As there is a large amount of possible futures this can help guide the development of vegetarianism, especially as there would be a better understanding of the diversity of possibilities (Kamppinen et al. 2003). When analysing modernisation it is not sufficient to try to describe the preferable state of the future, it is also necessary to try to see what other outcomes are possible.

5.6 Ways to Reach a Vegetarian Future

The preferred future can be outlined by working back from a vision (or future image). In the backcasting method the starting point does not have to be the most likely future but the preferred vision. The trend analysis has revealed that the actual levels of meat consumption do not point to as rapid a decrease in meat consumption as presented here. This scenario process however examines what possible development paths would lead to vegetarian vision in the next 50 or so years. There are an infinite amount of possibilities for the development of meat consumption in the future, but three specific that would lead to the vegetarian vision are outlined. The three scenarios presented follow

the traditional way of constructing scenarios as there are three ways to reach the future: drifting, planning and by catastrophe (Bell 1997, 109).

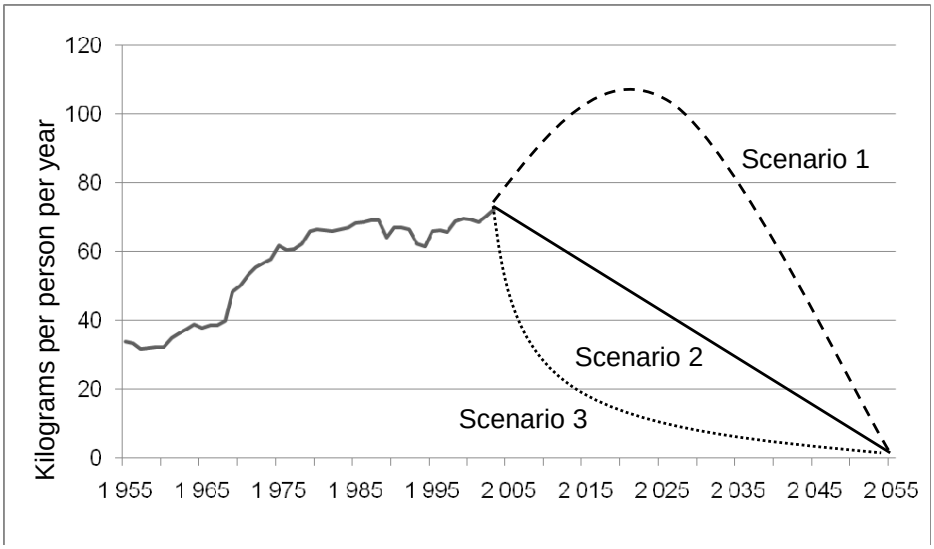

Figure 3 Development of meat consumption towards a vegetarian future in three different scenarios (historical data gathered from Laurila 1985, Laurila 1987, Statistics Finland 2005)

First there is growing consumption that then shrinks rapidly (see Figure 3.) following the idea of drifting. People are prepared to do something in this scenario only when they have to, in other words drifting would be characteristic of societal transformation. Secondly, there is the steady decline scenario, where people take consious actions to reach a particular future condition. Thirdly, there is rapidly declining consumption that is followed by a slower phase of decline, following the logic that people only take actions when faced with a catastrophe.

5.6.1 From Gluttony to Crash (scenario 1)

In the first scenario, From Gluttony to Crash, meat consumption grows from its current level of about 70 kilos per person per year to almost 110 kilograms per person per year by 2025 (see Figure 3.). Even at its peak though meat consumption stays under the current consumption levels of the USA (over 120 kg/person/year), but 110 kilograms would be over the current EU 15 average of 91 kg/person/year (FAO 2009). This growth during the first generation is mainly driven by two factors: The growing income levels of consumers, which

lead to the cheaper relative price of meat, which helps to ensure that meat continues to be socially preferred as a food product. There is some technical development in the meat replacing products (such as soy or wheat gluten), but this development is not acknowledged by the majority of the population. The environmental effects caused by meat consumers are not seen as relevant by public or policy makers during the first generation (see Table 7). In the table one arrow up means that there is small growth, two arrows up that there is moderate growth and three arrows that there is substantial growth driven by the referred factor. Horizontal arrow means that that factor does not influence the total consumption during that generation (see for example Kaivo-oja et al. 2004). The total amount of the change is summed up in the last column.

Table 7 From Gluttony to Crash – a scenario towards a vegetarian future

		Social	Technical	Environ-mental	Economic	Political	Value	Total influence
From gluttony to crash	First generation	↑↑	↓	↔	↑↑↑	↔	↑	↑↑
	Second generation	↔	↓↓↓	↓↓↓	↑	↔	↓↓	↓↓↓↓↓

During the second generation the environmental consequences of a continuing rise in meat consumption start to become evident and this starts to affect consumer values. Due to the evident environmental effects a larger change in society starts to take place and a change in consumer values starts to affect consumer actions. The industrialisation of agriculture continued during the first generation which meant cheaper meat, but at the same time it changed the perspective of agriculture and made it more businesslike in the eyes of the second generation. Technical innovations, such as the development of artificial meat, make it easy for consumers to move from traditional meat to industrially grown products.

5.6.2 Steady Decline (scenario 2)

In the second scenario, named Steady Decline, the continuing debate around climate change issues starts slowly to influence consumer values so that they

begin to consume a little less meat as it is considered a harmful product from the perspective of the climate. Political decision makers' support for meat production ceases. This becomes easier as the number of farms and farmers continues to decrease and the role of agricultural policy loses some of its importance in the political field. For example the custom of serving at least one vegetarian meal per week is introduced in all elementary and high schools throughout Finland at the beginning of the period. People still value meat as a product, but they consume better quality meats. The continuing growth in the average consumer's bodyweight increases meat consumption as people consume more of all foodstuffs. Some better quality wheat gluten and soy products are developed, but these are only used by a small share of the population (see Table 8).

Table 8 Steady Decline – a scenario towards a vegetarian future

		Social	Technical	Environ-mental	Economic	Political	Value	Total influence
Steady decline	First generation	↑	↓	↓	↑	↓	↓	↓↓
	Second generation	↔	↓	↔	↓	↔	↔	↓↓

During the second generation the small changes in policy towards meat production are expected to have made meat a relatively more expensive protein source, which means that people start to consume smaller and smaller shares of their total nutritional food consumption in the form of meat. Technical development partly caused by society supported development programs has continued to bring more and more meat replacing products to the markets and consumers have adopted these because they offer the same quality as meat products.

5.6.3 Out of Our Hands (scenario 3)

The major driving factor in the third scenario, Out of Our Hands, comes in the form of animal diseases. A global epidemic influences the whole meat production system and even though political actions are taken to boost production and meat prices are lowered, total meat consumption decreases in

this scenario. This is because humans do not see a decrease in meat consumption as threatening to their overall consumption practices, which are also seen as being reinforced by value changes that give inherent value to nature (see Table 9).

Table 9 Out of Our Hands – a scenario towards a vegetarian future

		Social	Technical	Environ-mental	Economic	Political	Value	Total influence
Rise of the citizen society	First generation	↓	↔	↓↓↓	↑	↑	↓	↓↓↓
	Second generation	↔	↓	↔	↔	↔	↔	↓

In this scenario as the number of farms decreases rapidly during the first generation, people become more and more distant from animal farming and as such they do not need to justify their usage of animals. At the same time fruit and vegetable farming becomes more and more commonplace in cities (where an ever larger share of people live) and a new perspective on food production is created. Thus farming becomes something that humans practice in their homes and in distinct areas set aside for cultivation in the cities and thus people reconnect with food production during the second generation. Also, as people want to cultivate their own food, they do not wish to use, and nor is there any need to use, animals in the process because the majority of people do not want to butcher animals.

6 CONCLUSIONS

> "Modern man is so clever in investigating the world that he leaves no stone unturned, from microscopic particles to outer space, so that we are overwhelmed with knowledge. However, our finite lives allow us only one single view upon the world, which has now been shattered into innumerable shards of information. In the face of such a world, one cannot but feel a vast hollowness: there is no coherency and the human spirit is mired by endless debates and strife. Is this a gift of modern civilization? Or is it a disaster?"
>
> -Anxiong Qiu (1972-) video and animation artist

6.1 A Summary of the Main Results

The perspective driving this work was an attempt to analyse whether or not the inherent value approach towards nature and animals could spread throughout society. As such the interest was to analyse societal transformation in the case of meat consumption. The perspective grew from the idea that humanity would slowly change its view of being the dominant, controlling creature of the earth towards that in which it is more of a companion. There are some larger scientific discoveries in humankind's near past that could be possible drivers of this development, such as a wider understanding of the origins of humans and the understanding that humans are animals that descended from apes. Also the growing interest in nature and, especially nowadays, climate gives humankind much better possibilities for changing our view of our place on this earth. This change is probably still driven in large part by an anthropocentric self interest, but sometimes there are also arguments that stem from other perspectives.

As this is the first piece of research (at least to the author's knowledge) where this type of transition named as Deep Modernisation has been investigated with such a strong futures perspective, it was decided to examine this development in only one specific area, namely meat consumption in Finland.

There has been philosophical discussion about the status of animals for as long as there is written material available. The arguments around the animal issue have diversified and expanded during recent decades and nowadays there are quite a few different perspectives. Generally the conclusion of the philosophers is that humans should not treat production animals the way they

are currently treated. Currently, the vast environmental consequences related to meat production are becoming more evident, for example, greenhouse gas emissions from meat production have become almost daily news. Also, from the human perspective arguments have started to emerge as part of a wider discussion that links meat consumption to chauvinism and to problems in coping with the double standards humans apply to themselves and other animals. A strong argument has been developing against eating our fellow earthlings. The purpose of this work was to offer a glimpse of this discussion and to observe whether this discussion has already had an effect on our society and if it is going to have an even stronger effect in the future.

When formulating the research questions this work drew from the principles of Deep Ecology and the non-anthropocentrism and intrinsic value approach towards other life forms. The target was to ask deeper research questions about meat consumption, which is considered to be a key issue if larger social change is to be actualised in people's perspectives towards other animals and nature. Asking relevant questions about meat consumption was considered especially relevant after the arguments used in Deep Vegetarianism perspective were evaluated. The purpose of utilising the Ecological Modernisation theory in this work was to gain background knowledge about the relevant sub-questions for the research. The development of the Ecological Modernisation theory during the last thirty years has emphasised the importance of using both descriptive and normative research questions. Similarly to the Ecological Modernisation perspective, technological development was seen as a driver of modernisation. However, technological development is not enough if there is to be development towards giving inherent value to animals and nature because social development is also needed. In the food sector this can mean changes in people's behaviour and the utilisation of new products which can help to transform the sector and the structure of consumption. As such the future is there to be made and people have increasing possibilities to make their desired future.

On the practical side this work has contributed to the body of knowledge on the development of vegetarianism and to a more precise understanding of the difficulties in defining vegetarians and evaluating their number. The future oriented part of this work has presented the broad possibilities that we humans currently have to promote vegetarianism, if we choose to do so. These factors should be useful to consumers and policymakers.

The main findings of this research and the answers to the research questions presented in the third chapter can be summarized as follows:

1. How has the number of non-meat consumers developed?
   -There seems to have been a growth in the number of non-meat consumers at the end of 1970s. The growth rate has somewhat stabilised since the 1980s. However, aggregate level meat consumption has continued to grow, even though some stabilisation can be observed.

2. How many vegetarians are there in Finland?
   -This is a very complicated question, because so many different meanings are attached to the word vegetarian. An educated estimate is about 0.5 to 3 percent of the adult population, depending on the definition.

3. What factors may affect meat consumption in the future?
   -There is a large variation in the possible factors, which include for example social innovations as well as technical developments. The possibilities for the development of vegetarianism are better than ever before. It is likely that the future will be influenced by a combination of factors.

4. What are the consumer and expert perspectives on the need for the change?
   -There is no common goal. Most people are driven by health considerations and by the perspective that old practices were better. Some people also like things as they are. By selecting different methods to influence different consumer groups more effective possibilities exist, if people desire to shape the future for a vegetarian diet

With regard to the main research question, Is Finnish society heading towards vegetarianism?, the answer is: There are better possibilities for a transition towards vegetarianism than ever before. What was highlighted was that vegetarianism can spread also because of the development in the socio-technical structures and environmental constrainers and in the end becoming a vegetarian does not need to be a conscious choice for everybody.

Currently, there is a small population of vegetarians that are developing the daily practices that are needed for making a societal transformation process to vegetarianism easier. This group is also one driving factor in the development of vegetarian products. The development of better substitute meat products for food products can make the transition easier for some consumers. Technological development in areas that have no direct links to the food

industry can also have a major influence on the foodstuffs that humans consume in the future. For example, the development of artificial meats can be driven by the development of artificial organs in medical research. As humankind becomes able to develop human organs from stem cells it will probably become cheaper and easier to produce meat from cells without using animals (at least on the current magnitude of scale).

There is also some indication that the separation between edible animals and other animals is diminishing as people take pigs as their pets. Such technological and social changes could be seen as driving society towards vegetarianism. Also there are growing environmental concerns related to meat consumption, especially because of the relevance of climate change to national policy agenda. Whether this will lead to people excluding meat from their diets, or just transferring to the eating of poultry, which has lower emissions, remains to be seen. As there is also a growing interest in the use of agricultural land to produce energy crops this could also influence meat prices as the production of animal feed needs to compete with energy production. On the other hand food prices constitute only about 11 percent of a consumers' total expenditure in Finland and, as such, it can be argued that changes in meat prices would not have a large effect on its consumption.

As outlined in chapter 5.6 there are many ways that the vegetarian future image (or vision) could become reality. There is the possibility that it can happen without any purposeful actions by society as a whole. Catastrophes can evoke sudden changes in society. Reaching the vegetarian vision by drifting or planning is probably going to take a longer time to actualise, than by the way of catastrophe. Even Peter Singer, the best known figure in the animal movement, states that there is only a remote possibility that during the next ten to twenty years the majority of meat-eaters would abandon all animal products (Singer 2008). Some people however do believe that we are heading in that direction and that in 25 years most people will be vegetarians (Boon 2003). A reasonable estimate is that planned changes will not take place quickly and there are going to be many phases in the development, assuming that there is going to be any development at all. The human race has, at least partly, the possibility to choose its direction, but there are still multiple paths that can be taken.

What can be claimed, based on this work, is that Western countries now have much better possibilities to see an increase in their vegetarian population than ever before and thus vegetarianism has much greater potential to be actualised on a larger scale.

6.2 An Assessment of the Results and Self-evaluation

> "It is the fate of every truth to be an object of ridicule when it is first acclaimed."
> -Albert Schweitzer (1875-1965) theologian, philosopher, and physician.

During the process of this research many interesting observations were made. It was noticed how difficult it is to observe how many vegetarians there are in Finland and how much meat is consumed by Finns. There were not as many vegetarians or non-meat consuming households as was assumed at the beginning of the research. It is worth pointing out that when global meat consumption was investigated in detail during this research process (it was a time-consuming pathway that was not included in the final dissertation, see Vinnari et al. 2005), the quantities of meat being consumed were found to be larger than expected, especially in Southern European countries. When collecting the possible factors influencing meat consumption in the future many new perspectives were discovered that the author had not thought of before. The differences experts had in their future images related to meat consumption were interesting to observe. During the research process not all the things that were expected were found, but many unexpected findings added to and stimulated the research.

The work contributed by examining, for the first time, trends in non-meat consumption and in semi-vegetarianism. To the best of the author's knowledge this type of work has not been conducted before and it will be interesting to see if similar analyses will be made in other countries in the future and what their results will be.

During the research process the researcher was introduced to several methods, which was very beneficial for the futures aspect of this thesis. Some methodological development was also made as a new method was developed for the selection of experts for the Delphi-process. The selection process named STEEPV-Delphi is a methodological development that should be usable for other researchers. This involved the combination of expert and consumer information in the formation of the future images. In addition, the visualisation of the results should also be a usable tool for other researchers as well as the idea of using a generational perspective in both the futures table method and in backcasting.

The difficult question to answer is of course what could have been done better. For the first two papers the best possible datasets, in the author's opinion, were used. In the first paper there might have been the possibility to design a more sophisticated method, but the emphasis was placed on making the results as understandable as possible, so the method can be said to be justified. In the Delphi method a stronger effort could have been made to

design a shorter questionnaire for the second round survey. Furthermore, the inclusion of foreign experts could have introduced an even broader perspective.

