

# 1<sup>st</sup> Nordic Organic Conference



Nordic Organic Conference  
2009

18–20 May 2009

at The Swedish Exhibition Centre  
Gothenburg, Sweden

*Vägen till ökad  
uthållighet i  
livsmedelskedjan*

*Towards increased  
sustainability in the  
food supply chain*

*Vejen til en øget  
bæredygtighed i  
fødevarekeden*

*Veien til økt  
bæredyktighet i  
matvarekjeden*

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*Nordic Organic Conference*  
*2009*

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## Global Change and the Earth System: a planet under pressure

Climate change has focussed the world's attention on the impact of human activities on the global environment. Although humans have always affected the environment around them and the global environment continually changes due to natural variability, something different is happening now. The human imprint on the environment is now clearly visible at the global scale in many different ways in addition to greenhouse gas emissions and climate change. The Earth's land cover has been extensively modified by humans with around 35 % under intensive cropping; human activities now fix more nitrogen from the atmosphere than all natural terrestrial processes combined; and the Earth is in the midst of its sixth great extinction event, with this rapid loss of biodiversity due to human activities. The magnitude of the human imprint on the environment – sometimes referred to as global change – has become so pervasive that humanity has now become a geological force equivalent to some of the great forces of nature. This has prompted some scientists to suggest that the Earth has left its current geological epoch, the Holocene, and has now entered a new epoch called the Anthropocene.

The production and consumption of food has been – and continues to be – one of the major drivers of global change. Most of the land-cover change that has occurred over the past several centuries has been the conversion of natural ecosystems to croplands and pastures; this has



also been the largest driver of biodiversity loss. Human modification of both the global nitrogen and phosphorus cycles has been for the production of fertilizer. About 70 % of the freshwater co-opted by humans is used for the production of food. As humanity enters the 21<sup>st</sup> century, significant challenges lie ahead. We will need to produce food for about 9 billion people by the middle of the century, but at the same time the environmental impact of this production – on the atmosphere, land and oceans – will need to be reduced substantially.

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# The role of organic food systems in meeting future challenges in the Nordic region

The Nordic region is facing a future with a changing climate, which can result in a greater food production, but also increased risk of crop failure, due to more radical weather conditions, such as spring drought and heavy rain incidents. Organic food systems have an important role in enhancing the sustainability and security of a healthy food supply in the Nordic region. Some important challenges are to contribute to mitigation and adaptation to global change and to implement international environmental goals, e.g. the Water Frame Directive, REACH, The Biodiversity Action plan, etc. and stimulate rural development in the region. Some important challenges in the Nordic agriculture and food production are:

- Improved use efficiency and recycling of limited nutrients (e.g. phosphorus) from urban areas (households) to agriculture
- Reduced nutrient losses to the aquatic environment and natural ecosystem
- Reduced degradation of soil quality
- Improved use efficiency of water and fossil energy
- Conservation and improvement of biodiversity and landscape values
- Reduced green-house-gas (GHG) emissions
- Renewable energy production in agriculture
- Reduced pesticide use
- High quality and healthy food and rural development

The basic sustainability principles: resource sufficiency (RS) and functional integrity (FI) relate to the depletion rate of the resource base and the ability of systems to reproduce important components, e.g. soil fertility

(Thompson, 1997). Organic farming (OF) serves as explicit model in the development towards a sustainable agriculture, but further developments towards a sustainable food production are required.

The aim of this presentation is to present how organic food systems can contribute with solutions to these challenges. Organic food systems may have had no or only a limited role yet. It is time to point to research and innovation agendas, which can develop organic farming in a way they can utilize it's potential in sustainable development.

## Reducing pollution of the environment

Organic farming has a strong potential to reduce the negative associated with food production impacts on the environment. No pesticides are used, the level of nutrient supply and surplus is often lower in organic than in conventional farming systems and organic farms use more pastures and catch crops in autumn and winter. Consequently the risk of polluting the ground water, other parts of natural ecosystems and food with pesticide residues is eliminated. Less eutrophication of ground and surface waters occur due to lower levels of nitrate and surface transport of phosphorus to lakes and rivers (Niggli *et al*, 2008). In OF plant production systems there is still a requirement for reducing N losses. Nutrient losses are normally lower in organic farming in terms of the amount of e.g. nitrate leached pr ha, and may be lower, similar or greater in terms of loss pr. kg of crop yield. However, the expression of N leaching on an economic basis (yield, DKK, €) is not relevant for losses which causes a local environmental harm only, e.g. leaching of nitrate to the groundwater. Here the impairment

of the aquifer is equally serious whether 4 or 5 tons are produced on the land. The effect of GHG emissions has global impact and consequently it is relevant to make a comparison of these losses on a yield (economic) basis.

Due to lower levels of mineral N in crop production, the emission of N<sub>2</sub>O on a per ha basis is often lower in organic farming than in more intensive farming systems, but only slightly lower or similar on a per kg product base. Products from organic systems such as milk, cereals, oilseed rape cause slightly lower emissions of GHG than conventionally produced, whereas animal products, crops with much lower yields in organic than in conventional agriculture and green-house products cause higher emission in organic farming (ICROFS, 2008).

### Sustainable management of natural resources

Organic farming has an important role in conserving natural resources such as non-renewable nutrients sources (e.g. phosphorus), soil quality and biodiversity.

There is an increasing awareness about depletion of non-renewable nutrient resources such as phosphorus. Due to a high degree of recycling of crop residues, animal manure and only occasional use of rock phosphates OF methods will result in conservation phosphorus resources. The recycling of urban wastes in terms of organic household wastes, eventually via hygienization in biogas plants, will strengthen recycling and conserve more P (Cordell *et al.*, 2009).

The soil organic matter (carbon) content, is enhanced by organic farming, due to crop rotations, the recycling of crop residues, catch cropping, pastures and use of animal manures, but also the soil microbial biomass, enzyme activities, aggregate stability of soils are often enhanced (Carter *et al.*, 2004). The higher C-sequestration in organically managed soil compared to conventionally managed soils is also important in relating to the mitigation of global change.

Several studies have documented that the species diversity is significantly greater in organic than in conventional systems even if adjustments have been made for differences in system components (ICROFS, 2008). The impact of organic management is greater in agricultural landscapes with only few other components than arable crops than in mixed systems with livestock and many small biotopes.

Organic farming in Denmark is now more profitable than conventional production (ICROFS, 2008), and due to the aim of local production organic farming is an important tool to stimulate rural development and prosperity in the Nordic region.

### Conclusions

Organic farming has an important role in sustainable development of food systems and farming in the Nordic regions, in terms of reducing negative impacts of farming on the environment, conservation of non-renewable resources, improving soil and food quality, stimulate biodiversity in some systems, mitigating climate change and in stimulating rural development. However, organic farming and food production must continue developing to become more sustainable.

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## Plenary session 1

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# The Organic Farmer – a key player for real change

My task for the opening session is to describe why organic farmers are main actors in the production of food for the future.

During my speech I will focus

- the farmers will and interest to act for reduced climate change
- methods and techniques that make difference
- less fossil fuel, steps will be taken
- potential for carbon sequestration, much more to do
- husbandry, mainly grass eaters, cattle and sheep
- soil management, pasture and grassland
- research and technology transfer for further potential

# Food for quality of life

The meals we are eating can be seen as expressions for different values, such as a good environment, well-being, animal welfare, solidarity... To care for the food is to care for the surrounding world. But who has the power to decide what's on our plates? And is there knowledge and transparency enough to make enlightened choices? In this "kitchen-on-stage-session" we will cook a warming and nourishing soup out of organic ingredients, knowledge and insights.



**Mats-Eric Nilsson**

Mats-Eric Nilsson är författare till *Den hemlige kocken* och *Äkta vara*, som sedan hösten 2007 har skakat om såväl tusentals matkonsumenter som stora delar av livsmedelsbranschen. Böckerna avslöjar ett utbrett ingrediensfusk där tillsatser ofta får ersätta reklamens lockande råvaror. *Den hemlige kocken* är nu en av de mest lästa fackböckerna i Sverige och har hittills sålts i 180 000 exemplar. Även uppföljaren *Äkta vara*, som kom i november 2008 och är en konsumentguide till oförfalskade livsmedel, har snabbt blivit en storsäljare. Författaren medverkar flitigt i press, radio och teve och reser under våren land och rike runt för att föreläsa om sin böcker. Mats-Eric Nilsson är mångårig nyhetsjournalist och har senast varit redaktionschef på Svenska Dagbladet där han nu är matkrönikör.



**Carola Magnusson**

Carola Magnusson är matmaman som har gjort ekoköket både känt och älskat. Hennes anhängare finns bland såväl kräsna matrecensenter, som miljömedvetna forskare och skolbarn. Med tre utgivna kokböcker är hon även en rutinerad kokboks-författare.

Under hösten 2008 lagade hon mat i Matakuten på TV 4, där hon uppmärksammade bristerna i de svenska skolköken. Parallellt med matlagningen är hon en aktiv föreläsare. I mars talade hon bland annat för tusentals entusiastiska kvinnor på 1,6 miljonerklubbens medlemsdag på temat "Ekologi och hälsa". Nu senast försvarade hon den ekologiska kosten i det direktsända programmet "Debatt" med Janne Josefsson. Det är enkelt att konstatera: utan Carola hade Sveriges ekologi inte varit där den är idag.

**Carolas utmärkelser:**

- Finalist till Leva-bättre-priset 2008 Tidningen LEVA
- Finalist till Stora matglädjepriset 2007 Tidningen Allt om mat
- Årets miljöledare 2007 Näringslivets miljöchefer
- Vinnare av Änglamarkspriset 2007 med motiveringen: "Det engagemang för god mat, miljö och hälsa som Carola Magnusson har ger ringar på vattnet. Carolas små och stora matgäster blir mer kunniga efter att ha matats med säsongstänkande, närproducerade nyheter, rättvist producerat och ekologiskt."
- Kokboken Manna – Bästa livsstilslitteratur 2005 Måltidsakademien Grythyttan

- Sveriges matambassadör under jordbruksministern (2002)
- The Gastronomic Academy Silver Medal (1999)
- Euro-Toque – Chef of the Month award (1999)
- Chefs Champion Prize (1998)
- The Organic Carrot of the Year Award (1997)
- The Werner Vögeli Award – Chef of the Year (1997)
- Årets Stockholmare (1997)

**Carolans utgivna titlar:**

- Manna*, Bokförlaget Langenskiöld, 2005
- Carolans ekokök*, Bokförlaget Langenskiöld, 2008
- Carolans ekosöta*, Bokförlaget Langenskiöld, 2009

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**Katarina Wochner Carlsson**

Jag är snart 45 år och arbetar som enhetschef för Måltid och Fastighetsservice i stadsdelen Högsbo i Göteborgs Stad. Det är en vacker stadsdel som inbjuder till promenader i närområdet. Flertalet av de cirka 17 000 invånarna bor i flerfamiljshus som byggdes på 50- och 60-talet.

Vi har tre grundskolor, elva förskolor och fyra äldreboenden. Idag lagar vi maten till förskolorna och skolorna men hoppas inom en snar framtid att själva kunna försörja våra äldreboende med egentillverkad mat.

Jag har förutom ansvaret för förskolornas och skolornas mat även ansvaret för skolornas lokalvård och vaktmästeri. Denna kombination av uppdrag beror på att man ser dessa uppgifter som stödprocesser och att ingen har den kompetensen som krävs. Dessutom är det ingen nackdel att jag har kompetens för alla tre områdena.

**En välskött ekonomi är grunden**

Min akademiska utbildning är Kostekonom, eller som det hette för drygt 20 år sedan; ekonomiföreståndare. Jag har en stor erfarenhet från i stort sett alla typer av offentlig måltidsverksamhet. Arbetat i både med och motgång och gett mig in i verksamheter som haft underskott på mångmiljonbelopp men har lyckats få dem i balans. Min nuvarande verksamhets ekonomi undersökte jag dock innan jag sökte arbetet. Det är nämligen oerhört svårt att utveckla en verksamhet om man först ska använda

mycket energi på att rensa upp i ekonomin. Lyckligtvis var den mycket välskött.

**Kompetenta medarbetare är A och O**

Min åsikt är att medarbetarna är mycket viktiga likaså för att få en väl fungerande verksamhet. Vem säger att en undersköterska vill eller kan arbeta med mat? Så kan det nämligen emellanåt tyckas inom kommuner. Vilken krögare skulle anställa en trött, utsliten och kanske illa behandlad undersköterska om man söker en snabb och serviceinriktad servitris eller servitör med utbildning? Jag anställer ingen till måltidsverksamheten som saknar utbildning oavsett om det är en kock eller ett skolmåltidsbiträde som behövs! Vi hade aldrig kommit så långt om inte kompetensen varit så hög och deras brinnande kärlek för mat. Alla tar ett mycket stort ansvar för att vi ska göra vårt bästa och att barnen ska tycka om vår mat. Det vill säga det jag ser som det viktigaste för att lyckas; en stor delaktighet.

**Tre rätter plus sallad är standard**

Vi serverar alltid tre olika rätter varav en vegetarisk samt en generös salladsbuffé med mellan 5–10 olika alternativ. Det är en ständig utveckling av både recept och produkter. Vi diskuterar alltid kvalitet, kvantitet och pris innan något köps in. Arbetet med matsedeln pågår



ideligen och alla barn som äter hos oss får hemsänt en matsedel för hela terminen första veckan på terminen. Utformat snyggt och i planschformat. Det ekologiska för 2008 blev 23,5 % vilket vi är mycket nöjda med. Vi har nu legat och nosat i närheten av 25 % i flera år. Vilket är ca 900 kkr av vår livsmedelsbudget.

### **Vegetariskt av budget- och klimatskäl**

Vi har under 2008 haft en fruktansvärd prisökning på våra ingredienser i vår matsedel. Jämförde priserna från februari förra året med i år och det har skett en kostnadsökning på alla livsmedel. Enbart huvudkomponenter d.v.s. proteindelen på 17–20 %. Detta faktum får vi inte ekonomisk kompensation för. För att fortsätta att kunna leverera samma goda kvalitet har vi nu istället infört fler hel vegetariska dagar men naturligtvis med tre alternativa rätter. Under våren har detta skett fyra gånger men ska fördubblas till hösten. Åtta dagar kommer alltså att vara helvegetariska och med tre olika alternativ. Vi gör inte detta enbart för att ha råd att servera den höga andelen ekologiskt. Ur klimatperspektiv är det viktigt att minska andelen animaliskt protein för att inte bidra till växthuseffekten och försurningen av vår natur. Alla har ett ansvar för miljön och framför allt vi som vill vara en förebild för andra verksamheter.

Som sagt ser vi också att det vegetabiliska proteinet är mycket billigare. Men det krävs mycket mod och kreativitet hos våra kockar när de hittar på nya recept och maträtter. Förbättringsområden vi ska arbeta mycket med under de kommande månaderna är svinnet och att öka kunskapen om mat hos våra matgäster. Redan efter påsk ska vi börja med kunskapsinformation enligt mjölkpaketmodellen.

Modellen innebär att varannan dag ska en fråga ställas med svar. Det finns sammanlagt hundra olika som följer exemplen: Ekologiskt vad är det egentligen? Vad kostar all den mat som slängs? Vad är tillsatser? Det kan även vara bilder på grönsaker som kan vara nya för barnen.

### **Omväxlande arbete**

Mitt arbete som enhetschef är mycket omväxlande. Ena stunden diskuterar jag nya städmetoder och den andra kanske låssystem eller matsedel. Har till min hjälp två gruppchefer och en mycket kompetent grupp av medarbetare som ger mig mycket energi. De är alla mycket engagerade och delaktiga inom sina områden.



**Gerd Holmboe-Ottesen**

Professor in community nutrition. She is a nutrition epidemiologist and has worked on diet and lifestyle factors in health surveys in Norway and in different developing countries. In addition she has been involved in studies oriented towards issues of food security and sustainable food production and their relationship to dietary quality and health. She made a report on sustainable food for the Norwegian National Nutrition Council, which was published in part in the Journal of the Norwegian Medical Association in 2004, entitled: Is organic food more healthy? Since then she has published two other literature reviews on the health aspects of organic food and is now working on the third.



**Niels Heine Kristensen**

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Niels Heine Kristensen har været initiativtager til en række forskningsprojekter inden for fødevarerektoren, ligesom han er en internationalt anerkendt forsker inden for økologi, bæredygtighed og ledelse, i relation til fødevarerektoren. Senest har han taget initiativ til projektet "Forum for Nordisk domesticeret Korn" og beskæftiget sig med relationer mellem økologi, kvalitet og smag.

Niels Heine Kristensen's forskning er koncentreret om udvikling af strategier og modeller for økologisk og bæredygtig omstilling. Det omfatter såvel områderne "food policy", produktkædeanalyser, distribuerede måltider, miljøledelse, hverdagsliv, som bruger- og deltagerorienteret innovation.



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## Show – the organic picture

### **What will the world look like when organic production is mainstream?**

*OR what will the world look like when the main stream has gone organic? When organic agriculture is the only stream?*

Take almost anybody to a field and ask them if they want to eat the sprayed or the organic vegetables, they all answer the organic, if they are honest.

So getting everybody to eat and think organic is a matter of organising and communicating it in a way that makes it possible for people to actually do it. They would choose it if they had the awareness of it.

Årstiderna is a transformational organism trying to find a way back to the basic things without defying reality.

### **We show up and we try to find and organize a future – or should we say a way.**

Årstiderna is a box scheme based on the ideas of a CSA (community supported agriculture). In Sweden and Denmark we deliver 35.000 boxes of fresh organic vegetables and fruits per week directly to the kitchen door of private households.

### **We try to stay present enough to hear when changes are needed**

We set out to reconnect the farmer with the people at the dinner table. We did it with a combination of modern technology such as the Internet and some good old marketplace thinking, and we are constantly mixing the two ingredients and constantly adjusting them to the ever-changing reality of modern life.

### **We try to tell the truth and communicate in a transparent way**

Markets are conversations and people speak in a human voice whether they are farmers or customers. In Årstiderna we are very aware of our responsibility. If we want to know and connect with our customers, we have to be open and genuine and be ready to tell the truth, also when it is not so nice.

### **And we try to get out of the way of a generous nature giving us good food**

Farming is one of the most honourable things you can do. We work with the miracle of the little seed that turns into nutritional food every day, and we strive to honour and respect it as much as we possibly can.

### **Årstiderna**

Is not the silver bullet answer to the question of “what will the world look like when organic is main stream”, but we do try to be a very practical example and a living organism - an emerging template into a brighter future of agriculture.

Ideally this would mean that we will become an organic food system consisting of farms working together, organized around and cooperating with local cities and with joint responsibility of providing non-industrialised, healthy and nutritious food for everybody.

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## What will the world look like when organic production is mainstream?

### The future will be organic. What will it look like?

Economic growth can no longer be driven by the input of fossil fuels, and the overuse of natural resources. The organic movement today has helped us understand how to work with nature's cycles instead of dominating them.

A key question will be how to find ways to support a new generation of farmers passionate about farming, but without access to basic resources such as land, and farm financing. A down turn in demand for fossil fuels will inevitably leave hundreds of thousands of employees unemployed looking to join the new organic revolution. To preserve and re-establish the vitality of rural communities it is important to also support and believe in small farms. This is true for many countries:

*"Here in the United States, the question was asked more than a half-century ago: what does the growth of large-scale, industrial agriculture mean for rural towns and communities? Walter Goldschmidt's classic 1940s study of California's San Joaquin Valley, *As You Sow: Three Studies in the Social Consequences of Agribusiness*, compared areas dominated by large corporate farms with those still characterized by smaller, family farms.*

*In farming communities dominated by large corporate farms, nearby towns died off. Mechanization meant fewer local people were employed, and absentee ownership meant farm families themselves were no longer to be found. In these corporate-farm towns, the income earned in agriculture was drained off into larger cities to support distant enterprises, while in towns surrounded by family farms, the income circulated among local business establishments, generating jobs and community prosperity. Where family farms predominated, there were more local businesses, paved streets and sidewalks, schools, parks, churches, clubs, and newspapers, better serv-*

*ices, higher employment, and more civic participation. Recent studies confirm that Goldschmidt's findings remain true."* (Peter Rosset <http://www.foodfirst.org/pubs/policybs/pb4.html>)

### As organic goes mainstream, will standards suffer?

This is an important question to address. It is vital that organic agriculture and its consumers develop into a way of life. Our throw away culture must become a thing of the past. If things don't change the word Organic will become nothing more than a marketing strategy, it will lose its purpose. It is not business as usual that will save us (and save the world). We have to keep the standard high. *"Organic farming is about taking the big global issues and problems seriously and working on solutions and improvements, changing the trend and showing new ways forward."* (Inger Källander).

In a true organic future there will be a lot more variety than there is today. Production systems will be more integrated. There will be more cooperation and communication between farmers and communities. The diversity of crops will be much greater than that which is available to date. There will be less standardisation and more local innovations. Once again you will see how our local environment and geology will influence the way we build houses. It will be seen as much a cooler alternative to have a nice, productive garden full of vegetables and fruits than a swimming pool for instance. We will grow more vegetables and more perennial crops. We will make better use of the land utilising trees and bushes. Farms will be created in a more intelligent way and farmers

more aware of all flows in nature. We will make much better use of ecosystem services.

Cities will be much greener, making them cleaner and offering a more pleasant environment in which to grow home produce. Every surface in towns will have more than one task. For example a roof will not just offer shelter it could potentially also harness the suns solar energy offering the inhabitants nice energy! There will be fewer cars and people will live closer to work, there will be less need for transportation. People will use there energy in a conservative and productive way, like in the city-gardens, and not idling in gyms without transmitting any power. We will not be so concerned about exercising to get thin, because moving comes natural in the everyday-life.

Phrases such “I don’t have time” will become a thing of the past as communities become stronger and knit together. Let’s hope for a true green revolution. The cities will be car free, easy to travel by bicycle, by foot, buss, and train and so on. Society as a whole will move at a lot

slower pace. And we will get much more done.

We will consume less throw away products and more services and experiences (like enjoyment of the countryside) and we do not have to travel far to do that. So we will have a richer life where we live. We will be more aware of “were does it come from were does it go”, when it comes to consumption.

We will mobilise people who have horses, and they’ll be involved in agriculture and forestry.

We’ll listen more to the radio as an alternative to the television because it is easier to be active then. There will be more focus on educational and informational programs relating to organic practices.

There will be less distinction between work and pleasure, and there will be more time for life.

More people will have hands like mine.

I think that green concept will soon take on an energy of it’s own creating a new revolution of the world as we know it.

**Presentation of the artist who is going to paint a picture with inspiration from the sessions visions**

*Erik Magassa*, painter, educated in London and New York. Living and working in Gothenburg. Questions about identity and cultural identity is a recurring theme in my paintings. In the working process colour is key. I draw inspiration from everyday events, objects in my immediate vicinity, or memories of my own experiences.

**Presentation av konstnären som ska måla en bild med inspiration från sessionens visioner**

*Eric Magassa*, bildkonstnär, utbildad i London och New York. Bosatt och verksam i Göteborg. Frågor kring identitet och kulturtillhörighet är en återkommande tematik i mitt måleri. I själva arbetsprocessen är färgen det primära. Jag hämtar inspiration ur vardagliga handlingar, föremål i min direkta närhet eller minnesbilder av egna upplevelser.





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## Organic food at a hospital kitchen

The Norwegian government aims for 15 % organic food production and consumption within 2015 (LMD, 2009). One of the strategies for reaching the consumption goal is to introduce organic food in public catering. An ambitious public aim of organic consumption calls for strategies that involve several ministries and sectors, not only the Ministry of Agriculture and Food (LMD, 2009). Organic consumption should be acknowledged as a tool to achieve a more sustainable society. Public kitchens and caterers should be given possibilities to not only ensure an efficient production of meals, but also take actions in a broader environmental and social engagement.

### **St. Olavs Hospital, Trondheim University Hospital – a pilot case**

Bioforsk Organic Food and Farming coordinated a pilot project in the introduction of organic food in the public sector in Norway during 2002–06, when St. Olavs Hospital in Trondheim worked for and achieved a goal of 30 % organic food. The pilot project was funded by the Norwegian Agricultural Authority (SLF). Project funding was used for training and work related to development processes, not to support food purchase. Many papers, training manuals and a text book were produced, and many lectures were given about the activities already during the project period. Currently, many Norwegian municipalities are starting to introduce organic food in their kitchens, and hence the experiences learned at St. Olavs Hospital are very useful and attract much interest.

The objective of the project at St. Olavs Hospital was to introduce organic food of high quality and preferably locally produced. The target was that organic food should

comprise at least 30 % by weight of the food served at the hospital at the end of the project period. The target was reached in 2006, and since then the hospital has continued with organic food at the same level. However, some products have been replaced by others. On average, the hospital offers 1100 patients 6 meals every day. In 2006, the share of organic food was 82 % of all rice used for porridge, 14 % of all flour, 27 % of all eggs, 14 % of all meat, 59 % of all milk, 7 % of all sour cream, 69 % of all cheese and 100 % of all potatoes used by the kitchen. In addition, locally grown organic vegetables were tested. In the further text, we will present the most important lessons learned from the project.

### **Discuss, decide and communicate why organic food is a good choice**

At St. Olavs Hospital, two factors were important for the realization of the pilot project. Building a new hospital took place at the same time as the pilot project started. The question of how to organize the food production and serving in the new hospital led to discussions about different concepts of management. The kitchen chef had to fight severely to achieve that the new hospital got a proper kitchen at all, because it was suggested to use largely pre-cooked food to save costs. This fight increased the chef's engagement about food quality in general, and his awareness of the importance of food for health and well-being. Hence, he was open to propose an introduction of organic food in the new hospital kitchen, and the project was realized. However, for a successful implementation, it is not enough to have one positive leader. All people active in the process of conversion to organic food must become involved.

To achieve support and loyalty to a decision about purchasing organic food in public institutions, it is essential to identify and express the reasons for this choice. At St. Olavs Hospital, social responsibility especially for our common environment was emphasized. Producing organic food is a strategy for sustainability in agriculture, according to the four basic principles as stated by IFOAM (International Federation of Organic Agricultural Movements). There are reasons to claim that conversion to organic food will contribute to a better environment. It is important to discuss this issue and communicate the ideas to all decision-makers as well as to the kitchen staff. Knowledge is motivating and inspiring.

The other main reason that was emphasized at St. Olavs Hospital was that the organic food would be of high quality, with nice taste and appearance, and also locally produced. These expectations had to be fulfilled if the kitchen should accept the extra costs for organic products. The organic food was expected to strengthen the kitchen's food philosophy about cooking with high quality fresh ingredients, and serve the food fresh. In short, sustainability and high quality were the leading guidelines for all decisions about what kind of food products should be converted into organic.

### **Training and competence-building**

Building competence and training the staff was a central activity in the project. Our initial assumption, that the degree of success of the project was dependent on the involvement of all actors, was confirmed. Information materials were produced for all staff, and every person employed by the kitchen during the project period participated in courses which lasted for two days, were arranged in a nice place outside the hospital and included a visit to an organic farm. Kitchen employees stated that this was the first time they were offered training outside the hospital, and that the courses were highly inspiring and made them proud to participate in the process. By the training activities, the idea of converting to partly organic food in the hospital kitchen was well rooted. Similar experiences about the importance of discussions and knowledge building have been reported from several cases in other countries (Cottingham, 2007).

### **Increased awareness about food quality**

When the project started there was a distinct lack of qualified local organic suppliers. The hospital kitchen

wanted to buy organic potatoes and vegetables from local farms. However, when purchasing local organic potatoes they experienced that the quality varied a lot. In some batches, the potatoes darkened by cooking. It was also a problem to store peeled potatoes in water without additives to prevent darkening. To increase the product quality and solve a range of various practical problems, we worked hard to establish collaboration between all stakeholders from farm to fork. Farmers, processing industry and kitchen staff were gathered frequently to discuss problems and how to solve them (Solemdal and Kvamme, 2005; Birkeland and Solemdal, 2007). The work with potatoes included organizing of farmers, agronomical recommendations, quality assurance and further handling, and resulted in a separate project also funded by SLF where the potato producers got support to become organized and produce more efficiently according to the demands of their large customer.

It is a time consuming activity to develop supply chains for organic food to meet the needs of the public procurement market. It may be a hard test of one's patience. All the stakeholders involved need to go through a learning process. Many small details can influence the product quality. A positive result, however, is that the stakeholders afterwards pay much more attention to food quality. This is a result that the hospital kitchen chef appreciates very much.

### **Demand cause changes**

When St. Olavs Hospital calls for tenders for procuring food, they cooperate with the municipality of Trondheim. The hospital always makes a request for prices on organic food products. Together with The Norwegian Defence and some private caterers that also are purchasing organic food, they have experienced that joining forces have resulted in considerably improved supply for organic food. By repeatedly asking for organic food, the kitchen applies pressure on their traditional suppliers. These are big organizations with many administrative levels and many actors involved. It is a huge process to change attitudes in a large organization. Yet, experiences from the project indicate that individual persons with positive attitudes to organic food, who work committed over time, can influence traditional suppliers significantly.



### Step-by-step

A partly conversion to organic food in a large public kitchen is a quite comprehensive exercise. Each step needs to be planned and many details have to be checked. In the start of our hospital project we got valuable help from experienced Danish consultants, who emphasized that small, but long-lasting steps are in the long run more efficient than a revolution on insufficient ground. At St. Olavs Hospital, all the decisions about organic food were done by the chef. He has the required overview to take good decisions based on purchase costs and quality.

### Avoid a one-sided focus on price

Most public institutions have to work within the limits of a tight food budget. When introducing organic food, it is crucial to avoid a one-sided focus on price. Choices should always be based on joint assessments of quality and price. We should aim at a broader understanding of expenses and costs than the current one-track price focus. Most kitchens have a potential to save money by other strategies than to reduce the food costs, which in most Western societies nevertheless comprise only a small part of the total costs. Potential cost-saving areas are ready-made meals, waste, food ordering systems, leadership at the kitchen, how the work is organized and sickness absence among the staff. At St. Olavs Hospital, a new electronic food ordering system was established during the project period. The new system implies that every meal ordered from the wards to the kitchen is ordered to a particular patient. This change reduced the total amount of produced meals by 20 %, and made it possible to buy more expensive food within the same budget limits.

