FUTURES FOR FOOD
6–7 June 2013 • Turku, Finland

BOOK OF ABSTRACTS

15th International Futures Conference organised by Finland Futures Research Centre, University of Turku

In association with
Finland Futures Academy
MTT Agrifood Research Finland

www.futuresconference.fi/2013
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WORKSHOP SCHEDULE

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<td>Future for Food Education</td>
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<td>&quot;Tutkittu ruoka – ennakoidut eväät”</td>
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<td>WORKSHOP 12: LS 13</td>
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<td>WORKSHOP 1: Food Policy I</td>
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<td>Chair: Dr. Juha Kaskinen</td>
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<tr>
<td><strong>Consumer and producer perceptions on corporate responsibility in the Finnish food chain</strong></td>
<td>Food policy coherence: estimating total synergies and contradictions in policy documents</td>
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<td>Koistinen, Laura &amp; Latvala, Terhi (MTT Economic Research, Helsinki, Finland)</td>
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<td><strong>Moving from consumers into co-producers through education</strong></td>
<td>The Political Economy of Food in Developed Economies: Contested Futures?</td>
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<td>Juntila, Minna &amp; Väisänen, Karoliina (JAMK University of Applied Sciences, Jyväskylä, Finland)</td>
<td>Busicchia, Brigit (Macquarie University, Sydney, Australia)</td>
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<td><strong>From food insecurity towards trade-dependency: A historical analysis of global food security</strong></td>
<td>New strategies to ensure sufficient food provisions in case of crisis in Germany</td>
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<td>Porkka, Miina &amp; Kummu, Matti (Aalto University, Finland) &amp; Siebert, Stefan (University of Bonn, Germany)</td>
<td>Menski, Ute &amp; Gerhold, Lars &amp; Braun, Janina (Freie Universität Berlin, Germany)</td>
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<td><strong>Sustainability transition for nutrients – two contrasting agrifood futures</strong></td>
<td>Structural change in the Finnish livestock sector – past changes and future prospects</td>
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<td><strong>Food Sustainability: From actual patterns to future perspectives</strong></td>
<td>Advertising for Sustainability – Promoting Sustainably Produced Food to Finnish Consumers</td>
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<td><strong>How to Make Cavemen Eat Responsibly – Evolutionary Psychology and Food Marketing</strong></td>
<td>Disposition and performance for sustainability: A Finnish case of supply chain analysis with the public sector catering industry</td>
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<td>Mikkola, Minna (University of Helsinki, Ruralia Institute, Finland) &amp; Hingley, Martin (Lincoln Business School, UK)</td>
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### WORKSHOP 4: Food & Diet Approaches

**Time:** Thursday 6 June at 13:45-15:00  
**Venue:** LS 13  
**Chair:** Dr. Markus Vinnari

- **Intentions to increase or decrease vegetable-protein and meat consumption and their associations to attitudes among Finns**  
  Jallinoja, Piia & Niva, Mari & Järvelä, Katja (National Consumer Research Centre, Finland)  
  Kotro, Jaana & Latvala, Terhi (MTT Agrifood Research Finland, Economics and Social Sciences)

- **Forced Choice Restriction in Promoting Sustainable Food Consumption: Intended and Unintended Effects of the Mandatory Vegetarian Day in Helsinki Schools**  
  Lombardini, Chiara & Lankoski, Leena (University of Helsinki, Finland)

- **Can beans become everyday food? Attitudes to and eating of pulses among Finnish vegetarians and omnivores**  
  Niva, Mari & Jallinoja, Piia & Järvelä, Katja & Pylvänäinen, Erja (National Consumer Research Centre, Finland) & Kotro, Jaana & Latvala, Terhi (MTT Agrifood Research Finland, Economics and Social Sciences)

- **Organic vs. Intensive farming: when choosing what to buy, what is really at stake?**  
  Ferreira-Aulu, Marianna B. (University of Turku, Finland)

### WORKSHOP 5: Food Policy II

**Time:** Thursday 6 June at 15:30-17:00  
**Venue:** LS 12  
**Chair:** Dr. Sirkka Heinonen

- **Values of naturalness and authenticity in food choices and policies**  
  Siipi, Helena (University of Turku, Finland)

- **Human and environmental well-being: Food, health and sustainability in Finnish policy documents**  
  Risku-Norja, Helmi (MTT Agrifood Research Finland) & Isola, Anna-Maria (University of Helsinki, Finland) & Nisonen, Sampo (University of Helsinki, Finland) & Kurppa, Sirpa (MTT Agrifood Research Finland)

- **Stick or carrot – Impacts of alternative climate and energy policy scenarios on agriculture**  
  Rintamäki, Heidi & Rikkonen, Pasi (MTT Agrifood Research Finland, Economic Research, Helsinki and Mikkeli) & Tapio, Petri (University of Turku, Finland Futures Research Centre)

- **Identifying Problems Childs and Champions of the European Food Industries and Markets: Benchmarking Key Sustainability Trends Linked to Food Production in the Member Countries of the European Union in the Years 1990–2007**  
  Kaivo-oja, Jari (University of Turku, Finland Futures Research Centre)

### WORKSHOP 6: Futures Research Methodology

**Time:** Thursday 6 June at 15:30-17:00  
**Venue:** LS 06  
**Chair:** Dr. Burkhard Auffermann

- **Drawing food trends: design potential in shaping food future**  
  Celi, Manuela & Rudkin, Jennifer (Politecnico di Milano, Italy)

- **Envisioning sustainable and healthy food supply chain: participatory scenario-based backcasting approach**  
  Latvala, Terhi (MTT Agrifood Research Finland)

- **Finnish Christmas Cuisine Scenarios to 2062**  
  Kääriäinen, Galina (University of Turku, Finland)

- **Combining qualitative and quantitative research methods to foresee the changing Finnish agrifood sector**  
  Huan-Niemi, Ellen & Niemi, Jyrki & Rikkonen, Pasi & Wuori, Olli (MTT Agrifood Research Finland, Economic Research, Helsinki) & Niemi, Janne (Government Institute for Economic Research (VATT), Finland)

- **Is futures studies a scientific discipline – who cares as long as the food is good!**  
  Vinnari, Markus (University of Eastern Finland) & Tapio, Petri (University of Turku, Finland Futures Research Centre)
### WORKSHOP 7: Food & Sustainability II

**Venue**
LS 01

**Time:** Thursday 6 June at 15:30-17:00

**Chair:** Dr. Minttu Jaakkola

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<tr>
<td>Sustainable Public Food Procurement in the UK</td>
<td>Stein, Mark (Salford University Business School, Manchester, UK)</td>
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<td>Who eats sustainably? Comparison of social groups in four Nordic countries</td>
<td>Mäkelä, Johanna (University of Helsinki, Finland) &amp; Kahma, Nina &amp; Niva, Mari (National Consumer Research Centre, Finland)</td>
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<td>Alternative food production models in the Global Futures Map</td>
<td>Kuusi, Osmo (Aalto University &amp; University of Turku, Finland)</td>
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<td>Design-intensive farming</td>
<td>Vrlik, Filip (University of Turku, Finland)</td>
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### WORKSHOP 8: Local Food Systems

**Venue**
Elovena-sali

**Time:** Thursday 6 June at 15:30-17:00

**Chair:** Dr. Helena Kahiluoto

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<td>Local food system development in Hungary</td>
<td>Balázs, Bálint (St István University, Hungary)</td>
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<td>The practices of localization of Finnish food system</td>
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<td>Local vs. Conventional Distribution: Farmer choices, embedded values</td>
<td>Birge, Traci (Aronia R&amp;D at Åbo Akademi University &amp; Novia University of Applied Sciences, Finland)</td>
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<td>Local and organic food activity and accessibility: the case of food circles in Northern Ostrobothnia</td>
<td>Korhonen, Kirs (MTT Economic Research - Oulu, Finland) &amp; Kotavaara, Ossi (University of Oulu, Finland) &amp; Miettinen, Milla (University of Oulu, Finland) &amp; Muilu, Toivo (MTT Agrifood Finland, Economic Research, Oulu, University of Oulu, Finland) &amp; Rusanen, Jarmo (University of Oulu, Finland)</td>
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<td>De-growth thinking – solutions for future food system?</td>
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### WORKSHOP 9: Food Production & Processing

**Venue**
LS 13

**Time:** Thursday 6 June at 15:30-17:00

**Chair:** Hanni Rützler

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<td>Fitness of organizational shapes for sustainable development: Examples from the food production</td>
<td>Kallio, Galina (Aalto University School of Business, Organization and Management, Finland) &amp; Heikkurinen, Pasi (Aalto University School of Business, Philosophy and Management and MTT Agrifood Research Finland, Economic Research)</td>
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<td>Towards a CO2, water and waste neutral food processing industry in Flanders by 2030</td>
<td>Smets, T. &amp; Van den Abeele, L. &amp; Schrooten, L. &amp; Nevens, F. (VITO - The Flemish research Institute for technology, Belgium)</td>
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<td>Possibilities in sustainable development in Finnish greenhouse production</td>
<td>Silvenius, Frans (MTT Agrifood Research Finland)</td>
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<td>Model of sustainable food production for developed and developing countries</td>
<td>Ketola, Tarja (University of Turku, Finland)</td>
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<td>Has crop production as part of the land use become more diversified – reasons and consequences</td>
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Chair: Dr. Johanna Mäkelä

Calculating land requirement for meat consumption in Finland
Allievi, Francesca
(University of Turku, Finland Futures Research Centre)

Data availability for research on the use of feed for animal production in Finland
Turunen, Jenny
(University of Turku, Finland Futures Research Centre)

The fourth detachment – The adventurous journey from killing cows to culturing meat
Buscemi, Francesco
(Queen Margaret University, Edinburgh, UK)

WORKSHOP 11: Future for Food Education
Time: Friday 7 June at 9:00-11:00
Chair: Dr. Mari Sandell

Sandell, Mari 1 – Egberg Mikkelsen, Bent 2 – Lagström, Hanna 3 & Lyytikäinen, Arja 4

1University of Turku, Department of Biochemistry and Food Chemistry, Functional Foods Forum, Turku, Finland
2University of Aalborg, AAU-MENU, Institute for Development & Planning, Copenhagen, Denmark
3University of Turku, Turku Institute for Child and Youth Research, Turku, Finland
4Central Finland Health Care District, Unit of Family Practise/Health Education and Prevention, Jyväskylä, Finland

WORKSHOP 12: Food & Nutrition
Time: Friday 7 June at 9:00-11:00
Chair: Dr. Outi Luova

Challenges of consumers to choose products in a grocery store considered from a weight management perspective
Saarela, Anna-Maria (Savonia University of Applied Sciences, Kuopio, Finland)

The Forerunners of Fat Use: Preferences of Nutritional Fats in Finland from 1978 onwards
Kahma, Nina & Jallinoja, Pia (National Consumer Research Centre, Finland) & Helakorpi, Satu (National Institute for Health and Welfare, Finland)

Environment and health economic cost-benefit analysis of diet shifts: The case of low carbohydrate diets
Punttila, Eliisa (University of Helsinki, Finland)

Sustainable Development and Food Needs of the Tribes: Some Field insights from Western India
Ashok Kumar, Eranti N. (Solapur University, India)

Herbaland seaweed: Ice cream for the future?
Md Shaarani, Sharifuldin & Nurul Azah, Yaakob, & Matanjun, Patricia (University Malaysia Sabah, Malaysia)
WORKSHOP 13: Environmental Impacts of Food Production & Consumption

Time: Friday 7 June at 9:00-11:00
Chair: Dr. Jari Kaivo-oja

Food and Baltic Sea environment -impact of diet on eutrophication
Vorne, Virpi 1 & Virtanen, Yrjö 2 & Hietala, Sanna 1 & Verta, Matti 3 & Vieraankivi, M.-L. 1 & Kurppa, Sirpa 2
1 MTT Biotechnology and Food Research, University of Oulu, Finland; 2 MTT Biotechnology and Food Research, Jokioinen, Finland; 3 Finnish Environment Institute (SYKE), Finland

Inter-household variations in environmental impact of food consumption in Finland
Irz, Xavier & Kurppa, Sirpa (MTT Agrifood Research Finland)

Material Efficient Waste Management Scheme: Minimize Food Waste Campaign 2013
Tarvainen, Mia (Helsinki Region Environmental Services Authority, Finland)

Nonsense or Resource? Rethink Institutions and Practical Measures of Bio-Waste Management
Chen, Lihuizi (University of Eastern Finland)

POSTER SESSION

Time: Friday 7 June at 11:00-12:00
Chair: Dr. Markku Wilenius

The role of sustainability in ‘alternative’ food retail businesses
Forssell, Sini (University of Helsinki, Finland)

Back to the Basics – Agency behind school gardening
Salo, Kirsti (University of Helsinki, Finland)

Beef Finland: how do we help reduce beef consumption worldwide?
Lee, Seungho (NODUS Sustainable Design Research Group, Department of Design, Aalto University School of Arts, Design and Architecture, Finland)

Forespecting the measures for meeting the demand and supply of the local food
Heikkilä, Lotta 2; Rikkonen, Pasi 1; Kotro, Jaana 1; Reinkainen, Anu 1; Virtanen, Markku 4; Kirveennummi, Anna 4 & Mäkelä, Johanna 4 MTT Agrifood Research Finland, Economics and Social Sciences; 2 MTT Agrifood Research Finland, Biotechnology and Food Research, Sustainable Bio-economy; 4 Aalto University School of Economics, Small Business Centre, Finland; 5 University of Turku, Finland Futures Research Centre, Finland

Future Trends in Food Safety Inspections
Degefu, Yeshitila; Hietanen, Iiro; Jokinen, Hannu; Laitinen, Riitta; Marnila, Pertti; Virtanen, Elina & Välismaa, Anna-Liisa (MTT Agrifood Research Finland, Food Safety Laboratory, Oulu, Finland)

Futures for Food Services – Multidimensional Challenges and Opportunities
Mertanen, Enni & Nukari, Jussi (JAMK University of Applied Sciences, Finland)

MODELING PHOSPHORUS AND NITROGEN FOOTPRINTS IN THE FINNISH FOOD CHAIN
Jenni Ypyä 1; Kaisa Grönman 2; Sirpa Kurppa 1; Risto Soukka 1; Yrjö Virtanen 1 & Pentti Seuri 2
1 MTT Agrifood Research Finland, Food Research, Sustainable Bio-economy; 2 Lappeenranta University of Technology, Finland; 3 MTT Agrifood Research Finland, Plant Production Research.

Futures for Soybean in South America by 2030
Gordillo, Ulla & Pérez, Pablo (University of Turku, Finland)

Modeling phosphorus and nitrogen footprints in the Finnish food chain
Jenni Ypyä 1; Kaisa Grönman 2; Sirpa Kurppa 1; Risto Soukka 1; Yrjö Virtanen 1 & Pentti Seuri 2
1 MTT Agrifood Research Finland, Food Research; 2 LUT Lappeenranta University of Technology, Finland; 3 MTT Agrifood Research Finland, Plant Production Research.