6.3 The Need for Further Research

> "Sociology for whom? –Sociology for all humans and other animals."
> - David Nibert, Professor of Sociology

Sociologists and futurists interested in the area of human-nature or human-animal relations should try to identify the changes that are taking place in our society in order to better understand the factors that lead to our maltreatment of nature or other animals and to identify possible ways to change these practices. This important work has already started and there exists a slightly better understanding of the ambivalent relationship we humans have with animals and also some of the ways in which they identify themselves in the natural world.

From a comparative perspective, similar research to that of articles I and II of this work in different geographical areas could provide more information about the distribution of vegetarianism in different parts of the world. This type of research could work as a basis for research to examine if there is a so called trickledown effect taking place, where some social classes follow the practices of some other classes. Also collecting possible factors affecting meat consumption is probably going to be approached differently in the future, as it was in article III.

With regard to what could be done to promote vegetarianism, a wide range of actions could already be taken, if society decides to promote vegetarianism. One way to promote vegetarianism would be to identify what vegetarianism means as currently many people do not even know that such a way of life is possible. The general public could be informed by using ad campaigns and by making vegetarian or vegan options available in schools and other public eating places. In addition, technological development can be advanced by giving financial aid for the development of artificial meat and alternatives to meat products. The technological development of alternative protein sources and especially the development of artificial meats is required, especially when considering the importance of taste as a reason for meat consumption. Technological development can also help to bring information about product ingredients and production methods to consumers, e.g. with the help of information chips attached to the packaging.

In relation to social and value factors, increasing consumer knowledge about vegetarianism can help in attaining a positive feedback effect whereby

consumers receive more knowledge about vegetarianism, then try out new products and this, in turn, results in companies receiving more finance for funding and developing new products. Ad campaigns can be used to further increase consumer awareness. Scientific research related to the implementation of these actions is also needed.

Political action is needed in order to make the general population understand that meat production is a waste of natural resources as well as an inefficient use of farm land. Furthermore, changes in the way economic subsidies are given to agriculture and especially to meat production are essential. On the issue of economic and environmental factors, environmental taxes have previously been proposed as a tool to alter the structure of food consumption (Goodland 1997). In this model the least efficient nutrient converters (pork, beef) would be highly taxed; while more efficient converters (poultry, eggs, dairy) would be moderately taxed. Research related to the possible effects of such political decisions could help in the evaluation of the sensibility of these actions. Additionally, the ethical and economic evaluation of how to include animal welfare costs in such a taxation system would help to guide consumption practices.

Research about how different people see different animal species and how they think that these should be treated is relevant if we want to influence consumers' actions. More understanding is needed of the categorisations that different consumers have for different animals and also of the capabilities that they think different animals possess. From the Deep Modernisation perspective it will be relevant to see how the hypothesis actualises in the future. It would also be interesting to observe what the situation is in other industrialised countries and what perspectives experts globally acknowledge as important factors in the development of meat consumption.

Of course if we want to observe if a wider societal transformation is taking place in line with the Deep Modernisation then we need to look at more than meat consumption, which provides a very limited picture. Even though it could be argued that meat is a key product, if we want to change our perspective towards nature and animals, transformations could also be taking place in many other areas of life. They can be happening for example in shoe manufacturing, where so called "artificial leather" or other types of fabrics could be replacing real leather. Societal transformation in line with Deep Modernisation might already be happening in some areas, but in the areas where it is not happening we could start to look for ways in which to promote change.

If the goal of medical doctors is to save people then the priority for social scientists doing research on the subjects of the environment or animals should be to improve the viability of earth and to promote the wellbeing of all

earthlings. Following the idea presented by Professor Nibert (2003, 22) in the quotation at the beginning of the chapter –*Science for whom? -Science for all living things*.

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ARTICLE I: Vinnari, Markus – Mustonen, Pekka – Räsänen, Pekka (2009) Tracking down trends in non–meat consumption in Finnish households, 1966–2006. Forthcoming in *British Food Journal*.

Title: Tracking down trends in non-meat consumption in Finnish households, 1966-2006

Abstract

Purpose: This paper examines changes in household consumption behaviour through an empirical investigation of the decision to consume meat, to not consume meat or to consume only small amounts of meat. The goal is to find out if the decision not to consume meat is becoming more prevalent, and to understand in what social categories this is happening, if any. A further aim is to investigate whether meat consumption is strongly associated with gender on the household level.

Design/methodology: Expenditure survey data gathered from Finland during the last 40 years is used to identify what kinds of changes are taking place in the consumption of meat and meat products. The independent measures include six variables: the gender of the highest earner in the household (HEH), the type of household, the type of municipality, and the income quintile, educational level and age of the HEH. The size of the samples varied between 2,986 and 8,258 households.

Findings: The analysis revealed that the decision not to consume meat became prevalent in Finland at the end of the 1970s but the growth rate has somewhat stabilised during recent decades. The gender of the highest earner in the household affects the family meat consumption. As non-meat consumption has become more widespread it has also more clearly become a middle-class phenomenon.

Originality/value: There are no previous studies available on the development of non-meat consumption from this long-term perspective.

Key words: Consumer behaviour, Empirical studies, Vegetarianism, Diet, Food habits

Classification: Research paper

1. Introduction

Meat consumption has attracted a lot of interest in recent decades because of ethical, health and environmental considerations. Scientists have long been debating the ethical implications of using animals as food (Walter and Portmess, 1999). Interest in meat also extends to its effects on human health (Sabate, 2001) and mental wellbeing (Adams, 2007; Patterson, 2002). Within the last couple of decades the large environmental effects related to meat as a consumption commodity have become everyday news. These effects include the use of land to cultivate food for the animals (Schlesinger, 1997; Tilman *et al.,* 2001), the energy required to produce the meat (Pimentel and Pimentel, 1996), and both direct and indirect water usage by the animals (Pimentel *et al.,* 1997; Chapagain and Hoekstra, 2004) as well as various emissions and waste from the farms (Dietz *et al*., 1996).

In addition to the scientific arguments, consumer concerns about meat consumption have also been reported. For example, interest in the ethical implications of meat eating is said to have spread among the general public at the end of the 1970s when Peter Singer brought out his book Animal Liberation, which became a bestseller around the world. Also the general public is interested in the issue and at least some consumers show negative attitudes towards intensive animal farming (Miele and Evans 2006; Maria 2006; Vanhonacker et al. 2008). Ethical concerns about meat include the fact that it originates from animals and these animals need to be butchered. There are also concerns for example about the healthiness of meat. (Holm and Mohl, 2000) These attitudes do not automatically mean that all consumers would change their behaviour. It has been stated that even if consumers have negative feelings about meat production they continue to consume meat products (ibid.). As far as food consumption is concerned, separating one's actions from those of other consumers can be difficult, partly because the things we eat determine our belonging to a certain

social group (Lupton, 1996) and as such it may make distinction difficult. It has been and is still generally assumed that meat is essential for a healthy robust lifestyle. (Franklin, 1999)

At the same time, people's attitudes towards meat have changed in Western countries in which it was traditionally considered a luxury but quite quickly became a product for the masses. (Rifkin, 1992) Meat consumption increased in the West during the last century partly because of its association with wealth and status (Franklin, 1999), but also because of the technical and social developments in agriculture, which led to cheaper meat prices. Similar growing trend in animal based food consumption is now evident in Eastern countries (Steinfeld et al. 2006) Finland still consumes much less meat than the European countries in general and the US, for example, but consumption has been slightly increasing. (Statistics Finland, 2005) This is not the whole picture, however, and a reverse development in the form of vegetarianism and the exclusion of meat from the diet has been reported in Western countries and in Finland (Twigg, 1983; Vinnari *et al.,* 2008). Technical, social and economic developments could be expected to increase non-meat consumption in the future (Vinnari, 2008).

Finland is a Nordic welfare state, which makes it an interesting context in which to study food consumption. In general, the Nordic countries are characterised by a commitment to full employment for men and women, equality in terms of free participation in higher education, and the promise of universal social benefits for all citizens. One of the most prominent features of these countries is that there is no 'male breadwinner' culture. For example, available statistics indicate that the frequency of women's labour-market participation in Finland is clearly above the average when compared to other European countries (for details see OECD, 2007). A look at the aggregate data covering the last forty-year period shows that annual meat consumption per person in Finland has risen from a little over 40 kilograms to over 70 kilograms (see Fig. I). The majority of meat

consumed in Finland is red meat (pork being the most popular and beef in second place), but poultry consumption has grown rapidly.

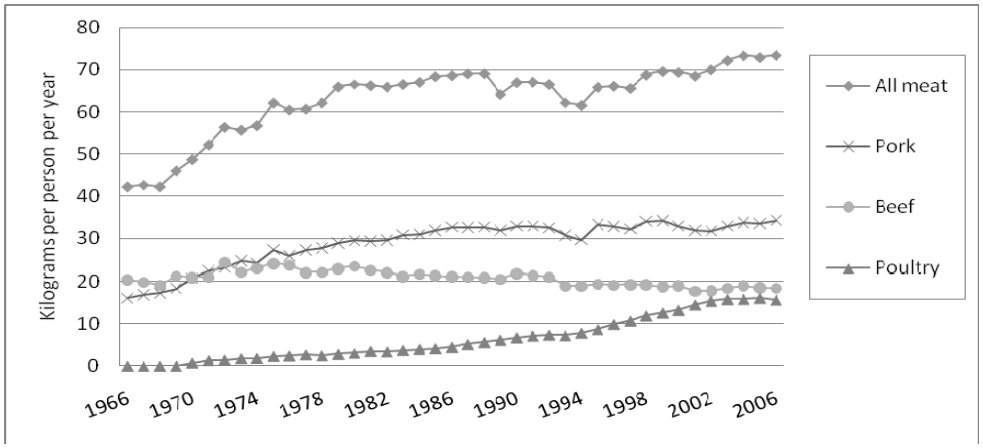

Figure I. Changes in the consumption of different kinds of meat in Finland, 1966-2006 (data gathered from Laurila 1985, Laurila 1987, Statistics Finland 1980-2007)

There are no previous studies available on the development of non-meat consumption. Even though debate on the issue has intensified, its effects on consumer behaviour in the long term are not well known (Richardson *et al*., 1993; Smart, 2004; Beardsworth and Bryman, 2004). There are some estimates of the number of vegetarians in some Western countries, ranging from three-to-seven percent of the population (Richardson, 1994; Dietz *et al*., 1995; Henderson, 2002; Food Standards Agency, 2004), and even in Finland (Laatikainen *et al*., 2003; Eurobarometer, 2005; Vinnari *et al*., 2008) with estimates of one-to-three percent, but no consistent data on long-term trends is available. There have been some studies covering shorter time periods (Beardsworth and Bryman, 1999).

There is some evidence that meat consumption is a cultural choice (Gossard and York, 2003) within a country, but no research investigating the developmental trend in the factors affecting it is available. Our aim in this paper is not to estimate the number of vegetarian households, but rather to

examine the development in the number of non-meat-consuming households. Because of the difficulties in defining a vegetarian diet (Beardsworth and Keil, 1992; Spencer, 1993; Weinsier, 2000; Maurer, 2002) and in measuring the number of vegetarians (Vinnari *et al*., 2008) we decided to use non-meat households as a proxy for estimating changes in the prevalence of abandoning meat. This could also give some indication of the development of vegetarian households because families that do not buy any meat products are probably more likely to follow a vegetarian diet. They may nevertheless consume some meat products outside the house (such consumption is not included in this research), or eat meat occasionally.

Some researchers have stated that it will not be vegetarians that have the biggest effect on meat consumption, and that semi-vegetarianism will influence total consumption most in the future (Gregory, 1997). There are no previous studies available on the development in the number of semi-vegetarians, meaning that food consumption consists mainly of vegetables with the occasional inclusion of fish, chicken, or red meat. Consumers in some countries have been reported to be interested in lowering their meat consumption, and in Great Britain for example, 15 percent of consumers classified themselves as semi-vegetarians. (Richardson *et al.*, 1994) There is, however, no general agreement on what is meant by semi-vegetarianism. In this study we define a semi-vegetarian household as a household that allocates less than ten percent of its total food consumption to meat or meat products.

Sociologists have pointed out that meat carries the highest status in the food hierarchy (Twigg, 1983; Fiddes, 1991), and it has been argued in the literature that meat consumption could be strongly tied to masculinity (Twigg, 1983; Adams, 2007; Jensen and Holm, 1999). Meat products are considered essential for men to “beef up” their manliness, and vegetables are seen as weak food (Adams, 2007). Meat is also seen as the core of western meals and removing it from could be a

threat to patriarchal culture and as such it would be a threat for men. (Douglas, 1975; Adams, 2007) It has previously been reported that there are considerable differences between the genders in eating behaviour (Kiefer *et al*., 2005). It has also been reported that women consume less meat than men (Kim *et al.*, 1997), but there is, to the author's knowledge, no previous research examining the magnitude of the influence of gender on single households' non-meat, semi-vegetarian and non-red-meat consumption.

2. Research questions

This paper focuses on the kinds of changes that have taken place in meat consumption in Finland during the last forty years. The research questions are the following:

1. Were there overall changes in the patterns of meat and non-meat consumption over the time period in question?
2. What are the typical socio-demographic features of the households that do not consume meat, or only consume small amounts, and what changes in these features have taken place?
3. Does the gender of the highest earner in the household increase the probability of the household being non-meat consuming or semi-vegetarian?

The first goal is to understand what kinds of changes in meat consumption have taken place. The second is to understand if the decision not to consume meat is increasing in prevalence, and in what social categories, if in any in particular. Even though negative attitudes towards meat are not necessarily associated with decreased meat consumption on a general level (Holm and Mohl, 2000), some social groups may react more profoundly by excluding meat altogether from their consumption basket.

The focus of this article is on the basic socio-demographic characteristics of the household, including education, age, household type, residential area and income level. We look at meat consumption and non-consumption from the point of view of the household. In this sense we acknowledge that the established consumption patterns are necessarily influenced by all members of the household.

However, of special interest is the third research goal to find out whether meat consumption is as strongly associated with gender as postulated. This is incorporated into the second research question to some extent, but additional analyses on single households were also conducted. Comparisons will be based on single-person households and information on the reference person's gender in other households.

3. Material and Methods

The data used was the Finnish Expenditure Survey provided by Statistics Finland (STAT, 2008a). The variables report amounts of household spending, and the data cover all acquisitions of goods and services during the research period. In these data, consumption is therefore defined simply as expenditure on meat and meat products. The same data that is used for creating official representative statistics of consumption expenditure in Finnish households has not been examined earlier in similar settings. Thus, all the results presented here are new.

Consumption-expenditure categories are classified in the data according to the national classification system (COICO-HBS classification), which includes about 900 different headings. Food is one of the main consumption categories in the classification (STAT, 2008a). The utilised data was combined with the data sets from the years 1985-2006. In addition to this, similar surveys

from 1966, 1971, 1976 and 1981 were used to examine the proportion of meat consumption of total food expenditure. These older data sets are not fully comparable with the later surveys and because of this we only used the data from 1985 onwards for the more detailed examinations (STAT, 2001). The data of 1995 was composed by using three separate samples from years 1994-1996 and the data of 2001 from 2001-2002.

The sampling frame in the data consists of persons over 15 years of age who had a permanent home address according to the Finnish central population register. Most of it was collected in face-to-face interviews and through the keeping of diaries of household expenditure over two-week periods. In addition, various official sources such as the tax registers and the social insurance institution provided information on income, pensions and insurance. Household expenditure is reported in the data in the form of annual estimates. Following the suggestions of Statistics Finland, the weights that were adjusted for population and sample sizes were used throughout the study. Thus, the sample size of the data remained untouched. The size of the samples varied between 2,986 and 8,258 households (STAT, 2001; STAT, 2008a).

In the analyses, a total of three dependent expenditure measures were used from each data set. These comprised expenditure on different kinds of meat: red meat, chicken and fish. These variables were also used to estimate the proportions of non-meat-consuming households and semi-vegetarian households. When the amounts of expenditure are reported as annual estimates in the data, this information is used to compare the proportions of consumers versus non-consumers (i.e. the percentages of households consuming meat products vs. non-meat consumers). However, we need to acknowledge here that the measures available in the data were not designed for our research purposes. In other words, it is not possible to separate meat products from non-meat products in some of the convenience-food items (e.g., pizzas, pasta sauces, hamburgers). We therefore did not include any of the convenience-food categories in the analyses.