### Conclusion

Introducing a considerable amount of organic food in a public kitchen calls for a careful planning. All kitchen staff should be involved in discussions and training activities. Achieving knowledge about organic production is motivating and inspiring and will lead to increased awareness about food quality in general. When several public kitchens in the same region are joining forces, suppliers will respond with larger assortment, better product quality, better availability and lower prices on organic food. Introducing organic food in public kitchens highly depends on enthusiasm from the kitchen chef.

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## Steps towards organic public kitchens

Since the year 2002 Step By Step towards Organic programme has been EkoCentria's main tool for the work in the national sector. The main goal of the programme is to encourage and guide catering services in the use of organic ingredients. Participating catering services complete a training session and apply for one of the three steps in the programme that reflect the usage of organic ingredients respectively. After kitchens make plans of action, they are rewarded with a yearly diploma that helps them inform their customers about the use of organic ingredients in their servings.

The program is mainly intended for counselling the catering sector personnel on self-monitoring, procurement, planning menus and meals as well as on eco marketing. However, the generated statistics by the program also provide vital information for the producer sector – farmers, manufacturers, wholesalers – enabling

it to effectively observe the market and react to changes in demand.

As of the beginning of year 2009, the programme dubbed "Step by Step" will be focusing on public sector. Applications, training and diplomas will be completely digitalized and moved to a virtual learning environment. The contents of the programme will be adjusted to prepare the participants for the changes brought by the new national Public Sector Purchasing Action Plan that defines clear minimum quotas of servings of sustainable character by 2010 and 2015.

In the beginning of year 2009 Step by Step Programme had nearly 300 registered participants. Current growing interest in sustainable development and environment friendly products is expected to help the number of kitchens rise to 500 before the end of year 2010.



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## Strategier for økt forbruk av økologisk mat i offentlig storhusholdning

Temaet for foredraget mitt er strategier for å øke forbruket av økologisk mat i offentlig storhusholdning. Jeg skal først presentere en kort status for økologisk mat i offentlig storhusholdning i Norge og hvilke potensialer og muligheter som ligger i dette markedet for økologisk mat.

Andre del handler om hvorfor vi trenger en målbevisst strategi for en slik satsing. Her vil jeg diskutere rundt eget materiale om økologisk matproduksjon og norsk likhetsideologi. Jeg påstår at økologisk matproduksjon introduserer selve ideen om konkurranse i norsk landbruk, som er preget av få og store salgssamvirkeorganisasjoner. Innad i norsk landbruk er det likhetsprinsippet som gjelder, og at all norskprodusert mat er bra og ren nok. Jeg vil redegjøre for hvordan det norske likhetsprinsippet ofte blir et hinder for arbeidet med å øke forbruket av økologisk mat og reklamen for denne. Dette er i endring, men veien til en friskere satsing på økologiske produkter og produktutvikling i Norge har vært lang og kronglete. Debattene har gått og går fortsatt i media i Norge. Er øko-maten sunnere, er den mer miljøvennlig, er den bedre? Kan man si at den er mer miljøvennlig og sunnere? Derfor er det viktig med gode strategier.

Tredje del omhandler myndighetenes arbeid med å øke andelen økologisk mat i storhusholdninger. I dag har

Norge en regjering som har gått offensivt ut med målsetninger om økologisk mat. Denne satsingen er nedfelt i den såkalte "Soria Moria erklæringen" som er tydelig på at staten skal gå framfor som godt eksempel mht økologisk i storhusholdning, og målsetningen er å oppnå 15 % økologisk matproduksjon og omsetning. Dette gjelder da også for statlige virksomheter og storhusholdninger. Beslutningene som er tatt, trenger tid til å institusjoniseres. Hva har blitt gjort og gjøres det nok?

For noen år siden ble konseptet Grønn stat lansert, som bl.a. beskriver hvordan staten skal foreta innkjøp, deriblant i forhold til miljømerker og innkjøp av økologisk mat. Jeg vil kort komme inn på hva dette betyr i praksis. I februar i år lanserte vår landbruks og matminister en ny handlingsplan for økologisk matproduksjon. Planen går langt i å beskrive utfordringer og tiltak og hvordan Norge skal oppnå 15 % økologisk matproduksjon innen 2015. Handlingsplanen fra LMD legger klare føringer for bl.a. å øke forbruket av økologisk mat i Norge. Et viktig tema i strategien er å øke forbruket av økologiske matvarer i offentlig sektor. Jeg vil i foredraget komme inn på eksempler om prosjekter som er blitt initiert og som bli støttet med statlige midler, og hva som er viktige satsingstema fremover. Til slutt presenteres et pågående prosjekt, som eksempel på hva som gjøres innen storhusholdningssatsingen for tiden i Norge.

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# Approaches for minimum and low input processing strategies which guarantee quality and safety

## Organic Food Processing

### Underlying principles, concepts and recommendations for the future

#### Results of a European research project on the quality of low input foods

Principles of processing of organic and 'low input' food have been analysed in the EU funded QLIF project.

#### Literature survey on underlying principles of organic and 'low-input' food processing:

The literature survey, focuses on the underlying principles of organic food processing, which are quite different depending on different types of products, different processing standards and marketing concepts. Some of the principles are basic (e.g. the use of certified organic ingredients, a certified production chain and minimal use of additives), others are shared broadly (e.g. more careful processing methods, naturalness) and some principles are in discussion mainly in the private sector (e.g. environmental management concepts, social requirements, regional focus).

The report reflects on the theoretical and practical roots of organic processing. It shows that EU organic Regulation covers a number of consumer perceptions such as certification system, traceability, minimal use of additives, labelling concepts and the use of organic raw materials. However, other consumer expectations such as careful processing, freshness, healthy nutrition and fair trade are not addressed by the regulation. Consumer expectations should be better taken into account.

#### Delphi expert survey

Between October 2004 and May 2005 a two-step expert survey was conducted using the Delphi method. In the first round, 250 experts in 13 countries in Europe were involved, and were asked to respond to a standardised questionnaire in October and November 2004, and a second round from March to May 2005. The Delphi expert survey was designed in such a way that the most important and currently discussed aspects regarding organic food processing were taken up. 120 experts from 13 countries responded in the first round and 83 experts from 13 countries responded in the second round. The experts were chosen in such a way as to have a good representation of food processors from different sectors, with different field of activities. In the first round, 55 % experts from food processing companies and 45 % experts from non-processors, and in the second round 46 % experts from food processing companies compared to 54 % experts from non-processors participated.

One focus of the survey was to clarify definitions which are often used to characterise organic food processing. A further question was which criteria are important for an organic product to be successful in food markets? The ranking was: Sensory quality, minimal use of additives and processing, freshness, and authenticity.

An important question was ‘Which aspects should be regulated’ on an EU regulation level and which ones on other levels (national, private company or label level) or not be regulated at all. The feedback from the experts was quite varied, depending on the different areas. On the EU regulatory level, the top priority mentioned was the minimal use of additives, followed by minimal and careful processing. Quality/sensory aspects, however, were not seen to be primarily on the EU level, because companies should have the chance to develop individual sensorial profiles for their products.

In general, most of the experts expect special processing methods to be used in the production of organic food. But when asking the involved experts more specifically it was very difficult to select those methods that are usable/suitable or not usable/suitable. However, regarding the use of additives, the answers were very clear. There is a tendency to prefer additives of certified organic origin both from the processors’ as well as the non-processors’ points of view.

### Code of Practice

The expert consultation has shown that there is a lack of clear guidance for operators on how to translate given regulations on a company level. A ‘code of practice’ for the organic food sector seems to be a good instrument which would eliminate the need for describing all the issues in detail in EU Regulation 2092/91. A number of problems which occurred in the last years were caused by insufficient implementation of the rules of EU Regulation 2092/91. Guidance is needed on the management level, but also for inspection/certification bodies, if more responsibility is given to the operators. Such a codex was developed in the project. (Beck A. (2006): Code of Practice for Organic Food Processing. Frick. 35 p.)

### Crucial topics highlighted in concept papers

#### 1. *Concept of ‘quality of origin’ and criteria and procedures for the evaluation of additives for organic food processing:*

This area of quality of origin is, on the one hand, relevant for the further development of marketing strategies. On the other hand, standard-setting/labelling organisations in particular can play an important role in developing this concept further by developing and promoting new private rules.

#### 2. *Environmental orientation*

#### *of organic food processing companies:*

Some instruments and tools are described which could be integrated into EU or nationally funded promotion or research projects for organic/low input food processing: Encourage ‘organic’ companies to focus more on environmentally friendly production methods. Help these companies to implement environmental management systems.

Proposals for amendments of EU Regulation 2092/91. It could be mandatory for companies to have an EMAS certification (EU Eco-Management and Audit Scheme) after a deadline, e.g. from 2008 on.

#### 3. *Processing methods and their labelling*

There are private as well as public instruments and tools to achieve better labelling.

The EU legislation should offer recommendations regarding what is allowed to be labelled and what cannot be labelled.

The national authorities and private standard-setting bodies have the opportunity to decide in their standards what kind of information about processing methods companies should put on the labels of their products.

#### 4. *Improvement of separation practices in the case of parallel processing of conventional and organic products*

EU organic Regulation already gives guidance with a clear goal in requesting a ‘sufficient separation during the harvesting, transportation, processing and packaging of organic food’. What has been missing is a stronger focus on a risk-based approach. In the new EU legislation parallel processing companies have to systematically to identify the risks and make a company-specific avoidance concepts.

To summarise, all of the four topics that were outlined by the research consortium are very important from the perspective of consumers, who have a certain perception of organic food production. If those expectations cannot be met, the organic food sector risks creating a situation in which consumers feel deceived and will buy other labelled, non-organic products which might give the impression of being more sustainable or more authentic.

The final recommendations for the development of organic food processing are addressed to different groups of actors:

**a. Recommendations for the private sector:**

The following examples are to highlight possible activities:

- New labelling concepts;
- Food safety prevention and monitoring;
- Sensory quality improvement;
- Environmentally friendly processing techniques.

**b. Recommendations**

**for competent national authorities**

Possible examples could be:

- National code of practice for organic food processing through initiating platform structures;
- Support for research projects.

**c. Recommendations for the European Commission**

Possible examples:

- Minimising the use of additives (maintain a restricted list);
- Defining and promoting careful processing and the authenticity of food;

**Acknowledgments**

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## Processing in organic standards and legislation

The normal approach to processing in organic standards and legislation is to make rather short and simple standards covering:

- separation of organic and conventional ingredients
- prohibiting irradiation as a processing method
- lists of allowed additives and processing aids
- regulation of the use of ingredients of conventional origin
- prohibition of GMO
- traceability through the entire process
- cleaning and handling of pests in the processing facilities

This is the core of the KRAV standards, the EU-regulation for organic production, the IFOAM Basic Standards, the National Organic Program in USA, the Codex Alimentarius and most other organic standards and regulations.

Some standards are much more elaborated and have detailed standards for each product group as for example cheese, beer or oils. The German Naturland and Bioland standards, the BioSuisse standards and the international Demeter standards are examples of this kind of standards. These standards are all combined with certification logos which are premium labels in the organic market and none of them are the only dominating logo in a country or a region.

There are several reasons for that most standards are not going into further detail on food processing. The initiative for organic farming started with care for the soil and the nature, processing of the products and the principles for that came later and are less developed. The

food processing companies has also been less involved in developing the standards compared with the organic farmers and their organisations.

Food processing is also very diverse area with a lot of different processes and methods used. It is therefore difficult to develop more detailed standards for processing without going into each product and set specific standards for each product group. This is obviously too much work for most standards setters, and to do it on the EU level or internationally is probably not possible due to too many different traditions and opinions on food processing. There are several examples of how different the EU member states discuss on accepting food additives in organic with nitrate for curing of meat or iron oxides for colouring of Easter eggs as two examples. Another example of problems with regulating processing of food are the attempts to introduce requirements for careful processing which should leave the ingredient as little changed as possible and keeping the quality of the ingredient. While too much pumping of milk makes it partly homogenised already before the dairy and might be unwanted and could be avoided through such a standard, the roasting of coffee is a quite violent process but with an outcome which many of us desire, and not only the light roast.

Even if this paper states that it is difficult and probably not desirable to further elaborate the standards for organic food processing there are still areas for improvement. Areas like criteria and procedures for evaluation of additives, the use of natural flavouring, carriers for additives and processing aids and post harvest treatments will be further discussed in the presentation.

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## Organic quality without a doubt

### Organic Innovation – The Thise-Way

**The presentation is a description of the milestones in Thises “evolutionary process” combined with war-stories from the organic battlefield.**

Thise Mejeri is an organic dairy situated in the northern part of Jutland – in Denmark. The dairy is a cooperative owned by the 86 organic suppliers of milk. The dairy was established in 1988 by 7 organic pioneers and during the past 21 years we have experienced a tremendous development. While the majority of Danish Dairies have been closed down in the period, Thise has grown to become the second biggest dairy in Denmark, with a marketshare of approximately 30 % in the field of organic dairy prod-

*“Milk isn’t just milk  
Neither is whey just whey”*

ucts. Today the company has 110 employees – a turnover of 68 mill. Euro – 90 different products and more than 200 items. A complete range of organic dairy products is offered by Thise: Butter, fermented products, cheeses of all kind – and 15 different kind of organic liquid milk.

From the very beginning it was clear to the organic farmers, that if they wanted their company to survive in a tough and competitive market - they had to do things

in a different way. The Thise-Way of organic innovation was formulated right from the start.

Focus was put on a niche-philosophy, comprising a continuous innovation and optimizing of quality. Thise is considered to be an innovative company, – but has neither got an innovation-department nor an innovation-budget, – and the company neither uses focus-group nor market analysis. Instead we have invented a new concept: Intuitive innovation.

This concept forms a framework to describe and to understand what we are actually doing.

The basis for the unstructured innovative processes is diversity in nature, especially the taste and functionality differences in milk from different cow breeds.

#### **The secret recipe of organic innovation in the Thise-Way is:**

- “Walk out the lab – close the door behind you.
- Open your mind, your eyes, your ears, – and sense the world.
- Diversity in nature is the key-word in organic innovation in the Thise-Way.
- Recognize the diversity – and protect it. It’s our responsibility.”



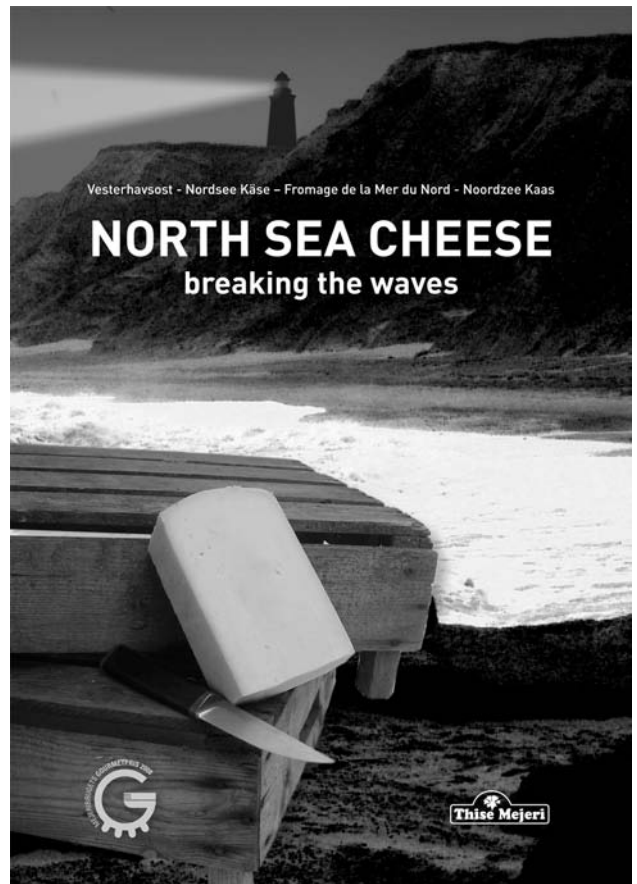
## THISE BOOKING



Choose your favourite



We support  
Thise Dairy



Jonathan Banks

The Nielsen company

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# Newest results on consumer behaviour and market overview – in Nordic countries and beyond

## Consumer Insight The Organic market in Europe

Contents:

*Background*

*Why people buy organic*

*Why people don't buy organic*

*Purchasing behaviour*

*Conclusions*

### Background

The organic concept, first marketed over 50 years ago, has experienced an upward trend with double-digit growth recorded in sales of organics products over the last 10 years in many markets. There are several causes and concerns that motivate consumers to purchase organic products but the fundamental driver of the growth is the consumer's raised consciousness and desire to purchase in a more **ethical** and **sustainable** manner.

The change toward organic products happens relatively slowly...

- first we see a growth in **awareness** of environmental and health issues
- next we see a change in **attitudes**
- and then finally we begin to see a change in **behaviour**.

The changes in behaviour are not extreme, but for example, those concerned with carbon emissions and the environment start to recycle more, try to reduce waste, may purchase low energy light bulbs, but still won't give up their car, or discount air flights for their holidays.

Organic's message of "good for nature, good for you" appeals to many. However, it's only one of several ways consumers try to purchase in a more ethical manner. The results from our Global Online Survey, which regularly polls 28,000 shoppers in over 50 countries, revealed the following alternative and complementary solutions being actively sought by shoppers:

- Energy efficient products and appliances
- Local products
- Recyclable packaging
- Farmers' markets
- Ethically produced or grown products
- Minimal packaging
- Fairtrade
- Not tested on animals

Organic marketers should consider their products to be competing with the other solutions listed above, for a share of these ethically minded consumers' 'mind space'.

### Why people buy organic

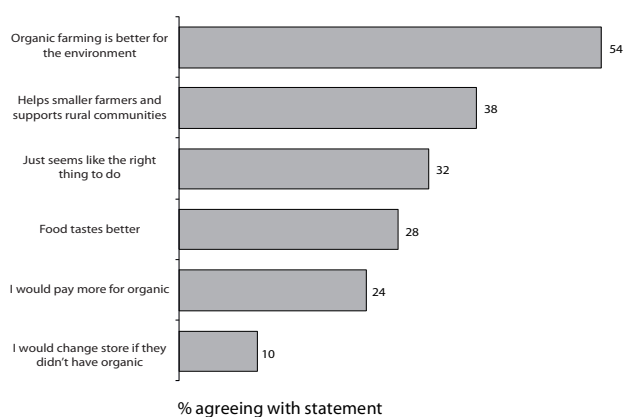
As part of our ShopperTrends 2008 study we asked **23 885 shoppers in 18 European countries** to give us their thoughts on **18 statements** and **13 categories**.

The 18 statements can be split in to 3 sets of attitudes:

- Pro-organic
- Health conscious
- Sceptical



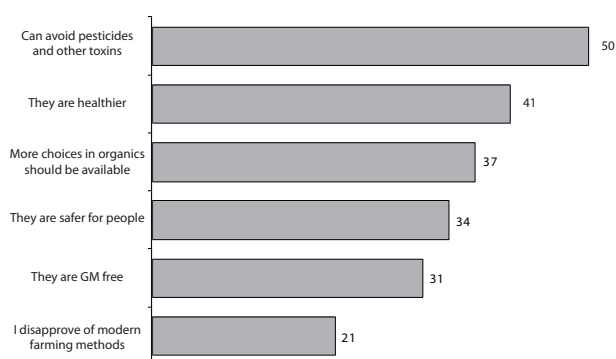
The pro-organic statements scored as follows:



Source: Nielsen ShopperTrends 2008 – total Europe

Don't under-estimate the "just seems like the right thing to do" consumer segment! These consumers want to do the right thing, but recognise that they don't understand the science behind the issues well enough. They therefore rely on the manufacturers and retailers to provide wholesome, appropriate solutions. Especially when it comes to health and nutrition concerns...

Health based reasons for purchasing organic



Source: Nielsen ShopperTrends 2008 – total Europe

Note the high level of shoppers wishing to avoid Genetically Modified products varies just 18 % in The Netherlands to 42 % in Spain and Austria. This is despite science based arguments that, provided we proceed *with caution* there is not a problem.

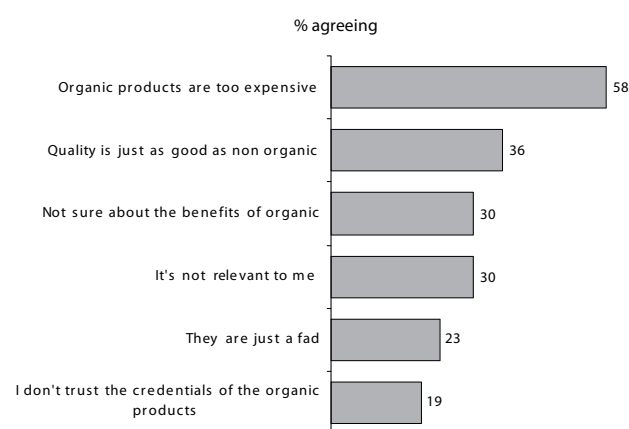
This is driven by:

- effective campaigning by the likes of the UK's Soil Association
- the willingness of the press to talk about 'Frankenfoods'

- the poor PR efforts of the GM lobby!
- negative perceptions of 'processed' food
- consumer instincts that "natural is good" and "synthetic is bad" (neither statement is necessarily true).

The variation from country to country demonstrates that there is no such thing as a European shopper (or retailer). Detailed thinking and planning must be done at a country level, or, preferably, even more locally than that!

Why people don't buy organic



Source: Nielsen ShopperTrends 2008 – total Europe

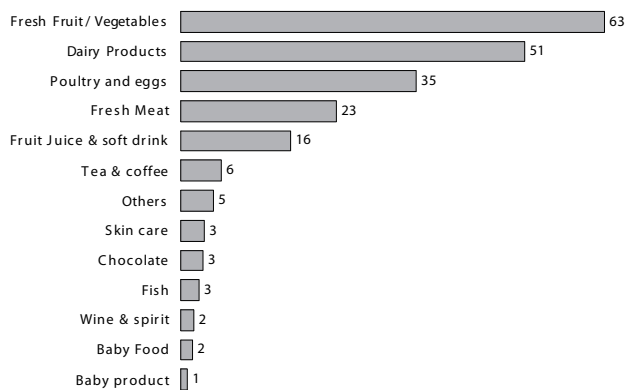
For all countries (except Ireland), price was the strongest negative statement. In Ireland (and to a lesser extent in some other countries) a view has developed that local produce farmed in a conventional manner is already excellent, therefore Organic has little (or no) additional benefits to offer.

Purchasing behaviour

Short-term (4 week) penetration varies widely from just 14 % in Portugal to over 60 % in Denmark. Even higher numbers would be seen at a 12 or 52 week level.

Different categories have different degrees of traction with consumers. The 'big 4' organic categories are produce (fruit & vegetables), dairy products, poultry & eggs, and meat:

% of all buyers having bought in the past 4 weeks



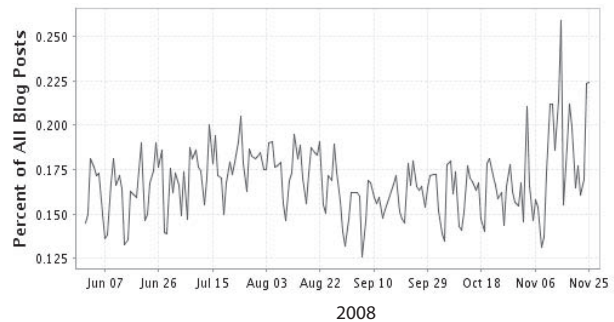
Source: Nielsen ShopperTrends 2008 – total Europe

Whilst baby categories are at the bottom of this league table, these numbers should be viewed in the context that typically, only 2 % of households include a baby. Given that limitation, the penetration for organic baby food and products, is therefore, relatively, very high! Organic provides mothers with reassurance, and a perception of risk reduction. Categories such as chocolate and alcohol have lower attraction levels as we tend to see stronger brands operating in these areas, and taste becomes a more important product differentiator.

This should not deter you from developing new products in these (or any other) categories. BASES research comparing ‘ethical food’ against ‘all food’ shows that since 2005, consumers are more interested in ethical products, but these offerings are now considered less

unique. Therefore, as a product differentiator, being ethical is not enough on its own.

There remains much interest in the organic category as evidenced not only by our scanning and panel data, but also measures such as the on-line buzz in the ‘blogosphere’ for organic – as measured by Nielsen BuzzMetrics:



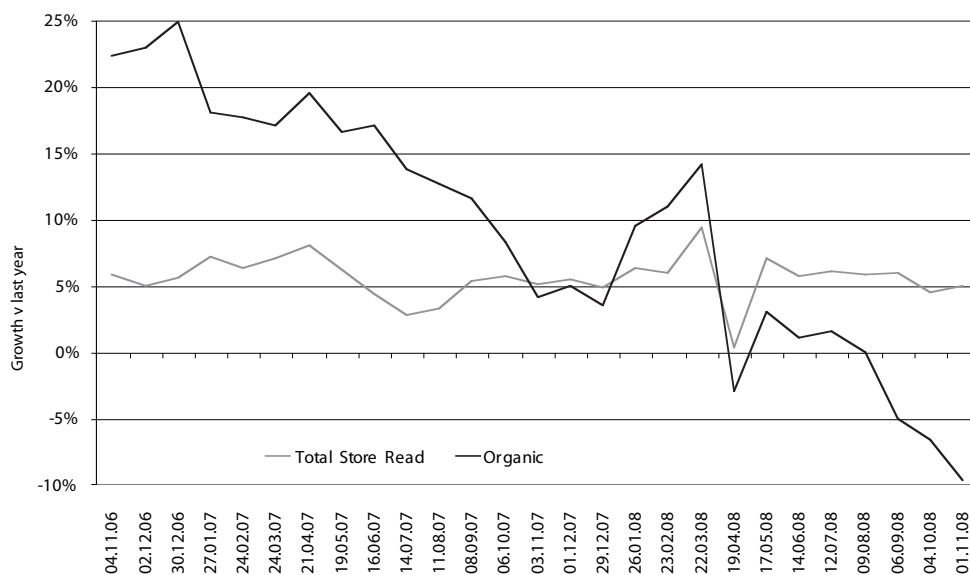
Source: Nielsen BuzzMetrics

During the first few months of 2008 we began to see half of our European Homescan households begin to change their shopping behaviour by:

- shopping less often
- buying cheaper products, and
- buying fewer product

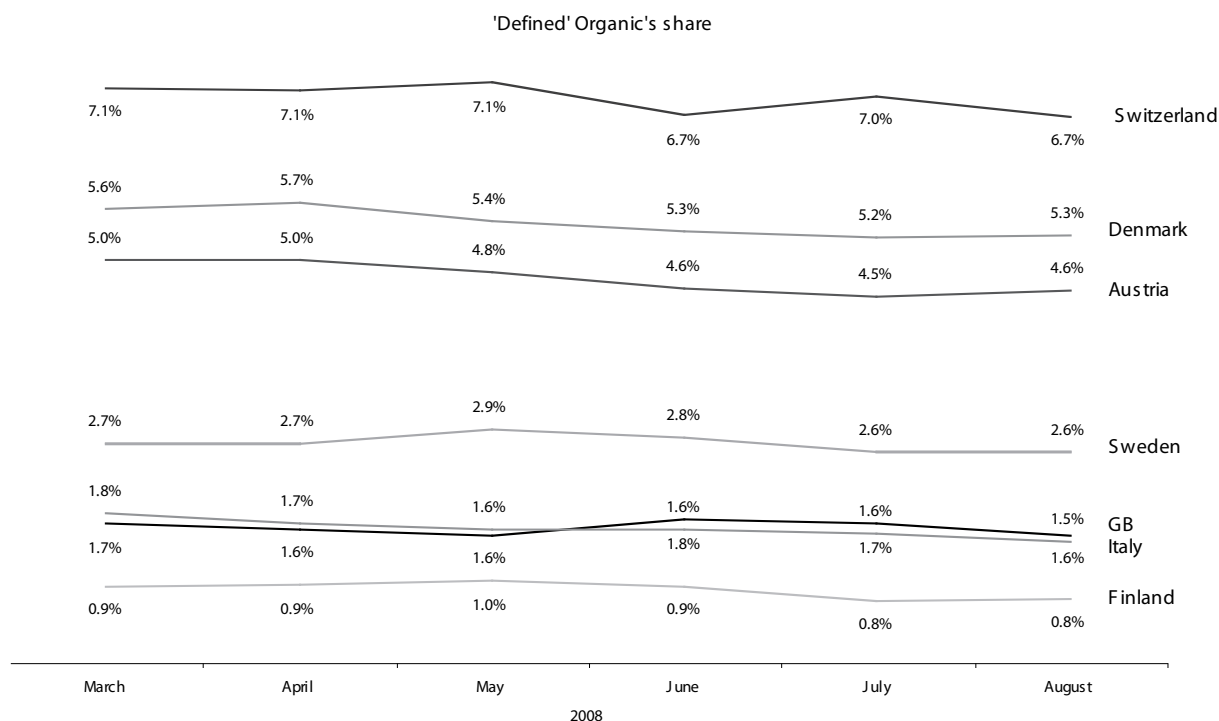
whilst the other half accepted the price increases.

For the last few years, organic had been achieving double digit growth in most countries (admittedly off a low base in some instances). Since then, the growth levels have slowed significantly, with declines now being recorded in such previously buoyant areas as Great Britain:



Source: Nielsen Scantrack Great Britain: 4 weeks ending

The reduction of organic's share of the total inevitably follows:



Source: Nielsen Scantrack

It should be borne in mind that it is difficult to match supply to demand quickly in many areas. The premium charged for organic has increased in many instances and varies from country to country, and category to category. A 20 to 30 % price premium has not been uncommon, though some retailers have been working hard to reduce the differential, especially in fruit and vegetable categories. Irrespective of input costs, we might expect organic's premium to become harder to sustain.

### Conclusions

Concern for the environment will continue to grow as we see more messages from government, NGOs, food retailers, and manufacturers on the need for us to change our behaviour. As we struggle to sustainably feed the increasing global population, currently 6.6bn, and rising to 9.5bn by 2050 – will we be more accepting of GM in the future? With 830 million malnourished in the world – new GM technologies may appear increasingly attractive.

Organic marketers must now work harder to justify their position on shelf. It is often said that buying organic is a lifestyle choice. For many shoppers, an organic accreditation will not on its own be sufficient to buy premium priced products and for the industry to secure ever-increasing, premium priced sales.

If an organic product is however demonstrably “good for nature, good for you”, and:

- **tastes better,**
- **is more nutritious,** and
- **is better for the environment**

then shoppers seeking the assistance of choice editing by manufacturers and retailers will continue to support organic – and happily pay a premium for it. If not, organic's raison d'être will be increasingly questioned!

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# What makes organic agriculture move – protest, meaning or market?