Potential ecotoxicity impact assessment
Räsänen, Kati & Kurppa, Sirpa (MTT Agrifood Research Finland, Plant Production Research)

Sustainable Food Course, a Cultural Revolution -- The Challenges of Creating and Maintaining an Introductory Course on Food, Food Culture, Food Systems, and Food Justice
Bartels, Kirsten A. & Bartels, Bart A. (Grand Valley State University, Allendale, USA)

FinCEAL - Developing Finnish Science, Technology and Innovation Cooperation between Europe, Africa and the LAC Region
Kagiri, Eva (Finnish University Partnership for International Development (UniPID), University of Jyväskylä, Finland)

Smart self-service lunch buffet provides customers with accurate nutritional value information
Tuukkanen, Riitta & Rautiainen, Teija (Mikkeli University of Applied Sciences, Finland)
ABSTRACTS OF THE KEYNOTE SPEAKERS

Food and Environment

Sirpa Kurppa, Professor
MTT Agrifood Research Finland

Thursday 6 June, 10:30
Venue: Elovena-sali, 1st floor

Environment has appeared to be by far the most critical constraint to futures of our food production-consumption chain. This is a new phase in the history.

Originally, agriculture and food cultures were tightly linked together, areaal self sufficiency was strived to, and structure food production-consumption chain inevitably depended on local ecosystem and followed the seasons of food raw material availability. Then processes have developed, such as freezing and canning that made possible to transport food in long distances. Production processes became focused on economic efficacy, production chains simplified and grew fast in terms of volumes.

With food globalizing process variety of food items exploded, seasons almost disappeared; transparency of the chains became indistinct. But illusion of globally excessive food was turned out false. Nevertheless, number of food products grew extremely high, the base of these products in terms of raw materials have narrowed to certain plant species or even certain cultivars which dominate the global market.

High volumes of production have cantered to areas which are suitable for growing certain raw materials and borderline areas have had major difficulties to find a niche of their presence in the competition. With this process the quantities of energy used for production has grown even though energy efficiency per product quantity has improved.

At present many experts admit that increase in the frequency and intensity of environmental crises associated with accelerating human-induced changes in global resources has became a major issue in food policy. Biggest obstacle that now has been met is loss of biodiversity. It seems very difficult to stop the concatenated process of loosing biodiversity in all of its scales: landscapes, habitats and species.

Biodiversity is linked to all other critical resources of food production such as land us, nutrient frown, use of water and use different forms of energy. And as such, ecosystem biodiversity is strongly linked to diversity of socio-economic system. Ultimately, by real, spatial, seasonal and quality based diversity of our food choice we have major impact to diversity of production system and to diversity of the use of resources from ecosystem. How people interpret this concatenation to their food culture and daily life rules futures of food to a growing extent.

When resources become tighter we have to find more diverse ways to use resources in a sufficient and sustainable way. And we have to become much more alert and active to rebalance our resource use when necessary for safeguarding resilience and avoiding concatenated shocks.
“By 2060, it will be illegal to use the ground to grow food” …and other futures

James Allen Dator, Professor and Director, Hawaii Research Center for Futures Studies
University of Hawaii at Manoa

Thursday 6 June, 11:15
Venue: Elovena-sali, 1st floor

H. G. Wells was right: “Civilization is a race between disaster and education.” Thomas Malthus was right too: Life depends on winning the race between population growth and food supply. Who is winning those races now? Who will win over the next ten to fifty years, and why? I have been tracking the main contenders for many years. One of my earliest sources on the subject was “Synthetic Food for Tomorrow’s Billions”, by Archibald McPherson, 1965. Jarvis Cain from the Department of Agriculture of the University of Maryland, who specialized in the future of food, a visiting scholar at the University of Hawaii while I was establishing futures studies there, also inspired me. Cain could not come up with a definition that distinguishes “synthetic food” from “natural food”. There is nothing “natural” about agriculture. Almost everything humans have eaten in the last 8000 years has been “synthetic” in any meaningful sense of the word. “Synthetic food” and “artificial food” seem passé. Now it is “biotechnology” or “genetically-modified food” or “designed food”. There are bitter disputes over the substances they denote. Are we being fed or poisoned? Starved or obese?

I will consider several alternative futures for food, based on different assumptions about the futures of certain interacting driving forces – human population growth, decline, and mobility; supplies of energy, water, soils, and fertilizer; climate change; economic systems, developments in biological and related sciences and technology; technical and political aspects of the dominant food (including seafood) industry as well as the counter natural food industry; and the emergence of the Anthropocene Epoch.

While there are very many reasons to be concerned, if not despairing, about the outcomes of the Wellsian and Malthusian races, I will end with some evidence for hope – and a challenge.
Looking back to see the future: changes in global food supply and related land use

Sanderine Nonhebel, Associate Professor, Center for Energy and Environmental Sciences
University of Groningen, The Netherlands

Thursday 6 June, 13:00
Venue: Elovena-sali, 1st floor

The production of food puts a large claim on land. On a global scale 30% of the land is used for the production of food. Population growth is the major driver for the increased need for food, but the type of food also plays a role: luxurious meals with meat require more resources than menus mainly based on staples. Next to this agricultural practices are of importance: high yielding intensive farming systems produce more food per unit land than the low input subsistence systems.

Globally we see huge differences in the factors mentioned above. People eat different foods and produce it in different ways. Next to this both food habits as agricultural practices change over time. The combined effect of all these differences and changes on the land needed for our food is the topic of the presentation.

We studied changes in menus in Western Europe over 200 years and the changes in agricultural practices and calculated the (changes in) land needed for food in these 2 centuries. We observe large changes in menus over time: Rye and barley were replaced with wheat, consumption of relevant quantities of sugar only started around 1880, in 2000 15% of the calories in the menu were obtained from sugar, etc. Yields increased nearly 5 times. As a result land needed for food dropped from 1.4 to 0.15 ha per person.

At a global scale we determined land use for food per capita through combining data on food consumption with yield data. In western countries 70% of the land needed for food was needed for the production of livestock feed. In the rest of the world the largest share is for the production of staple food like cereals, beans and tubers. The fast emerging economies show an increase in the meat consumption and an increase in the land needed for food per person.

The trends observed are used to discuss how much food we will need in future on a global scale and how much land we have to make productive to produce it.
The(R)evolution of cooking

Hanni Rützler, Future expert for food trends
Futurefoodstudio, Austria

Friday 7 June, 13:00
Venue: Osuuskauppa-Sali, Ground floor

Cooking gives us a company since our evolutionary beginnings. Moreover it defines us as: “Cookovores” or more exactly “cooking primates” as Richard Wrangham, British anthropologist and primatologist of Havard University, likes to name our species. And due to the fact that cooking characterizes us it will not disappear in the future. It is only on the way to reinvent itself: not any longer “food supply”, moreover “pleasure cooking”. And that is why men - slowly increasing- identify with cooking.

New cooking no longer takes place within our own four walls, it appears for example in restaurants in the guest room and there it can be (learningly) observed; it is part of team building while cooking workshops or it is going to be a pop - up event in new, exciting, temporarily locations. Sitting together around the table eating is much more than just providing us with food. It gives our lives sense orientation and perspectives; it gets a deep context with tradition, togetherness und the responsibility for each other. Short, we are remembering that the symbolic of cooking and eating together is much more than the day by day cookery much more than just getting feed.

Nevertheless the way we organize table fellowships differs very much from the way of eating former days. Megatrends like globalisation, individualisation, new forms of work, better education of women and consequential change of the gender relation females have step-by-step left their traditional responsibility for the day in day out cooking all by themselves. Products and services helping to prepare a quick and easy everyday cookery were useful on this way. Following to that less know how and time was needed to serve a daily family lunch or dinner.

Cooking gets chic to women and gets attractive to men as it looses its every day supply function, as it gets associated with fun, creativity, sense and social acknowledgement and it satisfies the growing need of distinctions; if the time used in the everyday routine is shortened and no more is fixed on a role model.

This nutrition concept opens the way for a new passion on shopping and cooking, gives room to culinary creative powers and gives the way free to an unexpected come back of the joint enjoying of meals.
Cultured beef: concept or cut?

Mark J. Post, MD, PhD, Professor and Chair of Physiology
Department of Physiology, CARIM, Maastricht University, The Netherlands

Friday 7 June, 13:45
Venue: Osuuskauppa-Sali, Ground floor

Worldwide we are doubling meat consumption in the coming 40 years as estimated by the WHO. Absorbing already 70% of the earth’s arable land, traditional meat production through livestock is rapidly reaching its limits. Livestock also contributes appreciably to the emission of greenhouse gases such as methane is therefore an ecological hazard. While cognizant of the down sides of the bio-industry, we continue to favor meat as an indispensable part of our diet.

The problems with livestock meat production are due to the inefficient bioconversion rate of 15% for cows and pigs. Current stem cell and tissue engineering technology present opportunities to culture meat with a higher efficiency. As a proof of concept we have produced a hamburger entirely through cell culture that should change the discussion around the feasibility of culturing beef.

After production of this concept hamburger, there is still a tremendous amount of work ahead to eventually get an efficient, cost-effective and high quality meat product. The versatility of the meat culture process offers additional yet unexplored opportunities such as alternative meat products that for instance contain healthier fatty acids, or blended meats from various stem cell sources to create new flavors.

It is inevitable that we come up with a resource, environment and animal friendly alternative to livestock meat, so we better should warm up to the idea that this alternative might be cultured meat.
Sustainable food consumption and production in a resource-constrained world
Lance O’Brien, Ph.D., Manager, Foresight Unit at Teagasc – the Agriculture and Food Development Authority, Ireland

Friday 7 June, 13:00
Venue: Osuuskauppa-Sali, Ground floor

The first decade of the 21st century has seen an increasing number of new “grand challenges” for food and agriculture. They include, amongst others, climate change, energy and water supply and (re)emerging diseases, which all affect the potential of future agriculture and food security. These challenges are further exacerbated by the current economic and financial crisis, the increasing scarcity of natural resources and the destabilization of ecosystem services.

The “grand challenges” are a real threat not only to future food supplies, but also to global stability and prosperity. They are increasing the uncertainty about the future development of agriculture and making it difficult to see how the growing demand for food and other bio-based materials in a bio-economy can be met without further compromising the provision of ecosystem services on which society and the entire economy depend.

There is an urgent need to take these challenges seriously and prepare the ground for a transition towards more efficient and sustainable food consumption and production in a resource-constrained world. The “grand challenges” demand an integrated and effective approach with public research playing a key role in supporting the necessary and inevitable transition towards a more sustainable development path.

Europe cannot divorce itself from these dynamics, but must continue to invest in the R&D and innovation necessary for the long-term production of sustainable and safe food in Europe and meeting food security globally.

The European agri-food sector should now consider that there is an opportunity to take up the challenge and be the first to win the global market for the sustainable production of healthy food in a world of scarcities and uncertainties.
WORKSHOP 1: Food Policy I

Time: Thursday 6 June at 13:45–15:00
Chair: Dr. Juha Kaskinen
Venue: LS 12, 1st Floor

Consumer and producer perceptions on corporate responsibility in the Finnish food chain
Koistinen, Laura & Latvala, Terhi (MTT Economic Research, Helsinki, Finland)

Consumers and producers have distant relations in the concentrated Finnish food system. However, the food supply chain is expected to respond to versatile consumer expectations on food characteristics, including corporate responsibility (CR). The aim of this paper is to examine and compare consumer and producer views of CR in the Finnish food supply chain. CR in the Finnish food chain is defined through seven key dimensions. The data were gathered with two online questionnaires from 1352 consumers and 555 producers. In the following phase survey results were used in stimulating discussion on CR in the participatory workshop of 6 consumers and 6 producers.

The survey results show that consumers and particularly food producers are interested in having discourses on responsibility issues with each other. Both also found all the responsibility dimensions generally as important. Consumers and producers rated their own possibilities to influence responsibility in the food supply chain as reasonable but, nevertheless, as weaker than the possibilities of retail and food companies.

Responsibility was seen as an important but challenging topic in the workshop discussions. The participants though that both producers and consumers should embrace more actively their role in influencing CR in the Finnish food chain. Enhancing producer and consumer interaction and enabling open discussion on responsibility issues could lead to deeper mutual and overall understanding on CR, and thus to greater leverage in the food system.

Moving from consumers into co-producers through education
Junttila, Minna & Väisänen, Karoliina (JAMK University of Applied Sciences, Jyväskylä, Finland)

This paper introduces plans for an educational model in the Finnish professional higher education with the aim of enhancing value co-creation and consumer-producer dialogue. The shared values and improved understanding of each other lead to more conscious consumers and professionals, and on the other hand, the promotion of local food and food communities. The aim is to introduce specialisation studies on Sustainable Gastronomy as part of Bachelor of Hospitality Management degree, educating graduates with a comprehensive understanding of the sustainable food chain and eco-gastronomy.

The educational goals will be achieved through carefully chosen content themes and study methods. Themes such as sustainability from farm to fork through the entire food chain, quality issues, food culture and food communication, and taste education will be discussed, not forgetting food policies and food economy. The consumer-producer dialogue will be encouraged gradually through several experiential methods such as co-creation, service design, producer visits, study tours, real-life development projects, practical training periods and thesis assignments.

Due to the global environmental developments there is a growing interest towards sustainable food systems, however, this cannot yet be seen much in the curricula. Perhaps the oldest and most comprehensive examples of higher education studies on the theme can be found at the University of Gastronomic Sciences in Italy, established by the Slow Food movement in 2004. In Finland Helsinki Culinary School Perho offers Sustainable Gastronomy studies at secondary level, and JAMK University of Applied Sciences would be the first one at tertiary level.
Food policy coherence: estimating total synergies and contradictions in policy documents

Nisonen, Sampsa (University of Helsinki, Finland)

This presentation focuses on a method for estimating the coherence of different policy documents covering a topic that concerns multiple societal sectors. Agricultural and food policy is one such topic, as it affects both environment and society. Additionally the societal dimensions of agriculture and food are numerous, as food has implications for health as well as culture and business. Consequently food related policy is made on different sectors and their goals don’t always coincide. To increase the coherence and effectiveness of food policy, key synergies and contradictions between various policy goals and actions should be identified.

The presented method is based on qualitative content analysis and theories of environmental policy integration. A set of food policy documents from different sectors is analysed: commonly found goals and actions are identified and then coded using qualitative data analysis software. The contradictions and synergies between and inside sectors are identified by comparing the goals and actions two by two. The quality of an interaction (synergy, contradiction, no interaction) must be considered separately from its magnitude, which depends on how often the codes occur in the policy documents. The more common the interacting goals and actions are, the stronger is the synergy or contradiction between them. By summing the magnitude values for synergies and contradictions between and inside sectors, a better overall understanding of policy coherence is achieved.

In order to improve accuracy and reliability, the method could be used as a framework for gathering results from individual studies focusing on single policy interactions.

The Political Economy of Food in Developed Economies: Contested Futures?