The independent measures comprised six variables: the gender of the Highest Earner in the Household (HEH), the type of household, the type of municipality, and the income quintile, educational level and age of the HEH. These variables could be considered to have a significant impact on household food consumption (Warde, 1994; Toivonen, 1997). The highest earner, or the reference person, is defined in the data as the one who had the highest personal earnings in the household during the preceding 12 months. A detailed description of the principles according to which the independent variables were formed and classified is available elsewhere (STAT, 2001; STAT, 2008a).

Descriptive statistics, namely frequency analysis and cross-tabulations, were used for the analyses. We used chi-square statistics (Pearson's χ^2) in order to evaluate the overall significances of the differences between the socio-demographic categories selected. We examined the impact of each of the independent variables in a separate model. Unfortunately, it was not feasible to use logistic regression models with the data at hand since the number of valid cases was often too small. Given these restrictions, we should interpret the results with caution.

4. Results

There have been extensive changes in household decisions to consume different kinds of meat in recent decades. Broiler meat was introduced to Finnish consumers in 1970, but it took a long time for it to appear on Finnish dinner tables: only 12 percent of households consumed broilers in 1985, but consumption had increased to over forty percent two decades later. There was also a slight upward trend in fish consumption up to 2001. In 1985, 95 percent of households bought red meat (beef or pork), and the share of red meat consuming households have stayed quite stable for the last two decades (see Tab. I.).

Table I. Percentage of households consuming different kinds of meat

	1985	1990	1995	1998	2001	2006
Red meat	94.5	94.6	94.8	92.9	94.3	93.9
Broiler	12.2	17.3	27.3	32.1	37.8	42.2
Fish	64.7	69.1	67.1	68.6	72.6	72.6

Households not consuming meat products started to appear in Finnish data at the end of the 1970s (see Table II). Between 1976 and 1981 the proportion of such households rose from 0.3 percent to 3.9 percent, which means that during that time period there was more than a tenfold increase. Further, during the next five years, between 1981 and 1985, there was rapid growth in the number of non-meat households, but then the rate stabilised at around five or six percent. In 1981, of the 7,368 households 111 did not buy meat or fish, and 151 did not buy meat (excluding fish). By 1985 the respective numbers had grown to 150 and 199 of the 8,200 households.

Table II. Percentages of non-meat consuming and semi-vegetarian households

	1966	1971	1976	1981	1985	1990	1995	1998	2001	2006
Sample size	3260	2986	3348	7368	8200	8258	6743	4359	5495	4007
No meat	1.29	0.80	0.33	3.88	5.46	5.36	5.01	6.86	5.11	5.81
Semi-vegetarian[#]					6.13	5.62	5.96	7.27	6.35	7.81

=households in which meat products comprised less than 10 percent of the food consumption

Reliable data was available on the number of semi-vegetarians from 1985 onwards. In recent decades meat products (not including fish) represented approximately twenty percent of the food consumption of the average Finnish household. The proportion was a little under twenty percent in the early eighties, and then grew to twenty-four percent before falling again to just under twenty percent (data not shown here). Given that semi-vegetarians are defined as households in which meat products account for less than ten percent of their total food consumption, it is evident that this is not a very large group. In 1985 there was only a little over half-a-percent addition to non-meat

consuming households, and in the last latest research year, 2006, two percent of the households in addition to the non-meat households were semi-vegetarian.

There are substantial gender differences in the reference person between households buying and not buying meat (see Table III). In 1985 the HEH percentage of women in all households was 37 and in non-meat-buying households it was as high as 65. The difference between heads of households then stabilised slightly, and in the 2006 data the corresponding figures were 40 and 61 percent. A similar gender distribution has also been reported among Finnish vegetarians (Vinnari *et al*., 2008).

It is worth pointing out that the structure of the household is a major determinant of meat consumption. For example, families with children may continue to consume meat even if all the adults are vegetarians. In terms of household type, most non-meat consumers are to be found in single households: in 1985 they accounted for over 60 percent of the households not buying meat, although two decades later this figure decreased to closer to 50 percent.

Another predominant group among non-meat consumers comprised the elderly. At the beginning of the research period over a quarter of such households consisted of elderly people, and the same group represented only 16 percent of meat-consuming households. During the research period, however, the proportion of elderly households increased to 21 percent in the case of meat consumers and decreased slightly among those not eating meat. The percentage of non-meat consumers appears to be smallest in families with children. When there are two parents in the family there is some evidence of a higher proportion, but not in single-parent households. The proportion of childless couples among non-meat consumers more than doubled, from five percent to over 11 percent, during the twenty-year research period.

Table III. Changes in the proportions of non-meat-consuming and semi-vegetarian households by the household reference person's gender, household type and age group

		Gender		Household type						Age group		
Year		Woman	Man	Single (< 65 years)	Childless couple	Single parent	Two parents	Elderly (> 65 years)	Other type	< 29	30-59	> 60
1985	No meat	64.8***	34.2***	61.4***	4.7***	2.0*	3.5***	25.4***	2.9***	43.9***	21.1***	35.1**
	Semi-vegetarian#	59.2***	40.8***	44.9***	5.8***	2.8	13.3***	19.5**	13.7*	22.6***	49.0**	28.4**
	All households	37.2	52.8	23.6	13.2	3.1	25.7	16.3	18.1	16.4	56.8	26.7
1990	No meat	52.3***	47.7***	50.6***	9.0***	1.9**	7.1***	26.1***	5.2***	30.3***	36.5***	33.2
	Semi-vegetarian#	54.9***	45.1***	32.8***	12.9***	2.8	14.0***	27.8***	9.7**	24.1***	41.6***	34.3***
	All households	39.2	61.8	20.9	17.2	3.5	25.6	19.0	13.8	15.0	56.6	28.4
1995	No meat	49.6**	50.4*	55.0***	4.8***	2.0**	7.2***	26.3***	4.8***	22.4***	44.0**	33.6*
	Semi-vegetarian	57.8***	42.2**	37.1***	13.2***	5.2***	16.2***	21.4***	7.0***	21.1**	49.6**	29.3
	All households	40.6	59.4	24.3	17.5	4.6	25.8	18.6	9.1	13.9	57.0	29.1
1998	No meat	40.6	59.4	55.4***	9.0***	2.6*	7.3***	21.9*	3.9***	29.9***	39.3***	30.8
	Semi-vegetarian#	51.6***	48.4**	41.3***	13.6**	4.4	13.2***	22.7*	4.7**	25.6***	47.5***	26.9
	All households	40.8	59.2	24.7	18.5	4.9	23.4	19.6	8.9	13.8	57.2	28.9
2001	No meat	52.3***	47.7*	55.7***	7.7***	2.3***	3.2***	28.1	3.2***	35.9***	33.2***	30.9
	Semi-vegetarian#	55.3***	44.7**	38.4***	14.6**	6.3***	14.0***	21.8	4.9**	30.9***	44.0***	25.1*
	All households	39.1	61.9	24.7	20.4	4.4	22.2	19.7	8.5	14.7	56.0	29.3
2006	No meat	60.6***	39.4***	51.9***	11.0**	1.9**	7.1***	24.7	3.2**	27.3***	42.2**	30.5
	Semi-vegetarian#	57.2***	42.8***	39.3***	16.0	4.8	13.7***	20.8	5.4*	18.6	53.2	28.2
	All households	39.8	61.2	25.5	19.9	4.3	21.4	21.1	7.8	14.0	54.2	31.8

=less than 10 percent of total food consumption includes meat or meat products
*** = $p < 0.001$; ** = $p < 0.01$; * = $p < 0.05$ (2-sided Pearson χ^2)

Thus, there have been some interesting structural changes by household type over the years. Examination by the reference person's age reveals considerably smaller changes. In brief, non-meat consumers predominate in the youngest age group (< 29 year-olds), and are second most prevalent in the elderly group. This separation to both ends of the age distribution started to flatten out in the 2000s, however. Nevertheless, non-meat consumers are still generally younger, but their appearance in the middle-aged groups is increasingly common.

The educational level of Finnish households rose substantially from 1985 to 2006. This also had quite clear effects on the percentages in the different meat-consumer categories. Namely, people with only a basic education have become rarer among both meat eaters and non-meat eaters. At the beginning of the research period tertiary-level education was not as common among non-meat consumers (15 percent) as among meat consumers (20 percent), but the difference has evened out (both 30 percent). Statistically significant differences by educational categories have existed throughout the years (see Table IV).

Analysis by household income level revealed some trends. In all the research years, non-meat consumption was the most general pattern in the lowest income quintile: in 1985 almost 50 percent of non-meat consumers belonged to this group, and in 2006 the figure was about 40 percent. However, the incidence of non-meat consumption started to spread to the other quintile groups, the lowest number of non-meat consumers being in the highest quintile. Differences by household residential area were also detected. At the beginning of the research period about 53 percent of non-meat consumers lived in cities and 43 percent in rural areas, while at the end of the period a substantial majority (78 percent) were living in cities. The research period was a time of fairly rapid urbanisation in Finland, but it seemed to be especially rapid for non-meat consumers.

Table IV. Changes in the proportions of non-meat consuming and semi-vegetarian households by the household reference person's socio-demographic characteristics, education, income and living space

		Education			Income quintile					Type of municipality		
Year		Basic	Secondary level	Tertiary level	Lowest 1	2	3	4	5 Highest	City	Densely populated	Country side
1985	No meat	52.8	32.3	14.9*	48.0***	19.0	12.3***	14.6*	6.1***	52.8*	5.0**	42.2**
	Semi-vegetarian#	43.1**	34.4*	22.5*	29.0**	18.3	20.3	16.5*	15.9**	60.6	7.6**	31.8
	All households	51.1	29.0	19.9	20.0	20.0	20.0	20.0	20.0	57.5	11.2	31.3
1990	No meat	45.2	36.1**	18.7*	41.6***	21.6	10.0***	11.9**	14.8**	64.2*	14.2	21.6
	Semi-vegetarian#	41.2	28.0***	30.8**	27.2**	19.0	19.2***	17.9	16.6*	56.8	16.6	26.6
	All households	46.1	30.7	23.2	20.0	20.0	20.0	20.0	20.0	59.5	14.9	25.6
1995	No meat	43.0	34.1	22.9	35.7***	26.5**	14.9***	11.2***	11.6***	57.4*	11.7	30.9**
	Semi-vegetarian#	34.8	33.3	31.8**	29.0**	18.6*	19.6	14.9*	17.9	65.4*	12.0	22.6
	All households	40.6	34.3	25.1	20.0	20.0	20.0	20.0	20.0	61.6	14.8	23.6
1998	No meat	40.2	36.8	23.1	45.1***	13.6*	15.7*	10.6***	14.9**	73.0*	9.0*	18.0**
	Semi-vegetarian#	31.6*	37.7	30.7**	25.9*	19.6	22.8	14.9*	16.8*	68.8	10.1*	21.1
	All households	38.5	35.3	26.2	20.0	20.0	20.0	20.0	20.0	63.2	13.9	22.9
2001	No meat	35.2	45.7**	19.2***	38.6***	25.5*	15.0*	11.4***	9.5***	73.2**	14.5	12.3**
	Semi-vegetarian#	31.1	43.4**	25.4	26.6**	25.5*	17.5	16.0*	14.3**	67.9	14.0	18.1*
	All households	35.4	37.5	27.1	20.0	20.0	20.0	20.0	20.0	64.3	15.5	20.3
2006	No meat	34.2*	36.1*	29.7	39.6***	18.8**	17.5*	15.6**	8.4***	77.9**	5.8**	16.2*
	Semi-vegetarian#	28.1*	42.2	29.7	23.0	23.3	21.1	16.9	15.7*	64.0	15.3	20.7
	All households	29.8	40.4	29.8	20.0	20.0	20.0	20.0	20.0	65.1	15.4	19.6

=less than 10 percent of total food consumption includes meat or meat products
*** = $p < 0.001$; ** = $p < 0.01$; * = $p < 0.05$ (2-sided Pearson χ^2)

Overall, it appears that the most obvious differences in meat-consumption patterns relate to the gender of the HEH. However, the information on the gender of the reference person implies that this person is able to influence food-purchase decisions more than the other members of the

household. This is always a necessary assumption when analysing household data. For this reason we considered it necessary to examine the gender differences within single-person households (see Table V).

Table V. Percentages of non-meat, semi-vegetarian and non-red-meat-consuming single households by gender

	1985	1990	1995	1998	2001	2006
No meat (Female)	11.2	8.2*	8.6	9.6**	8.6	10.8***
No meat (Male)	10.3	10.4*	8.1	14.1**	9.5	5.2***
All no meat single households	10.8	9.3	8.4	11.9	9.1	8.0
Semi-vegetarian# (Female)	16.1***	12.3***	13.0***	16.8***	13.5***	18.6***
Semi-vegetarian# (Male)	5.1***	4.6***	5.6***	8.0***	6.6***	6.0***
All semi-vegetarian single households	10.6	8.5	9.3	12.4	10.0	12.3
No red meat (Female)	15.6*	13.6	14.1**	14.8	12.6	17.4***
No red meat (Male)	12.6*	11.8	11.3**	16.1	12.7	6.7***
All no red meat single households	14.1	12.7	12.7	15.5	12.6	12.1

=households in which less than 10 percent of the food consumption includes meat products
*** = $p < 0.001$; ** = $p < 0.01$; * = $p < 0.05$ (2-sided Pearson χ^2)

In the case of non-meat consumers there were statistically significant differences in the years 1990, 1998 and 2006. In other words, the observed pattern was not clear throughout the period in question. In addition, in two years (1998 and 2001) there were higher numbers of men in the non-meat-consuming group. In the case of semi-vegetarians the gender differences were quite significant, and female households were more than twice as common in that group. There was some indication that non-red-meat consumers were also more likely to be female, but the differences were not as clear as in the case of semi-vegetarians.

5. Conclusions and Discussion

The issue of meat eating has been of interest to humans for a long time. It has been rigorously investigated from ethical, health and environmental perspectives. In recent decades more and more sociologists have started to investigate consumer perspectives on meat as a consumption product.

These studies have pointed out that many humans have mixed feelings about eating meat. On the aggregate level, however, these feelings do not seem to affect total meat consumption on the national level, although something might be happening under the surface. There are many reports about the possible rise in popularity of vegetarianism, and some people even suggest that vegetarianism will revolutionise food consumption (Maurer, 2002). Solid quantitative research about the developments is limited, however, and there is no previous research in the Finnish context. This article considers the phenomenon from a descriptive perspective. As already noted, the data at hand was not suitable for multivariate models because of the small number of observations

While it is true that we were not able to study in detail the trends in meat consumption between the different population groups, we can still present some general conclusions about recent changes. Households have indeed started to consume a wider variety of meats, and the broiler has found its way onto more and more dinner plates in Finland. This trend has become more and more visible over the years. First, at the end of the 1970s there was evidence that some consumers were no longer buying any meat products for their homes. There was a large increase in these households at the beginning of the 1980s, but then the growth rate stabilised and the number of households not consuming meat is currently around six percent. Secondly, it is obvious that while non-meat consumption has become more prevalent, it has also become more clearly a middle-class phenomenon. When we evaluated the socio-demographic factors related to non-meat consuming households we discovered certain trends. Previous studies have described vegetarians as predominantly young females living in cities (Sabate *et al*., 2001). Similar characteristics are evident in non-meat-consuming households. When the changes over time were observed, however, some differences were found. In 1985 non-meat-consuming households also included elderly people and people living in rural areas. Some of these were probably people who did not have the money to

buy meat. At the beginning of the research period the reference person in a substantial proportion of the non-meat-consuming households only had a basic education, but that has now changed and more households are in the higher educational levels. Moreover, the same type of transition has also happened with regard to income level. Thirdly, it is noteworthy that closer inspection of single households revealed that, in general, female households were more likely to be non-meat consumers. The effect of gender was especially strong in the case of semi-vegetarians.

Overall, it seems that the evolving arguments in the scientific arena have brought some development in certain groups in the case of meat consumption. On the other hand it is, of course, possible that developments in society have caused changes in the scientific arena. What seems evident, however, is that some changes have taken place, and it will be interesting to observe how the prevalence of non-meat consumption in different households in the future will reflect the expected technological developments, and the realisation among the general public of the environmental effects of eating meat. Even though not all the households that were non-meat consumers in this research were classed as vegetarian because they might buy products with some meat in them, it is probably easier to substitute the meat in these than in whole-meat products.