## Handling different perspectives on organic agriculture and its future development

Why does organic agriculture move in the direction(s) we observe? Is it a kind of inertial motion that is based on the historical roots of organic agriculture as a protest movement? Or is it a living, self-directed organization that moves according to its own will and meaning, in accordance with its basis values and principles? Or is it a market object, which is transformed and developed to meet changes in consumer demand, following the trends and megatrends of a market society?

Obviously, all three types of causes have some merit in explaining the dynamics that we see. The really interesting question is how to handle this diversity. Is it a sign of disintegration or lack of integration, and should we search for one homogeneous cause that explains the dynamics of 'the real' organic agriculture? We don't think so. We find that this heterogeneity is deeply rooted. There are different perspectives on organic agriculture 'within' organic agriculture, so to speak, with different logics and different strategies for acting, and we need tools to handle this heterogeneity.

### Example:

#### a Danish knowledge synthesis on the future of organics

In the spring of 2007 the Danish Ministry of Food asked ICROFS to carry out a fact finding work on development, growth and integrity in the Danish organic sector (Alrøe and Halberg 2008). The objectives of the work were to synthesise available knowledge on opportunities and barriers and evaluate alternative strategies to support a continued growth in organic production in consideration of the organic principles, consumer wishes and quality,

and including demand, production, processing, distribution and trade.

The development of organic agriculture is a very complex and heterogenic dynamic process. Many different actors are involved, including farmers, advisors, processors, traders, retailers, researchers and policy makers, and they have different views about what organics is, and different, more or less explicit organic goals and strategies. Moreover, globalisation, structural development and increasing international trade create new challenges and opportunities for organics and make new demands in relation to consumer trust and the credibility of organic products.

The organic standards do secure a fundamental agreement between the organic practice and consumer expectations. But within the rules there is a large scope to develop the organic practice, and it is evident that the organic actors act very differently. Furthermore, the organic standards themselves are constantly being developed in a balance between promoting growth by improving the conditions for efficient and large-scale operations and safeguarding organic agriculture as a real alternative for consumers, politicians and the agricultural and food industries. The knowledge synthesis has deliberately addressed this heterogeneity to ensure the coherence and relevance of the results to all the principal interests in the sector.

## Different perspectives on organic agriculture and organic actor strategies

Through our work on multidisciplinary research on multifunctional farming and on the dynamics and governance of organic agriculture, we have developed a

polyocular approach to observing and handling different perspectives on an object (Noe et al. 2008, Alrøe and Noe 2008). The main point is that different perspectives often cannot communicate directly with each other, because their concerns and logics are different and they use common terms in different senses. Therefore, there is a need for a separate, reflexive process that can provide a multidimensional space of understanding and enable communication by observing the different perspectives and adding the cognitive context of each perspective to what is said from that perspective.

Alrøe and Noe (2008) identified three predominant perspectives on the dynamics and governance of organic agriculture, protest, meaning and market, in relation to the revision of the EU regulations on organic production. They described how some current issues in organics look like from each perspective: the relation to conventional or mainstream agriculture, growth and trade, conventionalization and the viability of organic agriculture, the role of non-certified organic farming, and the purpose of standards and principles.

Based on this work, we have identified three archetypical actor strategies, *mainstream*, *alternative conservative* and *alternative innovative*, that represent a substantial part of the heterogeneity in the organic sector (Alrøe and Halberg 2008, chapter 17). The heterogeneity and the relevance of the strategies have been substantiated in the Scenario Game, where 70 actors from all parts of the sector played out their strategies in two of the scenarios prepared in the knowledge synthesis (Alrøe and Halberg, chapters 18 and 19).

The three strategies are ‘archetypes’ in that they are simplified and in some sense extremes, intended to stretch out the space of goals and perspectives that are found among the organic actors. It should be noted that the strategies represent certain perspectives – ways of seeing, reasoning and acting – and not groups or persons. Actors and groups can change perspectives and to a certain degree combine different strategies (though their concerns, logics and concepts are often in conflict). The three strategies are described below and compared in Table 1 in relation to some important challenges to the future development of organics.

*The mainstream strategy* works in a businesslike manner within the borders set by the present rules of organic agriculture. The key goals are higher economic efficiency, rational marketing, international division of labour and

thereby lower prices and a good foundation for market based growth. This strategy is an important reason why Denmark today is one of the world leaders with regard to organic production and sales of organic food. But it also leads to dilemmas with respect to the organic principles, problems of credibility and risk of subsequent backlashes in organic sales. An important question is therefore how this strategy can secure growth in the long run.

*The alternative conservative strategy* works from tradition-bound norms and rules, with biodynamic agriculture as the prime example. Key considerations are respect for the integrity of life, diversity and the social and cultural life in and around agriculture. This strategy maintains a distance to the conventional food system, which makes it easy to indicate differences in the market and to preserve credibility and consumer confidence. It has remained a small niche in Denmark, in spite of the growth in organics, but food scandals etc. have given cause to a renewed interest. An important question is therefore what role this strategy can play in a continued market growth of the Danish organic sector.

*The alternative innovative strategy* works towards a dynamic development of organics, rooted in the organic principles, seeking innovations, new alternative developments, new technology and new ways of producing public goods. The explicit focus on the organic principles supports consumer confidence and gives rise to suggestions of stricter rules and the development of rules in new areas. This strategy often has difficulties in succeeding in an established organic market, which is dominated by the mainstream, and where some innovations are picked up and implemented at an early stage by the mainstream or in conventional products. An important question is therefore how this strategy can survive in the short run.

## Discussion and conclusions

The future development of the organic sector depends on a range of possibilities and barriers – challenges to organics, which have been described in the Danish knowledge synthesis – as well as on the strategies that the organic actors apply to address these challenges. The three actor strategies or perspectives described here, have allowed us to work with scenarios for the future of organics in a nuanced and realistic way instead of working with ‘the organic actors’ as one, homogeneous group. It is significant that these three strategies are not strategies

for the whole organic sector. At sector level a mixture of different actor strategies is found, and presumably no single strategy will be able to secure the future growth and development of organics. Historically, the ability to keep finding new ways of cooperation between different organic actors has proven very important to the growth of the organic market in Denmark. We think successful strategies for the future development, growth and integrity of organics will have to consider how different organic perspectives and actor strategies can coexist and cooperate.

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Table 1. Comparison of three archetypical actor strategies in the organic sector and their perspectives on challenges to the future of organics.

Challenges to organics	STRATEGY / PERSPECTIVE		
	Mainstream	Alternative Conservative	Alternative Innovative
Coherence in the organic sector	Does not reproduce the alternative, challenges integrity and confidence	Preserves the alternative, confidence and integrity based on tradition	Preserves confidence and integrity, develops the alternative dynamically
Enrollment of new actors in the organic sector	Big companies, 'business men'	Small. On the basis of 'protest', 'wholeness' and 'quality'	'Fiery souls', entrepreneurs, 'professional challenges'
Economy and growth	Economics of scale, short run growth and competitiveness, risks in the long run	Small niche, stable or slowly rising	Innovation, basis for long-term growth and competitiveness, risks in the short run
Globalization	Uses and promotes the global market	Opposes globalization, works locally	Sceptical accept, develops fairer forms of commerce and trade
Energy and climate	Uses the most economical energy sources	Promotes implicitly through management form and local sale	Promotes explicitly through new green technologies
Nature and environment	Operates within the present rules	Promotes on the basis of respect for life	Promotes based on organic principles, develops new public goods
Use of conventional feed and manure	Indicates the needs for using it	Does not use slurry or conventional feed	Seeks to reduce and remove the usage of conventional inputs
Animal welfare	Operates within the present rules	Animals are an integrated part of the farm, cattle is not dehorned	New management forms with more animal welfare in the organic sense
Product range	Market oriented innovation, large batches of standardized goods	Stable number of traditional products, varies with place and season	Rising number, new products, often based on primary produce qualities, new areas (e.g. clothing, shoes)
Food quality	Uniform good quality, industrial norms of quality	Fresh, local produce, diversity	Taste, aesthetics and ethical principles
Processing	Large, often multi-national companies, mainstream capital	Integrated production, processing and sale	Mostly small companies, green capital
Organization	Organised in ordinary organisations together with conventional	Self-organised, not much cooperation with conventional	Dynamical model – both cooperation and conflicts
Sale	Anonymous sale in supermarkets	Often physical nearness via direct sale or specialist stores	Different sale channels, perceived nearness by way of the internet



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## The role of the EU organic logo on the market

The new EU Regulation on organic farming has changed the labelling requirements by making the use of the EU logo for all pre-packed products compulsory. Despite the new Regulation (EC) no 834/2007 applying already from 1 January 2009, the logo will be compulsory only from 1 July 2010. This presentation will explain what will be done in the meantime to find a good symbol for the new logo, and how citizens will be involved in making the final choice. By moving from a voluntary logo to a compulsory one, the European legislator has shown a clear political direction for a better functioning of the European internal market. How will this be implemented by the operators in practice? The implementing rules, adopted by the European Commission in September last year, provide a legal framework for that. What could be

the role of the EU organic logo for the development of the single organic market? The results of the consultations on agricultural products quality schemes launched by the European Commission at the end of last year in form of a Green Paper have shown regarding organic products that not only the small scale of the production is an obstacle to the development of a single EU market, but also the lack of information of consumers in general and in particular the absence of an EU-wide well-known logo. Of course a new logo is only one tool to support wider goals of a coherent policy. Organic farming is an important element of the Common Agricultural Policy, and the presentation will show the recent and future developments of the organic farming legislation in that perspective.

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## Scaling down food systems size – environmental effects

Large scale or small scale is mostly seen as contradictory in the agricultural debate and the arguments are either in favour of one or the other depending more on senses than science. A development towards larger and larger units is often viewed as inevitable in an economic perspective and sometimes also in an environmental. The small scale is seen as old age and a “sörgårdsidyll” but with important possibilities to add values in local markets. A niche for only a few. This discussions could be much more fruitful with a focus on appropriate or optimal scales for the desired aims of activities and in relation to resources used. The importance of scale issues for development of sustainable agriculture has to a large been ignored among actors in the agricultural sector in industrialized countries. There is also a lack of research concerning ecological aspects of scale in agriculture.

Food systems supported mainly by fossil fuel based inputs<sup>1</sup>, as the industrial food system of today has an optimal scale for using appropriated resources efficient. This scale might not be similar to appropriate scale for generating an optimum mix of desired outputs. Food systems exchanging fossil fuel for local resources and ecosystem services in its turn needs to work at scales appropriate for generating and using such services. Increased knowledge about appropriate scales to make use of different kinds of ecosystem services and to work with the local biodiversity, maximizing the interactions between species, both domestic and wild, and between biotic and abiotic factors will be central to secure stable and high production in a food system running out of fossil fuels.

<sup>1</sup> Only 3 % of the resources used in the Swedish food system are local and renewable (Johansson, 2005).

The local landscape mosaic, which means the scale of the variation in the landscape, and the variation in biotopes on a farm is of outmost importance for the biodiversity (Benton *et al.*, 2003). The larger the variation, the larger is the potential to harbour a large variety of wild animals and plants. Research has also shown that small farms may offer conditions benefiting biodiversity more than large (Belfrage *et al.*, 2005). These wild animals and plants are incorporated in the generation of the large majority of ecosystem services important for development of a sustainable agriculture. In example, to replace chemical pesticides with biological pest regulation there is an appropriate field size that is set by the mobility of the natural enemies in service. The length of the field edges needs to be long to increase the presence of unmanaged areas near the fields (Östman *et al.*, 2001). In other cases the size of the production on a farm ought to be set by the local landscape. If ruminants should collect a large part of their fodder by grazing, to reduce the non-renewable energy use for harvesting and transportation of fodder, and to manage carbon dioxide sequestering areas, such as pastures, the local landscape mosaic needs to decide the size of the herds. In still other cases, scales larger than the farm might be important, such as the scale of the interaction between farms and regions for an efficient circulation of nutrients. Efficient recirculation of nutrients is a precondition to exchange fertilizers for animal manure and a too large scale means a larger risk of leakage and large transportation costs.

Local production, local processing and local consumption also hold promises to be a one of the key prerequisites to create vivid local economies. Money stays and makes useful work in the local community when



people consume locally. An appropriate scale is important to make this chain work and to ensure that different economic activities at the country-side give desired social feedback to the local community. In conclusion one may say that it is essential to increase the knowledge about the importance of scale for a sustainable development of food systems and that more research is needed with issues of scale in focus both in an ecological and in a social perspective.

Awareness of appropriate scale in agriculture is important e.g. to:

- Exchange fossil fuels with ecosystem services
- To build resilience
- To benefit wild species
- To build renewable energy systems
- To strengthen local economies
- For social interaction
- To build functioning local networks

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# Scaling down food systems size – socio-economic effects

## Expectations into scaling down food systems

Scaling down or localising food systems has become a major part of rural development aspirations. In this respect it is important to note that it cannot be so much the attempt to reverse the increasing globalisation of food systems but rather to complement it in the sense of a Glocalisation (Robertson, 1995). This means at the same time when farmers markets mushroom and new social movement forge producer consumer alliances the concentration processes and power struggles in the food industry continue. Therefore we have to assume that there is a mixture of economic and social reasons for trying to localise circuits of food.

The idea to regionalise the food system and to combine “region” with “organic” meets the interests of different stakeholders. We can distinguish interests of stakeholders along the food chain and others in the regional surrounding environment. In the Austrian context we can find the following range of expectations and motivations:

### Stakeholders along the food chain:

#### Farmers

- Want to increase/secure income without growth of the farm size, e.g. increase/secure price premium and market share.
- Want to achieve a higher degree of independence from marketing institutions and more self determined working conditions.
- Want to diversify of farm operations into production processing and marketing to provide employment for two generations .
- Want to get direct feedback from customer as motiva-

tion besides transfer payments.

- They hope to reduce the exchangeability of their products in indirect marketing channels.

#### Processors

- Small scale food processors hope to survive the stiff competition in the concentration processes.

#### Retailers

- Retailers want to increase trust in their products and foster long-term consumer relations.
- Regional retail chains want to differentiate themselves from national/international competitors
- Regional products are a mean for product differentiation.

#### Consumers

- Want fresh, natural (and organic) produce .
- Want known origin way of production.
- Want a superior/different taste.
- Consumer organisations expect more food safety from regional and organic products.

### Regional stakeholders, civil society and policy

#### Farmers representatives

- Want to avoid decoupling of food production from maintenance of a cultural landscape (according to the slogan: “only a landscape that is able to sell its produce will survive”).
- They see it as a means to maintain small scale farming.
- Regionalised food systems are showcase for agriculture towards the consumer (justification of support for agriculture).

**Environmentalists**

- Environmental NGOs support the decrease of food miles in addition to organic as an environmentally friendly production method.
- Ecologists aim to preserve biodiversity.

**Regional development agents**

- Regional development programs expect localised food chains to increase the regional added value while strengthening regional identity at the same time.
- They perceive regionalised food systems as part of endogenous rural development and laboratory for innovations and product development
- They want to preserve traditional practices and artisan ways of production as distinctive symbolic values for their regions
- Regional development agencies want to improve the regional profile in the ongoing “competition of regions,” especially by creating additional programs for tourist activities.
- Tourism managers are looking for possibilities to single out their destination from the increasingly exchangeable range of attractions offered.

**Empirical evidence:****do regionalised food systems deliver these promises?**

In the following section I present three examples of regionalised/ localised food systems and analyse them according to the above listed expectations.

**Example 1: Collective initiatives with horizontal integration: Bauernkiste**

The Bauernkiste is a box system aiming to offer a full range of local and mostly organic products to consumers. It was started in 1996 by two women, one farmer one consumer, who had studied together at the University of Agriculture. Today the initiative is owned by farmers and organised by a central “agency” who does the selection of new suppliers, the marketing, organises the delivery etc.

Weekly delivery to the doorstep, consumers choose from a long list, a lot of additional information is provided. They partly supplement seasonal specialities from other regions. Starting around the regional capital recently franchised to two other regions in the same province. Ordering is done via an online shop. ([www.bauernkiste.at](http://www.bauernkiste.at))

**Analysis:****Benefit for farmers:**

The Bauernkiste allows farmers to make their pricing themselves, they have to pay a supercharge of about 27 % to cover the costs of the agency. For them it is a type of direct marketing, consumer feedback reaches them in a mediated form (questionnaires), there is a high degree of customer stability.

**Benefit for consumers**

Known origin, each product is labelled with the name of the producer, farms are presented on the homepage and in the written communication.

**Benefit for regional stakeholders**

The agency maintains good relations to the Chamber of agriculture, the project is a flagship project for direct marketing but it has little relevance for regional development actors.

**Example 2: Collective initiatives with vertical integration: Bio vom Berg**

In the region of Tyrol a farmer based umbrella cooperative (Bioalpin) has launched in 2002 its own brand called “Bio vom Berg” (Organics from the mountains) in order not to leave the market power to the trademarks of big retailers. Members are farmers and small scale processors, who provide a full range of regional organic products. The cooperative structure is a precondition for farmers to enter the supermarket as they bundle the supply and organise logistics and marketing. They found a partner in a regional supermarket chain who had not yet developed their own organic trademark but wanted to raise his profile against powerful competitors. The family owned supermarket chain operates 130 outlets in the province featuring regional products. The president of Bioalpin acts as a testimonial in the promotion, farmers identify with the brand, demarcate fields with grain etc. New products are developed jointly.

**Analysis****Benefit for farmers**

The membership in the relatively small cooperative allows farmers a high degree of identification. The close relationship with the retailer chain allows fairly good prices and reduces exchangeability for cheaper competitors.

**Benefit for processors**

Small scale cooperative processors (mainly dairies) find

a rather fixed regional market. The structure allows coordination of product differentiation and innovation as well as specialisation.

**Benefit for the retailer**

The retailer profits from the fact that a pronounced farmer led producer brand increases the credibility of the product. As both farmers and retailer have the common aim to retain their market power, at least on the regional scale, this strategy offers a win-win situation.

**Benefit for consumers**

Customers are sure to get a broad range of regional organic products as part of their daily shopping routine.

**Benefit for regional stakeholders**

The initiative contributes to preservation of small scale production and processing units. It leads to an increase in regional value added and to the creation of an innovative milieu.

**Example 3: collective initiatives with regional integration: Bregenzerwälder Käsestrasse**

The region of “Bregenzerwald” in Vorarlberg has an “organic” image although the percentage of organic farms is rather low, as agriculture uses traditional ways of production, with summer farms on alpine meadows and silage free hay feeding. Especially the dairy processing structure is extremely small scale with village dairies in almost every municipality. The development strategy builds on these factors creating a thematic label, the “Käsestrasse”. This concept combines about 120 farms, alpine summer farms, local dairies, restaurants, tourist enterprises and local craft producers under the overarching theme of cheese. The organisation has also established a local brand, to promote the cheese in retail channels outside of the region. A central cheese maturing cellar acts as a base for collective marketing. The general aim is to preserve the small scale structure of milk processing, which is viewed not only as a prerequisite to achieve high quality and thus a high price on the market, but also as a major asset for tourism development.

**Analysis**

**Benefit for farmers**

Traditional forms of farming are supported and their image is raised, local marketing increases independence from wholesalers.

**Benefit for processors**

Small scale processing units are supported, central

cheese maturing cellar is a crucial facility, coordination of production.

**Benefit for the retailer**

Regional brand increases consumer trust.

**Benefit for consumers**

Variety of cheeses has increased.

**Benefit for regional stakeholders**

Mainly interesting for tourism, but it was also a unifying theme for regional development, strengthening identity, contribution to conservation of artisan and traditional practices etc.

**Summary & Conclusions**

There are different degrees of integration which have different effects.

**Horizontal cooperation** of farmers to coordinate direct marketing remains with its effects obviously on the producer and consumer level. Their economic effects for farmers can be achieved in respect to higher margins and also better time economy as marketing, logistics etc are outsourced from the individual farm on one hand while it offers additional employment possibilities (as a driver to deliver boxes) on the other hand. There is a significant impact on the relationship between consumer and producer. Feedback is almost as personal as in farm sales. Customer loyalty is high. The regional characteristics are most often more important than organic, but consumers do expect these images combined under Austrian conditions. The benefits for regional stakeholders are small.

**Vertical coordination** along the supply chain includes in our example also horizontal coordination on the level of small scale producers and processors, here the economic benefits for farmers are mainly in a fixed market access and a price premium. The constant communication of the brand as a farmers brand allows on one hand a high identification of the producer and on the other hand increased consumer trust as it appears as if one could buy directly from farmers in the supermarket. The retailer benefits from this as it increases customer loyalty. In a regional perspective this form allows the participation of many farmers and small scale processors which means that it acts in stabilising rural structures. Moreover it shapes the perception of regional agriculture to a great deal (especially if there is no other regional farmers brand with a broad range of products in the supermarket).

**Regional coordination** involves a number of stakeholders from different fields. It is sometime difficult to have the economic benefits equally distributed among the different actor levels. Often farmers claim to be the fig leaf while tourism receives the lion share of the profit. If it works it can lead to a focal reference point for future regional development and streamline all endeavours so ultimately a consolidated picture of the region can be transmitted to the outside, which is also carried by the local population. In this case the scaling down of the food system becomes the focal driver for regional development.

Successful down scaling builds on the coordination of a number of different stakeholders. The various form of coordination lead to different effects both in economic and social terms. Within a given region all three modes of coordination can appear in parallel and strengthen each other. In this case a strong overarching organisation is needed, which starts with the participatory elaboration of a development concept. Research on the concept of "Eco-Regions" in Austria (Groier et al.2008) has shown the in general the sequence is to coordinate first on the level of farmers then on the chain level and finally on the level of regions.

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## Size may be everything but relation takes it all

### Who is Jörgen Andersson?

A grain-farmer from the area of Mälardalen who decided to make his future in the mountains of Jämtland, where the season for growing is short, and the history of strong local economies is long.

### What is Fjällbete, [www.fjallbete.nu](http://www.fjallbete.nu)?

A tool for survival in times of change. 125 part owners, mostly businesses in the touristic area of Åre. They are direct owners in the local food production. At the same time as they are giving themselves an organisation for economically more efficient relations within the community. Better for business and better for quality of living.

Let me make one thing clear right away: Organic, small scale, local, sustainable, permaculture etc. Thriving for those less important targets may coincide with improved resource efficiency. But if they do, that is likely to be a “side effect” from improved human relations between producer and consumer/co-producer. So why are we not aiming directly for improved relations?? We are hardly even talking about them!

I have not been asked to answer that question, and I am probably not fit to do it either, but some fragments of an answer lie within the subject I have been asked to speak about on this conference.

### First a little more about Fjällbete

A cooperation of production and consumption within the same body, built upon peoples trust for each other and the affection for the geographic area, ... the place we call home. A partowner Hotel can serve “their own” lamb chops, produced in the very same ski slope as their guests have been enjoying during the day. That owner

realize that they are responsible to keep Fjällbete viable enough to maintain this opportunity. They also realize that these particular lamb chops are without competition on the market, since there are no other producers in that ski slope.

The shepherds who are making decisions every day, keeping the animals happy, are talking to the people who are running the hotel. If they would be known as less than “first class shepherds”, it would have a direct negative impact on the satisfaction of the customer eating lambs on the hotel.

Maybe the people who are maintaining the skilift on that hotel have children in school who benefit from the fact that Fjällbete is running something called “Levande skola”, Living school. Inspired from our example they start to think about the strange fact that ordinary life within the community is not a normal part within the studies of their children. As if local enterprise wouldn't be as good for learning as the materials now being offered within the school walls. When these parents are talking to the people working in the hotel kitchen, it is likely they will build up an even stronger support for the idea of expanding the amount of food bought/produced through Fjällbete.

A woman working with real estate travels to work through the landscape where Fjällbetes sheep are grazing, making the scenery more alive. From what she has heard about this Fjällbete, it is open for interested people to get involved. Unlike “normal enterprises” Fjällbetes' intention is to present a “welcome sign”. Her choice is to lend a few hundred thousand SEK to Fjällbete. Her “pay off” is partly the knowledge that she has done a part in making that beautiful scenery possible, and



partly the fact that she gets meat on her table as interest for the loan.

As time goes she gets more involved and now she is developing our new financial products. For instance a way of transforming money into a yearly flow of meat. 33333 SEK 2009 will bring half a lamb ready to cook every year for as long as the company may survive.

### **Let us now take a few steps back and look at what is going on here**

We have so called consumers and savers on one side, while producers and borrowers reside on the other. Between them there is a pile of institutions doing their best to bring down the communication and relation to zero. If you run a bank or a grocery store, or a public authority, or an academic institution you will lose money, power and status if producers and consumers start to communicate. And if you allow them to proceed and build genuine business supported relations, **you** will be out of business before you know it. So please stay away from relations, and stick to, for instance, certified organic production!?!?

I will give you another example from our reality. One of the basic targets for Fjällbete is to utilize the waste areas of abandoned agricultural land. We believe that ruminants always have been, and still are, the best way of producing human welfare within our rather harsh ecosystem.

Some of our landowners are very eager to be environmental friendly and they couldn't interpret the messages from public media in any other way than that ruminants are a serious threat to our future. If we would have been more succesful in the building of relations we could probably have kept our sheep on this particular piece of

land. But instead those institutions between us won this battle, now allowing the brush to grow back in on some of the most arable pieces of land in our landscape.

To me this is a practical example of just how far the alienation can go. Trapping people inside anonymous little bubbles disabled in their interaction with the reality, surrounding them. But the more we can expose ordinary educated/alienated people to reality, and the more we can build trustful relations both ways, the more likely we also can achieve sustainable markets where production affects consumption and consumption affects production in a vital communication. And this brings me to a third leg of income for the enterprise of Fjällbete.

We sell "countryside enjoyment" as a product. This means that we take the opportunity to charge people for building profitable relations with them. Every customer for one product is a potential customer for 5 other products as well. This is nothing new for marketing people. Their problem is normally that their products are of relatively low value. But we sell genuine possibilities to create a better world. Our food had a better taste even before they knew that, ...Imagine!

### **Local economy**

One way of wrapping this up is to tie back to the idea of local economy. Because that is what this is all about. People coming together in order to utilize each other and their local assets in a more effective way. In order to do that, they need to make better friends with each other, them selves and the nature surrounding them. At the same time, and by necessity they will cut off the umbilical cord to institutions and far away organisations who wish to keep them "for themselves".

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## Udvikling af økologisk jordbrug, muligheder og udfordringer

Efterspørgslen på økologiske fødevarer har været voksende i Danmark i de senere år. Dette har imidlertid ikke ført til en øget omlægning af landbrugsjord til økologisk drift. I forbindelse med den danske videnssynthese om omlægning til økologisk jordbrug, har jeg set på de sociologiske aspekters betydning for potentialer og barrierer for omlægning til økologisk jordbrug. Herudfra har jeg forsøgt fremadrettet at svare på hvilke udfordringer og muligheder, som udviklingen af det økologiske jordbrug står overfor, primært med reference i en dansk kontekst.

### Efterspørgsel, men ingen ny omlægningsbølge i sigte

Økologibevegelsen i Danmark starter allerede i 1970'erne, som kritik af udviklingen inden for landbrugsproduktionsmetoder og af den generelle samfundsudvikling som helhed. Landsforeningen Økologisk Jordbrug dannes i 1981, og det første fælles danske værdigrundlag nedfældes. Men først i 1987, hvor den første økologilov vedtages, kommer der gang i omlægning til økologisk jordbrug. Af figur 1 fremgår det, at der er en jævn stigning i det økologiske areal frem til 1992. I 1993 begynder det imidlertid at knibe med at afsætte de økologiske varer, og en del omlæggere må opgive at forsætte den økologiske produktion (Ingemann, 2006). I 1995 sker der en kraftig tilvækst i antallet af økologiske bedrifter, en vækst, der forsætter frem til 2000, hvorefter den løjer af og antallet falder frem til 2008.

Nogle af de skelsættende begivenheder bag denne udvikling er FDB's lancering af en "økologisk discount" kampagne i 1993, der øjeblikkeligt får efterspørgslen af økologiske produkter til at overstige udbuddet. Dette får bl.a. MD-Food til at hæve tilskuddet til omlægningsmæl-

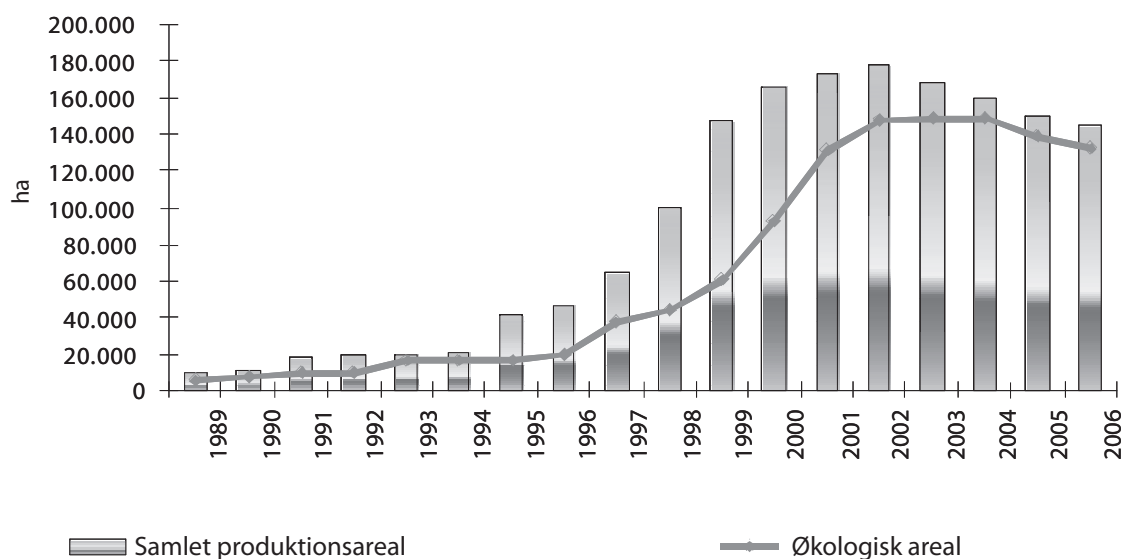
ken, hvilket sætter en omlægningsbølge i gang inden for mælkeproduktionen (Michelsen, 1996; Noe, 2007). En række andre begivenheder er med til at fastholde den positive udvikling inden for økologien op igennem 1990'erne, herunder en række sager med pesticidfund i grundvand, BSE-krisen og senere mund- og klovsyge. Kvægbrugernes efterspørgsel på foder og en øget støtte til omlægning af planteavl bidrager til, at også planteavlbedrifter kommer med i omlægningsbølgen, hvorimod den økologiske svineproduktion jf. plantedirektoratets tal forbliver marginal (Plantedirektoratet, 2007).