Busicchia, Brigit (Macquarie University, Sydney, Australia)

Is it reasonable to assume that different political economy contexts may have different futures of food? This comparative analysis proposes to explore how political economic variables impact upon and shape current and future food economies of selected developed countries. In view of the interplay between political systems and food systems, it subsequently attempts to imagine their respective futures.

Australia, the United Kingdom and France present significant variations as well as similarities to allow for assessing how national political structures, modes of interest mediation and varieties of capitalism construct their respective present and future food economies. Central to this analysis is the question of whether market based instruments and mechanisms, so pivotal to liberal market economies, can be politically enduring as well as being able to deliver adequate social, environmental and economically viable outcomes to the many challenges facing the national food economies. If markets fail to register environmental and social harm, is governmental intervention necessary to deliver the desirable outcomes? A typology of the researched food economies suggests distinct models, each following specific political and economic arrangements which tend to nurture particular patterns of operation.

The paper aims to shed light on the food situation in these selected high-income countries and asks how sustainable these food economies are in the face of pressing environmental challenges. This analysis aids our understanding of the situation at present by identifying the principles underpinning the respective national food security discourses and gleans insights into the contested future of food in these wealthy nations.
From food-insecurity towards trade-dependency: A historical analysis of global food security

Porkka, Miina & Kummu, Matti (Water & Development Research Group, Aalto University, Finland) & Siebert, Stefan (Institute of Crop Science and Resource Conservation (INRES), Univ. of Bonn, Germany)

Feeding the world’s population is a challenge that is only going to deepen in the future, as growing population and changing diets are expected to increase the already high demand. However, in order to tackle future challenges, we must understand the past. The aim of this study was to conduct a historical analysis of food security, food self-sufficiency and the role of agricultural trade in achieving food security. We used FAO’s commodity balances to calculate 5-year averages of country-level food supply, domestic food production and food trade for nine time steps during 1965–2005.

We found that global food supply has increased significantly both in absolute and relative terms. The percentage of population living in food secure countries (> 2500 kcal/cap/d) has almost doubled from the 33% in 1965 to 61% in 2005. While the share of food-insecure population has nearly halved, the most vulnerable group, those living with less than 2000 kcal/cap/d, has decreased from 52% to 3%. Global per capita food supply has increased by 20% since 1965, which means that in absolute terms food supply has more than doubled. Biggest increases can be seen in the MENA region, Latin America and China and South-East Asia. The composition of food supply has also changed significantly. In 2005 over a half of the world’s population lived on a very resource intensive animal food based diet (> 15% of calorie intake from animal based foods), while in 1965 the percentage was 33%.

While food supply has increased globally, food self-sufficiency (domestic production of >2500 kcal/cap/d) has not changed significantly. This indicates that while in the beginning of the study period insufficient domestic production meant food insecurity, in recent years it has been compensated by increased food imports. Indeed, the share of people living in net food importer countries has increased from 17% to 46% during 1965–2005. Food dependency has notably increased in the MENA region, Southern Africa, Central America and Southern Europe. A few countries, namely Australia, Argentina, Canada and USA have dominated the global food exports throughout the study period, but in recent years, Brazil and many South East Asian countries have also increased their food production for export.

Sustainability transition for nutrients – two contrasting agrifood futures

Kahiluoto, H. & Kuisma, M. (MTT AgriFood Research Finland) & Kuokkanen, A. & Kivelä, R. & Mikkilä, M. & Linnanen, L. (Lappeenranta University of Technology, Finland)

Nutrient flows, instrumental for food security, interact with climate change and biodiversity, those being the three earth processes which already transgressed the planetary boundaries. Major system innovations are required to transform these dynamics. We adopted the planetary boundaries as a quantitative goal for sustainable nutrient futures to be locally implemented. There agrifood system is in the core.

Since forecasting approaches tend to extrapolate the present unsustainable trends, we quantified two contrasting anticipatory future agrifood scenarios. Our aim was to illustrate the span of choices available, to facilitate catching on the gap, and the leaps for transformation. The process was interacting with a transition arena involving relevant actors and with a quantitative assessment of nutrient flows and leakages.

To avoid the paradigmatic traps, the scenarios varied on the archetypic axes of global – local, market led – public driven and on the paradigmatic axis of nutrient management, i.e., closed loop/cascade – eco-efficiency. The flows were allocated to farm, trade and consumption sub-systems currently and in the two agrifood scenarios. The key determinants were identified and enabling technology, market and policy frameworks for emerging system
innovations were sketched for each coherent scenario. The contrasting, quantitative scenarios will be presented. We conclude that whatever the dominant paradigm driving the nutrient future, the scarcity in terms of available nutrients per ha on farms and of calories on plates is striking. The nutrient security is, however, possible irrespective of the paradigm or their combination, but only achievable if the nutrients are globally equally distributed.

**New strategies to ensure sufficient food provisions in case of crisis in Germany**

Menski, Ute & Gerhold, Lars & Braun, Janina (Freie Universität Berlin, Germany)

The protection of food supply as a crucial infrastructure is a central subject of the security policy of Germany. Nevertheless, the currently valid political and juridical measures are not sufficient anymore under today's conditions in order to guarantee the safety of the population in the case of crises.

The interdisciplinary research project investigates how the continuity of food supply can be guaranteed in future under crisis conditions in order to prevent a supply crisis within the food sector. The perspectives of all relevant stakeholders – enterprises of the food chain, political decision makers, aid organizations and citizen as the addressee of the supply – are included in the investigation.

The project is based on two application oriented scenarios: a pandemic and a power failure. Based on these the behavior of the population, communication between stakeholders and the resilience of the supply chain are analyzed by using various methods of empirical research. Concrete recommendations and suggestions for improvement of the current status quo regarding the stability of the food supply chain will then be derived.

In order to visualize the individual results and to ensure the sustainability and practicability of these recommendations, a simulation tool which will display specific crisis situations as well as an educational training concept for political crisis managers will be developed.

The paper provides a comprehensive statement of the status quo of precautions of food supply emergencies in Germany, the methodical and organizational design of the research project, its first results as well as an outlook on future challenges and upcoming outcomes.

**Structural change in the Finnish livestock sector – past changes and future prospects**


The structure of Finnish livestock sector has changed rapidly, but steadily already for several decades. Various concerns about risks associated with modern food production have emerged. The goal of this study was to 1) analyze which kind of cattle or pig farms have continued from 1997 to 2009, to 2) project the future structure of livestock farms, and to 3) characterize how changes could impact animal disease risk factors.

To study structural change in cattle and pig farms, data from the Finnish farm registry and region-specific macroeconomic data were used. The contribution of different factors to a farm’s likelihood to continue production over the study period was estimated with logistic regression. Estimation results and data from a recent year were used to project future changes in the farm structure. DREMFIA sector-level economic model was also used to project the total milk and meat production and animal stock. A questionnaire to cattle and pig farms was conducted to study the biosecurity status of farms.

Results suggest that the number of farms and animals will decrease in the future. Large farms and mixed farms with both cattle and pigs are most likely to continue. However, mixed farms are expected to specialize in one species over time. The spatial agglomeration of production is expected mainly due to large investments of relatively few farms, because investments are highly dependent on farm-specific factors. According to the questionnaire larger farms use more biosecurity measures than smaller farms. Therefore overall biosecurity in Finland may improve in the future.
WORKSHOP 3: Food & Sustainability I

Time: Thursday 6 June at 13:45–15:00
Chair: Dr. Sirpa Kurppa
Venue: LS01, Ground Floor

Food Sustainability: From actual patterns to future perspectives

Viera, Grace & Nielsen, Thorkild (Aalborg University, Department of Planning, Denmark)

Agriculture is a resource intensive activity that requires large land areas and consumes significant quantities of water and energy. Food production generates considerable amounts of emissions and waste. Additionally, there are social issues and animal well-being concerns that should be taken into consideration. In the demand side, actual consumption patterns are unsustainable and problems like obesity and malnutrition are increasing. Currently, there is lack of consensus on feasible ways to produce and consume sustainable foodstuffs. Moreover, there are limited information flows from field to processing facilities, and weak links between producers and consumers. If food systems are to become sustainable in the future, major changes in production and consumption are needed.

This work presents an overview of current efforts towards the inclusion of sustainability practices into the food chain; from industry schemes that promote social and environmental responsibility to attempts to engage consumers in more responsible purchasing. The present paper reflects on why different sustainability efforts have not reached the expected results. Furthermore, it tries to understand the different drivers of system stability and change, analyzing how current scenarios and perspectives are shaped and shape sustainability efforts. The paper reflects into how changes towards sustainability are slowly taking place and the challenges for future food systems.

Key words: Food systems, sustainability, social and environmental issues, current efforts, consumption, production, future perspectives, change drivers

How to Make Cavemen Eat Responsibly – Evolutionary Psychology and Food Marketing

Lähteenmäki-Uutela, Anu (University of Turku)

The paper discusses the evolution of human psychology related to food choice. We carry cognitive models as typical to human species. The two basic questions addressed are:

- what are the evolutionary forces that existed in the stone age, exist now, and will exist in the future as related to human food preferences,
- how should this be recognized in food marketing.

Natural selection and other evolutionary forces have affected the development of the human mind. Many evolutionary psychologists say our brain still is in the stone age mode (species-specific cognitive architecture). For example, we prefer high-fat, high-sugar foods in order to gather body fat and survive when food is scarce. As another example, meat-eating has apparently been one of the developments that separated us from the apes. However, meat-eating, particularly in its factory-farming form, raises ethical problems in modern society. More generally, buying food today is a moral decision because of the environmental and social effects. Global food chains have not existed for long. The human brain has had to deal with moral dilemmas for millions of years, but these dilemmas have related to people in the tribe. Our brain might not be adapted to moral decisions that affect people in the other side of the world. It does not feel wrong to harm people we don’t know. Recognizing and understanding this cognitive inadequacy and comparative lack of compassion could perhaps help us solve global environmental and human rights issues related to food. It is a question of how to make cavemen eat responsibly.
Advertising for Sustainability – Promoting Sustainably Produced Food to Finnish Consumers

Ulvila, Kukka-Maaria (Jyväskylä University School of Business and Economics, Finland)

Food is one of the key consumption contexts in terms of environmental and social impacts in the World. Thus, sustainable food consumption and sustainably produced food products should be promoted actively to consumers. Statistics indicate that the the consumption of and the demand for organic and other sustainably produced food products has increased steadily in Finland but is the increasing demand for sustainably produced food visible in the amount of advertisements?

The objective of this research is to analyse, by using qualitative content analysis, both the amount as well as the content of food advertisements from the years 2006–2007 and 2010–2012 from three Finnish magazines. In addition, the aim is to outline what are the product attributes food producers and marketers use to promote sustainably produced food to consumers. Print advertisements in magazines are chosen since, mass media channels are considered the fastest and most efficient means of informing people about the existence of an innovation thus creating awareness about it. The diffusion of innovations – theory is used as theoretical framework.

The results indicate that, despite the ample amount of food advertisements, there are rather few advertisements of sustainably produced food products in 2006–2007. However, the gradual increase in the popularity of sustainably produced food is visible in the quantity as well as the content of advertisements from the years 2010-2012. The findings of this research yield new information about how sustainably and ethically produced food product have been marketed to a larger group of Finnish consumers.

Disposition and performance for sustainability: A Finnish case of supply chain analysis with the public sector catering industry

Mikkola, Minna (University of Helsinki, Ruralia Institute, Finland) & Hingley, Martin (Lincoln Business School, UK)

The public sector catering industry has been given the political task in Finland to contribute marketing development concerning sustainability. While depending on the current market for their ingredients, the committed caterers see the endeavor as a universal issue, whereby balancing ecological with socio-economic sustainability implies more transparency of and co-development with supply chain actors. In order to become a ‘player for sustainability’ in the market, the caterers need to learn how supply chains’ socio-economic dispositions for sustainability can be realized through their market performance. This paper aims to support the emerging market for sustainability through a Finnish case study, whereby supply chains from local to global are analyzed in terms of their disposition towards sustainability and market performance. How sustainability is framed, what kind of structures and economic relations develop within the chains, and whether business strategies orient towards increased sustainability, all amount to business dispositions; while capacity to deliver respectively signals of co-developmental potential. The results suggest that supply chains’ dispositions for sustainability are often inversely related to their performance. Small local supply chains may exhibit more transparency, equal economic relations and innovative strategies, however, they have limited sales volumes; the large global supply chains are less transparent but their volume performance is relatively good and agile. The major domestic supply chains are rather transparent and perform very well, with challenging developmental orientations. However, each supply chain seems to display particular current co-developmental potential within the system and could benefit from more detailed procurement criteria. The paper discusses the conditions of dispositions and performance and concludes that this aspect needs to be included in sustainability characterization, although structural and economic relations so far have been less visible in public procurement.
WORKSHOP 4: Food & Diet Approaches

Time: Thursday 6 June at 13:45–15:00
Chair: Dr. Markus Vinnari
Venue: LS 13, 1st Floor

Intentions to increase or decrease vegetable-protein and meat consumption and their associations to attitudes among Finns

Jallinoja, Piia & Niva, Mari & Järvelä, Katja (National Consumer Research Centre, Finland)
Kotro, Jaana & Latvala, Terhi (MTT Agrifood Research Finland, Economics and Social Sciences)

Consumption of beans, lentils and tofu is infrequent among Finns despite their positive impact on environment and health. The present study aims to explore the intentions to change the consumption of vegetable-proteins and meat and their associations with perceptions related to these products.

Two surveys using the same questionnaire will be utilized. The first was collected by a targeted online survey in November-December 2012 via organizations with potential pulse-users (e.g. animal welfare, organic food and student organizations). The respondents (N=1186) were relatively young (mean 34.4 years; SD 12.1), 82% were women, a third students and 38% vegetarians. The second data, representative of Finnish population, will be collected in February 2013.

The results of the targeted survey show that the respondents were already active users of vegetable-proteins: 69% ate beans and 55% soy products at least once a month. 37% intended to increase the consumption of beans and 22% of soy products within the next 2-3 years. In contrast, very few – even among non-vegetarians – intended to increase use of meat. A third of non-vegetarians intended to increase their fish, bean and lentil consumption. Positive perceptions of vegetable-proteins correlated with intention to increase their consumption. Likewise association was found in respect of meat. In the presentation, these results will be compared with the new, general population data in order to see to what extent the targeted population resemble the general population, and whether the vegetarians and students of the targeted population may be termed as pioneers of vegetable-protein consumption.

Forced Choice Restriction in Promoting Sustainable Food Consumption: Intended and Unintended Effects of the Mandatory Vegetarian Day in Helsinki Schools

Lombardini, Chiara & Lankoski, Leena (Department of Economics and Management, University of Helsinki, Finland)

This paper discusses the use of forced restriction of food choice as an instrument of food policy by using the mandatory Helsinki School District weekly vegetarian day as a natural experiment. Overall, the results show that the initiative produced a mixture of intended and unintended effects. On vegetarian days there were clear signs of non-compliance in the short term, manifested as a decrease in the participation in school lunches and in the amount of food taken to the plate and as an increase in plate waste. In the medium term, the only sign of non-compliance was a decrease in the amount of food taken to the plate. The difference between the short-term and medium-term effects can be interpreted as a weakening of non-compliance, as a change in the way it manifested itself, or a combination of both. The effects of the vegetarian day differed between school levels. In the short term, the clearest indications of non-compliance were found in lower-secondary schools. However, these schools also registered positive spillover effects in the medium term. The analysis suggests that the best way to reduce the unintended effects of a policy involving forced choice restriction depends on the causes of such effects. In the case of psychological reactance, default options may be preferable to forced choice restriction. For hedonic dislike, menu development should be prioritized, and moral suasion and information campaigns may help where non-compliance stems from a disagreement with the objectives and effectiveness of the intervention.