The question about the future of meat consumption is becoming ever more important given the global increase, which is partly due to the rise in the standard of living. In the developing world the average person now consumes nearly 30 kilograms of meat a year, and in the industrial countries the average is about 80 kilograms year. (Brown, 2006) If China and India were to follow the Western pattern of meat consumption the environmental consequences would be enormous. In the long run, however, we might hope that the trends in Western societies will also become evident in the developing countries. If we can better understand the drivers of both meat and non-meat consumption we might be able to help to control the growth in Western and developing countries.

There are substantial differences between nations even in EU towards animal farming. For example in Finland there is a the lowest share of people out of the EU-25 countries who think that animal policy should be more an the agenda and very large share of the population thinks that animals are treated better in Finland than in other EU countries (Eurobarometer 2005). This can partly be explained by the Finnish tradition to be a high trust society. As such Finland is probably not likely to have large share of non meat consumers driven by ethical factors. The animal disease discussion (such as BSE) or excessive usage of antibiotics to farm animals reported in other countries affecting perspectives towards meat products (Becker, 2000; Baines and Harris, 2000) has not been very influential in Finland. One possible factor that can have effected the non meat consumption was the rapid urbanisation that has taken place during the research period. Urban people can have better access to shops and they can have wider selection of products available for them (McEachern and Warnaby, 2006) and these could have made transition easier. More research is, however, needed to examine what factor of these or additions to these are the driving factor of the non-meat consumers or semi-vegetarians.

More research is also needed to examine the non-meat consumption in other countries in order to have comparative results, which could help to validate the results of this study. Examining the development in the prevalence of semi-vegetarian household with different shares of food consumption allocated to meat products could be relevant if actions towards limiting total meat consumption are considered. Qualitative studies about the non-meat consumption practises in household level related to eating in house and out of the house could clarify the prevalence of the "strict" non-meat consumers.

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Identifying vegetarians and their food consumption according to self-identification and operationalized definition in Finland

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Abstract

Objectives: To determine the prevalence and sociodemographic factors related to vegetarians according to different definitions in Finland and to compare the consumption of selected foodstuffs and nutritional intakes among vegetarians and omnivores.
Design: Information about subjects' identification as vegetarians in a survey was used as a basis for self-defined vegetarianism. Foodstuffs consumed and their frequencies of consumption were obtained, and the reported consumption frequencies of meat, fish, milk and eggs or food portions containing these foodstuffs were used as a basis for an operationalized definition of different types of vegetarianism. Reported consumption was used to estimate foodstuff and nutritional intakes.
Setting: Three large nationwide surveys in Finland.
Subjects: In total, 24 393 participants aged between 18 and 79 years were included.
Results: The proportion of self-identified vegetarians was 3·3% of the total population in Finland. According to responses to questions on consumption frequency, 1·4% of the population were pesco-lacto-ovo-vegetarians, 0·43% were vegans, lacto-vegetarians or lacto-ovo-vegetarians, and 0·18% were vegans or lacto-vegetarians. Eighty per cent of the self-identified vegetarians did not follow a vegetarian diet according to the operationalized definition, but they consumed fewer meat products ($P < 0{\cdot}01$).
Conclusion: Some self-defined vegetarians do consume red meat, poultry or fish, but they follow a healthier diet than self-defined omnivores. In the same sample self-identification indicated more than double the incidence of vegetarianism than the operationalized definition. Therefore self-identification is not a good method for observing the prevalence of vegetarianism.

Keywords
Vegetarianism
Prevalence
Self-identification
Dietary patterns
Nutrition

There is wide variation in the definition of a vegetarian diet[1–3]. Some definitions consider the exclusion of certain foodstuffs as the defining principle of vegetarianism. In the scientific literature, the term pesco-lacto-ovo-vegetarian (PLOV) signifies a person who consumes fish, milk, eggs and plant-based substances, but no meat or poultry. Sometimes the term vegetarian is understood to mean a person consuming plant-based substances, milk and eggs, i.e. lacto-ovo-vegetarian (LOV), but no fish, poultry or meat. A person who consumes only plant-based substances is considered a vegan. In other definitions consumption frequency is the defining factor. Some people use the term semi-vegetarian (SV) to describe a person who consumes meat products very rarely[4], while others define vegetarianism as a diet according to which meat, poultry or fish is eaten less than once a week[5,6].

The numbers of vegetarians, and especially of the different types, in Western countries are not known because estimates have been based on rather small samples or there has been wide variation in sampling methods[7–9]. According to the results of previous studies in the European Union, the prevalence of self-identified vegetarians is about 3 to 5% of the total population[10]. In Great Britain, according to different surveys[11,12], it is between 5 and 7%. Self-identification surveys in the USA have given high percentage rates of vegetarians (7%) in the total population[13], but some prevalence studies have put the number as low as 2%[5]. In Finland only some rough estimates have been made, and the assumed proportion is about 2–3% of the total population[14–16]. A Finnish survey of 12–18-year-olds estimated the incidence of self-identified vegetarianism as 9·9% for girls and 1·7% for

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boys in 2001[17]. What seems likely is that its prevalence has increased substantially during the last few decades in the Western world[5,6]. It has been reported that this growth is likely to continue in the future because of technological, social and economic developments[18].

Vegetarianism has raised a lot of interest in the medical context because of its possible effects in terms of decreasing risks from disease such as heart disease, various cancers and type 2 diabetes[19–24]. A link between lower BMI and vegetarianism has also consistently been reported[25–27], as well as an overall decline in mortality[28]. Even though the health effects of vegetarianism and veganism are largely acknowledged, some uncertainties remain[29,30], especially with regard to sufficient vitamin B_{12} and vitamin D concentrations in the diet[31,32].

The present paper investigates the prevalence and sociodemographic variables of self-identified vegetarians, and of LOV, PLOV and self-identified omnivores who consume vegetarian meals. The assumption in this research is that lay persons' definitions of a vegetarian diet differ from expert definitions and information is needed regarding which sociodemographic group's definition differs most from the scientific definition. This is important in order to target health promotion and health policies correctly to different groups. The aim of the research was to promote understanding of the limitations involved in using self-identification as a basis for estimating health effects in larger populations, especially since vegetarianism is expected to increase in the future. The last part of the paper concentrates on reviewing the intake of selected food types and their nutritional value in different vegetarian groups.

Subjects and method

Subjects

The data for the current study were drawn from three sources: the National FINRISK 1997 and 2002 studies and the Health 2000 Health Examination Survey. National FINRISK is a population-based risk factor survey, which has been carried out every five years since 1972 in Finland. The National FINRISK surveys utilize stratified random samples drawn from five areas in Finland: Helsinki and Vantaa (the metropolitan area), the cities of Turku and Loimaa as well as some rural communities in Loimaa, and the provinces of North Karelia, North Savo and Oulu. The study protocol includes health examinations and health questionnaires[14]. The 1997 study sample comprised 11 000 persons aged 25–74 years, of whom 7159 (65 %) participated in the study[14]. A further random sample of 1500 persons aged 65–74 years in two administrative areas in Finland was also included, and 1288 (86 %) of them participated in the study. The FINRISK 2002 sample comprised 13 437 persons, of whom 9580 (71 %) participated in the health examination or at least returned the questionnaire[15].

The nationwide Health 2000 Health Examination Survey (Health 2000) was carried out in Finland in 2000–2001 in eighty regions, incorporating fifteen of the bigger cities[33]. The study comprised many questionnaires, an extensive interview and a comprehensive health examination including laboratory and functional capacity tests as well as a thorough clinical examination[34]. The sample of persons aged 30 years or over comprised 8028 individuals, of whom 6986 (87 %) were interviewed in their home or in an institution. Overall, 84 % participated either in the health examination or in the examination at home. The sample of 18–29-year-olds comprised 1900 individuals, of whom 1503 (79 %) participated in the health interview and 1282 returned the health questionnaire given at the interview[35]. An FFQ was given at the end of the examination or the interview, and the participants were asked to return it by mail. A total of 6787 persons aged 18 years or above participated in the dietary study. After exclusion of those aged over 80 years, data were available for 6366 persons. The data set of the present study, pooled from the three nationwide surveys, comprised 24 393 individuals (data available for 24 044 individuals) following the exclusion of those who gave invalid data on their self-defined vegetarian status or their dietary habits.

Questionnaires

In all three surveys, information on the participants' demographic and socio-economic background, including education, family size, marital status and subjective health, was collected during the health interview and in the questionnaires. The level of education was assessed using information on formal schooling and vocational training. Education was categorized as low, moderate or high for the analyses. Those with no vocational training beyond a vocational course or on-the-job training, and who had not taken the matriculation examination, were classified as having a low education. Vocational training was defined as secondary education regardless of the basic education. Moreover, those who had passed the matriculation examination but who had no vocational training beyond a vocational course or on-the-job training were also classified in this moderate group. High education comprised degree studies at higher vocational institutions, polytechnics and universities. Marital status was categorized as married, co-habiting, divorced, widowed and single. The participants were also asked to assess their own health status on a five-category scale ranging from very bad to very good. This subjective health was further categorized as good or rather good, moderate, and bad or rather bad. The National FINRISK 2002 study and the Health 2000 survey also provided data on the potential use of dietary supplements.

Self-defined vegetarian status was defined on the basis of the question 'Do you consider yourself to be a vegetarian?' in the National FINRISK 1997 and 2002 surveys, and on the basis of the vegetarian diet option on the list of special diets in the Health 2000 survey.

The questionnaires in the National FINRISK surveys included a food-frequency section including forty foods or food items. The six frequency categories ranged from 'never or less than once per month' to 'once or more per day'. The dietary data in Health 2000 were obtained from a self-administered, semi-quantitative FFQ, which included 128 food items selected on the basis of experiences from previous studies to assess the whole diet over the previous 12 months. The nine frequency categories ranged from 'never or rarely' to 'six or more times per day'. The validity of the FFQ was assessed and the data collected appeared to meet the requirements of epidemiological studies[36].

The participants were divided into consumers or non-consumers of each food on the basis of their responses to the FFQ. Those who reported once per month or more were considered consumers and those who indicated less than once per month or rarely were considered non-consumers. Three commonly used categories of vegetarianism[4–6] were formed on the basis of reported consumption according to the questionnaire as follows: (i) vegans or lacto-vegetarians were defined as persons who ate meat products, eggs or fish less than once per month; (ii) vegans or lacto-ovo-vegetarians (LOV) were defined as persons eating vegetarian food, including dairy products and sometimes eggs, but no meat, poultry or fish; and (iii) vegans or lacto-ovo-vegetarians or pesco-lacto-ovo-vegetarians (PLOV) were defined as those eating vegetarian food, and also dairy products and eggs as well as fish, but no meat or poultry.

The dietary data from Health 2000 were used to describe dietary habits according to vegetarian status. Food consumption was converted into g/d by multiplying the frequency of consumption by fixed portion sizes. The ingredients of mixed foods were broken down into their components. The contents of different nutrients in food items were estimated using the Finnish Food Composition Database release 2 (National Public Health Institute, Helsinki, Finland).

Statistical analyses

Sample characteristics are described in terms of means and standard deviations for continuous variables, and frequencies (percentage) for categorical variables. Prevalence estimates adjusted for age, gender and the year of the study were estimated using a linear model[37]. The statistical significance of the differences between prevalences was tested using the likelihood-ratio test based on the model. The SAS/STAT statistical software package version 8·02 (SAS Institute Inc., Cary, NC, USA) was used for the statistical analyses.

Results

Prevalence

Of the 24 393 respondents (data about self-identified vegetarian status was available for 24 044 respondents), 783 (3·3 %) considered themselves to be vegetarian (Table 1). However the FFQ revealed that, according to the foodstuffs consumed, only 332 participants (1·4 %) in total followed a PLOV or stricter diet, and 104 (0·43 %) followed a LOV or stricter diet. The percentage of female vegetarians was more than double the percentage of males in all of the operationalized definition groups. The percentage of males grew in all of these groups between 1997 and 2002, but there were no significant changes among the females. All in all, there were no large differences in the total proportions of vegetarians between the different samplings utilized in the research.

Socio-economic factors related to different groups

The differences between self-defined vegetarians and those (PLOV and LOV) fitting the operationalized definition are presented in Table 2, which indicates the prevalence of these groups according to personal characteristics. However defined, vegetarians were mainly younger and predominantly women from the southern part of Finland. Vegetarianism was also more prevalent among single, divorced and widowed people. PLOV had a particularly high level of education and they were often also supplement users. No statistically significant differences in subjective health experiences were found among the vegetarians. Differences between the two definitional groups were evident in the large number of self-defined vegetarians in the older (60–79 years) age group. PLOV and

Table 1 The prevalence of vegetarianism in three nationwide surveys in Finland

	Prevalence (%)											
	FINRISK 1997 (*n* 8447)			Health 2000 (*n* 6366)			FINRISK 2002 (*n* 9580)			All (*n* 24 393)		
Type of vegetarian diet	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
Vegan or lacto-vegetarian* (*n* 44)	0·05	0·22	0·13	0·07	0·28	0·19	0·16	0·28	0·22	0·10	0·26	0·18
Vegan or lacto-ovo-vegetarian† (*n* 104)	0·09	0·67	0·38	0·18	0·71	0·47	0·27	0·59	0·44	0·18	0·65	0·43
Vegan or lacto-ovo-vegetarian or pesco-lacto-ovo-vegetarian‡ (*n* 332)	0·59	2·04	1·31	0·63	1·99	1·38	0·72	2·01	1·40	0·65	2·01	1·37
Self-defined vegetarian§ (*n* 783)	3·79	4·45	4·12	1·33	2·74	2·13	2·11	4·26	3·27	2·54	3·90	3·26

*Meat products, eggs or fish less than once per month.
†Meat products and fish less than once per month.
‡Meat products less than once per month.
§Data available for 24 044 persons.

Table 2 Multivariate adjusted* prevalence of vegetarianism, self-defined and operationalized from the FFQ, according to personal characteristics: combined data from three nationwide surveys in Finland (*n* 24 393)

	Self-defined vegetarian (*n* 783)	Pesco-lacto-ovo-vegetarian according to FFQ (*n* 228)	Vegetarian† according to FFQ (*n* 104)
Gender‡			
Men	2·46	0·48	0·20
Women	3·98	1·35	0·64
P value for heterogeneity	<0·001	<0·001	<0·001
Age (years)§			
18–29	3·56	1·85	1·46
30–59	2·53	0·88	0·34
60–79	5·20	0·71	0·23
P value for heterogeneity	<0·001	<0·001	<0·001
Area			
South	3·58	1·40	0·68
West	3·17	1·00	0·69
Middle	2·81	0·87	0·27
East	3·37	0·88	0·27
North	2·71	0·48	0·25
P value for heterogeneity	0·15	<0·001	<0·001
Education			
Low	3·64	0·58	0·22
Moderate	2·74	0·74	0·36
High	3·80	1·99	0·66
P value for heterogeneity	<0·001	<0·001	<0·001
Marital status			
Single	4·67	1·87	0·84
Co-habiting	3·39	1·19	0·50
Married	2·57	0·51	0·23
Divorced	4·19	1·38	0·61
Widowed	5·13	1·80	0·97
P value for heterogeneity	<0·001	<0·001	<0·001
Family size			
1 person	4·86	1·96	0·89
2 persons	3·62	1·02	0·48
3 or more persons	2·09	0·36	0·11
P value for heterogeneity	<0·001	<0·001	<0·001
Subjective health			
Good or rather good	3·04	1·11	0·46
Moderate	3·18	0·63	0·32
Bad or rather bad	4·50	0·83	0·51
P value for heterogeneity	0·003	0·003	0·24
Supplement user‖			
No	2·19	0·55	0·29
Yes	3·47	1·46	0·64
P value for heterogeneity	<0·001	<0·001	0·002

*Adjusted for age, gender and year of the study.
†Vegan or lacto-ovo-vegetarian.
‡Not adjusted for gender.
§Not adjusted for age.
‖Data not available in FINRISK 1997 (available for 15 045 persons).

LOV prevalence increased with level of education, but self-identified vegetarianism was also high among the less educated.

The personal characteristics of those of vegetarian status according to the operationalized definition are presented in Table 3. A very large proportion of PLOV and LOV in the present study were women (75·6 and 78·1 %, respectively) compared with omnivores (52·2 %), they were younger and a considerable number of them had the highest educational level. They also considered their health to be good, and were often supplement users. The two groups were quite similar in characteristics except that PLOV had higher educational levels (37·6 % belonged to the highest group).