Efter et par år med afmatning i den økologiske afsætning kommer der omkring 2003 igen gang i det økologiske salg, blandt andet understøttet af at supermarkederne leder efter nye måder, hvorpå de kan differentiere sig i markedet (Kledal, 2006; Noe, 2007), og de sidste par år har man haft vanskeligt ved at følge med efterspørgslen.

Man kan således lidt forenklet sige, at den nuværende situation på mange måder ligner den, vi havde mellem 1993 og 1995. Der er en god efterspørgsel på visse økologiske produkter, og der er på ny optræk til økonomiske incitamentter til at stimulere en øget omlægning af fødevarerproduktion til økologi; men tallene fra Plantedirektoratet (2008) viser endnu ikke tegn på en fornyet bølge af omlægning.

Nyere undersøgelser (Jensen, 2007; Noe, 2006) viser da også at en ny omlægningsbølge ikke er lige om hjørnet under de nuværende betingelser. Kun omkring 3 % af de adspurgte landmænd giver udtryk for, at de har overvejet at lægge om til økologi.

Jensen (2007) finder således i sin masterafhandling, at den altafgørende barriere for at lægge om er, at man



Figur 1 Arealudvikling i det økologiske jordbrug (Kilde: Plantedirektoratet, 2009)

ikke går ind for den økologiske produktionsform. Denne modstand synes dog at være mindre hos de yngre landmænd. Dernæst begrundes modstanden med, at det nuværende produktionsapparat ikke passer til den økologiske produktionsform. Herudover er der en frygt for faldende indtægt og endelig en frygt for mere administration.

Andre forhold som gør situationen i dag meget anderledes end 1994 er, at landbrugeren i dag allerede har været konfronteret med valget i forhold til udviklingen af bedrifter. Den øgede specialisering og effektivisering af produktionsapparatet betyder, at muligheden for at lægge om til økologi for længst er fravalgt. Strukturudviklingen har også betydet, at mange af de landmænd som typisk har været mere kritisk overfor den generelle udvikling har haft gode muligheder for at forlade erhvervet.

Det umiddelbare potentiale af landmænd, som kan stimuleres til at lægge om til økologisk jordbrugsform, synes således at være ret beskedent under de nuværende forhold. Set i lyset af de relativt gunstige økonomiske betingelser for omlægning og den stabile og gunstige markedssituation for økologiske produkter synes nye omlægningsbølger ikke særligt realistiske under de nuværende betingelser.

### Den indre energi og drivkraft mangler?

Men den mest afgørende forskel er måske ikke forskydningen i de værdier og holdninger hos gruppen af landmænd, der lægger om; men snarere forandringer i den økologiske bevægelse. Interviews med landmænd, der lagde om midt i 90'erne, indeholdt ofte en fortælling om, at man egentlig var mest lokket af de gode økonomiske produktionsresultater, hos naboer der klarede sig godt. Men efter omlægningen blev man både skubbet og suget ind i et netværk af økologiske landmænd. Skubbet, fordi man mere eller mindre blev frosset ud af det sociale netværk, som man tidligere havde været en del af. Suget ind, fordi man havde brug for de andres erfaringer og de forskellige økologiske afsætnings- og vidennetværk, som var under opbygning (Noe, 2006; Alrø og Noe, 2008; Frederiksen *et al.*, 2004; Risgaard *et al.*, 2007).

Men den væsentligste forklaring på at man ikke umiddelbart kan forvente en ny kraftig omlægningsbølge til økologisk jordbrug imidlertid er, at økologisk jordbrug som bevægelse ikke kan producere værdier der er stærke nok til at mobilisere denne indre drivkraft. Interviewene med landmændene i begyndelsen af 90'erne afspejle en entusiasme og dedikation for at vise og overbevise de andre om, at det kunne lade sig gøre at drive landbruget økologisk. Dette lykkedes i en grad så økologisk landbrug er blevet integreret i de konventionelle organisationer, men nu som en niche-

produktion og ikke som et kritisk alternativ til det konventionelle landbrug. Fokus flyttes således fra værdier hos producenterne til værdier hos forbrugerne. I takt med at konventionelle aktører inden for landbruget har set markedsmulighederne i økologien, har de produceret nye fortællinger om økologien som ikke en modbevægelse, men en niche, hvilket samtidig har gjort økologien stueren i det konventionelle fødevareregime (Noe, 2006; Alrøe og Noe, 2008).

### Hvad skal der til for at fremme en ny omlægningsbølge?

Som sagt ligner de omgivende betingelser for økologisk jordbrug i dag på en række punkter situationen midt i 90'erne. Der er i dag gunstige betingelser for afsætning, der er samfundsmæssigt en god opbakning til økologien, og de produktionsmæssige rammer for økologien synes ret trygge både i forhold til den opbygning af viden, teknologi og erfaringer, der er opnået inden for de forskellige områder af økologien. Men til forskel fra dengang synes denne gunstige situation ikke at afspejle sig i antallet af nye økologiske landbrugsbedrifter, tværtimod har der i en årrække været et lille fald i det økologiske produktionsareal.

Mere direkte målinger på interessen for at omlægge til økologisk jordbrug blandt landbrugerne generelt, viser da også, at kun få er inde i seriøse overvejelser om at lægge om til økologisk jordbrug, hvilket hænger godt sammen med de andre iagttagelser. Ser man i kortene, kan der således ikke umiddelbart iagttages en ny bølge af omlægninger under de nuværende betingelser.

Dette er dog ikke ensbetydende med, at denne del af videnssynthesen er en nekrolog over økologien. Men den henleder opmærksomheden på, at en nyudvikling af økologien ikke stimuleres ved at gøre mere af det samme. Ovennævnte analyse peger i retning af tre nye typer af initiativer, der kan være med til at revitalisere udviklingen af økologisk jordbrug og dermed stimulere til en øget omlægning.

1) Økologien kan kobles med nye ideer og værdier, der kan være med til at mobilisere nye kræfter. Miljø, bæredygtighed og etik er forsat vigtige temaer; men de er også meget slidte. Her er nogle af de nye bevægelser allerede i gang med koblingen mellem den æstetiske kvalitet, tilknytningen til sted og identitet, og hvad der egentlig er landbrugets rolle og berettigelse i det åbne land. Her kan økologien også begynde at tænke nærhed i andet end en fysisk og stoflig betyding.

Økologien skal ikke isolere sig; men tænke sig ind i samfundet på en ny og bæredygtig måde.

- 2) Økologien kan fokusere på at mobilisere nye typer aktører og nye typer virksomhedskonstruktioner, der tænker meget mere i vertikal og horisontal integration. Det kan være de unge mennesker, der er på vej ind i landbrugserhvervet, det kan være et samarbejde med andre former for erhvervsaktører og lokale aktiviteter.
- 3) Økologien kan fokusere på lokale udviklingsprojekter og stimulere til nye samarbejdsformer. I disse år er der stigende fokus på landdistriktsudvikling. Lokalt er der mange aktører, der er aktive i formulering af nye projekter. Samtidig kan man iagttage en generel samfundsmæssig udvikling i retning af at kunne genkoble sig til sted og lokal identitet.

Disse fokusområder er ikke ensbetydende med, at man skal se bort fra de eksisterende landbrug, men forslag til tiltag, der igen kan skabe og genåbne interessen blandt landmændene til at afprøve nye veje, som det var tilfældet i den første omlægningsbølge.

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## Vem slutar vara ekologisk?

### Utmeldinger begrenser

#### veksten i økologisk produksjon i Norge

Siden 2005 har det vært et offentlig mål å ha 15 % økologisk matproduksjon og forbruk innen 2015 i Norge (LMD, 2009). Antall bønder som legger om er imidlertid lavere enn ønskelig. Siden 2002 har det bare vært en netto økning på 562 primærprodusenter. Mellom 2002 og 2009 var det årlig ca 180 utmeldinger, og denne trenden ser ikke ut til å avta. I starten av 2009 var 2702 produsenter med i Debio-ordningen (Debio, 2009), og inkludert areal i karens var bare 5,1 % av jordbruksarealet økologisk. For å kartlegge årsakene til utmelding har Bioforsk Økologisk og Norsk institutt for landbruksøkonomisk forskning gjennomført et forskningsprosjekt i samarbeid med Danmarks tekniske universitet i årene 2007-08. I denne artikkelen omtaler vi de viktigste resultatene.

### Spørreundersøkelse og intervju

I november 2007 sendte vi et omfattende spørreskjema til alle produsenter som var utmeldt av Debio mellom 2004 og september 2007. Vi henvendte oss kun til bønder med stor nok produksjon til å motta offentlige produksjonstilskudd. Bøndene må da ha en årlig omsetning av varer og tjenester på minst 30 000 kr. Ved å holde oss til denne gruppen kunne vi supplere bøndenes svar med opplysninger om areal av ulike vekster og dyretall fra et sentralt tilskuddsregister hos Statens landbruksforvaltning. Gruppen omfattet 523 produsenter. Vi sendte samme skjema til en kontrollgruppe som mottok tilskudd til økologisk produksjon i 2006, 621 stk. Svarprosenten var 51 % for de utmeldte, og hele 68 % for kontrollgruppen. Spørreskjemaet skulle belyse årsaker til at noen bønder slutter med Debio-godkjent økologisk produksjon mens

andre fortsetter. Bøndene beskrev hvor problematisk ulike forhold var, eller hvor enige de var i ulike påstander, ved hjelp av en Likert-skala fra 1 til 7.

Bøndene ble bedt om å vurdere hvilket driftsopplegg det ville være på gården om 5–10 år, uavhengig av om de selv da vil drive gården. De kunne velge mellom fire alternativer, hvor forkortelsene i parentes nedenfor brukes videre i denne artikkelen:

- Konvensjonell (K)
- Økologisk (Ø)
- Etter økologiske retningslinjer, men uten sertifisering; kalt "Økoinspirert" (ØI)
- Nedlagt, noe som vanligvis innebærer at jorda leies bort (N).

Vi delte inn bøndene i fire grupper, K, Ø, ØI og N, uavhengig av om de opprinnelig tilhørte de utmeldte eller kontrollgruppen. For å supplere den kvantitative tilnærmingen gjennomførte vi dybdeintervju med fire tidligere økobønder og to erfarne veiledere innen økologisk landbruk. Når ikke annen referanse er oppgitt, er resultatene i denne artikkelen hentet fra Lien *et al.* (2008).

### Økobønder med katt og kanin?

Det er ingen krav til produksjonsomfang for å melde seg inn som primærprodusent i Debio. I årene 2004-07 hadde 16 % av økobøndene for liten produksjon til å søke produksjonstilskudd, og derfor kan karakteriseres som hobbybruk. Det store flertall av økobøndene i Norge er altså bønder med ett visst produksjonsomfang. Andelen "hobbybønder" blant dem som meldte seg ut i årene 2004-07 var 19 %. Det er altså ikke hobbybøndene som i hovedsak melder seg ut av Debio.



### Tilskuddsryttere?

Bønder som planlegger å legge ned kunne tjene på å legge om til økologisk landbruk de siste årene før de slutter. I perioden 2004-2007 meldte 6–7 % av bøndene med Debiogodkjenning seg ut av ordningen hvert år. I spørreundersøkelsen oppga 18 % av de utmeldte at de hadde lagt ned gårdsdriften. Dette antyder at noe over 1 % av økobøndene per år legger ned. Dette er lavere enn den generelle nedleggingstakten i jordbruket på 3,5 % per år i samme periode. Det er altså neppe mange bønder som har lagt om for å få litt ekstra tilskudd før nedlegging. Det viste seg også at N-bøndene hadde omtrent like store andeler med omlagt areal og husdyrhold som Ø-bøndene, men betydelig mindre areal totalt. I gjennomsnitt hadde denne gruppen 17 hektar, mens Ø-bøndene hadde 28. N-bøndene var også opptatt av økologisk mat. 25 % av både N- og Ø-bøndene prøver å kjøpe mest mulig økologisk mat, mot 20 % i ØI- og 2 % i K-gruppen. Mange N-bønder er altså motiverte økologer, som gir opp gårdsdriften av andre årsaker enn at de mistrives med å drive økologisk. Det er mange som tidligere drev med økosau i denne gruppen.

Økologiske produksjonstilskudd i Norge omfatter omleggingsstøtte, arealstøtte og dyretilskudd. Opprinnelig var det et krav om fem års økologisk drift etter omlegging, men bindingstiden ble redusert til tre år i 2007. Samtidig ble omleggingsstøtten redusert fra 7500 til 5 000 NOK per hektar, og fordelt over to år i stedet for ett. K-bøndene var mest opptatt av at bindingstiden var oppfylt. På spørsmålet om hvor viktig det var for beslutningen om å slutte med sertifisert drift at bindingstiden på fem år er innfridd, besvart på en skala fra 1 til 7 der 7 var svært viktig, var middelverdien for K 4,39, for N 3,82 og for ØI 3,48. Til sammenlikning var verdien 5,59 for det forholdet som var viktigst i gjennomsnitt for K-bøndene, "For mye byråkrati med Debio-sertifisering og -kontroll", og 2,67 for det som var minst viktig, "Manglende støtte fra familie". Hele 12 andre forhold var imidlertid viktigere for K-bøndene enn at bindingstiden var over.

### Økologiske bruk vokser raskere

I Norge har de økologiske gårdene vokst raskere enn i jordbruket generelt. Fra 2002 til 2007 økte jordbruksarealet på en gjennomsnittsgård fra 17,6 til 21,3 hektar. For økogårder var økningen fra 19,7 til 25,5 hektar. Antall melkekyr i en gjennomsnittlig besetning økte fra 15 til 18; i økologiske besetninger fra 15 til 20 (Koesling og

Løes, 2008). Det bidrar til denne utviklingen at de som melder seg ut har mindre areal og færre dyr enn de som melder seg inn. De generelle produksjonstilskuddene har en strukturprofil, der det gis mest støtte til de første hektar areal eller dyr i en besetning og mindre jo mer arealet eller dyretallet øker. For økotilskuddene er det svært begrenset strukturprofil. Dette er antakelig med på å øke interessen for økologisk drift blant bønder med store besetninger og mye areal.

### Fortsatt utmelding og stadig fler "økoinspirerte"

Urovekkende mange økobønder i Norge planlegger å slutte. Hele 25 % av bøndene i kontrollgruppen mente at driften ikke vil fortsette å være økologisk om 5–10 år. Blant dem som planlegger utmelding vil 20 % havne i N-gruppen, 40 % i K og like mange i ØI. Blant de som meldte seg ut i perioden 2004–07 var andelen 18 % N, 62 % K og 18 % ØI. Det er altså en økende interesse for å drive inspirert av økologiske retningslinjer, men uten sertifisering. 53 % av de utmeldte ØI-bøndene hevder at de aldri bruker kunstgjødning, og 72 % aldri kjemiske plantevernmidler. Likevel ønsker de ikke å delta i Debio-ordningen, og kan da heller ikke få tilskudd til økologisk drift. Planteproduksjonen hos ØI-bøndene er overveiende grovfôr. Det gjør det enklere å forstå den lave bruken av konvensjonelle innsatsfaktorer. Samtidig er det tydelig at økologisk sertifisering krever mer enn fravær av kunstgjødning og sprøytemidler. Direktesalg til forbruker viste seg å være spesielt viktig for ØI-gruppen. 25 % av disse bøndene selger halvparten av produksjonen eller mer direkte til forbruker, mot bare 10 % av Ø-bøndene og 5 % av K-bøndene. Kanskje er ikke forbrukeren like opptatt av Ø-merket i en situasjon med kjøp direkte fra produsenten?

### Mindre omlegging hos dem som blir konvensjonelle

I Norge er det tillatt å drive bare en del av gården økologisk (parallellproduksjon). Det er heller ikke noe krav om at husdyrholdet må være omlagt for å få tilskudd til økologisk planteproduksjon. Det er de mest motiverte som legger om både jord og husdyrhold. I utmeldingsåret var bare 50 % av arealet økologisk eller i karens i K-gruppen, mens Ø-bøndene hadde 83 %. På gårder med melkekyr var 71 % av besetningene økologiske i 2006 hos Ø-bøndene, mens bare 25 % av besetningene var økologiske i utmeldingsåret i K-gruppen. På gårder med korndyrking var 65 % av denne produksjonen øko-



logisk i Ø-gruppen i 2006, men bare 33 % i K-gruppen i utmeldingsåret. Det er selvsagt mulig at andelen med økologisk areal eller dyrehold kan ha vært større i årene før utmelding, men mest sannsynlig vil bonden beholde mesteparten av den økologiske produksjonen inntil utmelding har skjedd, for å være berettiget til tilskudd. Andelen av jord som ble lagt om i første år med økologisk dyrking var vesentlig større i Ø- enn i K-gruppen, og omleggingstakten i årene etterpå var også raskere. Stor grad av omlegging, helst av både jord og husdyrhold, er med på å stabilisere økologisk landbruk. Erfaring viser at det er vanskeligere for parallellprodusenter å beholde motivasjonen, ikke minst fordi kontrollen er strengere i slike tilfeller.

### Årsaker til utmelding

I gjennomsnitt for alle var den viktigste årsaken til utmelding for mye byråkrati med sertifisering og kontroll. I personlige kommentarer var det flere som savnet mer kommunikasjon og hjelp til å tilpasse seg regelverket fra Debio sin side, og som beskrev episoder under inspeksjon som hadde vært svært frustrerende. En spissformulering kan tjene som eksempel: «Det virker som den viktigste regelen er at en skal være så firkanta som mulig og at bruk av sunn fornuft er absolutt forbudt.» Ø-gruppen er imidlertid mer bekymret over endringer i regelverket enn at kontrollen er utfordrende. For Ø er det største problemet at de politiske rammevilkårene har vært lite forutsigbare. Videre synes de at merprisen er for lav, og i likhet med de andre gruppene ønsker de seg mer offentlige tilskudd. Spesielt K-gruppen er lite fornøyd med det økonomiske resultatet. Agronomiske utfordringer, med ugras som det mest problematiske, var generelt mindre viktige enn økonomiske. Det var få som klaget over mangel på veiledning om økologisk produksjon, eller manglende støtte fra familie og naboer. Noen utmeldte hadde imidlertid opplevd det økologiske miljøet som spesielt, og følte ikke tilhørighet.

### Hvordan kan vi få færre til å slutte?

For å nå 15 %-målet trengs det økt forståelse for at regler og kontroll er nødvendig for å definere og forvalte økologisk landbruk. Det bør også kommuniseres bedre hva som gjøres for å ivareta nasjonale interesser, for eksempel for å få unntak fra EU-regler som er dårlig tilpasset lokale forhold. Offentlige kontrollorgan skal ikke drive kommersiell rådgivning, men må likevel ha fokus på å yte service. Det bør vurderes om kontrollen kan forenkles med sjeldnere inspeksjoner eller mer bruk av egenerklæringer. Økobønder er generelt mer inspirert av miljø- og sunnhetshensyn enn dem som gir opp økologisk drift. Dette understreker betydningen av å informere om fordeler ved den økologiske driftsformen utover de rent økonomiske. Gårdbrukere trenger informasjon om fordelene ved den økologiske driftsformen for å bli inspirert til å legge om, og motivert til å fortsette. Det trengs tydelige røster med tillit blant bønder flest som kan forklare argumentene for økologisk drift, og hvorfor myndighetene ønsker å støtte denne driftsformen.

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## Hur får vi fler ekoproducenter? – kontroll, sammanfattning och kontinuitet

Marknaden för ekologiska produkter växer i Sverige, men produktionen av ekologiska produkter i Sverige ökar inte i takt med den ökade efterfrågan. Hur får vi fler ekoproducenter?

Genom ett politiskt beslut har det fastlagts att den certifierade ekologiska produktionen vid utgången av år 2010 bör uppgå till minst 20 % av landets jordbruksmark. Den certifierade produktionen av mjölk, ägg och kött från idisslare bör öka markant samtidigt som den certifierade produktionen av griskött och matfågel bör öka kraftigt. Dessutom bör 25 % av den offentliga konsumtionen av livsmedel utgöras av ekologiska livsmedel (Regeringens skrivelse 2005/06:88).

I december 2007 överlämnade Ekologiskt forum vid Kungliga Skogs- och Lantbruksakademien en aktionsplan till regeringen för hur man kan öka produktionen och konsumtionen av ekologiska livsmedel (Aktionsplan 2010).

De senaste årens marknadsutveckling för ekologiska livsmedel har lett till att efterfrågan har ökat kraftigt, både internationellt och nationellt. Den svenska produktionen av ekologiska livsmedel har dock inte ökat i samma utsträckning som efterfrågan.

Jordbruksverket har nyligen utrett prisutveckling och lönsamhet i ekologisk produktion (Jordbruksverket, Rapport 2008:10). I rapporten analyserar bl.a. varför den inhemska produktionen inte ökar i samma takt som marknadens efterfrågan. Några orsaker som kom fram i undersökning var att investeringar i byggnader kräver en viss djurbeläggning och till detta antal djur finns ofta inte tillräckligt med mark för att uppfylla reglerna för ekologisk produktion, ogräs och skadegörartryck, oro för lägre avkastning, brist på betesmark samt det detaljerade regelverket.

Detta föredrag ska behandla åtgärder för att få fler ekoproducenter.

### Miljöersättningen till ekologisk produktion

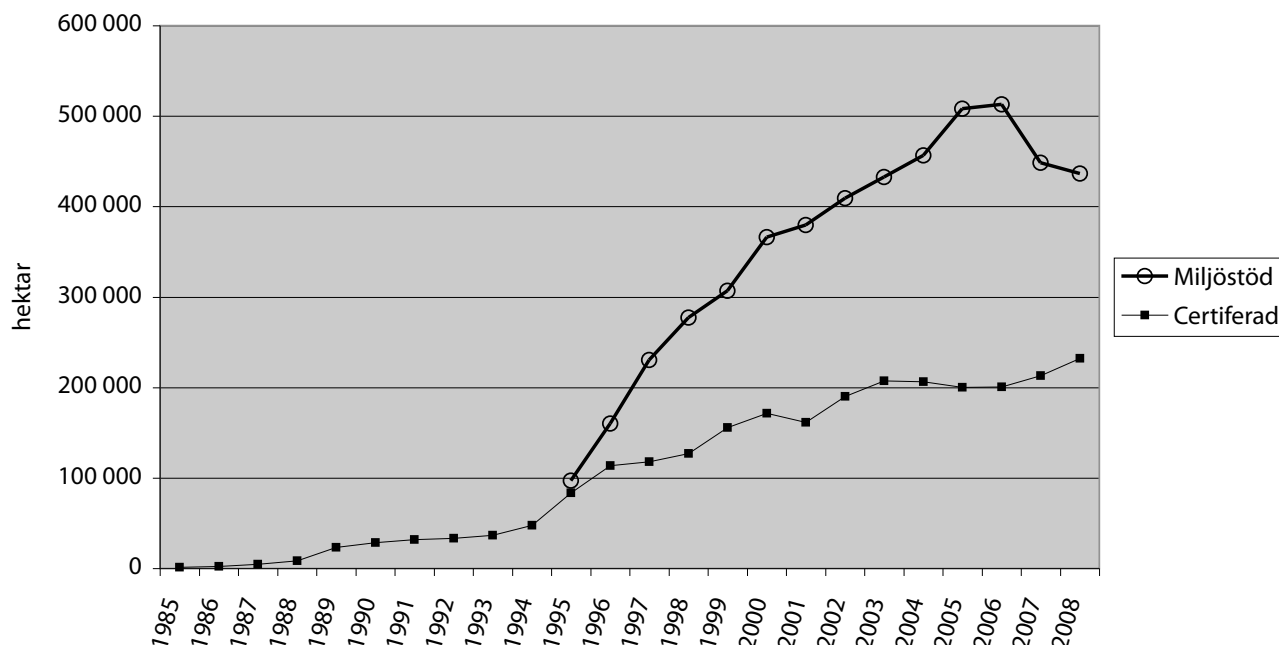
Ett styrmedel för att öka den ekologiska produktionen är miljöersättningen till "Ekologiska produktionsformer".

I Sverige var den anslutna arealen i miljöersättningen "Ekologiska produktionsformer" år 2008 totalt 437 000 hektar, varav 232 000 hektar var certifierad areal (Figur 1). Den certifierade arealen motsvarade cirka 9 % av den totala jordbruksmarken 2008 (Jordbruksverket, Rapport 2009:4). Målet för miljöersättningen "Ekologiska produktionsformer" i landsbygdsprogrammet är att 20 % av jordbruksmarken ska vara certifierad till år 2013. I dagsläget är andelen knappt hälften av det uppsatta målet.

Miljöersättningen "Ekologiska produktionsformer" har utformats för att bidra till att de nya målen för ekologisk produktion uppfylls. Reglerna för ersättningen innebär att:

- certifierad ekologisk produktion ger högre ersättning än produktion som inte är certifierad
- nötkreatur, får, slaktsvin, värphöns och slaktkycklingar som hålls ekologiskt ger ersättning för ekologisk djurhållning
- alla grödor som kan ge ersättning för ekologisk växtodling, liksom ekologisk vallodling, kan ligga till grund för djurersättning
- ekologisk djurersättning kan även fås för areal som ligger i ett åtagande inom miljöersättningarna för betesmarker och slätterängar.

## Ekologisk odling - Total åkerareal



Figur 1. Utveckling av areal med miljöersättning för ekologisk produktion. Certifierad produktion (kvadrater) och total areal med miljöersättning för ekologisk produktion (cirklar). Statistik från SCB och Jordbruksverket.

Totala antalet anslutna djur i ekologisk djurhållning 2008 var cirka 188 000 räknat som djurenheter (de), varav nötkreaturen var 157 000 (de). Av djuren var samtidigt cirka 125 000 djurenheter certifierade, varav 98 000 (de) var nötkreatur.

### Åtgärder för att få fler ekoproducenter

Utöver miljöersättningen till ekologiska produktionsformer kan fyra områden för åtgärder för att få fler producenter lyftas fram:

1. Framåtsyftande produktionsutveckling
2. Trovärdigt regelverk
3. Professionell rådgivning
4. Avsättning för produkterna

#### 1. Framåtsyftande produktionsutveckling

De ekologiska produktionen ska vara marknadsdriven och i sin tur driva på utvecklingen mot mer hållbara och miljömässigt konkurrenskraftiga produktionsmetoder.

För att uppnå en framåtsyftande produktionsutveckling behövs riktad forskning för utveckling av ekologiska

produktionsformer. Även utvecklingsprojekt behöver kunna få finansiellt stöd.

I Aktionsplan 2010 är en av de föreslagna åtgärderna att ta fram en forskningsstrategi för ekologisk produktion och konsumtion. Tidigare har treåriga ramprogram för forskning inom ekologisk produktion tagits fram av Centrum för uthålligt lantbruk i en bred process där forskningsfinansiärer, forskare, producenter och andra aktörer har deltagit.

Det finns behov av tvärvetenskapliga projekt som arbetar för att lösa flaskhalsar i olika delar av livsmedelskedjan. Utvecklingsprojekt som syftar till att öka den ekologiska produktionens effektivitet och konkurrenskraft är viktiga om den ekologiska produktionen ska kunna öka.

#### 2. Trovärdigt regelverk

Regelverket och certifieringsarbetet ska vara trovärdigt och lätt att förstå för producenter, konsumenter och övriga aktörer i livsmedelskedjan.

Den 1 januari trädde nya regler för produktion och märkning av ekologiska varor i kraft (EU Council Regulation 834/2007 och EU Commission Regulation 889/2008). Dessa regler utgör grunden för regleringen av den certifierade ekologiska produktionen. Andra certifieringsorgan, t.ex. KRAV, har ytterligare regler för sin certifiering.

För producenterna är det viktigt med klara besked om regelverket och hur detta ska tolkas. Jordbruksverket arbetar tillsammans med övriga aktörer med dessa frågor, t.ex. med information på internet under [www.sjv.se/ekoregler](http://www.sjv.se/ekoregler) där man bl.a. kan finna "Frågor och svar". Frågor om regeltolkningar kan skickas till [vaxtodling@sjv.se](mailto:vaxtodling@sjv.se). Beroende på frågan tar det olika lång tid att arbeta fram svar.

### 3. Professionell rådgivning

Konkret och detaljerad rådgivning ska finnas tillgänglig för alla intresserade producenter och rådgivningen ska vara anpassad till den enskilde producentens situation.

För att få fram professionell rådgivning behövs kompetensutveckling på flera olika nivåer. Det krävs satsningar på omlägningsrådgivning för att ge konventionella lantbrukare bra beslutsunderlag. Det är därför viktigt att säkerställa att det finns en rådgivarkår med goda kunskaper om omlägningsrådgivning samt omlägningsinformation i form av t.ex. ekonomiska kalkyler. Information om hur marknaden för ekologiska produkter ser ut och konsumenternas efterfrågan är avgörande för lantbrukarens beslut att lägga om sin produktion.

Det finns ett stort behov av kompetensutveckling av nya rådgivare. Rådgivning om ekologisk produktion bör vara integrerad i den övriga jordbruks- och företagsrådgivningen. Baskompetensen om ekologisk produktion behöver förbättras hos rådgivarkåren generellt. Det finns också behov av ett fortsatt nationellt samordnat utbud av informationsmaterial för att säkerställa en hög kvalitet på omlägningsrådgivningen till lantbrukarna. Informationsmaterial till rådgivare kan med fördel ligga på webben.

### 4. Avsättning för produkterna

Även om marknaden efterfrågar produkter är det av stor betydelse att den enskilda producentens produkter når fram till denna marknad. En möjlighet att öka precisionen mellan produktion och konsumtion är att i högre grad än idag arbeta med kontrakt och avtal mellan producent och uppköpare.

### Avslutning

Jordbruksverket har uppskattat det ytterligare antal lantbrukare som behöver lägga om till certifierad ekologisk produktion för att målet för miljöersättningen i landsbygdsprogrammet ska nås (Jordbruksverket, Rapport 2009:4). Lantbrukarna finns i två potentiella målgrupper, de som redan har miljöersättningen men som behöver certifiera sin produktion och de som nu har helt konventionell produktion.

Diskussionen om hur vi kan få fram fler ekoproducenter vidgas till en workshop på denna konferens onsdagen den 20 maj. Se vidare längre fram i denna rapport.