Keywords: Consumer behaviour, Finland, Food policy, School lunches, Sustainability
Can beans become everyday food? Attitudes to and eating of pulses among Finnish vegetarians and omnivores

Niva, Mari & Jallinoja, Piia & Järvelä, Katja & Pylvänäinen, Erja (National Consumer Research Centre, Finland) & Kotro, Jaana & Latvala, Terhi (MTT Agrifood Research Finland, Economics and Social Sciences)

Due to the environmental burden caused by increasing meat and dairy consumption, consumers in the Western world are encouraged to substitute meat with plant-based proteins. As part of a larger research project developing broad bean (faba bean) products, this study examines the use of and attitudes of Finnish consumers towards pulses and pulse-based foods.

The data for the study were collected by an online survey in December 2012. The Internet link to the questionnaire was distributed through organisations which could reach potential pulse-users, such as animal welfare, organic food, and student organisations, an organic food store and a vegetarian restaurant. Both users and non-users of beans were invited to take part in the study. The respondents (N=1186) were relatively young (mean 34.4 years; SD 12.1), a third were students and a majority were women (81.8%).

As 38% of the respondents identified themselves as vegans or vegetarians, the data provide a unique opportunity for comparison between vegetarians (incl. vegans) and omnivores. In the presentation, we compare the two groups with respect to their 1) attitudes to and 2) use of and reasons for eating and not eating pulses. Based on the findings we discuss the potential of plant-based proteins to become rooted in everyday life of not only vegetarians but also omnivores. We suggest that omnivores are generally not ready to turn into vegetarians, but there are already signs of ‘flexitarianism’ in which pulses to some extent have replaced animal-based foods in everyday diets.

Organic vs. Intensive farming: when choosing what to buy, what is really at stake?

Ferreira-Aulu, Marianna B. (University of Turku, Finland)

Since the green revolution, after 1960's, intensive farming has found strong support as well as heavy opposition. Organic farmers and an increasing number of consumers avoid intensive-farmed foodstuffs. They support a more ethical way of treating animals, and food free from chemicals.

But how consumers base these "ethical decisions" on? Can we really rank environment, human, and animal welfare?

There is no single best farming system for all circumstances. This paper presents a comparison between intensive and organic farming through the many spheres of sustainability.

On the ethical sphere of sustainability, I look into animal well-being, by presenting the difference between intensive, free-range, and organic farming. On the social sphere, I look into food security and land use. Can we feed our entire human species population with organic food? On the ecological, I look at soil organic matter, impact on biodiversity, nitrogen leaching, and energy used for production.

The paper is based on several FAO reports and a meta-analysis study by Tuomisto et al (2012). In that study, 71 papers with quantitative data were used to compare intensive and organic agriculture and livestock production.

Tuomisto et al suggest that organic foods use less energy for production, produce a lower impact on biodiversity and have higher soil organic matter. On the other hand, organic agriculture demands considerably more land use, 84% more. Intensive farming has lower nitrogen leaching per unit of area, and also lower nitrous oxide and ammonia emissions. The study suggests that model studies overestimate the benefits of organic farming.

The aim of my paper is to give space for fruitful discussions on food production methods, hopefully leading to create and inspire innovative solutions.
WORKSHOP 5:  Food Policy II

Time: Thursday 6 June at 15:30–17:00
Chair: Dr. Sirkka Heinonen
Venue: LS 12, 1st Floor

Values of naturalness and authenticity in food choices and policies

Siipi, Helena (University of Turku, Finland)

The aim of this paper is offer a philosophical analysis on meanings and justificatory power of the terms of ‘natural’ and ‘authentic’ in the context of food. Appeals to naturalness and authenticity are common in food marketing and many consumers' value and want to eat authentic and natural food. These values may to some extent drive, not only individual food choices, but also national and international food policies. Thus, understanding their possible senses and justificatory power will most probably be of high importance in the near future when changes due to the climate change, population growth, globalization, global food crises, and new biotechnological developments force us to face serious questions concerning local and global food policies.

The outcome of the analysis is that both terms are highly ambiguous in food context. Naturalness may refer to nutritive suitability, moderate need satisfaction, lack of human influence, and familiarity. Authenticity can be contrasted with being artificial, synthetic, substitute, or less real. Moreover, some meanings of ‘authentic’ and ‘natural’ are, for example through the idea of artificial, strongly connected to each other. I conclude that even though naturalness and authenticity in most of their senses do not offer good justifications for decisions concerning food, certain senses of the terms, such as naturalness as nutritive suitability, are highly relevant to food policies and individual food choices and should be taken into consideration in decision-making concerning food.

Human and environmental well-being:  Food, health and sustainability in Finnish policy documents

Risku-Norja, Helmi (MTT Agrifood Research Finland) & Isola, Anna-Maria (University of Helsinki, Finland) & Nisonen, Sampsa (University of Helsinki, Finland) & Kurppa, Sirpa (MTT Agrifood Research Finland)

The presentation examines the articulation of sustainability within Finnish food policy. It captures the results and conclusions from a qualitative content analysis of 25 relevant documents from the past decennium; these deal either specifically with food and nutrition or sustainable development, or they are more comprehensive and address both topics. The material represents different types of policy documents from government programs to strategies and recommendations.

The overall goal of equity and equal social, cultural and economic opportunities among the citizens is clearly stated in the documents. Although this is one of the key elements of sustainability, in the documents it is not consciously linked sustainability, but the references are latent. The outspoken references to sustainability deal mostly with the ecological aspects. The documents stress the significance of the citizens’ -“consumers”- personal choices regarding both own health and the environment. The role of the public actors is also recognised, and it is stated that the choices supporting healthy and sustainable life-style should be attractive, accessible and affordable.

Defining sustainability in the context of food is a prerequisite for coherent food policy, and the sustainability concept provides means to streamline health and food policies by paying attention to the criteria of sustainable food provision. Because the municipalities differ regarding the development needs and possibilities, the same approach cannot be offered to all, but the problems need to be addressed in the concrete situations. It is important to involve practical actors in developing the food sector and in formulating quantitative goals.
**Stick or carrot – Impacts of alternative climate and energy policy scenarios on agriculture**

Rintamäki, Heidi & Rikkonen, Pasi (MTT Agrifood Research Finland, Economic Research, Helsinki and Mikkeli) & Tapio, Petri (University of Turku, Finland Futures Research Centre)

In the climate and energy strategy of the EU, the aims to cut CO₂ emissions are presented to all economic sectors. We study what kind of conflicts, synergies, opportunities or control climate and energy policy brings to the farms in Finland. In this study the Delphi method is used in the evaluation of alternative outcomes both on farms and on agriculture in general. Six alternative farm types are modeled as a ground for evaluating the effects of changing policy measures.

The starting point of the examination is three scenarios: Baseline, Tight Control and Energy Plus Food. These scenarios create different adaptive needs and measures in farms. The Baseline scenario follows the present and forthcoming development and the Tight Control scenario in turn constitutes all the possible mitigation measures which have been recently introduced in the scientific discussion. In the Energy Plus Food scenario, the farms increasingly produce renewable energy in addition to the food and, therefore, have new opportunities to develop their businesses.

The Delphi panel estimates the chosen policy measures by the 1) probability of the use, 2) desirability, 3) acceptability, 4) scope of the introduction, 5) suitability and 6) effectiveness of the means to reduce emissions. As key policy measures restricting the growth of the organic soils, governing the clearance of new fields and reallocation of arable land, promoting the cultivation of grass in organic soil, changes in the manure handling, changes in the feeding and increasing largescale biogas production are studied. The approach and the results regarding each measure are reported in the full paper.

**Identifying Problems Childs and Champions of the European Food Industries and Markets: Benchmarking Key Sustainability Trends Linked to Food Production in the Member Countries of the European Union in the Years 1990–2007**

Kaivo-oja, Jari (University of Turku, Finland Futures Research Centre)

Sustainability of food production and consumption is one key policy issue in the world and Europe. There are many needs to develop new decision-support tools for political decision-making in this special field of policy – food policy.

In the comprehensive benchmarking study of the European Union key sustainability trends of the food production and consumption are diagnosed and elaborated. Sustainability of food production and consumption of the European Union is analyzed by the available data base of the Eurostat. Time horizon of the evaluation is years 1990-2007. The study covers (1) resource use and waste (8 indicators), (2) consumption patterns (3 indicators) and (3) production patterns (4 indicators). Thus 15 indicators are analyzed by statistical tools in the benchmarking evaluations of trends.

Firstly, the study aims to identify such EU countries, which have the biggest problems in resource use and waste management. Secondly, the study identifies the EU countries with biggest problems of sustainable food consumption. Thirdly, the study aims to identify such EU countries, which have biggest problems in sustainable food production. The study identifies also the champions of sustainability management in the European food business.

In the study also (1) resource and waste index (RWI), (2) sustainable consumption index (SCI) and (3) sustainable production index (SPI) are presented and reported. These index numbers can be used in the international evaluations of sustainability of the food business. As an integrated summary index food sustainability index (FSI) is presented and reported for various European countries.

On the basis of the FSI index and other developed index numbers (RWI, SCI and SPI) some critical evaluations of the agricultural policy of the European Union are presented. These critical remarks are based on policy relevant trade-off analyses. In the summary section some evidence based policy recommendations are presented for the European Parliament and the European Commission.
WORKSHOP 6: Futures Research Methodology

Time:  Thursday 6 June at 15:30–17:00
Chair:  Dr. Burkhard Auffermann
Venue:  LS 06, Ground Floor

Drawing food trends: design potential in shaping food future

Celi, Manuela & Rudkin, Jennifer (Politecnico di Milano, Italy)

Foresight and design are activities that aim to imagine the future in response to change and uncertainty. Designers as futurists, empathize with consumers. Food - a basic human need - has engaged over time in an intimate relationship with the design discipline. Design impacts the food system at several levels: material (product), immaterial (service) but also prospective (thought).

Designers, in collaboration with other actors, materially shape food production, communication, packaging and distribution. Moreover they can enhance more ephemeral aspects of food consumption focusing on the enhancement of the senses and the food-experience. It is necessary to bear in mind that each possible intervention strongly impacts on environmental and social behaviors. In order to understand how these facets of design can contribute to building a sustainable future for food and thus for people, the Advance Design practice recognizes trend tools as a method for social and design-driven innovation. As Bruland wrote, “Trends are seeds of tomorrow scattered in the overwhelming detail of the present.” Modern societal trends are drivers for durable growth and continuous innovation. Trend is an essential factor for a design project. Although designers commonly rely on their insight for project development, they implement a set of qualitative and quantitative methods to identify and visualize trends, some of them shared with futurists: brainstorming, mood boards, weak signals, cultural and ethnographic observations. The aim of this paper is to show how attention to trend can change food ways and act with a phenomenological approach. Several case studies will be analyzed with particular attention to Street Food.

Keywords: trend, food, advance design, innovation

Envisioning sustainable and healthy food supply chain: participatory scenario-based backcasting approach

Latvala, Terhi (MTT Agrifood Research Finland)

In the consumer-driven food chain consumers become more and more conscious of the impact they have on the environment and on their own health through their food choices. Therefore, new innovative solutions in the food market are called for. In this paper one technology solution “Tailored Consumer Profile” is introduced and the applicability of this solution from the viewpoint of different food chain actors is discussed by using backcasting method. Future scenario towards more sustainable and healthy consumer food choice by 2030 is discussed. The advantage of using scenario-based approach is to create a framework for dialogue among food industry, technology experts and farmer and consumer representatives which normally do not interact with each other.

The aims of this study are three-fold. First the utilization of participatory scenario-based backcasting approach is described. Secondly, the innovation ‘Tailored Consumer Profile’ is introduced which is technological solution to the complex phenomena of sustainable and healthy choices as it was introduced to the participants in the future workshop. Thirdly, the results of the future workshop are discussed in detail. Finally the research and development needs in the food chain are identified to enhance responsible choices and transparency in the food chain. This paper is closely related to the work done in the SmartAgriFood project (Program: Future Internet Public-Private Partnership Program, Project number 285326, www.smartagrifood.eu). The “Tailored Information for Consumers” is one of the pilot cases under the work package 400 of the SmartAgrifood Project.
Combining qualitative and quantitative research methods to foresee the changing Finnish agrifood sector

Huan-Niemi, Ellen & Niemi, Jyrki & Rikkonen, Pasi & Wuori, Olli (MTT Agrifood Research Finland, Economic Research, Helsinki) & Niemi, Janne (Government Institute for Economic Research (VATT), Finland)

This study is conducted to anticipate the future of the Finnish agrifood sector in the realm of the changing EU Common Agricultural Policy (CAP) in conjunction with the global agricultural, trade and climate policy. The goal is to support the process of policy planning and decision making in a rapidly changing environment. Two methods are utilised and combined in this study – the Delphi method based on panels of expert opinions and quantitative method based on a computable general equilibrium model called the GTAP (Global Trade Analysis Project). The Delphi method with panels of experts is used to forecast the short term (e.g. 5–10 years), and the quantitative “what if” modelling with the GTAP is used to forecast the long term (e.g. 20 years) until 2030. The methods complement each other in understanding the future developments of the Finnish agrifood sector. The interviewed food supply chain experts stress that the success of Finnish agriculture and food economy is highly dependent on the development of the CAP. The results of the GTAP-analysis confirm this by suggesting that the measures taken by the EU will have an essential impact on the Finnish agricultural production possibilities.

Key words: Delphi method, GTAP model, Finnish agrifood sector, agricultural policy, trade policy, climate policy

Is futures studies a scientific discipline – who cares as long as the food is good!