The majority (80·0 %) of the self-defined vegetarians were omnivores according to the operationalized definition

Table 3 Multivariate adjusted* distribution of personal characteristics according to operationalized vegetarian status from the FFQ: combined data from three nationwide surveys in Finland (*n* 24 393)

	Omnivore (*n* 23 971)	Pesco-lacto-ovo-vegetarian according to FFQ (*n* 228)	Lacto-ovo-vegetarian† according to FFQ (*n* 104)	*P* value
Gender, % men‡	47·8	24·4	21·9	<0·001
Age (years), mean (SD)§	48·1 (13·8)	44·7 (14·0)	40·3 (14·6)	<0·001
Area, % south	24·9	36·4	38·9	<0·001
Education, % high	17·6	37·6	31·3	<0·001
Marital status, % married	58·1	32·3	31·8	<0·001
Family size, % single	19·7	41·3	42·4	<0·001
Subjective health, good or rather good	59·4	69·5	64·9	0·002
Supplement user, %‖	44·0	66·3	62·4	<0·001

*Adjusted for age, gender and year of the study.
†Vegan or lacto-ovo-vegetarian.
‡Not adjusted for gender.
§Not adjusted for age.
‖Data not available in FINRISK 1997 (available for 15 045 persons).

Table 4 Distribution* of personal characteristics according to self-defined vegetarian status: combined data from three nationwide surveys in Finland (*n* 24 393)

	Self-defined vegetarian (*n* 691)			Self-defined omnivore (*n* 23 231)		
	Omnivore (*n* 554)	Pesco-lacto-ovo-vegetarian† (*n* 137)	*P* value	Omnivore† (*n* 23 142)	Pesco-lacto-ovo-vegetarian† (*n* 89)	*P* value
Gender, % men‡	45·4	17·9	<0·001	47·8	41·3	0·22
Age (years), mean (SD)§	56·0 (12·9)	44·2 (13·2)	<0·001	47·8 (13·7)	45·7 (15·0)	0·15
Area, % south	24·5	34·1	0·02	25·0	33·0	0·08
Education, % high	10·8	33·9	<0·001	18·0	38·2	<0·001
Marital status, % married	54·6	38·9	0·002	58·3	29·2	<0·001
Family size, % single	26·6	41·4	0·002	19·5	40·7	<0·001
Subjective health, % good or rather good	43·9	65·4	<0·001	60·0	65·6	0·25
Supplement user, %‖	52·6	75·5	<0·001	43·9	63·6	0·001

*Adjusted for age, gender and year of the study.
†According to FFQ.
‡Not adjusted for gender.
§Not adjusted for age.
‖Data not available in FINRISK 1997 (available for 15 045 persons).

(Table 4). According to the FFQ responses, these so-called vegetarians differed from PLOV in age (they were older) and gender distribution (which was much closer to that of the general population). There were also fewer people who felt that their subjective health was good or rather good in this group than in any other group in the study. People who considered themselves omnivores but followed a PLOV diet had a high level of education and were predominantly single. Among the self-defined vegetarians those who followed a vegetarian diet, according to the FFQ, were more likely to be supplement users (75·5 %) than those in the omnivore group (52·6 %).

Food intakes

The mean daily intakes of selected food items and nutrients adjusted for age, gender and energy intake are presented in Table 5. PLOV consumed higher amounts of grains and especially rye than subjects in the other groups. They also ate more vegetables (429 g/d) than the omnivores (276 g/d). They did not consume larger amounts of milk products than those in the other groups, but they did consume more cheese. They also consumed more fish. PLOV consumed some meat and meat products. An analysis of the crude numbers (data not displayed) showed that their unadjusted consumption of meat was 13·9 g/d and their consumption of poultry 1·0 g/d. There were no significant differences between the groups in the consumption of fat, butter and confectionery products. The self-defined vegetarians differed from the omnivores in their higher vegetable (409 g/d) and lower meat (103 g/d) consumption. Despite their perception of themselves as vegetarians, they included a considerable amount of meat in their diet. Among self-defined vegetarians the unadjusted consumption of meat and meat products was 88·9 g/d.

Nutrient intakes

There were no significant differences between PLOV and omnivores in the intake of nutrients. The former consumed less energy and their fibre intake was higher. There were differences in energy sources between the self-defined vegetarians and the omnivores: the distribution

Table 5 Mean daily intakes* (and standard deviations) of selected food items and nutrients in Finnish vegetarians and omnivores, according to the operationalized definition and self-definition in the Health 2000 survey

	Omnivore† (*n* 6277)		Pesco-lacto-ovo-vegetarian† (*n* 58)			Self-defined omnivore (*n* 6228)		Self-defined vegetarian (*n* 134)		
	Mean	SD	Mean	SD	*P* value	Mean	SD	Mean	SD	*P* value
Foodstuff (g)										
Grains	189·3	84·2	221·0	83·2	<0·001	189	84	203	95	0·005
Rye and hard bread	54·1	36·7	71·7	38·2	<0·001	54·1	36·8	59·4	39·6	0·08
Vegetables	276	194	429	275	<0·001	275	192	409	318	<0·001
Potatoes	175	124	154	101	0·15	175	124	160	142	0·13
Fruit, berries and juice	297	256	355	266	0·06	297	255	350	288	0·01
Milk and milk products	592	368	575	340	0·03	590	367	598	420	0·79
Cheese	42·9	37·2	63·2	54·8	<0·001	43·0	37·1	47·8	54·0	0·11
Eggs	27·8	24·8	28·8	14·5	0·71	27·7	24·6	29·7	31·3	0·28
Fish	45·7	39·9	65·1	51·6	<0·001	45·7	39·2	47·4	72·0	0·58
Meat and meat products	176	100	43	13	<0·001	175	100	103	131	<0·001
Red meat	145·0	88·4	42·1	12·0	<0·001	144·0	87·8	90·4	120·0	<0·001
Poultry	30·9	38·8	0·9	1·1	<0·001	30·9	38·9	13·0	24·8	<0·001
Fat	48·1	24·4	48·1	25·6	0·98	48·0	24·2	49·1	36·5	0·43
Butter and butter spread	11·0	8·9	11·6	7·7	0·55	11·0	8·9	10·8	8·6	0·75
Sweets and chocolate	17·4	21·7	22·1	34·5	0·08	17·5	21·8	20·7	28·3	0·06
Nutrients										
Energy (kJ)	9659	3542	8252	3697	0·03	9646	3605	9144	5007	0·11
Energy (kcal)	2307	846	1971	883	0·03	2304	861	2184	1196	0·11
Carbohydrates (% of energy)	44·9	5·8	50·4	5·0	<0·001	44·9	5·8	49·5	6·7	<0·001
Protein (% of energy)	17·2	2·2	15·2	2·5	<0·001	17·2	2·3	15·5	2·8	<0·001
Fat (% of energy)	36·2	4·9	32·7	4·7	<0·001	36·2	4·9	33·5	6·0	<0·001
SFA (% of energy)	14·7	2·5	13·3	2·9	<0·001	14·7	2·5	13·5	3·0	<0·001
MUFA (% of energy)	12·3	1·9	10·5	1·5	<0·001	12·3	1·9	11·0	2·3	<0·001
PUFA (% of energy)	5·7	1·2	5·8	1·1	0·67	5·7	1·2	5·7	1·6	0·89
Fibre (g)	24·5	10·7	33·2	14·2	<0·001	24·5	10·7	29·6	14·2	<0·001
Ca (mg)	1343	605	1435	643	0·08	1342	601	1389	791	0·18
Fe (mg)	15·4	6·0	16·2	5·8	0·03	15·4	6·0	16·0	7·9	0·01
Vitamin B_{12} (μg)	9·9	5·7	8·0	4·2	<0·001	9·9	5·7	8·5	7·9	<0·001
Vitamin D (μg)	6·7	4·5	7·7	5·4	0·03	6·7	4·4	6.7	7·0	0·81

*Adjusted for age, gender and energy intake.
†According to the FFQ.

(carbohydrates–proteins–fats) of energy intake was 45:17:36 for the latter and 50:16:34 for the former. Both self-identified vegetarians and PLOV obtained more energy from carbohydrates and less from fat. The intake SFA and MUFA was smaller among PLOV and self-defined vegetarians than among omnivores, but there were no differences in PUFA intake. Fibre intake was higher among PLOV and self-defined vegetarians, but there were no significant differences between the groups in the intake of Ca and Fe. Vitamin B_{12} intake was smaller among the self-identified vegetarians (8·5 μg/d) and PLOV (8·0 μg/d) than among the omnivores (9·9 μg/d), and there were no significant differences in vitamin D intake.

Discussion

The results of the present study reveal a large discrepancy in the number of vegetarians in society depending on whether the calculation is based on self-definition or operationalized definition: in the former case, the proportion of vegetarians in the whole population was 3·3 %, but only 0·43 % for LOV and 1·4 % for PLOV when the operationalized definition was used. Self-identification seems to give estimates that are double those calculated from the FFQ. This difference can probably be partly explained by the ambiguous interpretation of the term vegetarian. In particular, there were many self-identified vegetarians in the group with lower educational status and in the elderly. One could draw the conclusion that at least some of them confused the question 'Do you follow any special diet – such as a vegetarian diet?' with the question 'Do you include vegetables in your diet?' Another explanatory factor could be that vegetarianism is considered a positive behaviour and people want to relate to it, even though they do not eat only vegetarian food[38].

The discrepancy between the operationalized definition and self-identification decreased slightly between the years of the surveys (1997–2002), which may mean that knowledge about what is meant by a vegetarian way of eating has increased. On the other hand, it cannot be ruled out that this reduction might instead be due to the different ways of asking about vegetarianism used in the surveys and also the fact that persons aged 18–25 years were included in the Health 2000 survey but not in the FINRISK surveys. Previous studies in England have identified vegetarians as

likely to be female, well educated and living in the southern part of the country[39]. The present results suggest that similar characteristics describe Finnish vegetarians in all groups. These differences can be partly explained by the higher rate of urbanization. The higher prevalence of vegetarianism among women has often been explained by the perceived masculinity of meat as a food[40]. Single women also have more freedom to choose their diet, which may partly explain the high proportion of single people among vegetarians. Vegetarians (PLOV and LOV) were also characterized by good subjective health and supplement usage. However, some people who followed a PLOV or a stricter diet according to the operationalized definition did not consider themselves vegetarian. There may be several explanations for this: they do not see themselves as vegetarians because they eat fish or they consume meat products at very low frequencies, such as when visiting relatives.

An analysis of the mean daily intakes of selected food items showed that PLOV consumed higher amounts of grains, vegetables, fish and cheese than the other groups. There were differences between the self-defined vegetarians and the omnivores in terms of higher vegetable consumption and lower meat consumption among the former. A small amount of meat was observed in the diet of PLOV and self-defined vegetarians apparently resulting from rare consumption or the standard recipe file used to break down the mixed foods.

Energy sources differed between self-defined vegetarians and omnivores, and both the former and PLOV obtained a larger proportion of energy from carbohydrates and a lower proportion from fat. Their fibre intake was also higher than among the other vegetarians. Furthermore, their vitamin B_{12} intake was lower than that of the total population, but much above the critical level of $2\,\mu g/d$[6]. There were no significant differences in vitamin D intake among the groups.

Knowledge of the prevalence of vegetarianism on the national level is currently limited. A large sample was used in the current study in order to produce more reliable estimates. There are some limitations, however. Our data did not include children (0–18 years), which could have lowered the prevalence numbers because vegetarianism is popular among young girls[17]. There were also differences between the frequency categories in the samples, and there was no 'never use' category in the consumption frequency questionnaires. Nutritional intake also differs by individual, so there is a danger of generalization when average data are utilized. Adjusting nutrient intakes according to energy intake affected the consumption to some degree and resulted in higher meat consumption among PLOV, for example.

Some studies have used self-definition as a way of examining a vegetarian way of eating[41] and have concluded that self-identified vegetarians follow healthier diets than the general population. The conclusion in the current study is that both PLOV and self-defined vegetarians follow a healthier diet than the general population. In addition, however, it is important to note that 80 % of the self-identified vegetarians did not follow a vegetarian diet according the operationalized definition; in the same sample self-identification gave more than double the incidence of vegetarianism thus defined. This can mean at least three things: (i) that lay persons' definition of vegetarianism differs from the expert definition; (ii) that people do not know what food products they consume; or (iii) that some consumers want to identify themselves as vegetarian even though they consume meat. Related to the first point it would be important for a nutritionist to investigate in depth what a person means by a vegetarian diet before giving any nutritional advice. This is especially important in the case of older and less educated people. Related to the second point it could be useful to have vegetarian and vegan labels on food products, so that consumers would have a better understanding of what they are actually consuming. What is certain, however, is that self-identification is not a good method for observing the prevalence of vegetarianism at national level, and should be used with caution in identifying its health effects in certain groups.

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The future of meat consumption — Expert views from Finland

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Abstract

Meat consumption with large environmental and ethical implications is expected to grow in the future. Some studies, however, take the opposite view, that meat consumption is at a turning point because of a growing number of vegetarians and other factors in industrialized countries. This paper examines thirty nine Finnish experts' views on the development of meat consumption and analyses the explanatory grounds used by the experts in order to identify possible factors affecting meat consumption in the future. To ensure that different types of views would be represented, a new method of categorization of the experts was developed. In answer to the question; "What would constitute a preferable amount of meat consumption in Finland in the year 2030?", the average answer given by the experts was 66 kg per person per year and the median 71 kg, both of which would mean a drop from the current level of 72 kg. However, the average probable consumption foreseen by the experts was 75 kg and the median was also 75 kg. By analysing the grounds presented by the experts, the discussion part of the paper presents a selection of strategies that can be used to help decrease meat consumption: 1) aid the technological development of products that could replace foodstuffs that originate from animals, 2) use ad campaigns to increase consumer knowledge about animal rights and vegetarianism, 3) make political decisions to transfer agricultural production away from meat production and promote the broadening of the selection of alternatives to meat products in stores, and 4) place higher taxes on meat products.

Keywords: Expert interviews; Meat consumption; STEEPV analysis; Sustainable development

Abbreviations: kg, kilograms.

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1. Introduction

1.1. The current understanding of the future of the meat consumption

Most meat consumption forecasts have been approached from the simple perspective that when income levels rise, meat consumption also rises because meat is generally considered a normal good, meaning that when consumer income increases, meat demand increases [1,2]. This approach is understandable because meat has been traditionally regarded as a desirable and expensive food product in Western countries [3,4]. The most important attributes that consumers give to meat are taste, value for money and health [5,6].

The Food and Agriculture Organization of the United Nations (FAO) for example estimates that the trend towards the increased consumption of livestock products will continue in the following decades in the developed countries. The FAO estimates that in the year 2030 meat consumption will be as high as 100 kg per person per year in industrialized countries [7]. According to a World Bank report [8], the total global demand for meat is expected to grow by 56% between 1997 and 2020. Currently the variation in consumption levels is quite large. For example among the EU-15 countries, Spain consumed the most meat in 2004, a total of 135 kg per person. In Finland the amount of meat consumed is the lowest in the EU-15 countries, 72 kg per person [9].

The assessment for an ever growing trend in meat consumption is not, however, shared by all experts. Vegetarianism is seen by some as a factor that can affect meat consumption in developed countries [10]. Some even see the potential for a quite rapid end to the meat economy because of rising vegetarianism and the influence of the animal rights movement [11,12].

This paper investigates changes in future meat consumption that Finnish experts see as probable and preferable [13]. The objective of the study is to find out whether the continuation in the growth of consumption is seen as a generally preferable development or not by a large group of experts. The explanations stated by the experts are analysed by dividing them into those favouring an increase and those favouring a reduction in meat consumption. The purpose of this analysis is to achieve a holistic view of the factors affecting meat consumption in the long run. The discussion part of this paper outlines action that could be taken to achieve the preferable consumption levels. The type of research presented here thus represents that called for by Myers [14] where we try first to identify relevant factors and then assess the barriers to changing attitudes and behaviour in the direction of more sustainable consumption patterns.

1.2. The importance of meat consumption to sustainable development

Sustainable consumption practices have been traditionally approached from the narrow perspective of humans [15] or humans and ecosystems [16]. In the case of meat consumption, however, studying sustainability from this type of perspective can be limiting. A more holistic view is presented for example by Eckersley [17]. Dividing the natural world views into zoocentric and ecocentric viewpoints can help to better understand consumption practices. Furthermore, by dividing the human world views into humanistic and utilitarian, we can even better understand consumption practices.