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### Personligt meddelande

- Johan Ascard, underlag till figur 1.

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# The iPOPY project and how to communicate with the young generation

Public food service has been recognized as a promising arena for advancing sustainable development and changing the way people eat (Morgan & Sonnino, 2008). This paper explores communication with young people based on findings from the ongoing iPOPY- “innovative Public Organic food Procurement for Youth” project, which focuses on organic food in public food service for young people. We explore dimensions of communication with young people about organic food and sustainability in school and festival settings, based on iPOPY cases.

## **iPOPY project – a CORE Organic pilot project**

The aim of the iPOPY project (2007–2010) is to study how increased consumption of organic food may be achieved by implementation of relevant strategies and instruments linked to food serving outlets for young people in some European countries (Denmark, Finland, Italy and Norway). Supply chain management, procedures for certification of serving outlets, stakeholders’ perceptions and participation as well as the potential of organic food in relation to health and obesity risks are analysed. Because schools are central arenas for public food procurement for children and adolescents the project focuses on organic food served in schools. In addition to schools/municipalities in Denmark, Finland, Italy and Norway, a Finnish congregation and a Norwegian music festival are used as cases for public serving outlets for young people. More information about the project can be found at the iPOPY website <http://www.ipopy.coreportal.org/>. (Løes & Nölting, 2009)

## **Communication**

Communication has widely been viewed as transmission of information (Shannon & Weaver, 1949). The communication act is understood as a system which comprises of information, encoded and imparted by a sender to a receiver via a channel. This approach has often been used to study how the encoded message remains ‘unchanged’ as it passes in the channel from the sender to the receiver.

Contemporary communication theorists treat communication as a social system within which information and meanings are continuously processed and transformed. In this social system, construction of social reality gives us the basic shared understanding about what is meant by our lives and world (Berger & Luckmann, 1968), but in the conditions of late modernity, characterized by scepticism, individual freedom and active trust (Beck *et al.*, 1994), this understanding evolves as interplay of individual and socially shared interpretations of information and meanings. Here, communication is understood as that which becomes shared and is therefore publicly known and available (Luhmann, 1989). Finally, communication may be seen as means to ends, whereby communication adopts a more or less persuasive character, responded by receivers in more or less complying ways.

Combining these theoretical strands, communication can be studied as a system of transmission of information whereby this information is invested by meaning and aim by the sender and processed to possibly new



meanings and altered compliance with sender's aims by the receivers. A central part in this model is 'the information', which may consist of textual, visual and sensory elements experienced by the receiver.

This paper explores communication about organic food to young people on two arenas where organic food is served either as public or commercial service: a Finnish upper secondary school and a Norwegian music festival. The study is structured around the caterer as the sender (aim, information and food), and experience and interpretation of the message by young people as receivers. The study is based on focus group discussions with young people (aged 16–25 years), individual interviews with caterers and observations conducted in 2008.

### **Finnish school meal – institutional message and pupils' experiences and interpretations**

The Finnish school meal system represents a highly regulated practice aiming at academic performance and public health, and already in 1948 free school meals in primary education became the statutory liability for municipalities (Lintukangas *et al.*, 2007).

The 'institutionalised' offer of free school meals represents national food culture (rotating menu) and follows national nutritional recommendations. The school meal is also meant to be a relaxing and revitalising social break. Furthermore, the "whole school approach" (Morgan & Sonnino, 2008) aims to connect education in biology, geography, health and home economics with school meal implementation, with a model meal in the dining hall visualizing the 'proper balanced meal'. More specifically, education includes some knowledge on agriculture including organic food as well. The implementation of the school meal presents an institutionally powered message of healthy, nutritional, tasty, hygienic, free and scheduled warm lunch as an epitome of well-being for young people (Lintukangas *et al.*, 2007).

The handbook for school meals refers to the concept of sustainable development and recommends, if possible, to use local food (Lintukangas *et al.*, 2007). Organic food is not mentioned in the handbook. However, there are public caterers who express their concerns for both young people's health and depletion of natural resources and who use domestic or organic food for school meals (Mikkola, 2009). In this way, the "institutional organic message" can be described as basically positive, to some extent reserved, and ambiguous about organic food;

simultaneously, there is in some cases critical relation towards conventional food. This message is mixed, but it gives room for the use of organic food as a material and experiential message as well as information through text books, projects and lectures.

Young people's experience and interpretation of the organic message have several analytical dimensions. First, they referred to particular nice occasions in one's life history such as participation in organic meal preparation with particular persons. The school meal was, when compared with these experiential memories, suspected to be non-organic due to the low cost focus of Finnish school food service. The young people also expressed that they did not see a point in asking whether it was organic, since this hardly would change the way the procurement was run. However, school food seemed to have rather high relevance to the everyday well-being of the young people because they discussed it intensively and made detailed evaluations of it.

The pupils reflected on organic food as compared with conventional food and concluded, that the crops must be smaller than in conventional agriculture since organic is more pricey. They were aware and saw it as positive that no pesticides and fertilizers had been used in production; this fact also raised questions about the necessity of pesticides. The somewhat ambiguous understanding of organic food was also connected with curiosity about its quality. The commonplace expression of 'future with organic' appeared to attract them. The announcement of an organic trial in the school caused welcoming aplauds and suggestions for what the organic foods could be.

The content of education seemed to be restricted to organic labels, learning about organic foods in the local supermarket and project work. The young people themselves paid attention to the neutral content of education without any attempts to 'influence' their buying behaviour.

The organic message, received both in and outside the school where young people are exposed to many competing messages, was interpreted positively, with some ambiguity in terms of quality and the selection on the market. However, there was no big contrast to the culturally powerful institutional message of healthy school meals.



### Organic food in a Norwegian festival context – message and perceptions

Festivals are collective events that can be understood as arenas for social learning and opportunities to experiment with pleasure and meaning (Purdue *et al.* 1997). Being at the Øya music festival, one of the cases in the iPOPY project, provides young people an opportunity to taste and experience organic food, which may effect perceptions and learning about organic food (Roos *et al.* 2009).

Since 2003 Øya has aimed at serving organic food prepared by local restaurants. The menus are certified and labelled ([www.debio.no](http://www.debio.no)). In addition, posters with a text informing what organic food is have been placed by the food booths and special stands can be visited for more information. The festival magazine and the book to volunteers include information about organic food. The volunteers have access to free organic food when working.

The young Øya participants described the festival as a positive experience, and thus organic food got a positive association. Organic food was viewed as different from conventional food, and there seemed to be an expectation that it would be better for themselves, animals or environment, or taste better. But not all were sure about what made organic food different and why. There was a shared opinion that organic food is more expensive, and that the food sold at Øya festival was small portions for a lot of money.

Some of the participants, especially the volunteers, had noted the information on organic food, but others had not registered the posters or even that the food was organic. It did not seem like the experiences with organic food at the festival had had a direct effect on their consumption of organic food. There were mixed views on the transmission of organic food from festival to everyday context; some thought organic festival food had a positive effect, whereas others described festivals as separate worlds with limited influence. Festival food was mainly associated with necessity, fuelling the body and high price.

### Conclusion

Two cases from the iPOPY project demonstrate that when communicating with the younger generation organic food messages are competing with other messages also in protected food environments, and the sender and receiver attach different meanings to organic food. Our findings contribute to emphasizing the relevance of holistic approaches (e.g. whole school approach) and experiential activities in introducing organic food to young people.

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# Ekomat á la Linné

## – tasteful knowledge for public kitchens

### Ekomat á la Linné – en smaklig kunskap för offentliga kök

#### Vilka är vi?

Miljöresurs Linné är en förening för hållbar samhällsutveckling. Vi har funnits i nära 20 år och vårt huvudsakliga arbetsområde är Småland, Öland och Blekinge (ca 1 milj. innevånare). De flesta kommuner (34 av 38), alla landsting, flera länsstyrelser, ett flertal företag, universitet/gymnasieskolor, producentorganisationer och ideella organisationer är medlemmar – omkring 100 till antalet. Medlemmar får rabatt på våra kurser och seminarier samt vårt nyhetsbrev Droppen. Vi arrangerar också kurser, möten m.m. på våra medlemmars begäran.

#### Vad gör vi?

- Utbildning och information till offentliga sektorn och dessutom
- "Gröna krögare" som är ett samarbete med KRAV för att öka antalet KRAV-certifierande restauranger
- "Unga ekokockar" där vi jobbar med ekomatsutbildning på restaurangskolor
- Olika projekt inom ekologisk mat i samarbete med andra företag och organisationer

I Miljöresurs Linnés arbete med att öka de ekologiska inköpen inom offentliga sektorn erbjuder vi kompetensutveckling genom konferens, kurser och information till exempelvis kommunstyrelser, kommunstyrelsers arbetsutskott och kommunfullmäktige. I 25 av de 38 kommunerna i Blekinge, Öland och Småland har vi haft utbildningar och/eller information. Vi tar personlig kontakt med kommunerna för en uppföljning och för att kunna bistå med den hjälp de behöver – i synnerhet till dem

som fattat beslut om ökade inköp av ekologiska livsmedel. Vi erbjuder utbildning för alla kategorier t.ex. politiker, chefer, kostfolk, pedagogisk personal och elever.

#### Offentlig sektor och 25 %-målet

Våren 2006 beslutade Sveriges riksdag om ett inriktningsmål på 25 % ekologiska livsmedel år 2010 för den offentliga sektorn. Ett inriktningsmål betyder att det sedan är varje kommuns och landstings sak att besluta om sina egna mål för den ekologiska maten.

I vårt arbete för den offentliga sektorn är vår årliga kartläggning om kommuner/landstings beslut och procentuella inköp av ekologiska livsmedel en viktig grund. Våra kartläggningar innebär att alla svarar (100 % svarsfrekvens). Vi kontaktar personligen kommunerna och landstingen för att få in svaren. Uppgifterna som lämnas har blivit mer tillförlitliga för varje år. När kommuner & landsting fattar beslut om ökade ekologiska livsmedelsinköp har de också behov av att få veta de uppgifter vi efterfrågar i kartläggningen.

Projektet [ekomat.nu](http://ekomat.nu) startade hösten 2005. Vid den kartläggningen som då gjordes (gällande 2004) hade ca tredjedel av kommuner och landsting i vår region ett politiskt beslut om inköp av ekologiska livsmedel. I den senast gjorda kartläggningen hade 77 % av kommuner och landsting ett beslut om ökade ekologiska livsmedelsinköp.

Den faktiska inköpsökningen av ekologiska livsmedel går inte lika snabbt. Anledningen är ofta att motivation och kunskap saknas hos beslutsfattare, inköpare, kostansvariga och/eller kökspersonalen. Av detta skäl saknas ofta resurser till utbildning och till de ökade livsmedelskostnaderna.

De ekologiske livsmedelsinkøben var 3,5 % af regionens livsmedelsinkøb ved seneste kartlægning (2007). Dette var en fordobling mot foregående år (1,8 %). År 2004 var de ekologiske inkøben i kommuner og lands-ting uppskattningsvis under 1 %.

### Kompetensutveckling för Ekologisk mat i offentliga kök

Vårt fokus ligger på att förmedla kunskap – teoretisk kunskap om hållbar utveckling och ekologisk mat, praktisk kunskap och inspiration i kök och förändringsarbete i det dagliga arbetet (vad ska bytas ut, vad kan för övrigt förändras).

Vi månar om att inte bara presentera fakta utan att även använda andra metoder för att bearbeta värderingar och attityder. Inte minst viktig är en avslappnad och inbjudande atmosfär. Vid längre kurser kan även pauser användas till läroinriktade upplevelser såsom tidspromenader. Kurserna avslutas med att man tillsammans

i smågrupper tar fram några konkreta åtgärder som kan påbörjas inom några veckor. Exempel på sådana förslag är "mera säsongsanpassning", "två vegetariska / ekologiska dagar i veckan och mer baljväxter", "informera matgästerna med skriven information", "minska svinn med mindre avfallskärl". Ansvar för att detta kommer att utföras ligger på ansvariga inom de kommunala köken.

Vår erfarenhet visar att en tid efter en grundläggande utbildning är det önskvärd med någon typ av återkoppling. Exempel på detta kan vara en genomgång på plats i köken av vår kock eller en studieresa till ekologiska producenter.

Förutom kurser om ekologisk mat erbjuder vi föreläsningar med tema om "Klimatmat – mat med mindre miljöpåverkan" och om "Ekologisk mat och den biologiska mångfalden".

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## Organic Denmark's project: 'What is Eco about?' and the Organic Schoolfarms

Dette oplæg tager sigte på at udbrede kendskabet til informationsmaterialer og erfaringer fra en flerårig indsats for mere økologi i danske skoler. Indsatsen udføres af Økologisk Landsforening med tilskud fra Ministeriet for Fødevarer, Landbrug og Fiskeri.

Indsatsen består af følgende elementer:

1. Mere økologi i skolemaden  
[www.okologi.dk/skolemad](http://www.okologi.dk/skolemad)
2. Mere økologi i undervisningen – 'Hvad er økologi?'  
[www.okologi.dk/undervisning](http://www.okologi.dk/undervisning)
3. Økologiske Skolegårde  
[www.okologi.dk/skolegaard](http://www.okologi.dk/skolegaard)

I det nye projekt 'Økologi i skolen II – udbredelse til hele landet' er de tre elementer samlet i et projekt, bl.a. fordi nyere undersøgelser viser, at en ændring i skolens madvaner i retning af mere økologi, skal kombineres med undervisning i økologi, for at blive en forandring, der får en sundhedsfremmende effekt for hele skolen.

På konferencen vil der blive vist konkrete eksempler fra skoler, der arbejder med økologi på denne måde.

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## The packaging – a tool to minimize food waste

The packaging is a tool to get products, such as food, from production to consumption. A packaging not fulfilling its' purpose could lead to increasing spillage and unnecessary waste.

The knowledge of the spillage of food in the distribution chain and at the consumer level is increasing. Newly published research in UK pointed out that a third of the food consumers carry home is wasted. The Swedish Environmental Protection Agency (Naturvårdsverket) estimated that about 20 % of the food is wasted during distribution to the retail. This indicates that about 40–50 % of our food produced is wasted. Almost the same level as UN estimate the food waste in the developing countries!

To minimize waste and keep the quality of the food it is important to know the demand of functions in the distribution and use, for designing the packaging in correlation to these. There are three main functions of the packaging; protection, information and handle-ability.

The main sustainability purpose of the packaging is to protect the product. Destroyed products mean lost resources in product, packaging, manufacturing and distribution.

To get a resource efficient and satisfying product protection you got to know the connection between the durability of the product, the protection qualities of the packaging and the stresses in the distribution. Because of the increasing affection of sustainability then packed products becomes destroyed, an over-packing – using more material than exactly needed – are defensible from a resource efficient view.

The demands for information differ in the various parts of the value chain. During distribution the trans-

port package should give information about content and delivery address, to secure the right product to end up on the right spot. Supply disturbance and deliveries to wrong address means misused resources for transport, storage etc. In the retail the packaging should offer information about the content to support the sale. The end user needs information for be able to use the product, this means e.g. instructions for opening, cooking, dosage or assembling but also storage recommendations etc.

The packaging must be easy to handle during the whole distribution chain. It has to be adapted to the conditions and the equipments, mechanical or manual, that it can be expected to encounter during transport and storage. Rational retail handling means that unnecessary handling operations, e.g. picking of single primary packaging because of poor exposure in the outer packaging are avoided. Rational handling also concerns empties packaging which should be easily disposable. One-way packaging should be foldable and give as little waste as possible. Returnable packaging should be compressible or stackable for return transport.

The packaging contribution to global sustainability can only be achieved if all the actors in the value chain take their own part of the responsibility. The ultimate goal is therefore taking into account sustainability in every decision making process by packaging manufacturer, packaging filler, distributors, retailers and also consumers. This is a continually process that needs to be based on improvements and initiatives both from demand and supply sides.

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## The making of honest food

### The start

Torfolk Gård was established 32 years ago. We were young and we wanted to do something good for the environment. And we wanted to make honest food – no matter what. We had our farm and we started to grow vegetables. The jam production were introduced some years later.

Jams (especially with wild berries) are traditionally made in every Swedish household. Today it's more common to buy jams and marmalades in the shop, though we use to say that people who make their own jams are our best customers. They have a high consumption and they know how high quality jams should taste. And their own jams will not last the whole year until next season.

In the beginning we were the only company offering organic jam to the Swedish retailers. The most important thing for us was to promote "organic" and KRAV as a good choice. When KRAV grew on the market it became interesting for other producers. Today the sector has grown and we have got many competitors. The big conventional producers have some organic alternatives, and new small producers have started. As the international organic trade is bigger today, we also have imported organic jams and marmalades on the shelves. Our goal to promote organic has been successful, but our own company must struggle harder to survive.

### Honest food

When we started we had a vision with the production at the company:

"We make food that we want to eat ourselves". We wanted to produce honest food without chemicals and clean raw materials. And this vision is still valid. The

contents in our products are berries and sugar. Sometimes we add pectin, but never preservatives, artificial colours or artificial flavours.

We have in Sweden a magazine called "Råd o Rön" specialized on consumers tests. Some years ago they made a test on different lingonberry jams. A group of consumers tasted lingonberry jam from around ten brands. Torfolk Gård were one of them. In the comments there were someone who thought our jam tasted preservatives. This was very strange as we never use any preservative at all. But, in a comment the journalist presumed that the taste of preservative were mixed up with the taste of genuine lingonberries. The fact that we use a high percentage of berries and no additives gives a stronger taste of berries, and if you are used to more sugar, more water and less berries you will not recognize this taste. As you may know, lingonberries contains natural preservatives.

We started with wild berries in a time when there where no certification of wild production. And there are still consumers that doesn't understand why there is a need. Though we all know that chemicals used for the forest are common in many places.

Another advantage with the certification is very good traceability. As long as we buy certified berries, we always know where they are collected. If we want Swedish berries, we can specify our order and get what we want. And in our production of Lingongberry Jam, Blueberry Jam and Cloudberry Jam we exclusively use berries from Sweden. Raspberries and Blackberries come from Bosnia, Black Currant and Rhubarb are grown in Sweden and Citrous fruits are from Italy.



The decision to use Swedish lingonberries, blueberries and cloudberry is costly. The berry prices vary a lot, but we have for example got cloudberry offers from other countries much cheaper.

### Consumer dialogue

The fact that we don't use preservatives makes our products sensible. We need to be very careful regarding temperature in the production. The "preservation" in our products is the use of high temperature while filling the jars and tight closures. We think we have good control with the HACCP system and we work a lot with quality issues.

But we have no influence on the treatment of the product when it reach the consumers kitchen. When the jams are unopened they have a shelflife of 18 months, but efter opening they have to be considered as fresh products. To be sure that the jar will be finished before moulding we don't sell bigpack to households. We also work a lot with information. Some 15 years ago there were very few products on the market without preservatives, and people were unaware of how to treat those products. We got many phone calls regarding destroyed jams and did our best to explain how to keep the jars. Today the consciousness it much better. But information and a dialogue with the consumer is still very important.

### One, two or three additives

As I said before, we don't want to use additives. But we can't produce jams for the ordinary market without pectin. Pectin is used to get the product less juicy and more stable. It's a natural product made from citrus peel, but the process is more or less complicated.

When we started there were no restriction against using pectin in organic products. Some years ago pectin was divided in approved and not approved kinds. The pectin to use in organic production is not allowed to be amidated. We were forced to change our pectin to another kind. And we got a big problem!

The new pectin (not amidated) didn't work well. We made many trials but for some products we never manage to get a product with the quality we wanted. The problem is that the "not amidated pectin" is more sensitive regarding pH value. By adding two other additives, to regulate pH value and the percentage of calcium, the pectin works better. This is approved by the standards

but we think it's crazy to use two, or three, different additives instead of one.

The result for Torfolk Gård is that we have skipped the production of Apricot Marmalade and Strawberry Jam. In Orange Marmalade we use tricaliumcitrate, though we don't like it. Maybe we will be forced to use it Raspberry Jam too.

Another interesting item is the choice of sugar. In other countries it's common to add other sweeteners as honey, agave syrup and rapadura. But we always use sugar. We think the taste is much better and we don't want to act as health guards. Jam is a sweet product and it's better to eat less with high quality than to eat a lot half good products. Anyhow, using sugar means that you have to choose between European beet sugar or tropical cane sugar from South America or Asia. For a long time we used beet sugar, mainly to get a clean sugar with neutral taste. To decide what's best for the environment is not easy. On one hand, the beet sugar is produced close and don't need long transports. On the other hand, cane sugar needs less processing. Some years ago we decided to change from beet sugar to cane sugar. Better price was one reason, but also the good circumstances around the organic growing and the process. When the main part of the transport is made by shipping over the ocean we don't use much energy to get it. But I'm still not 100 percent convinced that we made the right decision. It takes too much time and knowledge to consider all facts and make the one and only choice.

### Our ambition to be transparent

As you can see, there are many problems when you want to produce a simple jam in the best way. We often discuss what's right or wrong, and maybe we make some mistakes sometimes. The most important thing will always be to be honest and transparent. The consumers must have the right to know how we produce the food. I also think they have the right to know why we choose one way or another.

In our ambition to be openminded towards our customers we have many study visits at our company. Most visitors like to follow the process and the questions use to be numerous. I think the distance between producers and consumers in the modern food industry very often is too long.



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# Analyses of conventional and organic meat quality

## What is meat quality?

Meat quality is a very broad term describing various kinds of meat parameters interesting to users of meat. Figure 1 shows how meat quality parameters can be divided into four sub-groups. Eating quality describes the taste of meat and whether it is tender and juicy. Technological quality concerns the suitability of the meat for further processing into various meat products, and nutritional quality regards fat content, minerals, bioactive compounds etc. This presentation describes the effect of organic production on especially the eating quality of pork.

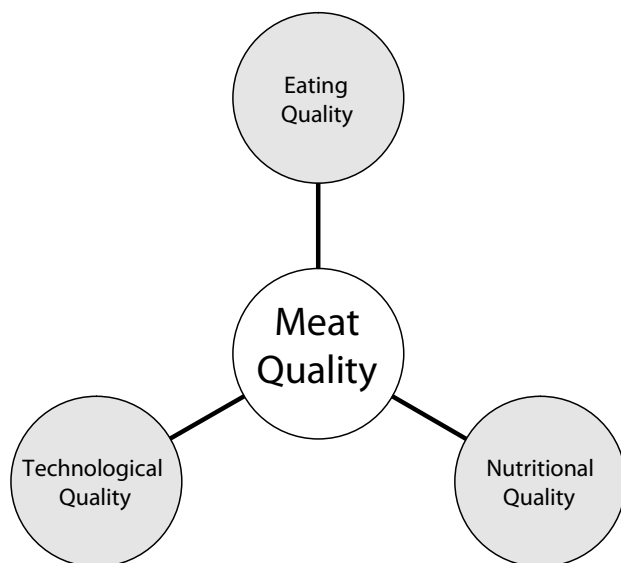


Figure 1. Meat quality parameters divided into four sub-groups.

## How can organic production affect meat quality?

Meat quality can be affected by all processes in the production line from farm to fork. Treatment of pigs during transport, stunning method, slaughter process, chilling and storage are all factors affecting the final meat quality. The difference between conventional and organic production of meat occurs at farm level and especially organic feeding has a major impact on meat quality (Figure 2). In organic feed artificial amino acids are not allowed and it is difficult to obtain raw materials with high protein quality. This results in a slow growth rate of the animals, which normally has a negative impact on meat tenderness. Consumers usually rank tenderness as one of the most important eating quality attributes, thus

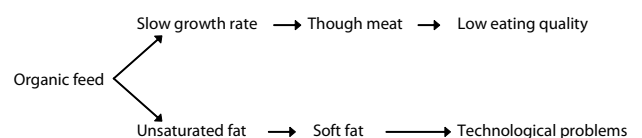


Figure 2. Organic feeding has a major impact on meat quality.

organic feeding is expected to have a negative impact on eating quality. A typical way of adding proteins to organic feed is to use whole seed and/or seed cakes, which are leftovers from pressing different seeds in the production of vegetable oils. Both cakes and whole seeds have a high content of unsaturated fat and this is reflected in the fat tissue of the animals. A high degree of unsaturated fat results in soft fat, which is a technological problem in the production of e.g. fermented sausage or in the slicing of bacon.

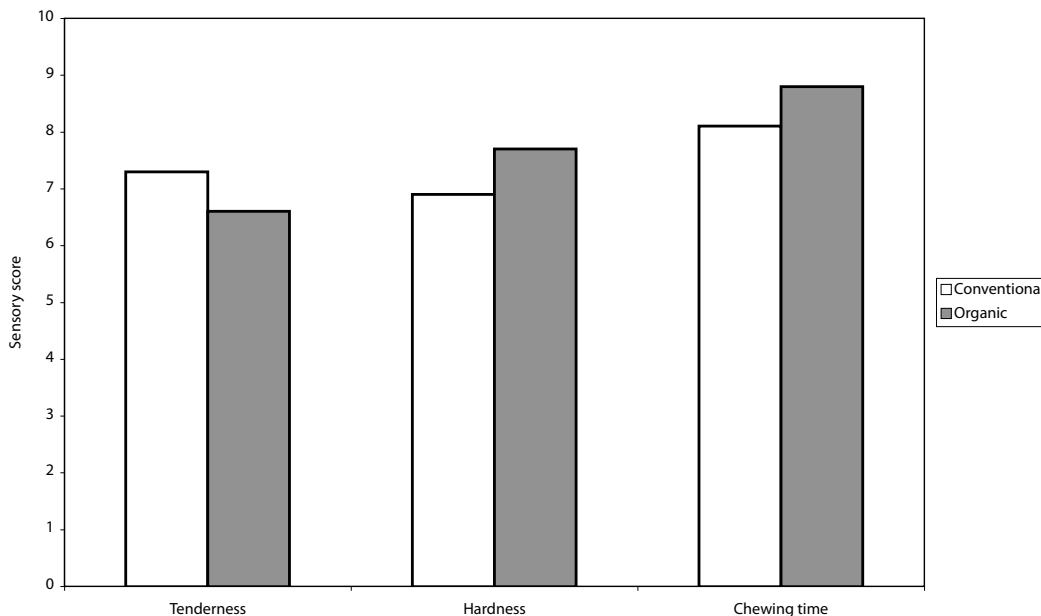


Figure 3. Difference in eating quality of pork chops between organic and conventional produced meat

### Results from research at DMRI

The Danish Meat Research Institute has been involved in several projects focusing on the quality of organic pork. The following is a short summary of the most interesting results from two of these studies.

### Comparison of meat quality from organic and conventional retail products

Approx. 50 retail packs of pork chops, sliced pork belly and minced pork were obtained from organic and conventional pigs. The pigs were slaughtered at the same slaughterhouse and were exposed to the same slaughter, chilling, packaging and storage processes. The only factor differentiating the pigs was the production system; i.e. organic or conventional. The three meat products were cooked into fried pork chops, fried pork belly and rissole, respectively, and analysed using an untrained consumer panel and a professional sensory panel.

A discrimination test, using the untrained consumer panel, showed that all three products could be differentiated according to the production system. The consumers were not told that they were testing conventional versus organic produced meat and they were not asked to choose the one they liked best.

The professional sensory panel made a profile of the eating quality of the three products. Figure 3 shows how eating quality of pork chops differs between organic and conventional produced meat. It was only the sensory

attributes related to texture that differentiated between production systems, i.e. conventional pork is tenderer. The amount of drip loss in retail packs was quantified and showed that organic pork chops lost more than 50 % more fluid during retail storage than conventional pork chops (2.8 % vs. 1.8 %). Pork belly differentiated mainly in flavour attributes and crispness. Organic belly had less meat flavour, more fat flavour and were crispier. The high fat flavour was probably caused by a high fat content in the organic pork belly. The rissole differentiated only in the surface colour, the organic being lighter. A chemical analysis of the chops found that organic pork had a low content of intramuscular fat (1.4 % vs. 1.7 %) and a high content of unsaturated fatty acid in the back fat (64 % vs. 61 %).

### 0, 80 & 100 % organic feeding of pigs

For several years, including as much as 20 % non-organic raw materials into organic feed was allowed. This exception was made as it is difficult to obtain locally produced feed ingredients to produce an optimal composition of the feed in terms of maximum growth rate and feed efficiency. However; from 2012 organic feed has to contain 100 % organic ingredients. For that reason, DMRI has, together with Danish Pig Production, investigated the consequences of changing from 80 % to 100 % organic ingredients in the feed for organic produced pigs.

540 pigs were divided into three groups and fed

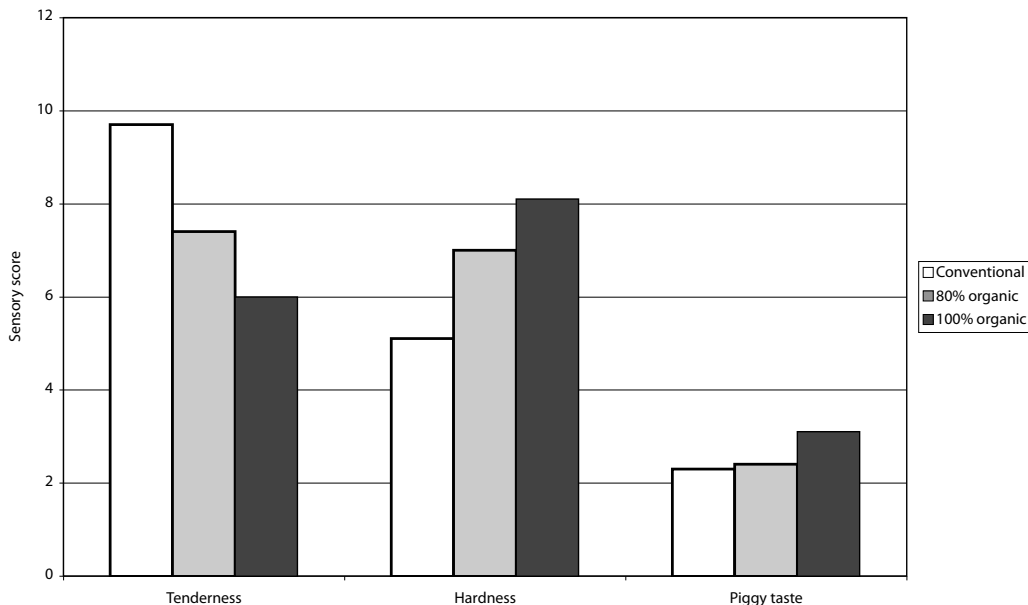


Figure 4. The effect of feeding – on some of the sensory attributes of pork loins.

either conventional feed, 80 % organic feed or 100 % organic feed. The organic feed ingredients used were selected from crops that were produced locally, i.e. in Denmark. The pigs were slaughtered at a commercial slaughterhouse at a live weight of approx. 102 kg. The pigs receiving conventional feed had the highest growth rate (1024 g/day) up to the time of slaughter compared to the organic fed pigs. The 100 % organic fed pigs grew slower (926 g/day) than the 80 % organic fed pigs (941 g/day).