Vinnari, Markus (University of Eastern Finland) & Tapio, Petri (University of Turku, Finland Futures Research Centre)

This article discusses Futures studies as a scientific discipline. First, we analyze futures studies from four different perspectives: 1) What kind of syntax does the field of futures studies have, i.e. does it offer methods that are only typical for this specific field? 2) What kind of semantics does it use, i.e. does it offer specific concepts or statements that are used and developed specifically in this field? 3) What kind of a pragmatic research field does it offer? 4) What kind of specific scientific community does it have? Based on these perspectives it is questionable, whether futures studies can be considered a scientific discipline in a standard sense. There is a limited number of methods that can be considered as rigorous methods in the field. The concepts used in the field are not very specific and they are also used in other fields abundantly. Related to the pragmatic aspect, future does not exist and futurists actually analyse data from the past and present with an interest to understand the paths to future. The interest of the majority of the researchers in the field is to analyze historical developments and to produce well argued material for decision makers. The institutions developed in futures studies are in their infancy. But does it matter? Perhaps Futures studies should not try to be “a science” in a traditional sense. It should try to be an open forum discussing perspectives to multiple issues and topics. We illustrate the perspectives with examples of futures studies to analysis of food.
Kääriäinen, Galina (University of Turku, Finland)

The aim of my research was to try to anticipate possible futures of the Christmas cuisine in Finland. Firstly, I conducted the research in the Christmas cuisine of the Finnish people in the 2000-s. I analysed weaknesses and threats, strengths and opportunities of the Finnish traditional cuisine and decided to focus only on the Finnish Christmas cuisine. I chose this topic since Finland has been quite homogenous country in its Christmas traditions from the 20th century already. The globalisation, from one hand, and the immigration, from other hand, has been affecting Finland and its population only in the late 1990-s and the 2000-s. Secondly, I defined as the time horizon the year of 2062. I decided that such time horizon would allow me to anticipate which Christmas traditions and what cuisine could be in Finland after the changing of two generations. I decided that fifty years would be proper time horizon as soon as the Finland could stop to be homogenous nationally until 2062.

After that I identified driving forces which could influence on the Christmas traditions and especially on the Christmas cuisine in Finland in the next 50 years. Then I ranked these forces how they are important and unpredictable. I decided that key decision factors might be the level of protection from global influences and the level of cultural heterogeneity in Finland.

Finally, I came up with the main logics for four scenarios by trying to anticipate how the Christmas cuisine might have changed in Finland in 2062.
**WORKSHOP 7: Food & Sustainability II**

**Time:** Thursday 6 June at 15:30–17:00  
**Chair:** Dr. Minttu Jaakkola  
**Venue:** LS 01, Ground Floor

**Sustainable Public Food Procurement in the UK**

Stein, Mark (Salford University Business School, Manchester, UK)

**Aims:** The paper will examine how some UK local authorities are attempting to promote health and sustainability in public sector food procurement for UK schools. While complying with EU procurement legislation, local authorities have devised ways of encouraging local food suppliers – including organic producers – to supply food to their schools.

**Methodology:** The paper is based on semi-structured interviews with local authority catering, procurement and sustainability managers and policy documentation and analysis produced by government, local authorities and NGOs.

**Results of the Research:**
- Methods of encouraging local and organic suppliers
- Economic viability of healthier and more sustainable food sourcing
- Supplier engagement – Meet the Buyer events, training in tender preparation and food quality methods
- Division of contracts into smaller sections;
- Specifying freshness [a way of encouraging local produce]
- Procurement distribution hubs – helping small producers with the logistics of supplying to municipal school systems
- Specifying better environmental performance from suppliers e.g. reducing carbon footprint;
- Reducing meat content and promoting vegetarian food
- Involvement of civil society eg the Food for Life Partnership – educating children at school about healthy and sustainable food – what is is, where it comes from, how to grow and cook it.

**Key Words:** municipalities school catering organic local food

**Who eats sustainably? Comparison of social groups in four Nordic countries**

Mäkelä, Johanna (University of Helsinki, Finland) & Kahma, Nina & Niva, Mari (National Consumer Research Centre, Finland)

Promoting sustainable food consumption is often at an intriguing crossroads of policy making and individual consumer choices. On one hand, the quest for solving problems related to sustainability of food production and consumption is high on food policy agendas. On the other hand, the current policy making often relies on informed choices by individuals.

The presentation discusses political consumption and consumers’ beliefs about sustainable food consumption from a Nordic comparative perspective. We tackle the question of sustainable eating from two angles. First, we explore how people as consumers in their daily practices follow habits that are considered as sustainable. Second, we investigate how people as citizens support sustainable policy making. We analyse data from a 2012 Nordic survey (N = 8 248) from the Food in Nordic Everyday Life project conducted Denmark, Finland, Norway and Sweden.

Sustainability of food consumption was measured with questions concerning consumption of locally produced foods, food products imported by airplane, seasonal vegetables, organic foods, meat and products with excessive packaging (cf. Tobler 2011). Support for environmental policy measures was examined with questions about environmental education, market interventions, regulation and taxation. Multivariate methods are applied to analyse the differences between social groups in the total sample and in each country.
The preliminary results suggest that age and household type are related to the differences in the sustainability of eating. Supporting environmental policy measures is positively correlated to sustainable food consumption. Our study shows that among the Nordic peoples the food habits of Swedes are the most sustainable.

**Alternative food production models in the Global Futures Map**

Kuusi, Osmo (Aalto University & University of Turku, Finland)

The Global Futures Map is described as a morphological matrix based on the updated UN Millennium Ecosystem Assessment scenarios (Kuusi 2013, Capenter et al. 2005). The time perspective of the map that especially takes into account the climate change is 2050.

In the scenarios, three basic food production choices compete with each others: agribusiness, Eco-economy and Evergreen Revolution. Typical features of the present agribusiness e.g. in Brazil include large scale and mechanization, high labour productivity, the leading position of large multinational corporations, monoculture cultivation based on herbicides and the use of genetic modification of the kind that we know today (e.g. the glyphosate resistance of soy beans). Eco-economy and Evergreen Revolution are based on small-scale production that is more labor intensive.

In the production model of the Eco-economy, not all cultivation is organic, but its features are regarded as a kind of ideal. The Indian bioscientist M.S. Swaminathan have introduced the concept of the Evergreen Revolution and later e.g. the Obama government and FAO have used the concept. The use of genetic modification, artificial fertilisers and crop protection chemicals are interpreted as key distinguishing features between the Eco-economy and the Evergreen Revolution.


**Design-intensive farming**

Vrlík, Filip (University of Turku, Finland)

Agriculture entered an oil-intensive phase after passing through a labour-intensive phase. What’s the next phase? This presentation argues that it could well be design-intensity.

A shift occurred during the last century when rising population had to be fed effectively. To achieve this, farm hands were replaced by oil – directly or indirectly in the form of machinery, artificial fertilizers, pesticides and transport. The reasons for the next shift in agricultural practice are oil scarcity, soil scarcity, unemployment, climate change and biodiversity loss. In effect, oil can be replaced by smart design of farms and fields.

The goal of high yields was previously reached by the use of monoculture fields. This is now associated with increasing economic and environmental cost. The most productive systems on Earth are forests. We can mimic them and copy some patterns. We can work with the natural forces instead of working against them. This approach can be applied in a back-yard greenhouse as well as in big agricultural production.

Smart design means the use of natural forces and elements in our favor instead of spending extra resources fighting against these forces. In so called ”edible forests”, individual plants and micro-organisms support one another by nutrition exchange: Below an apple tree one could plant clover to help fix nitrogen, comfrey to act as a dynamic accumulator that brings up nutrients from deeper down and makes them available to other plants, and tulips, chives and daffodils to attract beneficial insects and repel unwanted pests. All work in harmony to benefit each other, and the apple tree.
Local food system development in Hungary
Balázs, Bálint (St István University, Environmental Social Science Research Group, Institute of Environmental and Landscape Management, Department of Environmental Economics, Hungary)

This paper presentation examines local food system (LFS) development pathways in the context of recent regulatory reforms in Hungary implemented to promote local product sales and short food supply chains (SFSCs). Taking a SFSC approach three case studies will demonstrate how new type of local food systems initiated by non-farmers attempt to shorten the distance of consumers and producers. The findings are based on qualitative key informant interview and consumer attitude survey data that seek to identify how LFSs promote or enact sustainable food supply and how consumers perceive the nature of relationship between consumers and producers. The results from the ‘Szimpla farmers’ market’, the ‘Gödöllő Local Food Council’ and the ‘Szekszárd local food system’ show various specificities and challenges of new type of emerging urban civic food networks. The paper concludes by pointing to critical factors and tools for the future development of LFSs, as well as reflecting on the role of original research to facilitate change for more sustainable food futures.

The practices of localization of Finnish food system
Hyvönen, Katja (University of Eastern Finland, Geographical and Historical Studies)

The localization of the food system has been embraced as a solution to the problems of the modern industrial food system, e.g. the problems with food safety, environmental degradation, or livelihood of peripheral rural regions. Also in Finland almost all the key actors of the food system have recently emphasized the advantages of alternative or local agro-food networks.

In my on-going dissertation study my aim is to analyze the aims, motivations and practices of the organizations (NGOs, public sector and public funded projects, agricultural union), which aim to localize the Finnish food system. All these organizations share the same aim and they are all part of the same historical, cultural and socio-economic-institutional context. However, this does not necessary mean that they all aim to promote the localization of the food system as the same way. Instead, the history and mission of the organizations as well as organization’s current position and role as a part of the conventional food system may be highly important factors determining organization’s practices and politics of food system localization. In my study, which is based on neoinstitutional theory and the concept of institutional entrepreneurship, my aim is to analyze the differences and similarities of these practices and ask how and why the organizations aim to change the food system more local and more alternative.

The study is based on the content analysis of documentary material and qualitative interviews with the leaders of above mentioned organizations. The analysis shows that there are multiple ways to promote the localization of the food system. The first type, which is common among public funded projects, highlights the importance of rural livelihood and aim to market regional food and the food products with the clear geographical origin. The second type, which is common especially among NGOs, emphasize environmental questions and aim to promote local and alternative food networks, such as consumer purchase groups. The third type emphasizes the importance of quality and freshness of food and aim to promote locally produced and consumed food. The fourth type highlights the protection of Finnish agriculture and aim to claim that all the Finnish food may be understood as local food.
Local and organic food activity and accessibility: the case of food circles in Northern Ostrobothnia

Korhonen, Kirsi (MTT Economic Research - Oulu, Finland) & Kotavaara, Ossi (University of Oulu, Finland) & Miettinen, Milla (University of Oulu, Finland) & Muilu, Toivo (MTT Agrifood Finland, Economic Research, Oulu, University of Oulu, Finland) & Rusanen, Jarmo (University of Oulu, Finland)

Local and organic food has attracted interest in public discussion and a larger share of the markets in Finland during the last years. Local food consumption benefits local production and the economy and provides opportunities to shorten logistics chains, which reduces the environmental effects of transport and improves the traceability of products. However, the supply of local food and particularly local organic food does not have a large share of groceries in general. Thus, food circles – individual activity-based and highly specialised logistical chains for food – are increasingly favoured.

This study explores the accessibility and logistics of local and organic food in the context of food circles. The study is based on a survey that was sent to the members of nearly 20 Northern Ostrobothnian food circles, which means that all recently active food circles are included. The survey is implemented to seek consumers' views on local and organic food and its availability. In addition, geospatial analysis and geographical information systems/science (GIScience) are applied to scrutinise location and accessibility patterns of food circles.

The study shows what kind of definitions consumers give to the concepts of local and organic food by valuing their qualitative and production-related features as well as geographical issues. Consumers’ purchasing habits and restrictions overall express, in particular, questions concerning the origin and accessibility of local and organic food. The extent of food circle activity measured by the number of members, area of distribution and purchasing volumes, for example, enables the identification of potential market areas for local food, and the definition of the potential to develop supply and logistics chains to increase food accessibility and availability.

Local vs. Conventional Distribution: Farmer choices, embedded values

Birge, Traci (Aronia R&D at Åbo Akademi University & Novia University of Applied Sciences, Finland)

In this research, we look at distribution of Finnish agricultural food products by considering “conventional” centralized distribution and alternative “local foods” distribution. The extent to which Finnish farmers use alternative (local) distribution is unknown. For this project, “local” means products that the farm sells in farm shops & local markets, to restaurants and stores, directly to consumers, in the market, to children’s day cares and similar facilities and to the municipality.

Products are part of the ‘conventional’ distribution system if they are sold wholesale to a centralized buyer who distributes products on a large scale. These buyers include centralized warehouses, processors and supermarket chains.

Postal questionnaires will be sent to all farms in Inkoo, Raasepori & Hanko in February 2013. In addition to asking farmers about their distribution system, we also ask whether farmers are 1. satisfied with their current distribution networks 2. whether they are interested in alternative distribution systems and 3. if they would like more information on accessing the local foods markets.

Results of how farms distribute their products will be coupled with agricultural statistics to assess whether distribution through local foods networks is associated with High Nature Value farmland or related environmental conservation values.

This research is part of Bra mat i Västranyland local foods project.
De-growth thinking – solutions for future food system?

Tapiola, Titta (University of Turku, Finland)

Method: literature research

This presentation shortly introduces de-growth thinking and looks for possible applications for the food system.

Because we have limited natural resources on our planet Earth and because of ongoing ecological degradation, it seems feasible to think that economic growth and consumption cannot go on forever – at least in a form we understand those today. During last 25 years the global economy has doubled, while about 60% of the world’s vital ecosystems have been degraded one way or the other.

The objectives of the de-growth are to meet fundamental human needs and instead of promoting consumption and resulting economic growth the quality of life is the key value. The goal is to reduce the ecological impact of the global economic activities to a sustainable level and wealth equitably distributed between nations (meaning from developed to developing countries). De-growth requires a transformation of the global economic thinking and of the policies pursued at the global, national and local level, to allow the reduction of absolute poverty and inequality.

The food system is highly dependent on fossil fuels so peak oil and rising oil prices have significant impacts on it. How to prepare to this world and how to prepare the food systems for that? In my presentation I use very simple model to compare two food systems after the peak oil and high fossil fuel prices – one that has prepared for it and the one that hasn’t. Local solutions, renewable energy and new workload distribution might bring some answers. Interestingly solutions also follow ideology of sustainable development.
WORKSHOP 9: Food Production & Processing

Time: Thursday 6 June at 15:30–17:00
Chair: Hanni Rützler
Venue: LC 13, 1st Floor

Fitness of organizational shapes for sustainable development: Examples from the food production

Kallio, Galina (Aalto University School of Business, Organization and Management, Finland) & Heikkurinen, Pasi (Aalto University School of Business, Philosophy and Management and MTT Agrifood Research Finland, Economic Research)

Unsustainable development prevails in business life. Many offered solutions are based on technological advancements but the underlying anthropogenic ecologic crisis is argued to be structural and cultural instead of technical in its nature. This means that in order to reach sustainable ways of living and conducting business we may need a cultural shift in organizations.

The aim of this paper is to discuss the fit – suitability and limitations – of organizational shapes for sustainable development. We ask: what are the implications of organizational size and forms of ownership to organizational potential to contribute to sustainable development?

This inquiry is built on literatures of ecological sustainability, social construction of markets, and corporate responsibility. While our interdisciplinary exercise is mainly theoretical, we complement the study with empirical examples from the food production in the Finnish context.

We find that different organizational shapes are more fit than others to reach sustainable business. These varying shapes are compared and analyzed based on their sizes and forms of ownerships. We conclude by suggesting the enabling and constraining combinations to sustainable development.

Has crop production as part of the land use become more diversified – reasons and consequences

Keskitalo, Marjo & Jauhiainen, Lauri (MTT Agrifood Research Finland, Plant Production Research)

Diverse agriculture may increase the resilience of farms towards global and climatic changes and therefore different efforts have been made to diversify agriculture. However, there was lack of information on the level of crop production diversity in Finnish farms.