People holding zoocentric world views have negative attitudes towards meat consumption in general as well as to the growth of meat consumption in industrialized countries. One example of zoocentric environmental discourse is the animal rights discourse. People holding ecocentric world views see growth in meat consumption as harmful, but they do not consider using animals as food to be harmful *per se*.

People holding human-based world views can be divided into humanistic and utilitarian. Holders of a humanistic world view see negative consequences for humans if meat consumption continues to grow in industrialized countries. Human-based utilitarian thinkers see the continuation of that growth as development and as a positive thing (see Table 1). Utilitarians can be described as belonging to a cornucopian environmental discourse based upon an optimistic belief in human progress and technological development.

According to the ecocentric perspective, food consumption is one of the most polluting of our everyday activities when the collective impacts accrued during a product's life cycle are considered [18]. Due to their large environmental effects, some researchers claim that food consumption patterns are at the core of all human ecology [19]. The large environmental impacts related to meat as a consumption commodity – the use of land [20,21], energy [22] and water [23,24] as well as various emissions and wastes [19] – are by now widely acknowledged. The effect of agricultural production and its environmental consequences has also been studied extensively in Finland [25–27]. Meat consumption in particular is seen as environmentally significant consumption [28].

The ethical implications of using animals as food consumption commodities are, without a doubt, vast [29]. Because animals cannot argue their own views, philosophers have developed arguments explaining the animals' position. These zoocentric arguments started to rise in the seventies with the formation of the modern animal welfare movement, and they have intensified since to include animal rights arguments. [30] Currently there are many theories about animal welfare [31] and animal rights [32,33,30] and even though they are not wholly compatible with one another, they draw similar conclusions: animals should not be harmed merely to satisfy secondary human needs.

Sociological research has also acknowledged the importance of meat consumption practices [3,12,34,4,35]. Sociological analysis has revealed the consequences of meat consumption for humans and societies. According to the humanistic viewpoint, meat consumption has been linked to human chauvinism [36] and has also been seen as encouraging racism [37]. The core argument is that vegetarianism would also make the world more equal for humans by removing barriers to equality. The effects of meat consumption on human health and especially on the increase of overweight people in industrialized societies are also used as a justification for vegetarianism [38]. On the other hand, explanations favouring human-based utility usually concentrate on the economic benefits to farmers and to industry, and therefore they see rising consumption as beneficial [39].

It can be argued that for consumption practices to be truly sustainable, they should be sustainable not only from the human-based perspectives but also from the zoocentric and ecocentric perspectives as well.

Table 1
Views on meat consumption

Basic point of view		Attitude towards...		Applications
		Meat consumption in general	The growth of meat consumption in industrialized countries	Examples in environmental discourse
Nature based	Zoocentrism	Negative	Negative	Animal rights
	Ecocentrism	Neutral	Negative	Gaia
Human based	Humanism	Neutral or positive	Negative	Limits to growth
	Utilitarianism	Positive	Positive	Cornucopian thought

This table was formed together with Petri Tapio and the author.

2. Materials and methods

When selecting experts for future oriented research, which uses expert views as a basis for the information gathering, it is crucial to be cautious. [40,41]. This is due to the fact that for the experts to be truly representative they should reflect a broad spectrum of opinions and interests and have different background variables such as sex, age and professional background [42]. A group of experts, each knowledgeable about one aspect of a complex system, does not necessarily comprise expertise about the total system [43]. In futures studies, the application of structured analysis known as a STEEP or STEEPV (Social, Technological, Economic, Ecological, Political and Value environment) provides a framework for assisting in the consideration of different background variables [44,45].

The STEEPV analysis evolved from ideas developed by Johnson Research Associates in the early 1960s. Schwartz developed the idea further and developed the STEPV analysis in the early 1970s. This process was extended by Holroyd and Loveridge in 1975 into STEEPV [46]. This type of categorization ensures that opinions are aligned with different aspects of reality [47]. The novel approach developed in this research project is that by using a STEEPV set-up we can categorize experts. The emerging expertise matrix makes sure that not all informants are like-thinking individuals but represent different areas of thought. In addition to the STEEPV set-up four institutional categories were used to select the experts; researchers; people belonging to nongovernmental organizations (NGO); civil servants and politicians; and corporate representatives. The selection ensured that different aspects of the issue at hand would be covered.

The selection of the interviewed experts was made by the research team consisting of eight people. The research team discussed each expert's core competence and his or her area of expertise and made an informed decision about the category they belonged in. A group of selectors was used in the selection process to ensure that one person's opinion of the expertise of another person would not influence the selection. Only two people refused to be interviewed. The total number of experts interviewed was 39 (see Table 2). The environmental and ethical categories were combined because of the low number of experts who work in those areas in Finland, especially those who represent corporate interests.

The number of women interviewed came to 22 (56%) and the age distribution of all experts was between 27 and 68 years. The education level varied from a person holding two doctoral degrees to a person who had graduated from secondary school.

Semi-structured interview forms were utilised. The interviews were conducted by five different interviewers and the same type of interviewing method was used by all. Each interviewer interviewed people from different groups, so that the interviewer's own views could not influence the answers of a whole group. All interviews were tape-recorded and lasted from approximately one to two hours. The interviews were performed during the spring, summer and fall of year 2006. The interviews addressed the following areas: the background variables of the respondent, factors affecting food consumption in

Table 2
Number of experts interviewed in the project by category

	Area of expertise				
	Political	Economic	Social and cultural	Technical	Environmental and ethical
Research	1	2	3	2	1
Nongovernmental organizations	2	2	2	3	2
Civil servants and politicians	3	2	1	1	1
Corporations	1	3	2	4	1

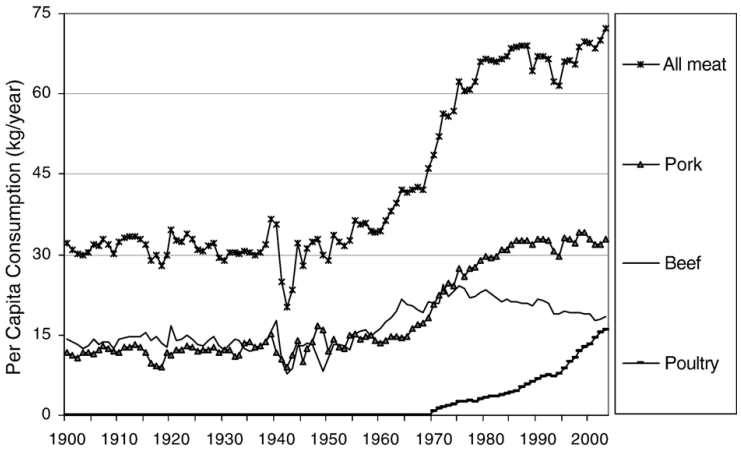

Fig. 1. Per capita meat consumption of different meats in Finland 1900–2004 (data gathered from [48,49]).

general, the development of the consumption of different food products and consumer values related to food consumption. Broad themes were used in order to help experts think about food consumption on a larger scale and in order to help them to consider meat consumption in its larger context.

The semi-structured questionnaire was partly based on previous trend data (see Fig. 1) There is fairly good data available on consumption structures in Finland dating back to the beginning of the twentieth century [48,49]. The historical development of meat consumption in Finland has followed the same pattern as the rest of the Western developed countries. Meat consumption remained fairly stable between 1900 and 1960. In the 1960s the increased industrialization of the meat industry meant consumers could purchase cheaper meat and the introduction of poultry at the beginning of the 1970s lifted meat consumption to a new level. However, beef products have gradually lost sales in the last three decades. There were also clear reductions in consumption during the World Wars and the economic recession at the beginning of the 1990s.

The interviewees were asked to continue the data sets up to 2030 by manually drawing two different colour or structured lines on a graph, one being for preferable meat consumption and another for probable meat consumption. This was done in order to see the differences between the preferable and probable situations [50]. In two cases respondent did not provide quantifiable answers, but their qualitative responses were still analysed. Interviews were transcribed and the final material consists of more than 450 pages of text. In three cases the recordings failed and notes from the interviews were utilised. The text from the interviews was read through several times and coded. The coding and categorization were conducted by the researcher.

3. Results

3.1. The preferable and probable amount of meat consumption in Finland in the future

The average answer given to the preferable amount of meat consumption in the year 2030 was 66 kg per person and the median 71 kg per person (see Table 3). Probable average consumption estimate value

Table 3
The averages of the expert views about preferable and probable amounts of meat consumption levels (kilograms per person per year) in Finland by the year 2030 by category

Expert categories			Institutional categories		
	Preferable	Probable		Preferable	Probable
Political			Research		
Average	65.8	75.0	Average	65.4	73.8
Median	71.0	75.0	Median	67.5	75.0
Economic			Nongovernmental organizations		
Average	75.6	80.3	Average	63.6	75.8
Median	74.0	79.0	Median	71.0	74.5
Social and cultural			Civil servants and politicians		
Average	72.8	76.4	Average	68.4	73.7
Median	72.5	77.0	Median	72.0	75.0
Technical			Corporations		
Average	67.9	72.3	Average	68.1	76.6
Median	68.0	72.0	Median	74.0	75.0
Environmental and ethical					
Average	35.6	69.6			
Median	31.0	71.0			
Total			Total		
Average	66.2	75.2	Average	66.2	75.2
Median	70.5	75.0	Median	70.5	75.0

was 75 kg per person and the median was also 75 kg per person. On average experts predicted that it would be preferable if meat consumption levels would decrease from their current level of 72 kg per person. The experts however predicted that consumption levels were probably going to continue to grow if there was no intervention, but only slightly.

There was large variation between the different groups in their thinking with regard to a preferable amount of meat consumption. The lowest levels of preferable as well as probable consumption levels in the future were found in the ethical and environmental group with the average value being only 36 kg per person for the preferable and 70 kg per person in the case of probable future. Largest preferable consumption numbers were presented by the experts' from the economic category who estimated consumption levels in 2030 being as high as 76 kg per person. They also estimated largest probable consumption levels: averages 80 kg per person. In this study a person's expertise area seemed to predict the answers more than institutional background.

3.2. The explanatory grounds used by the experts

3.2.1. Social grounds

The explanatory grounds used by the experts as possible factors affecting meat consumption in the future were divided into different groups according to the STEEPV categorization (see Table 4). The social factors, which could be interpreted as resulting in an increase in meat consumption, included: the increase in the number of obese people, growing meal portion size and the increase in keeping meat eating pets. Health studies have confirmed that obesity is an increasing problem in Finland [51] and obese people

Table 4
Possible factors affecting meat consumption in the future according to the experts

	Increasing factors	Reducing factors
Social	–Growing obesity of people –Growing size of meal portions –Increase in keeping meat eating pets	–Increasing number of vegetarians (including vegans and semi-vegetarians) –Ageing of the population leading to smaller meat consumption –Positive image development of meat alternatives –Better knowledge about preparing vegetarian meals –Increasing knowledge about animal capabilities (such as intellect and feeling of pain) –Increasing acceptance of alternatives to meat products
Technological	–Development of less energy intensive meat products enabling growing consumption –Development of more easily accessible meat products (for example: shorter cooking time)	–Development of artificial meats –Development of novel protein sources –Development of new methods for field use *e.g.* for energy production –Development of packaging (lessening the amount of unusable meat)
Economic	–More efficient (industrial) production affecting production costs –General increase in income levels in society	–Decreasing price of alternatives to meat products –Increasing global demand of meat affecting meat prices
Environmental or Ecological		–Growing number of animal diseases –Increasing meat prices due to increasing energy prices affecting fertilizer prices –Increasing meat prices because of growing transport costs –Global water shortage affecting meat production
Political	–The liberalization of market policies enables cheaper meat products to enter markets from other countries	–Changes in subsidies for meat production influences production structures change towards biofuels
Values	–Increase in acceptance of wasteful usage of food –Increasing estrangement of meat production –More selective usage of animal parts in food production and consumption	–Increase in meaning of animal rights to humans –Decreasing meaning of meat as a status food –Increasing acceptance of vegetarianism in society –Increasing importance of health issues to humans influencing change towards more vegetarian based food consumption

are more likely to consume more food. The number of meat eating pets, especially dogs, has grown during the last years to its current level of over 600,000 in Finland [52].

The social grounds, which could be seen as reducing meat consumption, included: the increasing number of vegetarians, the ageing of the population, which would lead to less food consumption, positive image development of alternatives to meat products, better knowledge about the preparation of vegetarian meals, increasing knowledge about animal capabilities (such as intellect and the ability to feel pain) and an increasing acceptance of alternatives to meat products. Currently the number of vegetarians is around 2% of the total population in Finland, but it is estimated to grow [53]. Furthermore, Finland is estimated as facing the fastest ageing of any population in the western European countries up to 2020 [54].

3.2.2. Technological grounds

The technological grounds, which could be seen as increasing meat consumption included: the development of less energy intensive meat products and the development of more user friendly meat products (for example: products that have shorter cooking times). The technological factors, which could be seen as decreasing meat consumption included the development of artificial meats, the development of novel protein sources, the development of alternative uses for fields, *e.g.* for energy production and lastly, the development of processing and packaging (lessening the amount of unusable meat). Currently only a few novel protein foods (NPF) are offered by food stores and shops in Finland. Novel protein foods consist of plant based substances, at present mainly soy and to lesser extent wheat gluten [55]. Artificial meats are products that imitate the structure and taste of real meat. One possible development path in artificial meats can be meat grown from animal cells in bioreactors, method that is now in its infancy [56].

3.2.3. Economic grounds

The economic grounds, which could be presented as increasing meat consumption, included: more efficient (industrial) production methods and a general increase in income levels in society. The current studies support the view that the industrialization of agriculture will continue in Finland [57]. The economic grounds, which could be seen as decreasing meat consumption, included decreasing price of alternatives to meat products and an increased global demand for meat. The increasing global demand for meat and its effects in global scale has been reported by many [58].

3.2.4. Environmental and ecological grounds

No environmental or ecological grounds were presented as explanatory factors for increasing meat consumption by the experts. Possible environmental or ecological factors, which could be seen as grounds that would decrease meat consumption, included the growing number of animal diseases, increases in meat prices because changes in energy sources could affect fertilizer prices and increases in meat prices due to growing transport costs and growing energy costs. Also the imminent global water shortage [59] was mentioned as a factor that could influence meat production and consumption.

3.2.5. Political grounds

The political grounds, which could be seen as increasing meat consumption, was that of the liberalization of market policies enabling cheaper meat products to be imported from other countries. The liberalization of the agricultural sector is estimated to continue according to some studies in Finland [57]. The political ground that could be seen as decreasing meat consumption was the likely decision to reduce subsidies given for meat production which would influence production structures changes towards biofuels.

3.2.6. Value grounds

Value grounds, which could be seen as increasing meat consumption, included an increase in the acceptance of the wasteful usage of food, the increasing estrangement of people from meat production (due to the fact that people in urban areas fail to make a connection between animals and meat production) and a more selective usage of animal parts in food production. The grounds, which could be seen as decreasing meat consumption, included an increase in the importance of animal rights to humans, a decrease in the importance of meat as a status food, an increasing acceptance of vegetarianism in society and increasing importance of health issues to humans influencing change towards more vegetarian based food consumption.

4. Conclusion and discussion

4.1. Conclusions

When producing research based on expert views of the future it is of utmost importance to try to find a range of views that covers most, if not all, opinions and expertise. In this work the STEEPV analysis was used to help in the selection process, in addition to the traditional variables such as age, sex and professional expertise. Hence, additional categorization of the experts into researchers, people with nongovernmental organization backgrounds, civil servants and politicians and business representatives was used to ensure a diverse range views was covered.

The analysis revealed that most experts do not see it as preferable or probable that meat consumption would rise very much in Finland by the year 2030. In answer to the question: "What would constitute a preferable amount of meat consumption in Finland in the year 2030" the average answer given by the experts was 66 kg per person per year and the median was 71 kg per person per year which would mean a drop from its current level of 72 kg per person. However, the average probable consumption foreseen by the experts was 75 kg per person and the median was also 75 kg per person. Therefore, it seems evident that most of the experts interviewed in this research would argue that something should be done in order to reduce the predicted growth in meat consumption.

4.2. Discussion

Human consumption of meat has a major impact on nature, animals and humans. It is not adequate to only see sustainable development from a human perspective, *i.e.* as a way of securing consumption possibilities for future generations. Thus, inherent value should also be given to animals and nature. Due to ever growing consumption possibilities it is more important than ever before to try to predict possible factors that could help to achieve sustainable consumption, especially in the industrialized countries.