The effect of feeding – on some of the sensory attributes of pork loins – is presented in figure 4. As in the former study, mainly texture parameters are affected. There was a highly significant effect on both tenderness and hardness of the meat. The conventionally fed pigs produced tenderer and less hard meat compared to the organic fed pigs. The 100 % organic fed pigs produced the least tender and the hardest meat. Some of the flavour attributes were also affected by feeding, especially the ‘piggy taste’ was more pronounced in the 100 % organic fed pigs.

The fatty acid composition of the back fat was also tested, and the fraction of saturated fatty acids was higher in the conventional fed pigs and the fraction of unsaturated fatty acids was highest in organic fed pigs.

### Conclusion of the two DMRI studies

The main conclusions can be summarised in the following statements:

- The slow growth rate up to the time of slaughter

for organic fed pigs has a negative impact on meat tenderness.

- There seems to be a small effect on meat flavour.
- The fatty acid composition of fat tissue is more unsaturated in organic fed pigs, which can result in technological problems.

### How to overcome problems with tough organic pork

Several technologies can be used to increase the tenderness of pork and thereby also the tenderness of organic pork. The most obvious technology is to include a tenderisation period of 3–7 days after slaughter before retail sale. A tenderisation period for high quality products is a normal procedure in the beef industry and would have the same positive effect on high quality organic pork.

Stepwise chilling is another technology which is known to increase tenderness of pork. In traditional chilling, the carcass temperature is rapidly decreased to a final temperature of approx. 5 °C in order to avoid a high amount of drip loss, chilling loss and problems with low shelf life and poor meat safety. When using stepwise chilling, the carcasses are also rapidly chilled, however the chilling process is set on a hold at a carcass temperature of 10–15 °C. This temperature is kept constant for several hours after which the carcasses are rapidly chilled to 5 °C. The stepwise chilling procedure has a dramatic positive effect on meat tenderness.

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# Organic agriculture in East Africa, benefits for small holder farmers, achievements and challenges

## Major points of my presentation

Brief background of East African organic sector:

Why did Africa start Organic Agriculture practices?

- As per our traditional practices, we were already growing 80 % of our crop organically (but without proper system of tractability)
- Increased earning .
- Due to East Africa's geographical location, a wide range of organic products can be grown in the region throughout the year.

These reasons could be sorted into two categories: i.e. these mainly targeting the export market and the other targeting the local/domestic and regional markets.

- Better Market opportunity.
- Cost effective processing.

## Benefits for small holder farmers

- Over 90 % of organic production is carried out by small holder farmers with an average land holding of 2 ha, though only up to 1 ha may be under active production.
- They get organic farming and documentation training from processor/Exporter/NGOs.
- Better production.
- Market assurance and better price offer from processor/Exporter.
- Free organic input and hand tools .
- Social benefits. (They work as group).
- Improved negotiation power.
- Food safety.
- HIV/other health advises.
- Better field management.

## Achievements and challenges

Facts and Figure (Table showing East African organic produce's export etc)

### Challenges

Processors/exporters invest money for certification of farmers/out-growers. They are responsible for farmers training, internal and external inspections, documentation, records etc. They are committed to buy all the crop from registered farmers to a better price. They are responsible for post harvest management, processing as per required standards, packaging and labelling as per international standard and marketing .

After all these efforts; no guaranteed market; no price commitment .

We have no control of the export market and the size of market is small and uncertain. Importers ask only for BULK cargo, they don't accept African Retail Packages (product photos attached). Some produce we can't export bulk, we need niche markets, where we can get better price .

Examples: vanilla, spices, dry fruits etc.

African exporters notice an increasing interest in fair/ethical/social issues from buyers in Europe and America. Often exporters are asked to assure good social standards in their companies and more transparency is demanded about the production process.

We need international lobbying for better price, secure and niche markets.

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## Judging long distance transport as good or bad is a tricky issue

Climate change represents one of the greatest environmental, economic and social threats ever for mankind and the planet.

Global climate change is caused by the build-up of greenhouse gases (GHGs) in the Earth's atmosphere. It is known that human activities of last decades caused this severe boost in greenhouse gas emissions. Unless global GHG emissions are reduced, there is nothing that can be done to prevent climate change.

Carbon dioxide (CO<sub>2</sub>) released when burning fossil fuels accounts for about 75 % of all greenhouse gas emissions. Fossil fuels are the energy source most used for transport by cars, trucks, ships and planes. With an ever growing year around demand for a wide range of food especially for the complete variety of fresh, seasonal and tropical foods, trade has become global and transport as a matter of course is increasing.

Transportation causes GHG emissions and the farther a product is transported the more CO<sub>2</sub> per kg of product is emitted. For this reason, it seems at first glance counterproductive transporting food over long distances. Rather, it seems necessary to keep "food miles" – the distance food travels from farm to plate – as low as possible. This is certainly true when choosing between two products that were produced in the exact same manner and transported by the same mode of transportation, but only over different distances.

However, this is far too simplistic. The situation is much more complex. Without global trade and transportation food would have to be eliminated from our menu that can only be grown in tropical zones, like pineapple, mango or banana, not to forget coffee, tea or cocoa. But, this is not only true for tropical fruits as the

problem of long distance transports concerns seasonal fruits' like strawberries or asparagus all around the year supply as well.

Therefore it remains a challenge to judge global trade of organic products and especially the impact of air freighted organic products. Compared to conventional agriculture organic farming systems are causing less greenhouse gas emissions. Even if organic produce is air freighted the production system itself remains favourable. And further on, any one-dimensional consideration or judgement especially of air freight disregards the positive contribution organic farming makes to food security and people's livelihood. It disregards organic farming's potential to alleviate poverty and to enhance the local environment in developing countries. Air freight makes it possible for producers in developing countries to sell high value goods and hereby to participate in and to benefit from international trade.

Finally, it is a case by case decision that has to be made. In the case of organic agriculture, its application in practice has to be observed as well. Is it a farming system just neglecting pesticides and mineral fertilisers or is it an active organic system that takes care of the environment, biodiversity and natural resources as well as of social aspects and livelihood of people?

Long distance transportation and especially air freight have thus to be put into the broader context. Whether or not they are acceptable can not be answered without having considered all aspects. Otherwise one might get a simple answer, however not the right one.

In the following some examples are presented to demonstrate the complexity of the matter:

### 1. Mode of transport and various considerations

The mode of transportation is as important as the distance a good is transported. One kg of produce transported from Morocco to the UK by road causes three times the emissions (around 300g CO<sub>2</sub>/kg) of the same good transported by sea (around 100g CO<sub>2</sub>/kg) while air freight results in 40 to 50 times the CO<sub>2</sub> emissions of sea freight (source: Riverford).

Further to the greenhouse effect caused by the amount of CO<sub>2</sub> emissions from planes, their total direct impact on the greenhouse effect is multiple. Other than for CO<sub>2</sub>, for which the altitude of emission does not make a difference, nitrogen oxides emitted in high altitudes contribute a lot more to the build-up of ozone than when emitted on the ground. Ozone in high altitudes is a highly effective greenhouse gas. And, according to current scientific knowledge, condensation trails of planes cause at least the same if not a higher greenhouse effect as their CO<sub>2</sub> emissions do (source: Quarks/DLR).

### 2. Locally produced apples or from overseas?

Buying a locally produced apple in Germany in spring means, the apple was transported a short distance but stored over five months in a controlled atmosphere. Buying an apple from New Zealand instead means it was freshly harvested, but transported around half the globe before arriving at the shop. Apart from energy used for transport and for storage, the structure and size of production on the farm might need to be considered as well: small scale production in Germany is more energy intensive than large scale production in New Zealand, apart from that yields per area differ resulting in different CO<sub>2</sub> emissions per kg.

According to a study from the University of Bonn, the total energy used for production and transport of the German apples after 5 months of storage is (only) 30 % lower (4.74MJ per kg of apples) than for the apples coming from New Zealand (6,35 MJ per kg apples). The difference is equivalent to a 1.5 km drive by car. And, if the apple is bought only after a bit longer storage the little advantage for German apples has vanished completely, and the long distance transported apple from New Zealand is the better option to buy.

Still, this is quite a one-dimensional evaluation only considering the amount of energy used, ignoring the energy source. What if ship transport is based on fossil fuel, but the warehouse is supplied with energy from solar cells on the roof?

### 3. Tomatoes – locally produced or imported

When fresh tomatoes shall be on the table in wintertime, a buyer in the UK may choose between local greenhouse tomatoes or tomatoes from Spain which are produced outdoor all winter but have to be transported to the market in UK. For every kg of tomatoes grown in a heated greenhouse, 2 to 3kg CO<sub>2</sub> are emitted. Crops yielding lower, like peppers or aubergines, are even worse with about 4.5kg CO<sub>2</sub> per kg (source: Riverford). For transport from Spain to the UK only one tenth (240g CO<sub>2</sub>) is emitted.

Depending on the efficiency of systems (both of transport and production), the situation may however be different, e.g. if insulating thermal screens are used or waste heat from combined heat and power of nearby industry, ground source heat pumps or other renewable energy sources. An attempt for including such aspects into standards is made by the Swedish organisation KRAV when developing climate certification standards in which the suggested standards for greenhouse production are defined as:

- At least 80 % of the heat energy used on an annual basis shall be of renewable origin or no more than 2.5 kW per sqm per week may be of fossil origin.
- Greenhouse operating throughout the winter shall be using heat conserving fabrics or foils (source: Ecology&Farming)

What can be learned from these three examples is the importance of looking at the complete energy footprint/ life cycle of a product before making a final assessment. The more parts of the supply chain are included, the better reasoned one's business or buying decision will be taken.

In Table 1, the results of a Swedish study show the differences in the energy footprint associated with fresh products sourced locally within the EU and imported from abroad:

- For products harvested fresh in the season (apples, cherries, carrots and strawberries) the local option is the less energy consuming one.
- For products that cannot be grown in Sweden (oranges, grapes, tropical fruits) the nearer sources use less energy, and the air freighted products use by far the most.
- For off season products (tomatoes) the local greenhouse produced crops are worse than the imported ones.



Table 1: Energy use associated with fresh produce sourced locally, within EU and imported

Fruit or Vegetable	Source and preparation	MJ life cycle input per kg
Apples	Sweden - fresh	3.5
	Central Europe - fresh	4.8
	Overseas - fresh	8.6
Cherries	Sweden - fresh	5.0
	Central Europe - fresh	6.2
	Overseas - fresh	9.6
Oranges	Southern Europe - fresh	6.8
	Overseas - fresh	9.4
Grapes	Southern Europe - fresh	7.8
	Overseas - fresh	9.7
Potatoes	Sweden - cooked	4.6
	Sweden - baked	29
Carrots	Sweden - fresh	2.7
	Central Europe - fresh	4.0
Tomatoes	Sweden – fresh, greenhouse grown	66
	Southern Europe – fresh, open grown	5.4
Straw-berries	Sweden – fresh	6.2
	Southern Europe - fresh	8.6
	Middle East - fresh, air freighted	29
Tropical fruits	Overseas – fresh, air freighted	115

Source: Carlsson-Kanyama, A., Pipping Ekstrom, M., & Shanahan, H. (2003). Food and life cycle energy inputs: consequences of diet and ways to increase efficiency. *Ecological Economics*, 44, 293-307.

#### 4. Kenyan roses

In the case of roses, air freighted Kenyan roses transported to Europe were found to have a 5.8 times lower total energy footprint than roses grown in Dutch greenhouses (source: Lincoln university report, ICTSD report). For organic green beans the situation is similar. Hence, let's ask for outruling heated greenhouse production of organic vegetables! If a product can be produced with lower energy use in Kenya than in Europe including transport – let's fly it in! In case these roses are even fair trade certified and show a positive impact on farmers' income – even better.

But how sustainable is that? Exporting temperate vegetables from Kenya for European consumers to eat fresh vegetables all year round is actually exporting water from a water scarce country into an area with suf-

ficient water supply. Various articles published around Valentine's Day hit on these issues.

The story of Lake Naivasha in Kenya is a good example: On the one hand there is the success story, a profitable export business has brought jobs to the area. But on the other hand, farmers rely on the lake for irrigation resulting in considerably dropped water levels. It has been suggested that if things don't change, the lake could disappear altogether with Hippos and bird populations, while irrigated soils get saline. In addition, jobs in the flower and horticulture production have brought lots of people to the region. Population grew from 7,000 to 300,000 within 40 years, but infrastructure did not develop as fast. Farms get all the water they need for free, but people have no running water and have to queue, and pay for it.

One of the questions therefore is whether and if which kind of food production for exports has the most positive impact on sustainable development or if there are better alternatives?

#### What about consumers – their behaviour and education?

Without doubt consumers' choices have an additional impact on the energy footprint. In the context of a consultation on air freighted organic goods the Soil Association Standards Board concluded (amongst other things)<sup>1</sup>: "Informing consumers should be a key part of addressing concerns about air freight. There are various channels for doing this online and through the media. Air freight labels, however, do not give consumers enough indication of the climate change and development impacts associated with the product. Carbon labels could provide a better indication of climate change contribution, however, this is dependant on a number of factors, such as methodology and use, which are still playing out."

As shown in Table 1 for potatoes, the choice of cooking method can have a significant effect on the energy footprint. Swedish grown potatoes oven baked (29 MJ/kg) require over five times the energy of boiled (5.4 MJ/kg) ones:

-> Based on the amount of energy spent, one consumer can go for oven baked potatoes with local apples while the other one chooses cooked potatoes with

1 Following a lengthy consultation on air freighted organic goods, the Soil Association Standards Board decided to allow organic air freighted food to carry its certification mark; at the same time the standard requires monitoring of air freighted organic goods.

air freighted strawberries, and both have the same energy footprint.

- > Equally, one consumer can shop by bicycle buying air freighted green beans from Kenya and the other one drives ten kilometres by car to get the same beans locally grown. Both would cause the same amount of CO<sub>2</sub> emissions.

Well, this is a bit like comparing the bad with the worse. Definitely the perfect consumer would be vegetarian, eating potatoes boiled not oven baked, shop local apples from season only and doing all groceries by bike.

### The impact of lifestyle

Comparing the North's lifestyle's impact on climate change to the one eventually be affected by a ban of airfreight or other restrictive measures for organic products, the decision on what action has to be taken is rather simple – even if not popular here. The average annual carbon footprint<sup>2</sup> of a person in the developed world is around 10 tons CO<sub>2</sub> equivalence, compared to 0.23 tons CO<sub>2</sub> equivalence per person for people in the 50 poorest countries of the world (Source: World Development Movement). This means that after nine days an inhabitant of the UK has already caused more emissions than a person from the 50 poorest nations will throughout the complete year!

The argumentation is that transport of food by plane or over long distances can not be justified in view of climate change. But can we afford to live in overheated houses without proper insulation? Can we afford to continue conventional agriculture? And, can we afford to go on holiday by plane? One tourist flight from Germany to Kenya causes 4.3 tonnes of CO<sub>2</sub> emissions per person (source: Atmosfair). One kg of food air freighted causes around 8.5 kg CO<sub>2</sub>/kg. So we could buy a lot of imported vegetables instead of one holiday flight<sup>3</sup>.

The 'funny' thing - we are aware of the negative impact of us flying everywhere we want. But in order to keep our lifestyle as it is, we start to look for compensa-

tion and introduce a system of "carbon neutral products" in order to still get all that we want. By paying a bit more for the flight, we finance the introduction of low energy light bulbs into African villages, or the planting of trees so that our CO<sub>2</sub> emissions are taken up somewhere else. We pay some more for the apples we eat in summer, so that somewhere else compost making can be financed to sequester CO<sub>2</sub> caused by transporting fruits to us (which is of course better than importing fruits and not caring for the damage caused). We request others to avoid or reduce emissions, but we only want to compensate for them.

### Conclusion

While everyone agrees that food transport has to be discussed, other factors influencing the impact on the climate have to be tackled as well, including lifestyle, conventional or organic production, vegetarian or meat diet, and others. With this in mind a balance needs to be found when arguing about what is right or wrong as other relevant issues have to be considered when trading organic products, like:

- Production for food security, poverty alleviation and social development
- Production systems with a holistic approach considering impacts on the environment, natural habitats and resources (e.g. water)
- Energy sources for production and transportation

Finally, consumers' awareness must be raised. Their individual behaviour and eating choices may impact reduction of GHG emissions more than with production or transport can ever be achieved. Carbon labels can help in creating such consumer awareness and carbon neutral products should support sustainable development where it is needed most – in the developing countries.

*Judging long distance transport as good or bad is a tricky issue!*

2 Measurement of all greenhouse produced individually in tons of carbon dioxide equivalent.

3 Tourism facilitates air freight of products by developing the infrastructure for air cargo; other countries do not have the option of air freight because there are no regular flights for people. As long as there is tourism, there will be free cargo space -> should it rather be filled with conventional or organic produce?

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## Navigating in a local context – farmer experiences on small scale selling on local markets

I'm a baker. I use only organic/biodynamic ingredients. The bakery is organic certified. I have my own mills in the bakery, therefore I'm able to use fresh wholegrain flour. Which I also do. The cereals I use is only spelt and rye grown in my province. I buy the grains direct from the farmer. The breads are fermented a long time only with natural sourdough. Therefore they will taste more, have good benefit for your health and last longer. They are made by hand and each bread is individual. For each kg of cereals that pass through the bakery I spend 1 SEK on buying more "biological diversity and biological density" – mainly on the farms where the cereals are grown. I turn mainly to customers in my province.

It is a challenge to educate a customer in all my added values ...

And to get them to buy the bread – learn what they want to hear – not only tell what I want to tell.

I run a local, small scale, environmental friendly company.

### – what is opposite of local?

I run a remote company. Yes, that would apply on some manufacturing industries as for example the Swedish Runöl who is famous for their local beer – which is manufactured in Germany. Isn't virtually every company that handles food stuff local in the local area? In Linköping where I live we have been honoured with local foodmanufacturers as Arla and Scan.

And what is automatically so environmentally friendly with the local food? The short transports of course! Start counting on emissions I have a rate of 7 kWh/tonkm for my local transports of the bread. In average 100 kg bread 70 km with my father's car. To get perspective,

professional long distance transports is usually regarded with 0.2 kWh/tonkm and short distance 0.7 kWh/tonkm. Transported with professional transport I would with the same emissions easily reach from Göteborg to Kiruna and still have 210 km left for local delivery.

I'm sure many small scale local producers sits in the same trap.

Nowadays the local small scale and environmental friendly food automatically is placed also on the organic map. I have several examples of "local producers" at home who have never claimed themselves as organic – but are regarded as organic by the public. This is a growing problem and we can talk more about the origin later.

Now I have an employee in the bakery. Orhan was not able to apply for a job in text – perhaps in Romani which I don't understand. He just gave me a short phone call. Now we both work 75% of full time. It's very important to keep weeks short and have more time with family and to enjoy your life beyond the company.

Orhan says "Janne ikväll ska vi mala Roger och baka bröder!" To afford an employee you need to have done proper calculations of how much you earn per hour. Otherwise this person will maybe drain your whole profit.

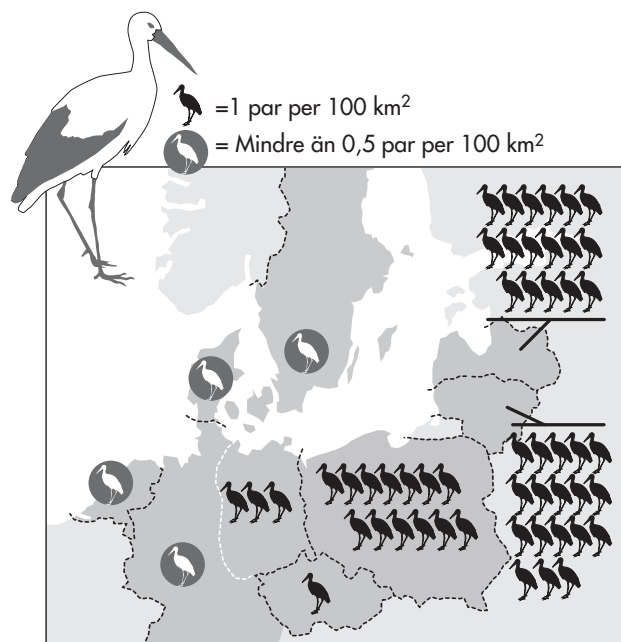
Having children when raising a company is not a problem. No one will ask you how you will cope with both of them. Except if you are a woman, then you will be severely interrogated how to solve the company and a little child at the same time.

Running a company like this you will be virtually attacked with persons who invites you to different types of meetings to gain the local market and the local food, and

the local companies. My own experiences is that many of these meetings and projects, which often demands cooperation with companies for gaining money from somewhere, will drain you on energy. There is only one partner who has given me energy from start and that is Eldrimner. A government supported organisation who's order is to support companies who does artisan food.

I believe in justice between species, generations and countries. Especially dedicated I am to biological diversity in the agricultural landscape. This dedication is gained from several years of studying bird's ecology and a lot of experiences from Eastern Europe. My conclusion is that organic farming is better for diversity than conventional. But to receive a modern type of agriculture where species that should be here also will be here, it demands much more of changing structure of the landscape. And the way how to utilize the fields.

Traditionally I have belonged to the more radical NGO's and worrying consumers. I'm still the same person but with another dress code! I now have the role of a company which is a new political platform for me. It is an attractive platform from where I can spread my visions. With relative small investments and in a short period I have had an amazing response from media, consumers, retailers, different types of projects and organisations.



*Stork populations; one black bird equals 1 nesting couple per 100 km<sup>2</sup>, one white bird in grey spot equals less than 0,5 nesting couples per 100 km<sup>2</sup>.*

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## How to deal with food chain bottlenecks with concerted action promoting learning

Today there are, with a few exceptions, hardly any connections between food producers and consumers. Small organic food producers have difficulties to reach potential consumers and customers. They have small, if any, resources to distribute and market their produce. Their amount of produce is often low and varied, implying that they cannot compete with large national and international food companies and retailers in supplying restaurants, school and hospital kitchens with their demands on cheap, uniform and semi-manufactured produce. Development of local food production and agricultural enterprises may favour rural development in general.

This paper explores some efforts of dealing with the complex and interconnected food chain problems described above. It is based on the experiences from a number of local workshops aiming at promoting learning and change among stakeholders with different (and some times contradicting) interests and experiences concerning food production, processing and consumption.

### Workshops for joint action and learning

The workshops took place in three Swedish regions between 2000 and 2005. They were included in projects financed by regional authorities or organisations that are dealing with issues of farming, food production, environmental problems or rural development. Although the regional initiators were not connected among themselves, the idea of taking a learning approach and initiate the workshops had risen from similar thoughts and ideas.

Traditional expert knowledge is not sufficient to deal with the complex and interwoven problems concerning

environmental issues, local food production and rural development. The workshops could create space for “ordinary” people as well as experts to discuss ethical, economical and environmental issues connected to the food chain, to define and develop knowledge about problems and come up with suggestions to how to deal with them on a local level. This inspired new ways of looking upon and dealing with issues and problems, and thus for the development of new ways of cooperation and action. All initiators took the starting point from the view that different and contradicting interests, experiences of our food system and its problems can be used as a base for joint learning rather than as a base for conflict and competition.

The design of the workshops varied depending of the scale of the initiating projects, and resources and money that were put on them. Some contained a sequence of many workshops that were addressed to same actors and took place within a defined time period. Others contained only one single workshop lasting for a day or two. The invitations to the workshops were very broad, addressed to farmer’s organisation, consumer organisations, environmental organisations, local folklore societies, supermarkets, restaurants, school and hospital kitchens, and to regional and municipal politicians and authorities etc. The initiators aimed for the invitation to attract people that in one way or another were engaged in the issues at hand. All workshops contained two, more or less well defined steps:

- 1) Creating a joint rich picture of the situation of the local food chain and its problem.
- 2) Finding solutions to problems that were identified.

### Results and conclusions

The workshops included people that were eager to take part in practical issues regarding the creation of better distribution, market and sales channels for local and/or organic producers and thus opportunities for consumers and customers to easily find their way to the supply of locally produced food. Thus, almost all workshops initiated collaboration among actors that by and by resulted in new projects. For instance, a supermarket owner created a specific “local product corner” in his shop for seasonal and locally produced vegetables and herbs, easy to find for consumers; a group of small producers made an agreement with responsible authorities of their municipality of using the school kitchen during periods when the school was closed for processing jam, marmalade and juice; another group of producers started a local brand of vegetables and processed food from a certain area.

Many ideas were born during these workshops that were never realised because of unrealistic expectations, because no one wanted or was able to take responsibility or because contradicting interest became clear but never dealt with during the process. Further, there were also participants that did not come to the workshops in order to find concrete solutions to problems in the first place, but for curiosity and/or for being inspired by the discussions about urgent and interesting issues connected to local food production.

The long term effects of the workshops when it comes to survival of the concrete projects have not been

evaluated. However, one of the projects, comprising a sequence of several workshops and meetings was evaluated in terms of the learning potential of those involved. The results show that the actors involved learned in the four domains that can be regarded as important in order to improve problematic situations due to recurrent meetings with actors from different “links” in the food chain:

- (1) they learned about facts concerning constrains and possibilities of local production and consumption
- (2) they developed relations to actors with different interests and learned to accept and incorporate norms and vales of other actors to their own perspective of local food chain challenges
- (3) they learned about themselves, their limitations, capacities and roles in the process
- (4) they learned how to cooperate and deal with similarities and differences among other actors to improve the development of a local food system.

Learning processes within local food systems involving actors with different interests and experiences may be important in order to understand and manage situations that they are part of, leading to a better comprehension of the complexity of the system and its context and thus to the possibilities of those involved to take concerted, more informed and efficient action.



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# The role of consumers acting on small scale local markets

The literature about local food networks has been flourishing in the last decade, giving place to on-going debates about the specific role of consumers in these systems and the potential role of proximity in the transformation of production and consumption food systems. The arguments in favor of local food networks' "resistance to agro-food distancing" and the positive effects of proximity (Winter, 2003) have been discussed by many authors (see Feagan, 2007 for a recent review of these debates). This paper aims at identifying the main types of consumers' involvement and at discussing the effects of some local food systems in terms of social equity. It is based on a literature review on alternative food system initiatives and on fieldwork and on various case studies carried out in France about CSA-type box schemes called AMAP and their networks<sup>1</sup>. The first AMAPs (Associations pour le Maintien d'une Agriculture Paysanne) – today nearly a thousand local consumer groups – were initiated in the early 2000s and their principles are quite similar to the US Community Supported Agriculture model. These consumers enter into medium-term contracts with one or more producers who undertake to supply them with a weekly box of fresh organic farm produce. The aim of this reciprocal commitment is to guarantee the viability of the farms, and to establish an equitable relationship

between producers and consumers. In a first part, I will present the main types of consumers' involvement and in the second part I will discuss some possible impacts of local food systems.

## 1. Two main types of consumers' involvement<sup>2</sup>

In order to understand the nature of consumers' involvement, it is necessary to assess both their motivations and trajectories, and the mechanisms developed by local food networks and organizations to mobilize them. There is a plurality of consumers' motives and trajectories towards alternative food systems. In the case of the French AMAPs, we can identify three degrees of involvement, corresponding to different views of the box. For the "less engaged", the box represents above all an original mode of buying good, healthy and tasty products. These "Amapians" often first contacted the AMAP out of a concern for their health or an interest in this alternative form of consumption and are not necessarily interested in the producer's sake or in issues of responsible consumption in general. Others see the box as an original form of trade with a "family farmer" and are mainly interested in local consumption and interpersonal relations with producers. Finally, for the most engaged consumers, the box is both an engagement to support farmers, as well as an act of citizen consumption relative to the broader concern of the future of the agri-food system. The movement and its organizations therefore have to come to terms with this plurality of trajectories. This is of course the case of most social movements but the particularity here, in the rifts produced by this diversity, is the forms of opposition

<sup>1</sup> The literature review on alternative food systems has been achieved during the C3D project, financed by the French National Research Agency (2005-08). Alternative agro-food networks gather very different initiatives, from fair trade to box schemes or farmers markets. Here we will focus mainly on box schemes, although fair trade will be taken as a counterpoint. The data comes from an on-going ethnographic analysis of French AMAPs based on in-depth interviews (n=50), participation to various meetings of the network at regional level between 2002 and 2008, and observations (e.g. distribution of the boxes, farm visits).

<sup>2</sup> This section is largely adapted from a recent publication: Dubuisson-Quellier and Lamine, 2008.

between what are thought to be citizen engagements and a logic that could prove to be still “too” consumerist as is often heard in the networks debates. If we try to get out of this citizen/consumerist opposition in order to qualify the nature of consumers’ engagement, the study of these alternative networks leads us to confirm the existence of the two main kinds of consumers’ involvement which had already been identified in the case of organic eaters in my doctoral work (Lamine, 2003). These organic consumers would choose organic products either by delegating their choice to the organic label or, in some specific cases like in AMAPs or other alternative systems such as some cooperatives, by getting involved in the construction of the production and marketing system. The first type of consumers’ involvement may be called delegation and is based on market mechanisms developed by local food networks and organizations, and it allows routinized purchases. The second one is called empowerment and is based on ad hoc contractual mechanisms between consumers and producers aimed at organizing the participation of consumers in deliberative and collective processes of choice.

This proposition is directly driven from several recent works in economic sociology, deeply inspired by the Actor Network Theory (ANT) and the Convention Theory (Boltanski and Thevenot, 2005). In this perspective, the market is assessed as a dense network of mechanisms and operations that allow markets actors to coordinate (Callon, 1998). In the market space, mechanisms such as trademarks, labels, prices, advertising, merchandising, or product design produce this “delegation” process: consumers rely on the presence of a label or a standard to make their purchase choices, and therefore delegate their operations of selection and control. The regime of delegation is close to the concept of individualized collective action (Micheletti, 2003) which describes individual involvement which can generate collective effects. For example, mainstream fair trade organizations try to make consumers responsible by explaining them that their individual choices can aggregate and generate a collective action, while other ones seek to promote strong consumer commitment in political and economical life through local involvement for example in the public buying policies of their local authorities. They work at locally connecting production and consumption actors in networks of empowered actors. However, fair trade is mainly characterised by the delegation regime, whereas the case of AMAPs

shows much more oscillations between delegation and empowerment in consumers’ commitment.