In the present study as part of MTT’s MONISOPU project (Sustainability through crop diversity to climate induced changes in plant production) we wanted to find out how diverse the crop production is at farm and regional level, and how the diversity has developed with time. In addition we want to know possible reasons and consequences of the changes occurred in the land use for the local community.

The study was based on farm parcel statistics collected by TIKE (Information Centre of the Ministry of Agriculture and Forestry). The study covered years 1995–2011. Diversity of land use at regional level was evaluated through calculation of Shannon index, where both the number and area of crops affected the resulting diversity level. The consequences of changes in land use for local community will be studied on the spring 2013.

Crop production has diversified slightly since Finland joined the EU in 1995, since the frequency of monoculture of spring cereals has decreased. Increased cultivation area of oil seed rape, turnip rape, pulses and other special crops as well as different grasses played a major role in diversifying the rotations. The 15 Centres for Economic
Development, Transport and the Environment (ELY-centres) of Finland differed in their diversity indices, which were between 1.41 – 2.14 and the lowest in grass production areas. The possible reasons and consequences of the changes in land use for local food and/or other material or immaterial goods will be discussed.

Towards a CO2, water and waste neutral food processing industry in Flanders by 2030

Smets, T. & Van den Abeele, L. & Schrooten, L. & Nevens, F. (VITO - The Flemish research Institute for technology, Belgium)

The food processing industry is one of the key economic sectors in Flanders (Northern region of Belgium). Although several initiatives have been taken, this food processing industry is still characterised by a considerable impact on the environment, e.g. production of waste water and emissions of greenhouse gasses. In order to achieve a sustainable food system, the sector is engaged to assess the feasibility of becoming carbon, water and waste neutral by 2030. Therefore, the objective of this study is to propose and evaluate different roadmaps, including technological, economic and societal conditions, leading to a carbon, water and waste neutral food processing industry in Flanders by 2030. The roadmaps are designed by combining cost abatement curves of available and innovative technological solutions, their potential risks and possible enablers. The technologies evaluated are related to e.g. the reduction of food waste, process improvement and innovations and green energy. The methodology is developed in a setting of co-creation between scientific partners, the sector federation, company representatives and public administrators. In this way, a sufficient sense of reality, a shared understanding of the problems and opportunities, and a prepared playing field for actual realisation of the trajectory is ensured. The roadmaps indicate that by 2030 ca. 2600 kton carbon emissions can be reduced, the water footprint will be limited and food waste streams can be prevented, reused, recycled or applied as an energy source.

Possibilities in sustainable development in Finnish greenhouse production

Silvenius, Frans (MTT Agrifood Research Finland)

A Finnish carbon footprint project made by MTT Agrifood Research Finland in 2011–2013 showed large possibilities in reducing carbon footprint of Finnish greenhouse production. The project was made by using life-cycle assessment methodology and main part of the life cycle of the products were studied: plant and bulb cultivation, fertilizer production, substrate production, production of packages, transports, emissions of composting the plant residues, transports and heat energy and electricity consumption of greenhouse farms.

The studied products were tomato, cucumber, salad, tulips and Elatior begonias. The project was carried out by using pilot farms and there were altogether 16 farms. According to the results of the study the use of energy is the most significant source of climate impact of greenhouse products. In the tomato farms the part of heat energy production was 79–96 % of the total emissions. With regard to cucumber growing more electricity is used than in tomato production and energy production was 75–96 % of the emissions.

Because energy use was the most important source of greenhouse gases the most effective means to have the effect on the carbon footprint is to improve energy efficiency and start to use renewable energy. The study showed that in relation to current situation the carbon footprint would be 85 % smaller, if only renewable energy would be used. The change has started to occur, because the use of renewable energy in Finnish greenhouse cultivation has over doubled during the last ten years.
Model of sustainable food production for developed and developing countries

Ketola, Tarja (University of Turku, Finland)

Developed countries can learn about sustainable food production as much from developing countries as vice versa.

Farmer Managed Natural Regeneration (FMNR) was developed for Niger in the 1980s. This simple and inexpensive land regeneration method re-vegetates deforested and deserted arid areas by pruning stems regenerating from stumps of previously felled, but still living indigenous trees or shrubs. The FMNR’s success among Nigerien farmers has spread it to other food-insecure countries: Burkina Faso, Chad, Ethiopia and Mali. As deforestation and desertification due to climate change spread further particularly in Africa, Australia, China, the USA and Southern Europe, FMNR can divert their vicious circles and bring land back for food production.

Forest gardens are traditional food forests in tropical areas of Africa, South America and Asia. They are the most sustainable food production systems because of the ecological resilience their holistic agro-ecosystems provide. Forest gardens can be adapted to temperate climates, which has been experimented in the UK, the USA and Canada.

Organic farming is gradually increasing its share relative to conventional, intensive farming, despite chemical corporations’ attempts to maintain that its spread would lead to famine. Independent research shows that the yields of organic farming, with correct techniques, can match or exceed those of intensive farming without its malignant ecological and health impacts.

In addition, novel ideas for sustainable food production, such as pests for food and international regulations for farmland purchase/leasing, will be introduced. Finally, a global model of sustainable food production for developed and developing countries will be built.
WORKSHOP 10: Meat Consumption & Production

Time: Friday 7 June at 9:00–11:00
Chair: Dr. Johanna Mäkelä
Venue: Osuuskauppa-Sali

Calculating land requirement for meat consumption in Finland

Allievi, Francesca (University of Turku, Finland Futures Research Centre)

The production of meat is a particularly inefficient conversion, as on average about 6 kg of plant protein are required to obtain 1 kg of meat protein. Large amounts of feed grains are required and these in turn require vast areas of land. The future population growth and increase in meat products demand will also increase the amount of land required for meat production. Therefore, it is important to analyze the current land requirement for the production of meat and the factors affecting it. In this analysis the focus is on Finland, which is used as a case study to test a land requirement model developed by the Center for Energy and Environmental Studies of the University of Groningen, which so far has been tested only on the Netherlands. Meat production by broilers, pigs and beef cattle on their current feeds are compared. The model is tested on a time series from 2000 to 2009, in order to detect the changes which have taken place in feed composition and related land requirement for each of the meat types examined. By knowing how much land is currently used for meat production, it is possible to estimate how much of it would become available for other uses if the meat consumption would be reduced in the future.

Data availability for research on the use of feed for animal production in Finland

Turunen, Jenny (University of Turku, Finland Futures Research Centre)

The purpose of this presentation is to point out some problems in the availability of public data on the use and international trade of feeds for production animals. The presentation is based on experience from an ongoing research project.

The livestock sector occupies approximately 70% of the Worlds agricultural areas and in Finland more than 2/3 of the grain produced is fed to animals. This major impact of the animal feed production sector on land use and environment makes it an important subject for research. In our research project we have collected data on the use and origin of different plant based feed ingredients in Finland. Our primary data sources have been the FAOSTAT and the Finnish national statistical authority, Statistics Finland.

Although domestic agricultural production and activities are generally well covered by Statistics Finland, and the FAOSTAT offers extensive global agricultural statistics, it is impossible to find out from public data sources how much and what kind of imported feeds and feed ingredients are used in Finland and where they come from. Even approximate data needs to be combined from several different sources, such as private feed companies and the Finnish Food Safety Authority. Data from these sources is not publicly available and data acquisition even for research purposes is very time consuming. In order to make the animal production sector more transparent and to foster research on the environmental effects of meat consumption, the data availability on the global trade and use of animal feeds should be improved.
The fourth detachment – The adventurous journey from killing cows to culturing meat

Buscemi, Francesco (Queen Margaret University, Division of Media, Communication and Performing Arts, Edinburgh, UK)

The purpose of this paper is to investigate how, in the Western world, the relationship between people and meat is changing because of cultured meat. Since the Renaissance, the idea of the living animal is being detached from the action of eating meat. This process occurs through the disappearance from food of the ‘animal origins of meat’, which are the parts, like the head and legs, that remind us that once meat was an animal. Since the 1500s, they have been disappearing first from meat dishes, second from cooking procedures and finally from food markets (Mennell, 1996), in still ongoing processes.

Goody (1982) finds that humans deal with food in four stages: Production, Distribution, Preparation and Consumption. While Distribution, Preparation and Consumption have been undergoing this detachment process, the stage of Production has not been affected yet. Producing meat still implies direct relationships between humans and the living animal.

Testing on cultured meat will lead to the beginning of the fourth detachment, that from Production. Producing meat won’t imply direct contact with animals any more. This means that all Goody’s stages will be involved in the process. Usually considered a shocking novelty, therefore, cultured meat, either obtained from stem cells or totally grown in the laboratory, is instead simply a stage of a historical process.

No one had previously analysed the disappearance of the animal origins of meat relating it to Goody’s stages, and a current issue like cultured meat had never been considered a step of this detachment process.


Consumer segments of environmental consciousness of meat production

Pohjolainen, Pasi & Tapio, Petri (University of Turku, Finland Futures Research Centre)

According to widely accepted consensus the high level of meat consumption in the Western world is causing severe environmental problems. Although technical solutions to the issue are highly welcomed, they cannot solve the question all by themselves, and there is also a need to reduce the amount of meat consumed. From the consumer point of view the transition would not be carried out sustainably without the consciousness of the environmental aspects of meat eating, meaning perceived importance as well as knowledge of causes of, and solutions to, the problems. Previous studies indicate that consumers’ general environmental consciousness can be considered moderate, although this varies depending on the subject field and consumer segment in question. Available studies on environmental consciousness of meat production are so far few, and the observed levels of consciousness all in all rather low. There is, however, some evidence of differences between consumer segments in this respect regarding other pro-environmental beliefs and action, socio-demographics, values and meat consumption frequencies. This study adds to the discourse of consumer segmentation by examining the environmental consciousness of meat eating. We give detailed information on the discrepancies between consumer groups and assist the planning of proper policy measures in the future. The data are based on a survey questionnaire with a representative sample of Finns (n=1889, response rate=47.5), collected in spring 2010. Factor, Cluster and Variance analyses are utilized for consumer group differentiation and comparison.

Key words: Consumer segments, environmental consciousness, meat production, socio-demographics, value domains, meat consumption, survey, cluster analysis
Meat & Sustainable Development

Ailus, Sabi & Ferreira-Aulu, Marianna & Kwazema, Martins & Shabanova-Danielyan, Elizaveta & Tapiola, Titta & Vrlik, Filip (University of Turku, Finland)

The topic of our presentation is meat. It is analyzed from different viewpoints of sustainability: ecological, social, cultural and economical. The research questions included “What cultural values and attitudes positively influence meat consumption?”, “How do the food security problems relate to meat production and consumption?” and “What various effects does factory farming have on the environment?”. Our work revealed that the issue of meat is much more complex than people may think. The resulting paper provide holistic perspective to meat that includes examination of topics like the questionable necessity of meat in human diet, lobbying in the USA, food waste in the world, and a host of others.

Possible solutions are also presented. We looked at possible political, educational and technological solutions, and often we found that social responsibility would be most effective.

While pondering the question “How can individual consumers make a difference?”, we realized that individual choice is shaped not only by one’s cultural background and knowledge but also by advertisement, manufactured desires and other industry influences. Ideally, consumers should be aware of their food’s origin and its impacts on environment, health, society and future. At the same time, global efforts to achieve sustainability should take into account cultural aspect as well, so the local solutions are in accord with cultural values and belief systems of different societies.

The presentation is based on half-year work of seven international Masters’ students who analyzed the topic of meat thoroughly as part of the Sustainable Development minor.
WORKSHOP 11: Future for Food Education

Time: Friday 7 June at 9:00—11:00
Chair: Dr. Mari Sandell
Venue: LS 07, Ground Floor

Sandell, Mari ¹ & Egberg Mikkelsen, Bent ² & Lagström, Hanna ³ & Lyytikäinen, Arja ⁴

University of Turku, Department of Biochemistry and Food Chemistry, Functional Foods Forum Turku, Finland ¹
University of Aalborg, AAU-MENU, Institute for Development & Planning, Copenhagen, Denmark ²
University of Turku, Turku Institute for Child and Youth Research, Turku, Finland ³
Central Finland Health Care District, Unit of Family Practise/Health Education and Prevention, Jyväskylä, Finland ⁴

Food has an important role in daily life and well being of children. Food experiences of childhood are important guides to eating behaviour of adulthood. Food is full of properties that we perceive with our senses by smelling, touching, hearing, watching and tasting. We live in individual sensory worlds, and our food perception processes are also individual. Children are active investigators of both food material and products during eating and cooking. By encouraging their excursion to world of food culture and food activities, we could support them to expand their food preferences and to triumph over their food related bias.

In the contribution from Bent Egberg Mikkelsen the case of Danish school & kindergarten meal program revival and the new educational opportunities that it provides for learning about life & health skills in schools and institutions for young people will be elucidated. The presentation evolves around the case of the SoL local community intervention (Health & Local Community, www.sol-bornholm.dk). It will outline the food related hands-on learning activities taking place in the schools and kindergartens participating in the intervention and draw conclusions on its transferability of the findings when it comes to using institutions for young people as learning spaces that can contribute to increased food and nutrition literacy and healthier and more sustainable food patterns

Presentation of Hanna Lagström deals with individual and within family eating habits variations. The STEPS Study aims to search for the precursors and causes of problems in child health and well being by using a multidisciplinary approach. On point is to evaluate associations between environmental and behavioural influences in development of childhood eating habits and weight development. Focus is in parental eating patterns and practices which explain childhood feeding practices, eating habits and food consumption. Presentation creates a basis for discussion how to influence to affect possible way to the development of eating habits.

This workshop contemplates food perception of children by exploiting knowledge applied to food education and more precise to taste education. The present status of food education and the implementation of applications in Finnish kindergartens will be described. With learning café all the workshop attendees will participate to outline the food education possibilities of society. Let’s throw ideas around!
WORKSHOP 12: Food and Nutrition

Time: Friday 7 June at 9:00–11:00
Chair: Dr. Outi Luova
Venue: LS 13, Ground Floor

Challenges of consumers to choose products in a grocery store considered from a weight management perspective
Saarela, Anna-Maria (Savonia University of Applied Sciences, Faculty of Business, Tourism and Culture, Kuopio, Finland)

Aims: The aim was to explore the challenges of consumers’ when choosing food products for weight management purposes and their expectations about a grocery store environment as a facilitator of healthy food choices.

Background: The study was a part of a project “Consumers in the weight management market” (2009-2011) funded by the Finnish Funding Agency for Technology and Innovation.

Methods: In a real-life grocery store setting, the subjects (n=36), who were actively managing their weight, were given tasks to choose 11 products twice, before and after reminding them weight management. The subjects were asked to think-aloud whilst they were observed both manually and audio-visually by using wireless technology. After product choices (n=792), the subjects were interviewed in relation to the challenges to choice a product and future prospects of grocery store environment considered from a weight management perspective.