The analysis of the factors affecting meat consumption made by the STEEPV categorization clarified the complexity of the issue. Of course no complete list of factors can be presented but identifying possible factors can help to influence the situation. There can be factors that will help to lower meat consumption in Finland without intervention, such as the ageing of the population, or the probable emergence of animal diseases and an increase in the competition for natural resources as the human population grows. These factors can however, be offset by factors such as, the increasing obesity of the population and cheaper meat products entering markets as a result of even more efficient production methods.

Based on the results presented in Table 4, many different types of strategies could be selected to influence meat consumption. In order for the actions to produce results, however, it is important to note that selection of strategies from different categories in the STEEPV can produce more efficient outcomes. The potential utilisation of the different categories, in order to aid the reduction of meat consumption, can be demonstrated by the following examples. Even though the research was carried out in Finland these results can partly be generalized as applying to most of other industrialized countries.

Firstly, technological development can be advanced, by giving financial aid for the development of artificial meats and alternatives to meat products. Technological development in alternative protein sources and especially in the development of artificial meats is required when considering the importance of taste as a reason for meat consumption. Technological development can also help to bring information, about product ingredients and production methods to consumers, *e.g.* with the help of information chips

attached to the packaging. Secondly, and related to social and value factors, increasing consumer knowledge about the issue can help in attaining a positive feedback effect whereby consumers receive more knowledge about vegetarianism, then try out new products, which, in turn, results in companies receiving more finances for funding and developing new products. Ad campaigns can be used to further increase consumer awareness.

Thirdly, political actions are needed in order to make the general population understand that meat consumption is a waste of energy resources, as well as an inefficient use of farm land. Furthermore, changes in the way economic subsidies are given to agriculture and especially to meat production are essential. Also consumer access to novel protein sources should be secured. Shops could be instructed to extend their selection of alternatives to meat products, *e.g.* in the same way that car producers are expected to sell a certain percentage of electric cars in California. Fourthly, and related to economic and environmental factors, environmental taxes have been previously [60] proposed by Goodland as a tool to alter the structure of food consumption. In Goodland's model the least efficient nutrient converters (pork, beef) would be highly taxed; more efficient converters (poultry, eggs, dairy) would be moderately taxed. Grain for human food would not be taxed, while coarse grains might be modestly subsidized. This type of taxation is relevant from the point of view of ecocentrism but it could also be used from a zoocentric perspective by taxing all animal products highly.

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Future images of meat consumption in 2030

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ABSTRACT

The issue of meat consumption has been a subject of interest that has been looked at from environmental, animal and human perspectives. This paper contributes to the discussion by clarifying the diversity of views with regard to the future of meat consumption. Two round Delphi expert interviews and a consumer survey were conducted in order to collect information. Five coherent future images were constructed: Traditional Approach, Business as Usual, Humans First, Wellness and Vegetarian Society. The discussion part of the paper presents possible ways of influencing meat consumption according to the holders of these different images of the future.

1. Introduction

Food production has undergone a great transition during recent decades. The worldwide transformation of agriculture from using traditional, low-tech methods to its current intensive use of energy, fertilizers, machinery, biocides and irrigation has led to significant increases in agricultural production. The transformation has resulted from factors such as programmes of agricultural research, technological innovation, the development of new infrastructures and the expansion of the volume and logistical ability of the world economy. Agricultural transformation, which was driven by the green revolution, made the majority of foodstuffs available, and at lower prices, to almost all consumers in the Western world in the sixties and seventies [1,2]. Since then consumers have had a virtual freedom of choice regarding food, within certain limits of course, and the markets have made sure that a diversity of products has been available.

However, there is no sign that this ongoing transition will come to an end anytime soon. The efficiency of logistics, the variety of products and the apparent ease of buying food products in many countries does not mean that food consumption choices are unproblematic. Western societies have moved from a situation where the "producing enough" approach has resulted in problems of overproduction. Moreover, the green revolution has also had major social and ecological impacts. One effect of the green revolution has been the growth in meat consumption in the developed world in recent decades (see Fig. 1). Furthermore, most estimates expect the growth rate to continue [3,4]. It would therefore be reasonable to assume that further transition might emerge from the pressure created by the demand for meat. However, in some countries, such as Finland, the growth of meat consumption has somewhat levelled off since 1988.

The green revolution combined with population growth and very low food prices has come to be regarded as problematic. More specifically, an increasing amount of literature has identified problems with the current energy intensive system of food production and consumption. Additionally, meat consumption has been identified as problematic from at least three perspectives: an environmental perspective, an animal perspective and a human perspective [5–7].

The environmental consequences of meat consumption have received considerable publicity during the last 10 years. It has been stated that the environment is being degraded or rendered unproductive in some regions, because of the

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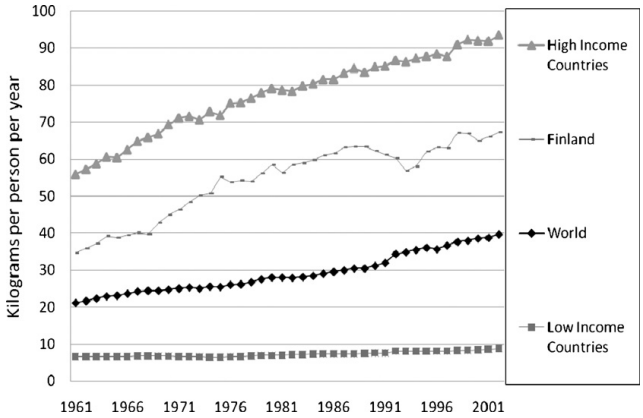

Fig. 1. The development of meat consumption on a global scale and in Finland from 1961 to 2002 [42].

environmental impact of meat consumption and production on land [8,9], energy [10] and water [11,12]. Globally, agriculture accounts for approximately a fifth of the total green house gas emissions, and of that amount approximately 35% comes from livestock production [13]. Beef production results in large amounts of methane, which is a significant contributor to green house gas emissions [14]. According to the life cycle approach, a kilogram of beef is equivalent to the amount of CO_2 emitted by the average European car every 250 km [15]. In addition, when differences between omnivorous, vegetarian and vegan dietary patterns were evaluated the green house gas emissions resulting from meat consumption were evident [16].

From animal welfare and animal rights perspectives the argument for a reduction in meat consumption and an increase in vegetable consumption started to gain more credence, in the 1970s, as concerns about the environment rose. In his classic book Singer [17] presented animal welfare arguments based on the concept of least harm, which emphasised that ethical action is action that provides the most good or does the least harm. According to Singer's argument harm to animals should also be considered and evaluated and this would lead to a vegetarian diet. Reagan [18] argued that animals are valuable as such and further strengthened the animal rights arguments. From the animal rights perspective the basic interests of non-human animals should be afforded the same consideration as the basic interests of human beings. Many more arguments have since followed and most claim that, from the ethical and animal point of view our usage of animals and meat eating is contestable [19].

From the human perspective interest in meat consumption practices has two strands; its effects on physical health and on mental well-being. With regard to physical health, research supports the idea that there is neither much harm nor many benefits from a vegetarian diet. This is, of course, very difficult to prove, but current data seems to support the view that there are no major differences in health or life expectancy between omnivores and vegetarians [20]. Some researchers have, however, argued strongly in favour of a vegetarian diet [6]. With regard to mental well-being sociological research has identified possible linkages between meat consumption and chauvinism [21] and meat consumption has also been identified as possibly endorsing racism [22] by endorsing 'specism'. Specism is the act of placing higher moral or ethical value on one species over others.

Calls to lower meat consumption levels globally have been presented from an environmental perspective and methods for achieving that goal have been developed. Goodland [23] proposed that foodstuffs higher in the food chain (like meat and milk) should be taxed more heavily than products lower in the chain (like vegetables and berries). This may be inadequate action since food accounts only about one-tenth of the consumer-price index in developed countries (13% in Finland in 2002) [24]. Because of the low proportion of food in the total consumption any additional taxes would have to be quite high in order to be effective and that may be politically unacceptable. A team of international health experts led by McMichael [25] proposed an international contraction and convergence strategy as a way of limiting global meat consumption. Although promising, such a strategy would be quite hard to implement as such. It might be that better results could be achieved with more subtle measures aimed at specific groups, which is a theme elaborated on in the text below. In order to plan and implement procedures that can influence meat consumption, a better and broader understanding of the factors influencing meat consumption is required. Furthermore, the consumer perspectives of these factors should be analysed in order to understand the level of influence needed for the changes to be brought about.

The purpose of this paper is to examine images of the future in the context of both probable and preferred meat consumption up to the year 2030, in order to identify what types of images exist and to determine which factors are seen as relevant. Images of the future have been described by as "development constructs" that society creates to characterize its

expectations about the future [26]. From this perspective, images of the future can be seen as expressing the end points in a continuum of social change [27]. If images of the future are then seen as a tools for making such images become part of reality they can then be used to direct actions and decision-making [28]. If the factors behind these images can be identified and the relationships that these factors have within certain groups can also be recognised there should be improved opportunities for influencing those factors and ultimately realising the desired image of the future.

The rest of the paper proceeds as follows: first the Delphi method for investigating expert views is described. That is then followed by a description of the consumer survey and the cluster analysis method that was used in that analysis. The third section compares the expert views with the results of the survey on consumer views. Then the factors affecting expert and consumer views on meat consumption are laid out in a table. Based on the comparison, future images are formed and enriched with citations from the expert interviews and the answers to the open questions written by the consumers. The final part of the results' chapter uses visualization to outline the differences between the views. Finally, the results and the formation of the future images are discussed and recommendations for future research are made.

2. Materials and methods

Expert views on the development of the factors affecting meat consumption were asked for as part of a wider two round Delphi study on the future of food consumption. The Delphi method is an expert view based method of envisioning the future of a complex issue. The key characteristics of the Delphi method are: at least two rounds of inquiry, feedback from previous rounds and anonymity of statements [29–32].

Fundamentally, the Delphi method is not a survey aimed at finding average opinions or differences in opinion between statistically representative groups. Rather, it is an expert based method which aims to make sense of alternative scenarios for the future [30–32]. Thus, the choice of respondents is crucial to the understanding of results [31,33]. In this study, special attention was given to ensuring a wide range of expertise was represented, which was contemplated by several meetings within the research group and the project board. An expertise matrix was formed, in which the nature of a person's expertise was cross-matrixed with the background organisation of the panellists. The panellists' expertise included political, economic, socio-cultural, technical and environmental and ethical approaches to food consumption. The organisations they came from included research, administration, enterprise and non-governmental organisations (Table 1). There were 22 women in the 39 participants (56%) in the first round panel. Age ranged from under 30 years old to over 60 years old. The experts varied from professors to students, directors to lower-post research experts.

The first round of the Delphi was conducted as semi-structured face to face interviews regarding the future of food consumption. The interviews lasted from 1 to 2 h. The interviews were then transcribed and factors affecting meat consumption were identified by reading through the text many times. The transcribed texts amounted to more than 450 pages. Expert views on both probable and preferred amounts of meat consumption in the future were asked for and reported separately [7]. The interviews were conducted in Finnish. The second round was carried out with the Webropol-Internet service [34]. The second round included questions that hoped to elaborate upon answers, given to first round questions regarding the factors seen as affecting food consumption. Three factors from the categories of economic, social, technical and environmental and ethical were presented in the first round and were chosen for the second round questionnaire. The experts expressed their views on both the probable and preferred future of meat consumption up to 2030. In the first round, 39 experts were interviewed and only two people refused of the 41 asked to participate. Out of these 39 experts interviewed, 21 responded via the Internet survey.

In addition, the research utilized a survey on Finnish consumers. The National Consumer Research Centre has compiled a register called the "Consumer Panel" for the gathering of research data. Altogether the panel has about one thousand members over the age of 18 years. Based on the availability of the people in the panel, 271 consumers were asked to answer the second round questions and 177 (65%) answers were received. From those who answered the survey 173 stated their gender, of which 104 were women. Also, 172 stated their age, of those 27 were between 21 and 30, 45 between 31 and 40, 37 between 41 and 50, 34 between 51 and 60 and 29 over sixty.

Both the experts and consumers were asked to assess possible changing factors identified in the first Delphi round by using a scale of 0–10 (presented as 'radio buttons'). Zero meant either very unlikely or not at all preferable and ten was defined as either very likely or very preferable. Respondents were also given the possibility to answer the 'cannot say' option for each statement. Each prompt was expressed as a statement of a direction, or trend in the future development of meat consumption. The stronger the respondent saw the trend as being in the future, the higher the value (see the complete list of

Table 1
The expertise matrix—number of experts interviewed in the project in the first round and the second round (second round in parentheses).

Background organisation	Area of expertise				
	Political	Economic	Social and cultural	Technical	Environmental and ethical
Research	1 (0)	2 (1)	3 (2)	2 (2)	1 (1)
Non-governmental organisations	2 (0)	2 (1)	2 (1)	3 (3)	2 (1)
Civil servants and politicians	3 (0)	2 (1)	1 (1)	1 (1)	1 (0)
Corporations	1 (1)	3 (3)	2 (2)	4 (1)	1 (1)

meat consumption related variables in Section 3). The cases were then grouped by hierarchical cluster analysis. Cluster analysis [34] does not require random sampling unless it is used to verify a theory [36] and thus fits well with Delphi studies [37,32].

The first round interviews were carried out in 2006 and the second round survey in 2007. Incomplete answers in the second round were excluded from the cluster analysis. Views on probable and preferred development were treated as two separate cases, thus 17 experts had 17 views on probable development and 17 views on preferable development, totalling 34 views of the future. With regard to consumers, there were 102 complete answers for preferable future development and 113 for probable future development, totalling 215 complete responses for the consumers. No weighting of variables was considered necessary since all variables were on the same scale.

The Furthest Neighbor method was used for the grouping and the normal Euclidean distance was used as the measure of dissimilarity [38]. In addition, the Ward method was used to make sensitivity tests in order to see whether the groupings were static or dependent on the clustering method. A few cases changed places in the grouping but we found no need to reconsider the future images. Furthest Neighbor was thus chosen to express the results since it uses a simple Euclidean distance measure whereas the Ward method uses squared Euclidean distance. Consumers and experts were grouped separately for comparison. The decision outline, regarding the number of different future images outlined, was mainly based on the tradition of futures studies, which most often uses three to six [39] or three to five scenarios [40]. Furthermore, since the limit of illustrative scenarios is often considered to be seven and three might give an apparent option of two extremes and a midway alternative [41,32] four to six future images were considered relevant. Four expert clusters and five consumer clusters were chosen based on the hierarchical tree output of the SPSS14.0 software.

3. Results

3.1. Average views of the preferred and probable future of meat consumption

Average and median values for the preferable and probable future images of both experts and consumers were calculated in order to identify differences and large dispersions from the average (Table 2). Statistical tests of significance in differences between the two groups were not calculated since the expert panel was not a random sample.

Large differences in the probable and preferable images of the future could be identified with respect to issues such as, "cheap foreign meat will have entered the market", "rising income levels will have increased meat consumption" and "increasing amounts of animal diseases will decrease meat consumption". In contrast, probable and preferred future images were closest to each other when considering whether support of health values would lead to "increasing vegetarianism", "increasing meat prices will have led to a decrease in meat consumption" and "vegetarian meat substitutes will have taken the place of meat in the market". Surprisingly, increasing attention being given to animal rights and resulting in less meat being consumed also gained close estimates in the preferred and probable futures.

Both consumers and experts saw laboratory grown meat as the least preferable factor that would influence future meat consumption of the factors presented to them. Neither consumers nor experts desired human remoteness from livestock and the prospect of cheap foreign meat entering Finnish markets and consequently resulting in an increase in Finnish meat consumption. However, this development was considered to be very likely, which makes it a clear threat in the respondents' minds. It was especially a threat in the opinion of the experts. However, even consumers stated that would be a negative reason for increasing meat consumption.

Both consumers and experts thought that it would be very likely that the number of vegetarians would increase in the future and regarded health factors as a probable and, in particular, preferable reason for this increase. Vegetarianism was also thought preferable when considering average responses. However, it was not entirely clear whether the respondents actually meant an increase the amount of strict vegetarians or an increase in the share of vegetables in people's diets.