Indeed, AMAPs’ box schemes combine an entire delegation of the choice of products in the transaction by the individual consumer and a necessary although variable empowerment of all consumers taken collectively in the negotiation with the producer of the conditions of production, before the transaction. However, this negotiation does not necessarily need to take place as frames often exist already. If the farmer has the organic certification, the conditions of production might not really be discussed; consumers trust the label and do not want to know or inquire much more. If the farmer is not certified, the question has been debated at the very beginning and assessed through a kind of participative evaluation system involving both experimented farmers and consumers. Actually, it is when problems occur that real processes of negotiation might appear. It sometimes happened that a producer could not deliver enough quantity and/or diversity of vegetables in a box. In that case, some individual consumers wanted to get out of the system, which reveals a negative effect of aggregation, which we can consider as the reverse of the individualized collective action linked to the delegation regime. In such cases though, the organization’s leader would usually try to gather the consumers and to discuss the farmer’s difficulties and the possibilities of improvement through the involvement of all or some consumers who could offer their specific skills (one is an accountant, one an agronomist; another knows old ways of fighting weeds or diseases, etc.).

These two kinds of consumer involvement, delegation and empowerment, cannot be described as two different worlds, even if some actors may present them as irreconcilable: they are ideal types in the Weberian sense. Alternative food networks suggest a framework for mixed behaviours of consumers that associate multiple types and degrees of consumer involvement, from the delegation to fair trade or organic food standards that may sometimes be little known by consumers to a strong involvement of consumers such as in some local food systems such as AMAPs. Between these two very specific positions, most consumers adopt intermediary behaviour, combining delegation and at certain times and participation in collective choices about production and consumption. Moreover, consumer involvement often changes over time.

## 2. The possible impact of alternative local food systems<sup>3</sup>

In Europe, the focus of the growing literature about local and/or alternative food networks has largely been put on local food networks as “new” (collective) forms of marketing for farmers and as contributing to the possible advent of a new rural development paradigm (Van Der Ploeg, 2007). In North America, many studies have analysed these local food networks ambition and potential to create meaningful change in the food system. Some authors try to transcend the tension between the alternative potential of these local food systems, which relies on a pragmatic and incremental way of acting, and their oppositional potential, which supposes more classical political action, by suggesting the notion of “food democracy” (Hassanein, 2003). Others consider they are more oriented toward developing new alternatives for consumers in a more diverse food system than toward changing the dominant food system (Allen et al., 2003). Finally, a great part of the recent literature has been devoted to the debate over the arguments of local food networks’ resistance to agro-food distanciation and of proximity’s positive effects (Feagan, 2007 for a review). Many authors have pointed out the fact that local communities are not intrinsically egalitarians nor democratic. Localism is sometimes a way for local elites to create effective territories for themselves (Dupuis & Goodman, 2005), and examples in France can be found in a long tradition of promoting locally grounded “quality” foodstuff like wines, cheeses or cooking. What is the place of less-favored social groups, in terms of economic, social, cultural and food or culinary capital? The case of French AMAPs shows that this system is not always a good solution for farmers who are in great difficulties. Some producers, despite the guarantee of regular income offered by the system, are not able to produce in sufficient quantity, most often because the conversion to such a system is very demanding and they might not get enough support both from consumers and from other producers. Regarding consumers, there are almost no AMAP in less favored areas. However, some AMAPs members share the price of an extra box to give to a needy family, but this remains anchored in a basic charity view. In order to build a more lasting commitment, other AMAPs try to involve local authorities so that they would deliver

food vouchers that could be used by underprivileged families to pay for the weekly box. Besides, there is a risk that such systems might generate new asymmetries between producers and consumers: the AMAPs can become structures in which consumers have most of the decision-making power, and the producers become their “suppliers”, compelled to meet consumers’ demands just as they were formerly forced to comply with the terms and conditions of mass distribution.

Another series of questions deals with the possible consequences of such a focalization of food issues at local scale in terms of larger transformations of the agro-food system. Concentrating the attention, the efforts and the means on local food networks in certain places might lead to leave aside social groups, entire regions, which would have more difficulties and less means to settle such networks. In the case of farm to school programs in the USA, with the transfer from federal programs based on surpluses and initiated in the 1930s to local initiatives, the guarantee of equal access and protection under the law was partly replaced by the rhetoric of neo-liberal governmentality, based on themes like personal responsibility, consumerism, and choice replaced (Allen & Guthman, 2006). In France, the choice to launch organic and/or local procurement programs, though strongly encouraged by the government since 2007, depends on the local authorities, and many discrepancies are to be observed, just as in the USA or elsewhere probably. There might be mechanisms of capture of production potentialities (scarce concerning organic agriculture) by well to do or more competent communities who can afford such local food systems. This shows the necessity for mechanisms of social and territorial equity at an accurate scale.

In a way, individual consumption shows similar trends than these farm to school programs, with similar possible consequences in terms of social equity. The State might guarantee less and less control on food rights, while favored populations would adopt alternative food systems or quality schemes created by corporate groups for those who can afford them<sup>4</sup>. We can talk of a converging trend between the withdrawals of the welfare state from certain prerogatives, the local initia-

3 This section is based on a recent communication: Lamine C., Deverre C. Is local (food system) beautiful? SusConf 2008, Arlon, Belgium, 28-30 mai 2008.

4 Most private quality schemes are much more conceived to guarantee the traceability of products and protect the retailers in case of food scandals, than to protect the environment or to better the diet of less favored social categories ...

tives of some local authorities or communities and the organization of corporate food actors to develop quality schemes for those who can afford their products. There are two main consequences to this evolution. Besides the risk that some regions or social groups might see their food rights being endangered, we have to question the consequences of the States's withdrawal in the support of food rights but also of transitions towards more sustainable forms of agriculture. Public policies, especially through the European Common Agricultural Policy, have been clearly accountable in the last decades for the strengthening of the dominant agro-food system, with its social and environmental consequences (marginalization of smallest farms, standardization of food, water pollution ...) but also its undisputable redistributive effects, which led to a long period of low food prices, a relative rise of (remaining) farmers' income, and a widespread access of food to all European regions and districts, whatever their localization or social status. Can local food networks be able to rebuild another socially and environmentally sounded food system, leaving state intervention just editing "good" food sanitary rules and "fair" competition conditions?

### Conclusion

We have seen that the degree and nature of consumers' involvement varies a lot from one case to another. Despite the undisputable potential of local food networks in terms of reskilling of consumers and producers (Jaffe & Gertler, 2006), despite their positive impacts in many areas for local producers and consumers in terms of quality of work and food as well as social links, conflating citizenship and consumerism might reinforce the idea that social change is mainly a matter of aggregated individual wills and actions rather than something that has to be debated and defended collectively and sustained by public law according to civic values (Allen & Kovach, 2000). Therefore the question of whether local food networks constitute a major turn in the path of food system change or just a new market "niche" for some producers and consumers (Goodman 2004) is still open.

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## Uthållig förvaltning av landskap – ett samspel mellan människa och natur

Hur skall vi göra för att bibehålla artrikedomen i jordbrukslandskapet? Hagmarken är en av landets artrikaste naturtyper. På en enda kvadratmeter kan man hitta upp till 25 olika växtarter. Bete och kompletterande skötsel är en förutsättning för att de biologiska värdena dessa så kallade naturbetesmarker hyser, skall bibehållas. Naturbetesmarkerna passar emellertid illa in i det moderna jordbruket, varför deras utbredning kraftigt minskat under de senaste 60 åren. På grund av markernas relativt sett låga produktionsförmåga, och svårigheterna att få till stånd en ekonomiskt rationell markanvändning är särskilda insatser från samhällets sida en förutsättning för fortsatt hävd. De kvarvarande svenska naturbetesmarkerna har därför kommit att bli bevarandeobjekt. Mot bakgrund av Konventionen om Biologisk mångfald, som Sverige undertecknade vid FN:s Rio-möte 1992, utgör bibehållandet av hela den svenska hagmarksarealen ett delmål under miljö kvalitetsmålet "Ett rikt odlingslandskap".

### Betesmarkerna behöver förstås i sitt sammanhang

Djurhållande bönder och fritidsbrukare kommer under överskådlig tid att vara "nyckelarten" för den biologiska mångfalden i betade marker. Därför är det angeläget att veta mer om förutsättningarna för deras arbete och vad som får dem att vilja fortsätta. För att ta reda på detta gjordes intervjuer med betesmarksbrukare i fyra olika delar av landet; i Berg och Lerdala församlingar på Billingen, i Malmbäck och Almesåkra församlingar på Småländska höglandet, i Sködinge och Lerbo församlingar i Södermanland samt i Offerdal och Kalls församlingar i mellersta Jämtland, inom ramen för forskningsprogrammet HagmarksMistra.

En central slutsats från intervjustudien är att naturbetesmarkerna behöver förstås i sitt sammanhang. Betesmarkerna är inga isolat, utan skötseln av dem ingår vanligen som delar i aktiva lantbruksföretag. För att betesdriften skall bestå krävs tillfredsställande villkor för hela verksamheten. Vidare behöver nya brukningsformer stimuleras, såväl storskaliga lösningar, som tids- och arbetsbesparande skötselsystem i den lilla skalan liksom samverkansformer för brukandet av marker i bygder med olika karaktär. Samtidigt varierar naturbetesmarkernas betydelse för landskapsbilden, liksom deras ekonomiska vikt för lantbruksföretagen, deras plats i människors medvetande och funktion vad gäller trakters identitet. Det kan också finnas mer brännande frågor som konkurrerar om uppmärksamheten, inte minst avfolkningsproblematiken i glesbefolkade områden. En rimlig strategi bör därför vara att ge förutsättningar för lokalt anpassade lösningar att växa fram, med fördel i en befruktande interaktion mellan landskapsvård och landsbygdsutveckling.

### Involvera brukarna och gör dem delaktiga

En annan viktig fråga rör lokal delaktighet. För att landsbygdens landskap och dess värden skall skötas på ett hållbart sätt, krävs det att brukarna medverkar och har inflytande. Om brukarna involveras i större utsträckning, blir effekten troligen att skötselsystem och skötselmetoder bättre anpassas till förutsättningarna i olika trakter. Naturbetesmarkernas brukare är intresserade av att blir mer aktiva och ta del i utformningen av målsättningar och skötselplaner. De känner i regel stolthet över att äga marker med särskilda värden, vill gärna att den biologiska mångfalden består i deras ha-



gar, och bär en känsla av ansvar för detta. Men hur skall den lokala delaktigheten utformas? Denna fråga adresserades i en studie av samarbetet rörande landskapet på södra Öland.

På södra Öland finns mycket höga biologiska värden i Stora alvaret och sjömarkerna, kalkrika marker som betats under årtusenden. I landskapsvårdskretsar har området blivit omtalat för den samverkan som där skett mellan myndigheter och lantbrukare, bland annat världsarvsutnämningen. Genom intervjuer och dokumentstudier framkom faktorer som varit lyckosamma; ömsesidig respekt, möjligheter till lokalt inflytande med formella forum för dialog mellan brukare och myndigheter och utvecklandet av en gemensam förståelse i frågan. För lantbrukarna är det viktigt att få vara delaktiga i ett sammanhang med övergripande strategidiskussioner, där landskapsvärden betraktas som integrerad del av jordbruket och bygden. Frågan om delaktighet är därför svår att begränsa bara till markanvändningen. Därtill har självfallet tilltagna ekonomiska resurser för ersättningar till lantbrukarna och för personalresurser från myndighetssidan haft stor betydelse.

Samtidigt framträdde också försvårande aspekter. Förutsättningarna för samverkan är i hög grad knuten till intresset och förmågan hos enskilda handläggare. Detta pekar på ett behov att utveckla strukturer och strategier som kan överleva personalförändringar, och som inte riskerar stor arbetsbelastning för ett fåtal. Vidare blir långsiktigheten och hållbarheten i samverkan betänkelig när ambitioner om samförstånd endast gäller vissa satsningar och projekt, medan andra sköts på annat sätt. Från brukarnas håll är en sådan bristande helhets-syn svår att godta, samtidigt som det ger tjänstemännen en svår arbetssituation. Problematiken på Öland har sin grund i en kollision mellan två konstitutionella regler, som sätter olika ramar för hur beslut om marken skall tas; världsarvsprocessen förutsätter lokal delaktighet, medan skyddsvärda landskapskvaliteter bestäms på central nivå i EU:s naturvårdspolicy Natura 2000.

Sammantaget motiverar resultaten en diskussion kring vilken kompetens som behövs i arbetet med landskapsfrågor inom exempelvis länsstyrelsernas naturvårdsenheter. Vilka konsekvenser får den växande insikten om att naturvård inte bara handlar om biologi utan till en avgörande del också om människor, relationer och kommunikation?

### **Naturbetesmarkernas framtid**

#### **– en fråga för skattebetalare och konsumenter**

Handlar då naturbetesmarkernas framtid bara om böndernas agerande? Nej, allmänheten spelar ur flera aspekter avgörande roll för att dessa värden långsiktigt skall finnas kvar. Allmänheten har inflytande över samhällets utveckling, dels som medborgare och dels som miljöaktörer. Som medborgare påverkar vi samhällets prioriteringar genom vårt deltagande i det demokratiska samtalet. Inga politiska idéer överlever utan folkligt stöd, hur välgrundade de än må vara. Frågan om en satsning på "folkbildning", en höjning av den allmänna kunskapsnivån om biologisk mångfald har därför väckts. Stadsnära betesmarker för rekreation kan fungera som en länk mellan dagens svenskar, som till 84 % bor i tätorter, och landsbygdens landskap.

Miljöaktörer är vi i egenskap av konsumenter på en marknad. Att stimulera försäljning av "naturbeteskött", och låta konsumenterna betala för produktens mervärde i butiken är därför ett alternativ vid sidan av jordbrukspolitikens ersättningar, till att öka de företags-ekonomiska förutsättningarna för fortsatt nyttjande av naturbetesmarkerna. En fördel med detta alternativ är att länken mellan konsumentens efterfrågan och produktionen stärks. Genom att köpa kött från djur som betat på naturbetesmarker och då acceptera ett högre pris i gengäld mot "bibehållen biologisk mångfald" kan vi i konkret handling bidra till uppfyllandet miljömålet om hagmarkerna.



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## Hur kan den biologiska mångfalden i jordbrukslandskapet ökas?

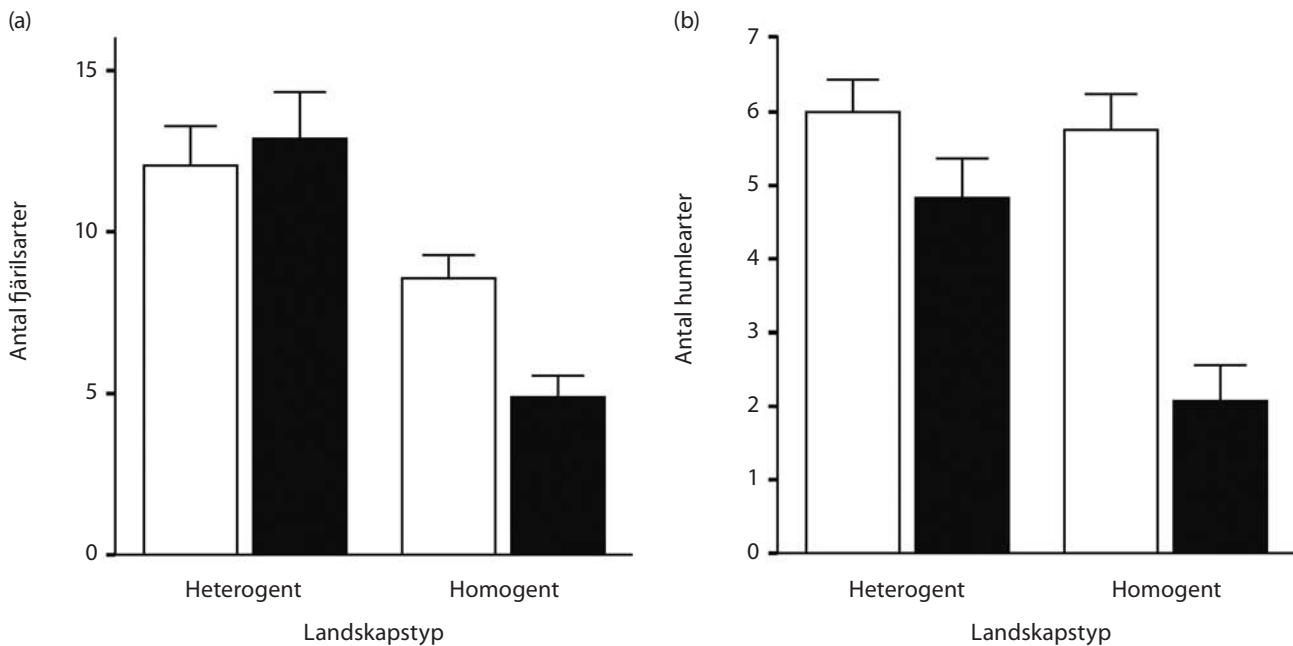
Brukandet av jordbrukslandskapet har förändrats dramatiskt under det senaste århundradet (Tilman *et al.* 2001, Robinson & Sutherland 2002). Det tidigare mosaikartade landskapet, med en blandning av små åkrar, ängar, haggar och våtmarker, har idag i många områden ersatts av ett likformigt landskap som domineras av vidsträckta åkrar. Samtidigt har användandet av konstgödsel och kemiska bekämpningsmedel ökat. Tillsammans med den strukturella förändringen har det lett till en ökad produktion inom jordbrukssektorn, men också till att många arter som lever i jordbrukslandskapet nu minskar i utbredning och riskerar att utrotas (Benton *et al.* 2003). Biologisk mångfald har inte bara ett värde i sig, utan kan också gynna jordbruksproduktionen genom de ekosystemtjänster som arterna utför. Ekosystemtjänster är alla de tjänster som ekosystemen och dess arter bidrar med till mänskligheten, som till exempel reglering av skadegörare och pollinering av grödor (Costanza *et al.* 1997).

Det finns huvudsakligen två tillvägagångssätt för att öka den biologiska mångfalden i jordbrukslandskapet; anläggning av halvnaturliga livsmiljöer och extensifierat brukande av åkermarken (Hoogeveen *et al.* 2002). I Sverige, och i andra länder som är medlemmar av den Europeiska unionen (EU), används miljöersättningsprogram som ekonomiska styrmedel för att minska jordbrukets negativa påverkan på miljön (Kleijn & Sutherland 2003). Jordbrukare kan inom programmen ansöka om ekonomisk ersättning för åtgärder som gynnar miljön och den biologiska mångfalden. En av de möjliga åtgärderna är att övergå till ekologisk odling, vilket resulterar i ett extensifierat brukande av åkermarken. Andra möjligheter är att fortsätta skötseln av gräsmarker och att anlägga och sköta småbiotoper. Förekomsten av betesmarker och

andra mer halvnaturliga landskapselement, som småbiotoper, resulterar i ett mer heterogent och variationsrikt jordbrukslandskap med fler lämpliga livsmiljöer för de växter och djur som lever i jordbrukslandskapet.

Minskad ekologisk heterogenitet, både lokalt och på större landskapsskalor, anses idag vara ett av de största hoten mot biologisk mångfald i jordbrukslandskapet (Benton *et al.* 2003, Tschardtke *et al.* 2005) och ökad ekologisk heterogenitet, i både tid och rum, har föreslagits vara nyckeln till att bevara jordbrukslandskapets mångfald (Benton *et al.* 2003). Mer variationsrika och heterogena jordbrukslandskap, med en stor andel gräsmarker, småbiotoper och mindre storlek på åkrarna, ger en större artrikedom av bland annat växter och blombesökande insekter (Rundlöf & Smith 2006, Rundlöf *et al.* 2008a; figur 1), och flera studier har visat att den biologiska mångfalden ökar med ökande landskapsheterogenitet (Weibull *et al.* 2003, Tschardtke *et al.* 2005). Halvnaturliga gräsmarker kan vidare fungera som källor för biologisk mångfald, och potentiellt bidra till fungerande ekosystemtjänster, i mer intensivt brukade jordbrukslandskap (Öckinger & Smith 2007).

Jordbrukslandskapets heterogenitet kan samverka med brukningsintensiteten i hur den biologiska mångfalden påverkas. I många undersökningar har man funnit större art- och individriktighet av växter och djur på ekologiskt brukad mark än på den konventionellt brukade, men jämförelser mellan odlingsätten har gett blandade resultat (Bengtsson *et al.* 2005, Fuller *et al.* 2005). De motsägelsefulla resultaten kan dels bero på skillnader i hur studierna utformas (Bengtsson *et al.* 2005), dels på yttre faktorer, som till exempel i vilken typ av jordbrukslandskap som studien är gjord (Rund-

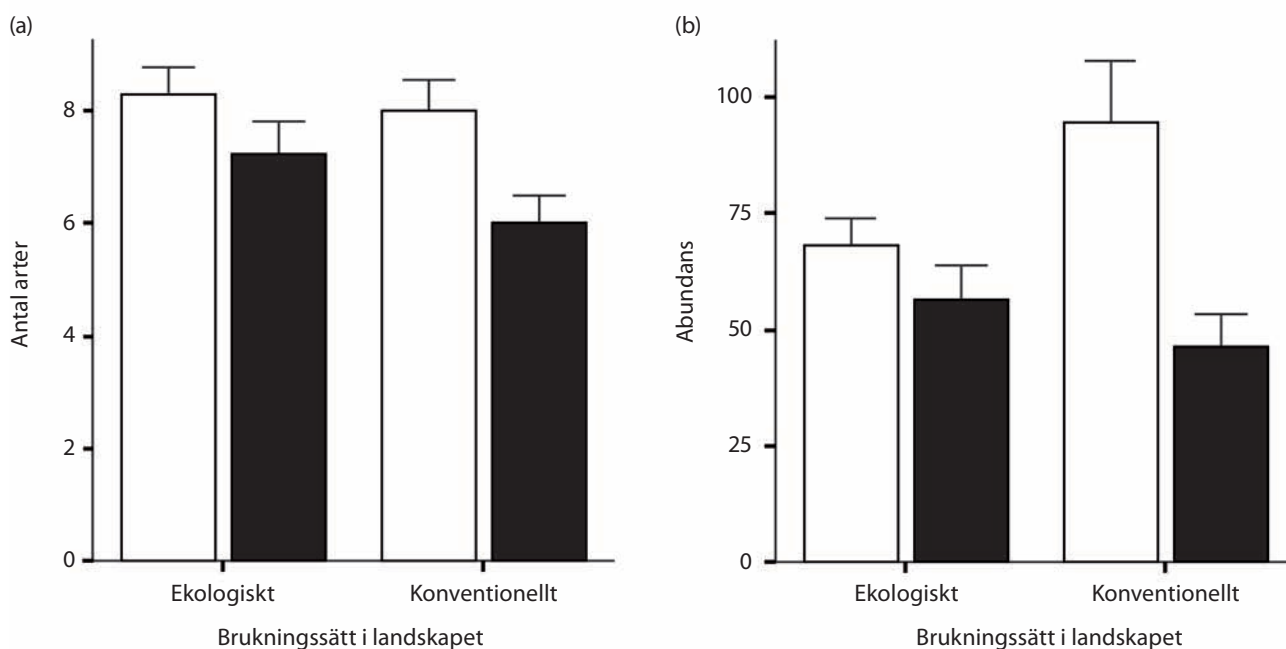


Figur 1. Artrikedom av fjärilar (a) och humlor (b) i relation till bruknings sätt (ofyllda staplar – ekologiskt, fyllda staplar – konventionellt) och landskapsheterogenitet. Staplarna visar medelantalet arter per gård och år, felstaplarna SE och  $n=6$  gårdar per brukningsform och landskapstyp.

löf & Smith 2006), hur stort område som är omlagt till ekologisk produktion (Rundlöf *et al.* 2008b) eller vilken organism som studerats (Fuller *et al.* 2005). Ekologisk odling verkar relativt konventionell odling gynna den biologiska mångfalden i högre grad i mer homogena intensivt brukade slättbygdslandskap, jämfört med i mer heterogena extensivt brukade mellanbygds- och skogsbygdslandskap (Roschewitz *et al.* 2005, Rundlöf & Smith 2006, Rundlöf *et al.* 2008a; figur 1). Vinsten i biologisk mångfald blir alltså större med ekologiskt jordbruk i homogena intensivt brukade odlingsområden när man jämför med motsvarande gård med konventionellt jordbruk. Det kan bero på att det är större skillnad mellan odlingsystemen i sådana landskap, till exempel är användningen av bekämpningsmedel inom den konventionella odlingen högre där (SCB 2004). Men det kan också bero på att mer varierade landskap redan har så stor biologisk mångfald att en liten förbättring i livsmiljön inte gör så stor skillnad (Tschardt *et al.* 2005).

En omläggning till ekologisk odling verkar spela

olika stor roll beroende på vilken organismgrupp som studeras (Fuller *et al.* 2005). Växter och växtsamhällets sammansättning påverkas direkt av kemiska bekämpningsmedel. Artrikedomen av växter är i de flesta undersökningar högre på ekologiskt brukad jordbruksmark än på konventionellt brukad mark (exempelvis Bengtsson *et al.* 2005, Fuller *et al.* 2005, Roschewitz *et al.* 2005, Rundlöf 2007), delvis beroende på att växterna direkt gynnas av avsaknaden av kemiska bekämpningsmedel och dels för att de direkt kan kolonisera från fröbanken. Andra organismer, som insekter, behöver närhet till källmiljöer för att kunna utnyttja lokalt förbättrad livsmiljö (Fuller *et al.* 2005, Öckinger & Smith 2007). Den ekologisk odlade jordbruksmarken förekommer idag ofta som isolerade öar, omgivna av konventionellt brukad mark, vilket gör att organismer som kräver större områden av förbättrad livsmiljö, som fåglar, inte påverkas av odlingsformen i lika hög grad (Fuller *et al.* 2005). Artrikedomen av växter och blombesökande insekter gynnas av större samlade områden av ekologisk odling, jämfört



Figur 2. Medelantal fjärilsarter (a) och individer (b) per 250 m och år i åkerkanter till ekologiskt brukade åkrar (ofyllda staplar) jämfört med antalen vid konventionellt brukade åkrar (fyllda staplar) i landskap med antingen hög (ekologiska landskap) eller låg (konventionella landskap) andel av den omgivande jordbruksmarken brukad ekologiskt. Felstaplar visar SE och  $n=7$  landskap per brukningsform.

med mer isolerade åkrar som brukas ekologiskt (Rundlöf 2007, Holzschuh *et al.* 2008, Rundlöf *et al.* 2008b; figur 2a). Det kan bero på att en stor andel ekologisk odling gör att det också finns större sammanhängande områden med gynnsam livsmiljö, vilket gör att fler arter kan överleva. Även konventionellt brukade åkrar påverkades av att vara omgivna av en stor andel ekologisk jordbruksmark, vilket tyder på att ekologisk odling inte bara påverkar artrikedomen på den ekologiskt brukade marken, utan också i omgivande områden. Å andra sidan verkar en åkers bruknings sätt spela större roll för förekomsten av fjärilar om åkern är omgiven av konventionellt brukad åkermark jämfört med om den är omgiven av ekologiskt brukad åkermark (Rundlöf *et al.* 2008b; figur 2b), vilket tyder på en "landskapseffekt" av ekologisk odling. Alltså verkar fjärilar, i landskap dominerade av konventionell odling, aktivt leta upp ekologiskt brukade åkrar och samlas där.

Det finns ett stort behov av att identifiera åtgärder som kan stoppa förlusten av biologisk mångfald i jord-

brukslandskapet, och det kan endast uppnås genom att förstå vad som påverkar förekomsten av arter. Sammanfattningsvis kan sägas att förekomsten av halvnaturliga livsmiljöer, som gräsmarker och småbiotoper, ger en ökad landskapsheterogenitet och som ett resultat större biologisk mångfald, men även ett mer extensivt brukande av jordbruksmarken, som ekologisk odling, leder det till en större biologisk mångfald i jordbrukslandskapet. Dessa två faktorer kan samverka och ibland ersätta varandra, men extensivt brukande utan ökad landskapsheterogenitet gynnar framförallt de mer vanligt förekommande och rörliga arterna. En ökad förekomst av vanliga arter kan, bara genom sitt stora antal, medföra ekosystemtjänster som pollinering av grödor och vilda växter och biologisk kontroll av grödors skadegörare (Kremen *et al.* 2007). Bevarande av mindre rörliga, ovanligare och mer specialiserade arter kräver antagligen mer specifika åtgärder än ett mer extensivt brukande av åkermarken, men en ökad landskapsheterogenitet som ger fler möjliga livsmiljöer av olika karaktär gynnar även sådana arter.

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# Effektiv kvävehushållning och mångfald i ekologiska växtföljder

## Sammanfattning

Kvävehushållning i det ekologiska lantbruket är en stor utmaning eftersom man är beroende av biologisk fixerat kväve och gödselmedel som innehåller mycket organiskt kväve. Det innebär att det finns en betydande risk för kväveutlakning utanför växtsäsongen. En bra växtföljd, en anpassad strategi för ogräsbekämpning, ny teknik och nya grödor kan minska problemen avsevärt.

## Kvävehushållning på ekologiska lantbruk

I ekologiskt lantbruk är en av grundpelarna att hushålla med växtnäringen och recirkulera denna i störst möjliga utsträckning. Målsättningen är att det ska vara balans mellan tillförsel och bortförsel av växtnäringssämnen. Alla biologiska system är dock mer eller mindre öppna och man har ännu inget bra system att återcirkulera växtnäring från konsumenter till producenter – varken inom ekologiskt eller konventionellt jordbruk.

## Växtföljd

En bra växtföljd är en förutsättning för att lyckas i ekologisk odling. Man varvar mellan närande (kvävefixerande) och tärande (icke-kvävefixerande) grödor. Dessutom försöker man varva mellan ettåriga och fleråriga grödor, höstsådda och vårsådda grödor etc. Växtföljden varierar mycket beroende på gårdens inriktning men på nästan alla ekologiska lantbruk är en klöverrik vall en bas i kväveförsörjningen.