Discipline: consumer behavior, nutrition, marketing

Results: The study subjects had several challenges while choosing food, such as the time taken (maximum 225 seconds) to find a suitable product among all the options of a wide product category (variation of product options from 74 prepared salads to 459 ready meals per product category), understanding all package labels properly (for example the GDA-label in relation to the nutrition content table). The subjects had several practical suggestions, such as colored labels in shelves, how consumer-oriented marketing communication and services should be developed and provided by retailers cooperatively with health-care actors to promote consumers’ awareness of healthy food choices in grocery stores.

The Forerunners of Fat Use: Preferences of Nutritional Fats in Finland from 1978 onwards
Kahma, Nina & Jallinoja, Piia (National Consumer Research Centre, Finland) & Helakorpi, Satu (National Institute for Health and Welfare, Finland)

The use of fats has long been a concern in Finland. Despite assiduous awareness-raising work and health campaigns, Finns get too much saturated fat. International studies have shown that the choice of fat is stratified along socio-economic factors so that women and those with higher education follow nutritional recommendations more often than those with lower status. The same groups tend to be the first to adapt to healthier sources of fat.

This paper explores the choice of nutritional fats as a bread spread and the fat used in cooking during the last three decades from the viewpoint of lifestyles. Differences in fat choices are mirrored against time, age, gender, education, and residential area.

The analysis is based on data from Health Behaviour and Health among the Finnish Adult Population monitoring survey, which is a postal survey covering a random sample of 5,000 Finns each year. Altogether the data comprises of 130,000 respondents. Logistic regression is used to analyse changes over time. A sharp reduction in the use of butter and a turn towards light spreads and vegetable oils can be seen in the data. Thus, the use of butter seems to increase after 2007.
We shall discuss these changes and the question of who are the forerunners of fat use. The results imply that fat choices have changed whereas nutritional recommendations have remained much the same. Thus, lay knowledge has a new kind of role. In the end possible social and historical explanations behind these trends will be discussed.

**Environmental and health economic cost-benefit analysis of diet shifts: The case of low carbohydrate diets**

Punttila, Eliisa (Department of Economics and Management, Faculty of Agriculture and Forestry, University of Helsinki)

The aim of the study was to quantify the net benefits when 7 % of Finnish adults shift from their average diet to a low carbohydrate diet, a very low carbohydrate diet or a diet based on Finnish nutrition recommendations. The low carbohydrate diets were based on 84 food diaries that were collected by an online survey.

The net benefits were estimated using cost-benefit analysis and included both environmental impacts (changes in greenhouse gas emissions and in nutrient emissions into Baltic sea) and health impacts (changes in myocardial infarction and stroke incidence related to consumption of fruits and vegetables, and in colorectal cancer incidence related to red and processed meat). Two scenarios were considered, a non-weight loss and a weight loss scenario. In the latter scenario the changes in colorectal cancer and type 2 diabetes incidences related to overweight were also included.

When 7 % of Finnish adults shift to the low carbohydrate diet, the very low carbohydrate diet or the diet based on nutrition recommendations, the total net benefits were respectively -3,7 million, -10,8 million and 7,3 million euros per year in the non-weight loss scenario. In the weight loss scenario, the net benefits were respectively 11,2 million, 5,8 million and 20,6 million euros per year. The shift to the diet based on nutrition recommendations resulted in the highest positive net benefit. The net benefits of shifting to the low carbohydrate diets were positive only if these lead to a significant weight loss.

**Sustainable Development and Food Needs of the Tribes: Some Field insights from Western India**

Ashok Kumar, Eranti N. (School of Social Sciences, Solapur University, India)

From time immemorial, forests have been nurturing human species by offering a huge basket of edible fruits, roots, seeds and leaves, bush meat and honey and so on. Most of these products are consumed by the tribes and are classified as Non-Timber Forest Products (NTFPs). They supplement the food needs of the tribes. A micro level study carried out in Western India reveals that nearly 57 percent of the NTFPs harvested are used for meeting consumption as compared to 33 per cent from agriculture and 10 per cent from animal husbandry sector.

Sustainable development strategies of the state have hardly taken into cognizance to meet the food and nutritional issues of these forest dependent communities. Looking into the future (also present) policy and market scenarios, food based NTFPs which constitute a rich biodiversity base of many forests of the region, would decline in the near future. This may lead to the twin problems of biodiversity loss and insecurity to access to food from the common property resources. In the context of planning for sustainable development and food, this would be a strong case to be debated and alternative future scenarios are to be worked out. The present paper is an attempt in this direction.

This study was carried out under the financial assistance of the World Bank in its “India Environmental Management Capacity Building” Technical Assistance Project.
Herbal and seaweed: Ice cream for the future?
Md Shaarani, Sharifudin & Nurul Azah, Yaakob, & Matanjun, Patricia (University Malaysia Sabah, School of Food Science and Nutrition, Malaysia)

Traditionally herbs are being used for culinary and medicinal purposes. It will give a better flavor when add to a dish or belief to give health benefits when being consumed as it is. At present, most of these herbs being consumed as fresh, flavorings and processed beverages. There is a growing interest to diversify the use of herbs and one of them is to make it into ice cream. Herbal ice cream offers health benefits plus the enjoyment of eating ice cream is a very attractive combination not just for the consumer but also manufacturers. Further, it is an “innovative” way to introduce herbs (or leafy plants) to children which is known to dislike “greens”. As an example Centella Asiatica, a herb which is known for its various health benefits i.e. reduce anxiety, enhanced memory etc. has been studied for its potential as herbal ice cream. The study showed that the consumers liked the taste (95%) and the texture (93%). This ice cream also showed that the total phenolic compounds still exist (20%) after being processed as an ice cream.
WORKSHOP 13: Environmental Impacts of Food Production & Consumption

Time: Friday 7 June at 9:00–11:00
Chair: Dr. Jari Kaivo-oja
Venue: LS 09, 1st Floor

Food and Baltic Sea environment -impact of diet on eutrophication

Vorne, Virpi 1) & Virtanen, Yrjö 2) & Hietala, Sanna 1) & Verta, Matti 3) & Vieraankivi, M.-L. 2) & Kurppa, Sirpa 2)
1) MTT Biotechnology and Food Research, University of Oulu, Finland; 2) MTT Biotechnology and Food Research, Jokioinen, Finland; 3) Finnish Environment Institute (SYKE), Finland

The increase in the economical welfare in Finland, Estonia and Latvia is projected to the diet. Consumers are important since by their choice they can influence the structure of agricultural production and thus the state of the Baltic Sea which has been affected by severe eutrophication for many decades. This eutrophication trend is global, it is predicted to continue, and it forms strong linkage between dietary choices and environmental impact of human consumption per capita. Despite this, among consumers it is not always recognized that cultivation of food raw materials and related production activities might cause negative impacts on the Baltic Sea.

With EIO-LCA and statistical analyses the changes in food consumption and supply in these countries were estimated and how these changes have possibly affected the eutrophication impact of the respective food chains on the Baltic Sea. The results show an increasing trend in pork and poultry consumption and change in production patterns. The farm sizes are increasing while the number of farms is decreasing. The domestic supply of animal products has grown, and its contribution to the eutrophication impact has reached 70 – 80 % of the total eutrophication impact of food. For Finland, eutrophication impact of food could be reduced by about 7 % if a diet based on national nutrition recommendations were to have full effect on private food consumption. Nutrient load into the Baltic Sea could be reduced also by improving crop yields, optimizing fertilizer use and by practicing efficient nutrient recycling. These would be efficient means to reduce the eutrophication intensity of both animal and plant products.

Keywords: Baltic Sea, Finland, Estonia, Latvia, food production, food chain, food consumption, nutrients, eutrophication.

Inter-household variations in environmental impact of food consumption in Finland

Irz, Xavier & Kurppa, Sirpa (MTT Agrifood Research Finland)

The environmental impact of food consumption varies widely with the type of foods consumed. It is for instance well established that consumption of meat has a relatively much larger impact on climate change than that of most plant-based foods. Further, food waste has been identified as contributing significantly to the environmental impact of food consumption. It follows logically that dietary change represents one means of transforming food systems in the direction of greater sustainability. The difficulty, however, lies in developing ways of motivating people to modify what they eat, as many constraints potentially hinder changes in behaviour, including established habits, limited income, lack of information on environmental impact, cognitive limitations, or the difficulty of accessing environmentally friendly foods.

In order to understand those constraints better, and identify potential target groups for intervention, we analyse the environmental impact of food consumption at household level in Finland. The data originates from the Finnish Household Budget Survey 2006, which gives a detailed record of the foods (259 aggregates) consumed by over 4000 households. The food quantity data are matched to indicators of greenhouse gas emissions and eutrophication, as well as a food composition database.

Tests of differences in means of the environmental indicators identify the socio-demographic groups that are statistically different in terms of their environmental impact of food consumption. The total impact is decomposed further into a diet composition effect (i.e., what foods households consume) and a quantity effect (i.e., how much households
consume). Results indicate that: 1- the environmental impact varies widely across households; 2- this heterogeneity relates both to the types and quantities of foods consumed; 3- there are significant differences in impacts among socio-demographic groups, in particular in relation to income, education and age of the households. The implications of those differences are discussed, for instance to infer the effect of income growth on the environmental externalities of food consumption, or the possibility of developing food policies integrating environmental and health goals.

Keywords: Climate adaptation strategy, resilience, outside-in impacts, inside-out impacts, food supply chain, Finland

**Material Efficient Waste Management Scheme: Minimize Food Waste Campaign 2013**

Tarvainen, Mia (Helsinki Region Environmental Services Authority, Finland)

Helsinki Region Environmental Services Authority (HSY) is a regional authority providing environmental services for residents and companies in the Helsinki area. Material Efficient Waste Management Scheme (2011–2013), aims to reduce the amount of municipal waste, especially the domestic and public sector waste. The scheme consists of several sub-schemes and receives funding from the European Regional Development Fund. One of the priorities of the scheme is food waste prevention.

Description of Campaign: Households, specifically families with children aged up to 8 years, are approached with an attitude campaign. In 2012 (April-May) a small-scale pilot campaign was implemented in the Leppävaara region in the city of Espoo. The campaign included e.g. lectures, delivering recipe cards and putting up a Facebook site with tips. A survey was conducted before and after the campaign. In spring 2013 the campaign will be launched in the entire capital region. New additional campaign elements include e.g. extensive advertising and “Leftover Consultant” at hypermarkets.

Results: The pilot campaign for families did not seem to change the behaviour of the respondents of the follow-up survey (n=218) but they were more concerned about discarding food than before the campaign.

Conclusions and Findings: Campaigns can increase people’s awareness of food wastage but it is a challenge to make people to actually change their habits. However, raising awareness is the first step on the way to the future with less waste.

**Nonsense or Resource? Rethink Institutions and Practical Measures of Bio-Waste Management**

Chen, Lihuizi (Department of Business, University of Eastern Finland)

Purpose: The purpose of this paper is aiming to challenge common sense and recognitions in relation to waste and waste management. By adopting household bio-waste as an example, the paper is expected to rethink institutions and practical measures of bio-waste management.

Design/methodology/approach: The argument is constituted by conceptual analysis and theoretical propositions grounded on property right theory, Microeconomics and welfare economics.

Findings: In order to collect bio-waste from households or encourage waste segregation, we should realize: a) Bio-waste is a tradable resource rather than detrimental nonsense; b) households possess right instead of obligation to deal with bio-waste they own; c) subjective motivation: environmental protection could be an egotistic business but not an altruistic charity; d) objective condition: bio-waste is a sort of private product rather than public product; e) Instead being charged with waste disposal fee by public sectors, households should be paid by bio-energy company as they supply raw materials for the company.

Originality/value: Traditionally, when the waste is viewed as a kind of detriment, actors who cause the damage should and must pay for the cost as compensation; in my mind, when the waste is regarded as a product, owners of the waste could gain profit as they choose to sell what they own.

Keywords: waste management; waste segregation; bio-waste transaction; property right
POSTER SESSION

Time: Friday 7 June at 11:00–12:00
Chair: Dr. Markku Wilenius
Venue: Mercatori

The role of sustainability in ‘alternative’ food retail businesses
Forssell, Sini (University of Helsinki, Faculty of Agriculture and Forestry, Department of Economics and Management, Finland)

Alternative food networks are widely seen as a positive counterbalance to conventional food networks and a force toward a more sustainable food system. The inherent sustainability of alternative food networks, however, has been questioned. This study aims to investigate the realisation of this promise of sustainability in one type of real-life alternative food network, independent retailers of organic, local and/or specialty foods, through understanding the role of sustainability in the thinking and practices of the people running such food businesses.

The initial theoretical background lies in the literature on alternative food networks and sustainability entrepreneurship (also termed ecopreneurship or social entrepreneurship). The study is based on interviews with retailers in Finland and the UK. Results will shed light on alternative food retailers as entrepreneurs, their relationship to sustainability and possibly what implications this has for how the businesses are operated and the potential of such retailers to contribute to a more sustainable food system.

Future Trends in Food Safety Inspections
Iiro Hietanen, Anna-Liisa Välimaa, Riitta Laitinen, Hannu Jokinen, Pertti Marnila, Yeshitila Degefu, Elina Virtanen, MTT Agrifood Research Finland, Food Safety Laboratory, Teknologiantie 3B, 90590 Oulu, Finland

Globalization requires efficient food safety inspection tools in the near future. Food processing companies have a growing responsibility to internally monitor the quality of processed food. However, advanced and fully automated methods meeting such demands are still not available.

In the future, advanced foreign object inspection will be carried out by utilizing multi-energy x-ray technology or multi-wavelength optical machine vision. The most challenging foreign objects like glass, plastics, or wood cannot be detected by conventional metal detectors or x-ray techniques. Thus, foreign particle detection efficiency can be highly improved by applying multiple x-ray energy bands in the inspection systems and by combining such advanced x-ray imaging with specialized image processing.

In this work dual energy x-ray technology has been applied for detection of foreign objects such as glass, plastics, wood, etc. Preliminary results of tests and development carried out in MTT’s food product conveyor test line are presented and first estimations on capabilities of dual energy x-ray detection are provided.

Microbiological contamination in food cannot be detected in early phase by human instincts. Available cultivation methods are also very time-consuming and products may reach end customer before the test results are available. In this project advanced sample processing and modern, sensitive methods for the detection of Listeria monocytogenes are discussed.
Back to the Basics – Agency behind school gardening

Salo, Kirsti (Department of Agricultural Sciences, Plant Production Biology/Horticulture, University of Helsinki, Finland)

The idea of sustainable future and welfare for the earth and its habitants need a new mode of attitudes and actions. The changes in behavior doing and attitudes are slow – talks and action do not match.

Formal and informal learning provide possibilities for sustainability education. Children and youth of present time are lacking the contacts and knowledge to the basics of living. Food production and life cycles in the nature are no longer everyday knowledge of people. Experiences in the nature and relationship to the nature are scarce. Previous research has reported that the knowledge of food production and gardening clearly improve the motivation and self-esteem to learn different subjects at primary school in the class room (Blair, 2009; Canaris, 1995; Faddegon, 2005; Ozer, 2007).