3.2. Future images

The answers given by the participants were clustered into different consumer and expert view groups. After that the answers were then placed into a futures table (Table 3). In order to make the table more readable, the answers were visualized using arrows. Cluster centres (i.e. the average responses of the variables in a cluster) 0 to 2 were marked as ↓↓, 2 to 4 as ↓, 4 to 6 as ↔, 6 to 8 as ↑ and 8 to 10 as ↑↑. The futures images were then combined by using the quantitative results gained from the cluster analysis and the qualitative answers received from the expert interviews and consumer surveys.

3.2.1. A Traditional Approach Society

A distinctive feature of the first cluster (see Table 3) was that the views presented were very negative towards the development of meat substitutes. The increase of animal rights issues in society was also seen as being very negative. However, animal diseases as a factor that would decrease meat consumption were not considered as being relevant. In the expert group, human remoteness from animal production, which would lead to increasing meat consumption and cheap foreign meat entering the Finnish market, was also considered to be very negative. In contrast, factors that would increase traditional meat consumption were considered relevant.

Two comments characteristic of this view are presented below:

Table 2
Differences in consumer and expert views on potentially changing factors in meat consumption by year 2030 in Finland on a scale of 1–10[a].

Variables	Consumers		Experts	
	Average	Standard deviation	Average	Standard deviation
Economic				
Increased income levels will have increased meat consumption				
Prob.[b]	6.5	2.0	6.1	2.3
Pref.	3.9	2.5	4.0	2.9
The global increase in meat prices will have decreased meat consumption				
Prob.	5.3	2.3	5.1	2.4
Pref.	5.6	2.6	5.3	3.0
Cheap foreign meats will have entered the market				
Prob.	7.8	1.7	7.3	2.3
Pref.	3.0	2.5	2.9	2.4
Social				
The number of vegetarians will have increased				
Prob.	7.2	1.9	7.6	1.5
Pref.	7.1	2.4	5.8	2.8
Human remoteness from food production will have increased meat consumption				
Prob.	4.7	2.4	4.0	1.6
Pref.	3.3	2.3	2.5	2.4
Interest in health factors will have increased vegetarianism				
Prob.	7.5	1.8	7.4	1.7
Pref.	8.4	2.1	7.6	3.1
Technical				
An increase in the number and diversity of meat substitutes (such as soy and wheat protein products) will have decreased meat consumption				
Prob.	6.1	2.2	5.5	2.6
Pref.	6.0	2.8	5.3	3.1
Laboratory grown artificial meat will have taken the place of conventional meats				
Prob.	3.6	2.7	2.4	2.7
Pref.	1.6	2.0	2.6	3.0
Development of less fatty meat products will have increased meat consumption				
Prob.	6.4	2.0	6.2	2.4
Pref.	5.7	2.7	5.7	3.1
Environmental and ethical				
Global increases in the price of raw materials and scarce resources (water, energy and land) will have decreased meat consumption				
Prob.	5.5	2.2	5.7	2.4
Pref.	5.8	2.6	4.8	3.1
Increases in animal diseases will have decreased meat consumption				
Prob.	5.8	2.4	5.0	2.4
Pref.	3.7	3.0	2.5	2.1
An increase in animal rights issues within society will have decreased meat consumption				
Prob.	5.3	2.4	4.9	2.3
Pref.	6.1	2.9	4.7	3.1

[a] The respondents were asked to imagine what will have occurred by the year 2030.
[b] Prob. = probable future, Pref. = preferred future.

"*We can keep meat consumption growing if we can develop healthier meat products. It is important from the perspective of employment.*" (Expert interview)
"*Nothing but domestically produced meat for our tables*". (Written consumer comment.)

Based on such characteristics this cluster was separated from the others and was named the Traditional Approach Society as it relied on past experience and a rather closed domestic food market. Sixteen out of the 215 views given by the consumers belonged in this cluster as did two of the preferred views out of the 34 views given by the experts.

3.2.2. The Business as Usual Society

The second cluster was the only one in which both consumers and experts did not view any radical changes as preferable nor probable. A slight decrease in meat prices and an increase in income levels seemed to account for the slight increase in the number of vegetarians. Less fatty meat products were seen as increasing slightly, whereas laboratory meat was considered to be marginal.

Table 3
The futures table of both the consumer and expert future images of the factors affecting meat consumption in Finland in 2030.

Variables			Consumers					Experts			
			Traditional Approach	Business as Usual	Humans First	Wellness	Vegetarian	Traditional Approach	Business as Usual	Humans First	Vegetarian
Economic	Increased income levels will have increased meat consumption		↑	↑	↔	↔	↓↓	↓	↔	↔	↓↓
	The global increase in meat prices will have decreased meat consumption		↓	↔	↔	↑↑	↑	↑	↑	↓	↑↑
	Cheap foreign meats will have entered the market		↑	↑	↓	↑↑	↓	↓↓	↑	↔	↓↓
Social	The number of vegetarians will have increased		↔	↑	↑	↑	↑↑	↓	↑	↑	↑↑
	Human remoteness from food production will have increased meat consumption		↓	↔	↓	↑↑	↓	↓↓	↔	↓	↓
	Interest in health factors will have increased the number of vegetarians		↔	↑	↑↑	↑↑	↑↑	↓	↑	↑	↑↑
Technical	An increase in the number and diversity of meat substitutes (such as soy and wheat protein products) will have decreased meat consumption		↓↓	↔	↔	↑↑	↑↑	↓↓	↑	↔	↑↑
	Laboratory grown artificial meat will have replaced conventional meats		↓↓	↓	↓↓	↑	↓	↓↓	↓	↓↓	↔
	Development of less fatty meat products will have increased meat consumption		↔	↑	↑	↑↑	↔	↔	↑	↔	↓↓
Environmental and Ethical	Global increases in the price of raw materials and scarce resources (water, energy and land) will have decreased meat consumption		↓	↔	↔	↑	↑	↑	↑	↓	↑↑
	Increases in animal diseases will have decreased meat consumption		↓↓	↔	↔	↑↑	↓	↓↓	↔	↓↓	↔
	An increase in animal rights issues in society will have decreased meat consumption		↓↓	↔	↔	↑	↑↑	↓↓	↔	↓	↑↑
	Number of cases in the cluster	Preferable	9	15	0	50	28	2	4	8	3
		Probable	7	94	4	7	1	0	12	5	0
		Total	16	109	4	57	29	2	16	13	3

■ = very undesirable or very improbable. □ = very preferable or very probable.

> "*We do not have any reason to raise meat consumption in Finland, nor do we have any reason to try to lower it radically. There are no environmental reasons in Finland nor are there any health reasons*". (Expert interview).
> "*I do not know if human remoteness from food production will result in lower meat consumption, but at least consumers will want their meat cut into smaller chunks and packed in a nicer way*". (Written consumer comment).

The majority of consumer views belonged in this group (109 out of 215 answers) as well as almost half of the expert views (16 out of 34). As no great changes were expected and slight changes pointed in the same direction as current trends the future image of this group was called Business as Usual.

3.2.3. The Humans First Society

The third cluster differs from the second cluster by having a more negative perspective on laboratory grown meat and also by being more negative towards cheap foreign meats entering the market and consequently resulting in increased meat consumption. A 'no regrets' approach to environmental factors was adopted as animal diseases, an increase in resource prices and animal ethics were not considered very relevant. On the other hand, health factors resulting in increasing vegetarianism were high on the agenda.

> "*Our primary goal is to bring benefits to consumers, and yet not harm their purchasing power*" (Expert interview.)
> "*People will value the role of agriculture as the maintainer of the countryside*". (Expert interview.)

This was the smallest consumer cluster (only 4 out of 215 views) but among experts it was the second most popular group (13 out of 34 views). This future image was called the Humans First Society.

3.2.4. The Wellness Society

The fourth cluster was quantitatively only identified among consumers but there were some compatible aspects in the qualitative material in the expert interviews. This cluster was characterized by having a positive perspective on all factors that could have positive effects on humans. Views in this cluster saw it as beneficial that cheap foreign meats would enter the Finnish market and they saw no problems in human remoteness from food production. For this cluster increased meat consumption as a result of healthier meat products becoming available was also seen as a positive thing. Both increasing and decreasing factors affecting meat consumption are seen as growing simultaneously. The image formed here seems not to form an entirely coherent unity as, for example, meat prices seem to go up (due to scarce resources) as well as down (due to international trade).

> "*In the future I believe that more emphasis will be placed on health aspects. It is very difficult to forecast what the effects (on food production) brought about by climate change, water adequacy and logistics will be*". (Written consumer comment.)
> "*This wellness, meaning the well-being of humans. This will be a growing issue*". (Expert interview)

This cluster was termed the Wellness Society and 57 out of 215 consumers views belonged in this group. What was notable was that out of those 57 views 50 belonged to the preferable category.

3.2.5. The Vegetarian Society

The last cluster was characterized by having very positive views towards an increase in vegetarianism in general. It was also the only group which did not assume that income increases would result in increasing meat consumption. In this cluster experts were very negative and consumers negative on the issue of cheap foreign meat entering the market and resulting in increased meat consumption. Several citations clearly show the thinking behind this image:

> "*. . .at the same time as we get more (meat) substitutes, these (substitutes) will develop a better image and they will become more available*" (Expert interview.)
> "*We are raising a generation which believes in veganism and does not believe in red meat*". (Expert interview.)
> "*If we would have a more vegetarian based diet in the rich countries we would save natural resources and we could carry forward our globe*". (Written consumer comment.)

This future image was called the Vegetarian Society. There were 29 consumer and 3 expert views in the cluster. This group was characterized by a large share of preferable views (28 out of 29 consumers and all three experts).

3.3. A comparison of the future images of meat consumption

The five future images of meat consumption are compared in Figs. 2 and 3 in relation to the economic, social, technical as well as environmental and ethical perspectives in order to visualize the differences between the groups. The combined values of the expert and consumer clusters were used as the basis for the visualization. From the economic perspective there are large differences between the Business as Usual image and the Vegetarian image. The vegetarian group saw the issue of cheap foreign meats entering the markets or an increase in income levels resulting in a growth in meat consumption as being very negative.

In the social category the Humans First image is the only one that has any positive ideas stemming from human remoteness from food production. The Traditional Approach image is the only one that does not see increase of vegetarianism as a positive factor even if it would increase human health.

Fig. 3 highlights the fact that all groups saw it as negative that laboratory grown meat would replace traditional meat. On the other hand there was a large variation in the images on the issue of meat substitutes, ranging from the very negative perspectives of the Traditional Approach group to the very positive views held by the Vegetarian group.

None of the groups disagreed strongly with the statement that a scarcity of raw materials and resources will have limited the consumption of meat in the year 2030. The Vegetarian image thought that this was very likely and agreed with the statement very strongly. Overall, the Humans First image was rather similar to the Business as Usual image. The Vegetarian Society and the Traditional Approach images often directly oppose each other in most cases.

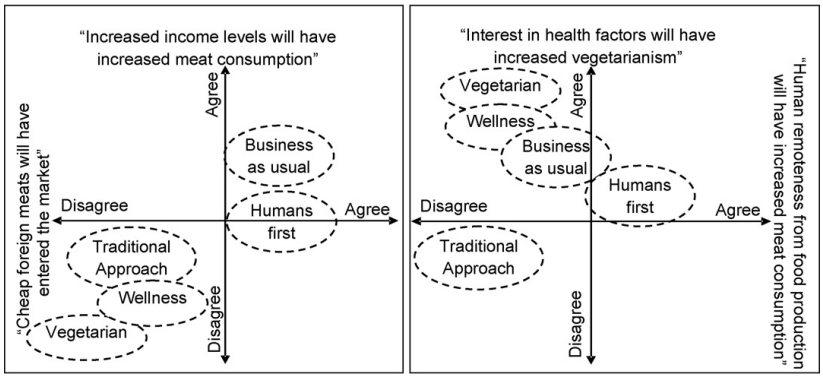

Fig. 2. Five future images in relation to economic and social factors.

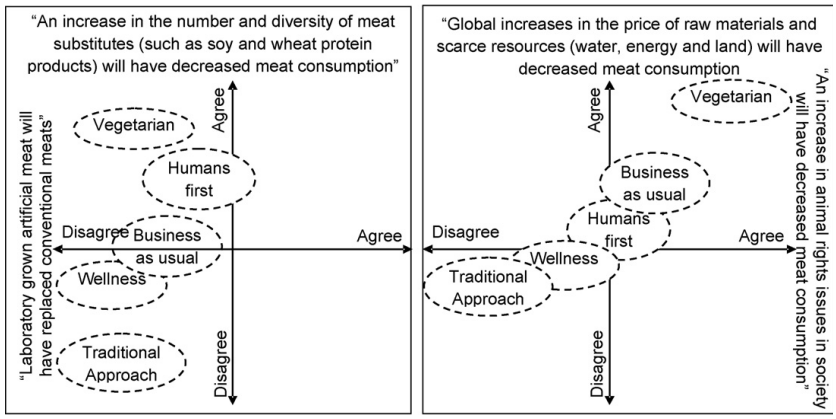

Fig. 3. Five future images in relation to technological, environmental and ethical factors.

4. Conclusions and discussion

In this paper we have analysed different types of future images of meat consumption for the year 2030, which were identified based on expert interviews and a consumer survey. The need for the analysis was based first of all on the fact that arguments about meat as a commodity have gained new perspectives and thus interest during recent decades. Firstly, the environmental burden from meat consumption has become a particularly important factor, especially if global warming is to be confronted. Secondly, the rise of animal welfare questions, due to industrial farming systems in Western countries, has raised interest in the issue. Thirdly, new knowledge about human physical and mental well-being related to meat consumption has, for its part, provoked interest in controlling consumption.

Current ideas regarding reducing meat consumption are, however, fairly robust. The idea of this paper has been to widen our understanding of the variety of the views on the issue and identify what type of interest groups can be observed. The reason for making this identification is that different kinds of groups may require different types of action and responses if they are to be encouraged and persuaded to alter their behaviour for economic, social, health or environmental reasons. The case data was from Finland, but the questions include aspects of the global food market applicable to many industrial countries confronted by the decreasing economic importance of their food production, as well as high-tech food productivity, environmental concerns and animal ethics.

This paper has developed a method for the systematic elaboration of future images by the using quantitative cluster method in combination with qualitative material in order to achieve enriched future images. The analysis revealed that both experts and consumers had a fairly negative view of laboratory grown meat. This indicates that technological development

may not be the most popular solution for coping with the growing meat consumption demand. Four out of five clusters produced an image which saw the number of vegetarians increasing, but only one saw it as very likely. When the answers were divided into different clusters the diversity of perspectives regarding the factors affecting meat consumption became evident. Five different types of images of the future were identified the: Traditional Approach, Business as Usual, Humans First, Wellness and Vegetarian societies.

There can be many reasons for the diversity of views related to meat consumption. Some humans value human life as the most valuable thing and others think that the environment is also valuable. It can also be that personal relationships with farmers or relationships to animals can influence people's perceptions in relation to the issue. Such different background variables can partly explain the variability of the answers. The most likely image of the future according to this research contained the emphasizing of small changes that would maintain the current, visible changes. The Business as Usual image of the future, which was the most popular image, was held by 109 out of the 215 responses given by the consumers and 16 out of the 34 views given by the consumers.

Based on the results of the paper a more practical, group by group, view towards changing people's meat consumption should be applied if, e.g. changes to bring about less green house gas emissions from agriculture are desired. For example the Traditional Approach Society group could be better informed about animal rights issues and more emphasis could be given regarding the possibilities of meat substitutes. This group could also be informed about the possibilities of vegetarianism in general. The Humans First group could be given more information about the capabilities of animals so that they would become more interested in them. For this group more and better products that could substitute for meat products would need to be available. The Business as Usual image seems to be rather strong and in order to alter its mindset economic incentives would probably be required. The Vegetarian Society image group might be encouraged to share their views with other consumers.

The key message of this research is that there are variations in people's perspectives regarding the need for change in meat consumption practices. Hence, it is obvious that a selection of methods would be required to help bring about any change in meat consumption. However, taxing products at a higher rate is not sufficient as different groups would need to be persuaded in different ways of the benefits of altering their diets and beliefs. More research is needed in order to develop efficient ways to influence meat consumption practices. As one of the consumers commented:

> "*First of all I believe that consumer groups will be divided into different segments: different kind of trends and/or ideas will become stronger and there will be more diversity*".

Understanding more about this diversity of consumer views in relation to the issue can help make the targeting of the methods more efficient and thus any transformation process more likely to succeed.

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