The Evergreen Model of Environmental Education action plan (www.ikivihreamalli.fi) is using the outdoors as an expanded learning environment and gives methods how to develop sustainability education at school. The model was initiated by a local 4H-association in collaboration with the local municipality and the primary schools. The intention according to the learning goals of the schools’ curricula was to fulfill experiential learning out of doors and to realize a holistic vision of a sustainable learning environment as well for the teachers as for the pupils.

A new concept for food education among children, known as Ruokakoulu-Matskolan (www.matskolan.fi), is conducted as a pilot project by local 4H-associations and a network of partners in Finland during 2013. The aim is to give children possibilities to learn and use the local products and prepare meals during day camps.

In this poster presentation the action plan and a case study are presented. Results of agency study of school gardening are reported.

Further research is needed to explore synergies between the school gardening/farm education and the concept of food education among children.

Beef Finland: how do we help reduce beef consumption worldwide?

Lee, Seungho Doctoral Candidate (NODUS Sustainable Design Research Group, Department of Design, Aalto University School of Arts, Design and Architecture, Finland)

The interdisciplinary research started off by questioning: if food-miles matters, is it better to consume Finnish beef than Italian vegetables? It’s clear we need to reduce meat consumption en masse, but how? The study attempts to take holistic view to the problem and come up with systemic alternatives.

18% of all greenhouse gas emission comes from animal production (FAO, 2006), which is 1.5 times that of all transportation worldwide combined. Beef production generates greenhouse gases 13 times more than chicken. Massive tropical forests in South America and elsewhere have been leveled to create pasture for cattle, the majority being cleared by burning; it creates carbon dioxide significantly contributing to global warming.

About 4650 liters of water are needed to produce 300 grams of beef whilst 1440 liters for the same amount of pork, and only 63 liters for potato. This is accelerating the world’s water scarcity and a threat for all mankind especially for Finland as importing fruits and vegetables will be increasingly harder.

The recent studies in Harvard shows consumption of red meat is associated with an increased risk of premature mortality from all causes including cardiovascular disease, cancer and type 2 diabetes mellitus. The increased mad-cow-disease and the foot-and-mouth epidemic, largely starting in Britain but also seen in other places around the world is also a result of taking the shortcuts in agriculture/food production due to the market pressure.

See references at http://www.beeffinland.org
Foreseeing the measures for meeting the demand and supply of the local food

Heikkilä, Lotta¹ & Rikkonen, Pasi¹ & Kotro, Jaana¹ & Reinikainen, Anu² & Virtanen, Markku³ & Kirveennummi, Anna⁴ & Mäkelä, Johanna⁵ (¹ MTT Agrifood Research Finland, Economics and Social Sciences; ² MTT Agrifood Research Finland, Biotechnology and Food Research, Sustainable Bio-economy; ³ Aalto University School of Economics, Small Business Centre, Finland; ⁴ University of Turku, Finland Futures Research Centre, Finland; ⁵ University of Helsinki, Finland)

The demand of local food is increasing. The growing concern of consumers on the topic of e.g. transparency, traceability, the origin of products, food safety and freshness opens wide market opportunities for local food producers. On the other hand challenges related to local food are still complex e.g. logistics and irregularity of the supply. Local food is not always easily achievable for consumer. In addition local food producers do not know enough consumer expectations and demands concerning local food products.

The aim of this research project is to promote the measures meeting the demand and supply of the local food. Furthermore, how value promises of the local food companies meet consumer expectations are studied. In addition new business opportunities for the local food entrepreneurs are developed to enable the growth of supply. New opportunities will be developed in tight cooperation with consumers and local food entrepreneurs.

The research takes a qualitative approach to the phenomenon and is based on participatory research with features from the focus group method. The data will be collected in a participatory workshops and interviews for local food entrepreneurs and focus groups for consumers. Analysis will be conducted with value chain analysis, swot analysis and qualitative content analysis.

The project was launched in January 2013 and will be completed by December 2013. The research consortium consists of MTT Agrifood Research Finland (the project coordinator), University of Helsinki, Aalto University and The Finland Futures Research Centre. The project is funded by The Quality Chain of the Finnish Ministry of Agriculture and Forestry and the research consortium.

Futures for Food Services – Multidimensional Challenges and Opportunities

Mertanen, Enni & Nukari, Jussi (JAMK University of Applied Sciences, Finland)

Aim: To analyse how Hospitality Management Master’s degree students foresee the future of food services.

Materials and methods: One of the courses in the programme is “Innovation and Development”, which encourages students to develop their skills to use future research methods and apply these to foresee their operational environment. While accomplishing the “Weak signals” assignment, students were asked to collect information and use a future research method to analyse the data. In 2008-2012 all together 136 students have attended the course, 43 of those (32%) observed food services topics. The students chose their topic freely, although they were encouraged to select the subject area founding their master’s thesis. The reports containing food service themes were further analysed.

Results: The topics of the weak signal reports on the food service area is divided in the following categories: the future production methods in professional kitchens; the challenges of public as well as in commercial food services; future education needs in food services; nutritional quality and safety issues on food services; and outside pressures for food services. The reports seem to partly forego the public discussion.

Discussion: The course adds skills and develops the thinking of the students. Food services face multidimensional challenges and demand. However, there are still several opportunities in all food service sectors. In addition, the materials and reports collected by students could be used as research material and further analysed in order to foresee the future of food services as well as education needs in this sector.
Futures of Soybean in South America by 2030
Gordillo, Ulla & Pérez, Pablo (University of Turku, Finland)

The study is related to the futures of soybean production in South America by 2030. The purpose of the study is to build alternative futures using the scenario methodology, and to introduce an important issue for us the researchers, which is the perspectives of the different parties involved in the production of soybean in South America. We use the PESTEC table as a framework to generate variables for the study, and then we use these to build 4 different scenarios based on 4 different perspectives which are the following: The genetically modified soybean producing companies, the European consumer, the environmentalist and the local South American people. We base our parties’ perspectives in trends and extreme stereotypes. It is important to note that not all Europeans or local South Americans think the way we portray them, however, we believe that our scenarios reflect the thoughts of these 4 groups. Our scenarios reflect the ideal future of these 4 parties, and the events that must take place in order for these to become the present. Our main purpose is to awake people’s thoughts on this issue and let them decide which future would be among the least and most possible.

Modeling phosphorus and nitrogen footprints in the Finnish food chain
Jenni Ypyä1) & Kaisa Grönman2) & Sirpa Kurppa1) & Risto Soukka2) & Yrjö Virtanen1) & Pentti Seuri3)

1) MTT Agrifood Research Finland, Food Research 2) LUT Lappeenranta University of Technology, Finland, 3) MTT Agrifood Research Finland, Plant Production Research.

Cycling of nitrogen (N) and phosphorus (P) has multiplied during last decades, largely due to increased mining of phosphorus and generating nitrogen for reactive form mainly for use as fertilizer. Accelerated cycling of nutrients is principally due to three changes in the global food system: increase in population, changes in diet to more P and N intensive products and industrialization of agriculture. Even though emissions and nutrient balances of nitrogen and phosphorus have widely been determined especially in farming, the general view of the nutrient use efficiency is still lacking in the entire food chain.

Less than half of the total N and P input via fertilizers and animal manure in crop production is effectively utilized. The remainder is dissipated into the environment where it contributes to a range of ecological and human health effects. Different food groups exhibit a highly variable nitrogen and phosphorus intensity; on average red meat or milk products require more nutrients than cereals or other plant materials, therefore the possible losses are also greater.

In this study the nitrogen and phosphorus flows will be characterized for different food types, from a product-specific point of view aspect. Food chain activities will be evaluated from a life cycle perspective from extraction of resources for farming up to the disposal of remaining waste, by utilizing Life Cycle Assessment method. The captured, recycled and released nutrients as well as nutrients included in the products will be determined. The tool of nutrient footprint should be converted according to different farming or production methods. The leaky points of the entire food chain are essential to determine in transition towards sustainable nutrient economy.
Potential ecotoxicity impact assessment
Räsänen, Kati & Kurppa, Sirpa (MTT Agrifood Research Finland, Plant Production Research)

The effects of toxic substances have been largely studied in last decades, and environmental chemicalization can be as equally serious problem as climate change or other environmental problems (Rockström et al. 2009). Ecotoxic impact assessment has been progressed only in the recent years, even though there has been considerable interest in calculating carbon footprints. Different life cycle assessment (LCA) categories should also be evaluated for obtaining more realistic environmental impacts of the food production chain.

Chemicals are used in different steps of the food chain, for example plant protections products (PPP) in crop farming or chemicals used in food packing production. As hazardous substances they induce environmental effects that have been traditionally measured with risk assessment. We propose to utilize ecotoxicity impact also in LCA. That would accumulate fate, exposure and effect (i.e. ecotoxic effects) of a substance at each step of production chain. Final quantitative result is a potential ecotoxicity impact that is describing all ecotoxicity effects induced by measured chemicals through the particular production chain per functional unit of the final product.

By this means, we are able to raise the understanding of our responsibility of food ecotoxic background not depending where production of farm inputs or raw materials or processes take place. In the global food chain, there has been an inconvenient tendency of some global companies to place hazardous steps of a production chain into a country where requirements of ecotoxic documentation are less strict. Simultaneously as we try to push global responsibility for climate change, it is necessary to raise the importance of other categories of environmentally impact, especially those that go hand-in-hand with the climate change, as the ecotoxicity does.

Sustainable Food Course, a Cultural Revolution - The Challenges of Creating and Maintaining an Introductory Course on Food, Food Culture, Food Systems, and Food Justice
Bartels, Kirsten A. & Bartels, Bart A. (Grand Valley State University, Allendale, USA)

This session discusses an undergraduate course on sustainable food systems based on a three-tiered structure – where our food comes from, the choices we make, and the waste and excess -- with objectives of exploring food systems locally, regional, nationally, and globally; and investigating their environmental, economical, and cultural aspects.

Engaging with traditional in-class lectures, service-learning activities, movie nights, and cooking together, high-impact practices and experiential learning where pivotal to the success of the course which culminated with a formal reception for university officials where students prepared dishes from locally-grown ingredients to highlight the breadth of knowledge gained (both in cooking skills and in knowledge of food systems and sustainability).

From the impact on their diet, to the way they handle waste, to their greater involvement with sustainability initiatives both on and off campus, this class set lofty goals and managed to meet (and even exceed) each of those goals and created a new group of people concerned and aware of issues with their food and food systems. The future of food begins with education, and courses like this are pivotal in enhancing awareness in all aspects of our food systems. It is the hope that this presentation will inspire others to develop similar courses to impact the future of food.
FinCEAL - Developing Finnish Science, Technology and Innovation Cooperation between Europe, Africa and the LAC Region

Kagiri, Eva. Finnish University Partnership for International Development (UniPID), University of Jyväskylä

FinCEAL is a Ministry of Education and Culture funded project that is aiming to increase support for Finnish researchers focusing on Africa and the Latin America and Caribbean (LAC). The project is divided into two components, Africa and LAC, and is supporting the following regional thematic research areas; Africa - Food security, Health, Climate Change, Renewable energy and Information Society; LAC - ICT for societal challenges, Bioeconomy, Biodiversity and Climate Change, Energy, and cross-cutting issues. UniPID has been mandated by the Ministry to run the project.

The specific objectives of the project are to:

- Support and consolidate participation of Finnish researchers and the science policy experts in bi-regional science policy dialogue and processes
- Coordinate and network Finnish researchers and science policy experts working with Africa and the LAC regions
- Expand awareness of Finnish researchers in both regions
- Highlight current Finnish research and scientific cooperation relevant to the regions

FinCEAL will achieve these objectives through the following activities:

- Create an Info Bank of Finnish researchers and research conducted on the regional thematic areas.
- Conduct thematic workshops in Finland.
- Hold side-events in Europe, Africa and LAC regions.
- Facilitate the participation of Finnish researchers in relevant bi-regional events.

Grant project preparatory funding to support Finnish institutions interested in applying for Horizon 2020 funding. The project will run through 2014. For more information: http://www.unipid.fi/en/page/146/finceal/.

Smart self-service lunch buffet provides customers with accurate nutritional value information

Tuikkanen, Riitta & Rautiainen, Teija (Mikkeli University of Applied Sciences, Finland)

Smart buffet service line give customers individualised real-time information on the nutritional value of meals – they indicate, for example, the amount of energy, fibre, fats, carbohydrates and protein contained in the meal. In smart buffet the service immediately indicates the amount of the food on the plate and the total amount of calories contained in the serving. After putting together a meal, the customer can get a detailed summary of the nutrients contained in the meal and a comparison with meal recommendations. The nutritional information produced by the service is gathered from the recipe software of lunch restaurant. Users of the smart buffet identify themselves with a remotely readable RFID card.

The smart buffet was tested in spring 2013 at the staff restaurant of Fazer Food Services headquarters in Helsinki. According to the results of the survey, using the smart lunch counter is easy, and it helps people to put together healthier meals. 66% of the people who responded to the survey said that using the service had had an impact on their eating habits, and 76% said that it had increased their interest in healthy eating. 48% of the respondents said that the service provided added value to having lunch at the staff restaurant.

The smart buffet was created as the result of multi-disciplinary cooperation between nutrition, catering and information technology experts. The complete system, jointly implemented by Fazer Food Services, Metos, the Mikkeli University of Applied Sciences and AgentIT, is based on a smart counter patented by the Mikkeli University of Applied Sciences. The National Technology Agency (TEKES) has supported the development work.
SPECIAL WORKSHOP – ELVIRA (in Finnish)

Time: Friday 7 June at 9:00–12:00
Venue: LS01

Launch of the publication of the Research Programme on Nutrition, Foods and Health (Academy of Finland).

Suomen Akatemian Ravitsemus, elintarvikkeet ja terveys (ELVIRA) -tutkimusohjelman arviointiraportin julkistamistilaisuus

”TUTKITTU RUOKA – ENNAKOIDUT EVÄÄT”

8.30–9.00  Ilmoittautuminen ja kahvi
9.00–9.10  Akatemian puheenvuoro
Ohjelmaksikon johtaja Arja Kallio
9.10–9.40  Loppuarviointiraportin julkistaminen
Prof. Liisa Lähteenmäki, arviointipaneelin jäsen
9.40–10.10  Kommenttipuheenvuoro arviointiraporttiin
Prof. Matti Uusitupa, ELVIRA rahoittaja
10.10–10.40  ”Mitä suoli edellä, sitä aivot perässä”
Prof. Pentti Huovinen
10.40–12.00  Paneelikeskustelu: Millä eväillä eteenpäin?
Moderaattorina lääketieteen toimittaja Ulla Järvi

Prof. Liisa Lähteenmäki (Århusin yliopisto), tulevaisuuden kuluttaja
Prof. Matti Uusitupa (Itä-Suomen yliopisto), nutrigenomiikka
Prof. Pentti Huovinen (Turun yliopisto), mikrobiomi
Dos. Jaana Laitinen (Työterveyslaitos), painonhallinta
Dos. Leila Karhunen (Itä-Suomen yliopisto), ravinnon rakenne ja kylläisyys

12.00–   Lounas