En närande gröda påverkar dock bara kvävetillgången till de efterföljande grödorna i 1–2 år. Ett ton ts (torrsubstans) baljväxtgrönmassa med ett kväveinnehåll på 30 kg kväve resulterar vid omsättning i 200 kg humus och ca 18 kg växttillgängligt kväve. Eftersom humusbild-

ningen sker snabbt (1–2 år) blir också grön gödslingseffekten kortvarig. Trots en stor andel kvävefixerande grödor i växtföljden och en bra teoretisk växtnäringssbalans är kväve därför ofta den viktigaste begränsande faktorn för skördenivån på ekologiska lantbruk.

Den största delen av kvävet i vall, stallgödsel och kvävehaltiga specialgödselmedel är organiskt bundet. Organiskt kväve mineraliseras inte alltid när grödan behöver det utan även när det finns risk för förluster. Det är därför viktigt att planera växtföljden, gödslingen och jordbearbetningen så näringsämnen frigörs vid rätt tidpunkt.

## Samodling

Samodling kan vara ett bra sätt att utnyttja grödornas olika egenskaper. Långliggande odlingssystemförsök i Skåne visar att ärt/havre eller lupin/havre till mogen skörd gav högre kärn- och proteinskörd jämfört med odling av ekologisk trindsäd i renbestånd (Figur 1). Dessutom varierade skördarna mindre vid samodling och det blev märkbart mindre problem med ogräs.

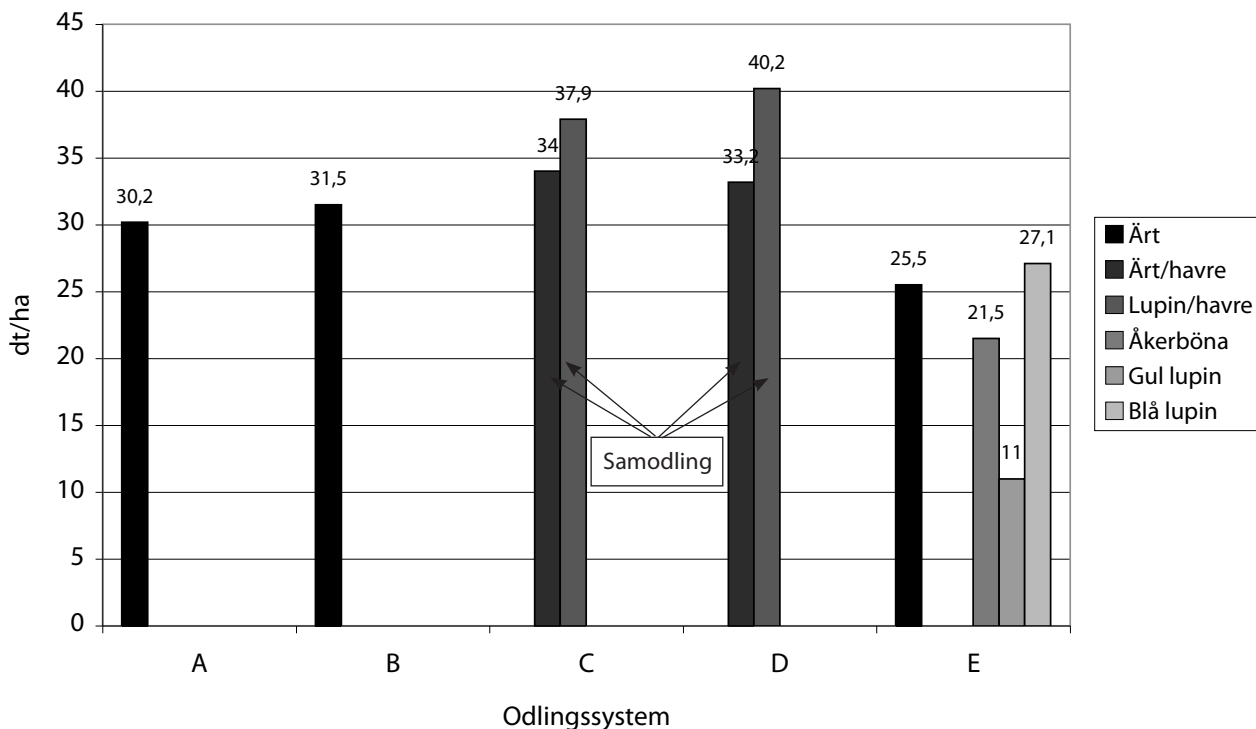
## Gör en växtnäringssbalans!

Eftersom skördenivån normalt är lägre i ekologiska grödor än i konventionella är det viktigt att anpassa gödselgivorna till en lägre avkastningsnivå. Alla lantbrukare kan anmäla sig som medlemmar av Greppa Näringen på [www.greppa.nu](http://www.greppa.nu) och göra en egen växtnäringssbalans.

## I vissa grödor finns det

### fortfarande inga riktigt bra lösningar

Tabell 1 visar att potatis är en riktig "kvävebov". På försöksplatserna Önnestad och Östra Ljungby (Tabell 1)



Figur 1. Kärnskörd i konventionell och ekologisk trindsäd. Skånska odlingssystemförsök 1987–2005. A = konventionell växtodling utan djur; B = konventionell växtodling med djur; C = biodynamisk växtodling med djur; D = ekologisk växtodling med djur och E = ekologisk växtodling utan djur.

odlades potatis i alla odlingssystem. Det framgår tydligt att potatis är en problematisk gröda även om man i alla odlingssystem under alla år har haft en vällyckad etablering av en fånggröda (råg) efter potatisen. P.g.a risken för bladmögel mm har man normalt fler år mellan potatisgrödorna i en ekologisk växtföljd än i en konventionell. Detta har stor betydelse för utlakningen på gårdsnivå.

### Biologisk mångfald och bekämpning av ogräs

Ekologisk odling gynnar ofta den biologiska mångfalden eftersom inga kemiska växtskyddsmedel används och man ofta har en mer varierad växtföljd. Skillnaden mellan ekologisk och konventionell odling är störst i lantbruksområden med intensiv produktion.

### Bekämpning av rotoegräs

I de flesta ekologiska växtföljder genomför man en stubbearbetning på hösten mot rotoegräs vid åtminstone ett tillfälle. Det är främst kvickrot och åkermolke som kan bekämpas på detta vis. Bekämpningen utförs normalt

när det inte finns mycket kväve i markprofilen, dvs efter ett eller två år med tärande grödor. Efter en tidigt skördad gröda hinner man ibland etablera en fånggröda efter den mekaniska bekämpningen vilket både minskar kväveläckaget och förbättrar ogräsbekämpningen. Ett års bekämpning brukar inte vara tillräckligt om man har fått problem med rotoegräs utan man måste följa upp behandlingen året efter. En tvåårig vall som skördas 2–4 gånger har god effekt mot åkertistel som är känslig för avslagning i kombination med konkurrens från en vallgröda.

### Bekämpning av örtoegräs

Ogräsharvning och radhackning i växande gröda kan ge en bra bekämpning av örtoegräs och ökar inte risken för kväveförluster. Det finns dock risk för skador på lärkreden och tofsvipebon. Dessutom minskar antalet jordlöpare och spindlar efter varje överkörning. Jordlöpare och spindlar spelar en stor roll som biologiska bekämpare av tidiga angrepp av bladlöss. Högst två ogräsharvningar eller radhackningar rekommenderas i vårsädd spannmål



Tabell 1. Mineralkväve (N) på hösten efter olika grödor i tre skånska odlingsystemförsök 1999–2005. Rangordning av de sju grödor med mest kväve i markprofilen. A = konventionell växtodling utan djur; B = Konventionell växtodling med djur; C = Biodynamisk växtodling med djur; D = Ekologisk växtodling med djur och E = ekologisk växtodling utan djur

Bollerup			Önnestad			Östra Ljungby		
Gröda	Odlings-system	Kg/ha N i 0-60 cm	Gröda	Odlings-system	Kg/ha N i 0-60 cm	Gröda	Odlings-system	Kg/ha N i 0-60 cm
Korn*	A	60	<b>Potatis</b>	D	80	<b>Potatis</b>	B	50
Höstraps	A	38	<b>Potatis</b>	E	75	<b>Potatis</b>	E	47
Sockerbetor	B	37	<b>Potatis</b>	C	72	<b>Potatis</b>	D	47
Höstvete	D	37	<b>Potatis</b>	A	64	Lupin	E	40
Lupin	E	36	Ärt	A	61	Rajgräs, frövall*	E	39
Havre/ärt	D	36	<b>Potatis</b>	B	60	<b>Potatis</b>	C	39
Höstvete	A	35	Ärt	E	54	<b>Potatis</b>	A	35

\* En misslyckad odling ett år i perioden drar upp medeltalet för grödan

och trindsäd och den sista behandlingen bör utföras senast 30 dagar efter sådd för att ge lärkorna möjlighet att lyckas med en häckning. Höststråsäd bör normalt inte ogräsharvas på hösten. En eventuell ogräsharvning på våren genomförs så tidigt som möjligt.

## Ny teknik och nya grödor

### Ett halländskt projekt med användning av GPS och kvävesensor

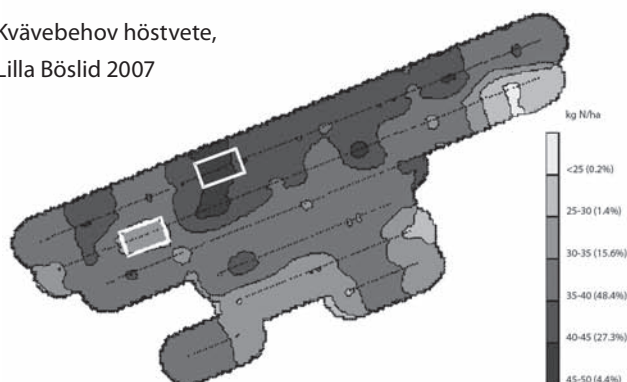
Demonstrationer i Halland 2007–2008 visade att GPS-tekniken kunde utnyttjas vid spridning av stallgödsel till ekologiskt höstvetet till bröd. På ekologiska lantbruk i södra Sverige är det ofta ett problem att få en tillräcklig proteinhalt i höstvetet till bröd.

I demonstrationerna grundgödslades hela fältet med gårdens gödsel i första hälften av april. Strax före stråskjutning (st 30–31) skannades fälten med en kvävesensor för att registrera grödorns kvävebehov (figur 2). Två försöksrutor delades in i tre mindre rutor (A = ingen tilläggsgödsling och B + C = olika mängder tilläggsgödsling). Grödan gödslades vid stråskjutning.

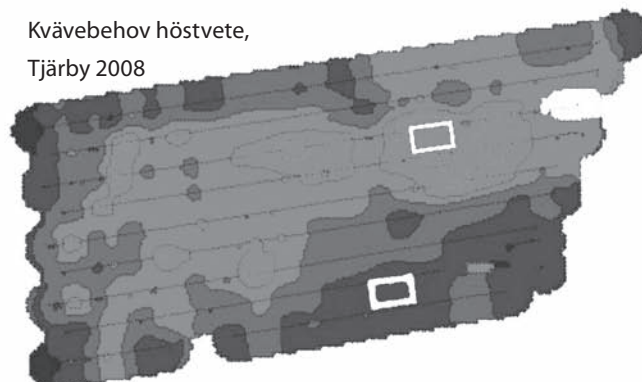
Demonstrationerna visade att kvävesensornas bedömningar av grödornas behov var korrekta och att proteinhalten och skördenivån kunde höjas i höstvetet. Tilläggsgödslingen verkade inte påverka kväveinnehållet i jorden på hösten (N-min).

På sikt kan det även bli aktuellt att använda GPS-tekniken vid bekämpning av rotogräs.

Kvävebehov höstvete, Lilla Böslid 2007



Kvävebehov höstvete, Tjärby 2008



Figur 2. Resultat av skanning med Yara-kvävesensor i höstvetet i Halland 2007–2008. I de ljusgrå områdena fanns det ett lågt kvävebehov medan behovet var högt i de mörkgråa.

### Ogräskäraren bekämpar roto­gräs i växande grödor

Ogräskäraren kallades tidigare "tistelskäraren" och är utvecklad av lantbrukaren Jonas Carlsson. Den utvärderas 2008–2010 i ett Ekoforsk-projekt. Redskapet har ett antal knivar som skär av ogräset (bl.a. åkertistel) i växande gröda men skonar grödan. Första årets resultat är lovande. Ogräskäraren är unik eftersom det öppnar upp för att man kan bekämpa vissa arter av roto­gräs i växande gröda vilket leder till minskad jordbearbetning och därmed mindre risk för kväveutlakning.

### Biogasanläggningar ger bättre kväveutnyttjande

En biogasanläggning kan fungera som en "metallkossa" på ekologiska lantbruk utan husdjur och förbättra utnyttjandet av stallgödseln hos ekologiska husdjursproducenter. Om man skördar och rötar en grön­göds­lingsvall minskar ammoniakemissionerna jämfört med en grön­göds­lingsvall där man lämnar det putsade växtmaterialet kvar på ytan.

Hos husdjursproducenter är kväveförlusterna genom denitrifikation (omsättning av nitrat till kvävgas) väsentligt lägre från rötad gödsel än från obehandlad gödsel. Vid rötning av gödsel reduceras innehållet av kol i gödseln. När den rotade gödseln tillförs marken förbrukas mindre syre vid nedbrytningen och denitrifikationen minskar.

### Italienskt rajgräs som fånggröda och fodergröda

Nyare danska försök och en demonstration i Halland visar att helsäd med insådd av italienskt rajgräs ger en stor grovfoderskörd av bra kvalitet och minimerar utlakningen av kväve på lättare jordar. Dessutom får man ett klöverfritt år i växtföljden vilket motverkar "klövertrötthet" på gårdar med mycket vall. Det är svårt att etablera klöver i en "klövertrött" jord på grund av en kombination av svampsjukdomar och nematoder.

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## Know your farmer – Know your Food

*Konsumenters attityd och kunskap om de gröna näringarna. Baserad på kvantitativ studie, med inslag från kvalitativ förstudie, Lantbrukarnas Riksförbund, nov 2008.*

**Den övergripande bilden** av bondens verksamhet och de råvaror bonden producerar är positiv. Drygt 8 av 10 har ett positivt helhetsintryck och förtroende för bondens verksamheter medan 9 av 10 har ett positivt helhetsintryck och förtroende för de råvaror som bonden producerar. De näringar som är närmast förknippade med bonden, och där kunskapen är störst, är traditionella som mjölkproduktion och djuruppfödning och spannmålsproduktion, medan nya områden som energi och upplevelseturism i mindre grad förknippas med bonden.

**De starkaste mest positiva** helhetsintrycket för bondens verksamheter är "god miljö och hållbar utveckling", "råvaror och svensk mat" samt "öppna landskap". Konsumentens drivkraft är låg när det gäller bonden som producent av energi. Förnybar energi i sig är ett viktigt område för många konsumenter, men det är endast i låg grad förknippat med bonden.

**Viktiga fokusområden** är att skapa möten mellan konsument och bonde. Undersökningen visar att kunskapen och förståelsen för bonden och vad bonden gör är generellt sett låg. Bondens verksamheter upplevs som ett

svårt område och man har inte inblick i "bondens värld", konsumenten skapar sin egen bild i brist på faktisk kunskap och erfarenhet. Det man tror, känner och hoppas är det som styr konsumentens inställning och resonemang. Bilden av bonden som ligger närmast t.ex. en ensam hårt arbetande man i gummistövlar, flanel skjorta och traktor. Även om man inser att bonden idag gör fler saker än tidigare och att jordbruket har utvecklats enormt är det "urbilden" av bonden som dominerar. Konsumenten efterlyser mer möten mellan konsument och bonde.

**LRF har genomfört ett tiotal kunskapsinriktade möten**, s.k. Dialoger i syfte att skapa ett ökat engagemang och en tydligare närvaro hos medborgarna. Vanligaste frågorna har handlat om ekologiskt/konventionellt kontra närodlat. Konsumenten vill veta varifrån maten kommer - så nära ner på gårdsnivå som det bara går och helst ska det också finnas en bild på producenten på förpackningen. Detta upplevs som en garanti för att det är råvaror de kan lita på. Spontana kommentarer från konsumenterna efter dessa möten är "När får jag träffa en bonde igen?" eller "Detta är så viktigt och jag har lärt mig massor jag inte visste ... jättekul ... tack från hjärtat och magen"

**Know Your food – Know Your farmer:** Konsumenterna vill veta mer och anser att det är viktigt med en mer nära relation med bonden. Alla vinner på den relationen, både konsument och bonde.

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## Conference hotel restaurant with local purchasing and own meat production

### Bondförnuft

Det finns många anledningar att arbeta ekologiskt. Miljöaspekterna är naturligtvis en viktig anledning. Men det var inte så det började för mig.

Jag tog över ett jordbruk i Roslagen, en timma norr om Stockholm, för 10 år sen. Gården heter Järinge och fram-synta ägare ända sen 1800-talet hade valt att jobba utan konstgödsling och besprutning. De tidigare ägarna hade inga vetenskapliga studier att luta sig tillbaka mot när de beslutade sig för att fortsätta arbeta ekologiskt, detta var naturligtvis långt innan ekologiskt var ett begrepp, och jag tror att det mer handlade om en känsla av vad som är rätt sätt och fel sätt när man brukar jorden.

På samma sätt var det för mig när jag tog över Järinge. Jag hade bara en övertygelse om vad som var rätt sätt att bruka jorden på. Och det var att fortsätta på den väg som tidigare ägare av gården hade stakat ut. Fortsätta att låta bli att sprida ut fosfor och kväve på markerna, fortsätta att låta bli att vara en del av den verksamhet som ser till att Östersjön håller på att dö och istället fortsätta att låta kalvar växa upp med sina mödrar, fortsätta se djuren själva få välja det bete de föredrar i de gärdesgårdsinhågnade hagarna, fortsätta bruka jorden på ett sätt som inte lakar ur den utan är hållbart.

### God mat

En följd av att arbeta ekologiskt när man är köttproducent är att man får fram ett kött som saknar motstycke. Vill du själv testa kan du ta till exempel två kalvkotletter eller välja vilken styckningsdel som helst, bara det ena är konventionellt producerat och den andra ekologiskt. Och även om det inte råkar vara ett ekokött just från oss i Skebo, kommer det här enkla provet ge dig en intressant

upplevelse av skillnaden. Börja med att jämföra färgen på de båda köttbitarna. Det ekoproducerade köttet är klart rött. Det beror på att de dominerande fetterna i köttet tillhör gruppen omega 3-fetter som binder antioxidanter. Mängden antioxidanter gör att köttet härsknar långsamt. Mycket långsammare än det kött du är van vid. Kött från konventionellt producerade djur domineras av omega 6-fetter med mindre mängd antioxidanter, som gör att köttet härsknar snabbt och blir grågrönt. Köttet är mörare. Tryck med pekfingeret i köttet. Det kan ge en aning om skillnaden i mörheten och textur redan innan du stekt. Skär du ett djupt snitt i kotletterna med en vass kniv, med samma tryck i båda, kan du också känna att kniven går ner lättare i ekoköttet. En nyckelfaktor för mörhet hos kött är dess mognadsgrad. Mognadsgraden beror på en mängd olika faktorer. En viktig sådan är hängningstiden. Ett ekokött kan hängas längre beroende på en annan kemi (omega 3-fetter och antioxidanter). En annan nyckelfaktor för köttets mörhet är dess surhet (pH) vid slakten. Låga pH-värden ger ett mörkt, hårt, torrt kött, med liten hållbarhet, ett kvalitetsfel vanligen orsakat av stress och stor ansträngning hos djuren före slakt. De långa transportererna, där djuren tvingas parera lastbilens skakningar och kurvor, gör att djurens muskler alstrar mjölksyra som sänker pH-värdet i köttet. Stressen inför slakt utlöser dessutom ofta hormoner, som gör att köttet möras sämre och inte heller smakar gott.

Nu är det dags att steka dina kotletter. Smör, salt och peppar, inget annat. Utöver mörheten är det smakriken hos ekoköttet som du tydligast kommer märka av bitarna du stoppar i munnen. Det är inte en smak du känner, utan toner av olika smaker som framträder tillsammans som ett ackord. Är det just kalvkött du testar,

beror en skillnad på att den ekologiska kalven får di och lever med sin mamma fram till slakt. Den första tiden utgörs foderstaten av endast di. Vart efter kalven växer ökar betesinslaget i näringsintaget. Smakskillnaderna du upplever är faktiska. De har aldrig förnekats ens av de främsta förespråkarna för det traditionellt producerade köttet. Efter att ha tillagat kött var och varannan dag, vågar jag påstå att ursprungligheten, naturligheten i det ekologiska köttet, ingår som en viktig del i köttets smak och är den viktigaste kryddan. Det är helt enkelt väldigt mycket godare. Rent kemiskt skiljer sig det ekoproducerade, som du förstått av texten ovan, att det domineras av omega 3-fetter, vilket gör det väsentligt hälsosammare att äta. Det känns helt enkelt på smaken att det ekoproducerade är nyttigare, vitaminrikare och även mineralrikare. Hållbarare, saftigare och mörare. Graden av surhet, pH-värdet, hos köttet har betydelse för flera egenskaper än köttets möjligheter att möras. Rätt pH-värde gör också att köttets vätskebindande förmåga ökar, vilket ger ett saftigare kött. Människor tycker om att äta sunt och njuta av vad de äter. Njutningen ökar om man vet att köttet man äter kommer från ett djur som mått bra i livet – från födseln till slaktögonblicket. Det man äter får en extra dimension när känslan av den goda smaken på tungan förenar sig med känslan av god etik och gott samvete.

### Nå ut

Arbetet med gården ledde snart in mig på nya spår. Det var svårt att genom de vanliga kanalerna få ut vårt kött på ett sätt så att de mervärden jag kunde leverera kom ut till slutkonsumenten. Detta tände idén om ett eget slakteri. Så för 7 år sen lämnade vi in den första bygglovsansökan för ett eget slakteri. Det blev det första steget i en lång vandring som gick i mål i februari i år, då vi invigde vårt eget slakteri men jag återkommer till det för att återgå till den kronologiska ordningen. Under arbetet med att få till alla tillstånd för slakteriet så blev en 1700-tals herrgård i vår närhet till salu. Herrgården hade drivits som kursgård under ett antal år och här såg jag möjligheten att få ett skyltfönster för vårt ekologiska kött. 2003 började en intressant resa med att skapa en gourmérestaurang på Skebo Herrgård.

Det har gått bra för oss. Vi har genom åren vunnit både tävlingar och fått lysande recensioner. Vi erbjuder även konferens- och hotelltjänster och kombinationen

med vårt kök ledde till att vi vann Svenska Mötens tävling Årets Mötesmåltid både 2005 och 2006.

I år har vi av Stiftelsen Sveriges Bästa Bord utsetts till Silverkrog. DI Weekend skrev i 7:e numret "Fasanen med pumpakräm och tryffelsky är superb och lammet, rullat i den nordafrikanska kryddblandningen harissa, är utan tvekan det bästa vi ätit, så mörkt att det kan skäras med smörkniv." Arla har nominerat oss till årets Guldko och restaurangguiden White Guide beskrev en middag hos oss så här "Det är ren poesi, halsbrytande i sina kontraster."

Grunden till våra framgångar är dels våra dedikerade medarbetare och dels våra utmärkta råvaror. Det vi inte själva producerar, köper vi från andra lokala producenter som delar våra värderingar och arbetar ekologiskt.

### Slakteriet

Slakteriet startade som sagt var i februari och charkuteriet och butiken kom i gång strax därefter. Anläggningen ligger på våra egna marker och transportererna är i det närmaste obefintliga. Våra djur slipper stressen av den långa transporten (8 timmar lastbilsåkande till Skara är alternativet), som dels medför onödigt lidande och dels försämrar kvalitén på köttet.

Gårdsbutiken som ligger i samma byggnad som slakteriet och charkuteriet har under denna vår vuxit snabbt. Efterfrågan är stark och även om vårt ekologiska arbetssätt är ett starkt argument för våra produkter är det ändå närheten och det genuina arbetssättet som vi står för som våra kunder lyfter fram i första hand utöver den höga kvalitén. Jag tror våra kunder bygger sitt köpbeslut på en känsla av vad som är rätt sätt att producera mat på och att de sedan som bonus får möjligheten att laga god mat på förstklassiga råvaror är bara en bonus.

### Helheten

Att jobba i denna helhet innebär något unikt för mina medarbetare. Maskinföraren på Järinge Gård vet att det enformiga plöjandet på våren är en del av det arbete som leder fram till gourmématen som kökschefen på Skebo Herrgård skapar. Förståelsen för helheten inspirerar liksom insikten om det egna arbetets betydelse och känslan av att vara en del av denna helhet. Rent konkret innebär upplevelsen av god mat, tillagad av vad vi här på gården tillsammans kan producera, en sådan motiverande erfarenhet att engagemangsnivån ligger på topp.

Denna helhet ger också unika möjligheter som till exempel när Skebo Herrgårds kökschef vill ha lammbräss, en vara som normalt är mycket svår att få tag i och närmast omöjlig från ekoproducerade djur, går han ner till slakteriet och väljer själv ut sin bräss. Samtidigt passar han på att med styckaren diskutera hur länge biffstocken som hängt i 4 veckor skall hänga. Det gäller ju att den inte går över tiden, samtidigt som det är optimalt om biffstocken kan styckas i samband med bröllopet och därmed slippa ligga vakuumpackad i en mellanperiod. Styckarens arbete får en annan dimension, slutmålet är konkret och motiverande. Kökschefen har en råvarukälla som inspirerar och utgör en svåråtkomlig konkurrensfördel för konkurrenterna.

Helheten ger även andra möjligheter som till exempel har konferensdeltagare hos oss möjligheten att "fika med kossor". En aktivitet då någon från gården håller i en gårdsvisning och visar hur ett modernt ekologiskt jordbruk fungerar. Detta är inte bara en trevlig upple-

velse för våra gäster utan även en möjlighet för dem att med egna ögon få se hur ekologiska råvaror produceras. På detta sätt vill vi också inspirera dem till att använda ekologiska råvaror hemma eller som en gäst sa efter en gårdsvisning: "Så här vill jag att min biff ska leva".

### Avslutning

För alla oss som arbetar med de olika delarna i verksamheten står råvarorna i centrum. En ekologisk produktion är en självklarhet eftersom den ger en ur smakhänseende och näringsinnehåll överlägsen produkt, samtidigt som produktionsformen går hand i hand med miljön. Det finns inga konflikter med omvärlden, bara symbiotiska positiva effekter av att de olika rörelserna är integrerade och samverkar. Det känns som vi åstadkommit något banbrytande och nydanande, där lönsamhetstänkande och en ur miljöhänseende optimal produktionskedja är i framväxande.



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## Reasons for local and regional purchasing

The demand for locally produced food has increased over the past few years. However the boundaries between local and regional food are often confusing and likely to be the same to the consumer. Different actors often use different definitions of these concepts, definitions which are hidden to the consumer. In order not to confuse the consumer and because we may wish to communicate different qualities associated with regional and local foods separately, it is important that we communicate a clear definition.

I find the following definitions suitable for general use. Regional foods carry particular qualities associated with a specific geographical area, a region. These qualities may be associated with taste or other qualities derived from the cropping methods, particular methods of production or processing and traditions of the region. The size of the region depends on the product. Regional foods may be purchased and consumed locally or non-locally. Local foods, however, are produced, processed and purchased within the same region. The concepts are partially overlapping on the market side in that regional

foods may be regarded as local food when purchased locally. However local foods do not carry added values associated with the area other than that it is locally produced, that is at a certain distance from the consumer.

As the concepts of regionally produced foods and locally produced foods are only concerned with the production step of the food chain they may be regarded as similar concepts.

Furthermore, depending on whether we discuss environmental, economic or social aspects of food consumption the geographical area defined as local it is essential that the concept does not take on a single definition regarding geographical distance. To achieve appropriate discussions of the situation in focus, including development of different kind, the concept of local thus take on a fuzzy border.

This presentation will discuss different reasons for purchasing and promoting consumption of local and regional foods, using inspiration from recent studies of environmental facts and consumer perceptions.

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## Knowledge sharing in organic food supply chains

Although local, short supply chains are regarded as most suitable for organic products, most organic food is sold through general retailers. The extended supply chains create challenges: (1) how to sustain the connection between farmers and consumers and deliver the multifaceted value of organic food and (2) how to cooperate to meet both the needs of consumers and of each independent company involved in the supply chain. Previous studies of supply chains have suggested that information or knowledge sharing is the key to meet these challenges. A case study examined the current level of knowledge sharing along two organic food chains from farmers to consumers. The findings suggest that communication, which is more open and covers a wider scope, would be advantageous. Furthermore, the horizontal collaboration between actors specialised in organic food is emphasised. Further research is needed to develop innovative ways to share knowledge and collaborate among the actors.

### Problems in the organic market

Organic food accounts for only a small share (0–5 %) of the total food market in many European countries (Hamm and Gronefeld, 2004; European Commission, 2005). The problems identified as the main hindrances to growth are poor availability and the high prices of the products, the imbalance between supply and demand, high operating costs, lack of information flow, ineffective promotion, and poor reliability of supplies (Bähr et al., 2004; Baecke *et al.*, 2002; Franks, 2003; Hamm and Gronefeld, 2004, Finfood, 2004 a, b). All these issues shift the focus to the organic supply chains and call for

solutions that involve knowledge sharing between the chain actors.

### The organic market in Finland

The retail sale of organic products in Finland is estimated to account for a total market of 0.8 per cent (Heinonen, 2007). Although sales have recently increased in many western countries, in Finland they have developed very slowly. In some countries, one actor, such as a supermarket chain, has taken an active role in developing the organic market. This has not happened in Finland where the retail sector is highly concentrated; two leading retail groups manage about 70 % of the market. This is seen, for example, in the absence of organic private labels that are common in many countries. The national, state-owned organic label, Sun-label, prevails in Finland and is well-known among consumers.

### The case study

To understand better knowledge sharing in a real-life context, researchers conducted a qualitative case study with two cases (Yin, 2003). The cases, two organic chains, were depicted from the organic manufacturers' point of view, following their main products upstream to a couple of farms and downstream to consumers via retailers. In both chains, the manufacturers were small companies, specialised in organic production and owned by organic farmers. With the exception of the manufacturer and its suppliers, the proportion of organic food was small, as it is in Finnish food chains in general. The cases differed from each other in two respects: product characteristics (yoghurt as a fresh product vs. muesli with a long shelf

life) and marketing concept (a manufacturer marketing its own product vs. a manufacturer marketing via a big company).

The study examined knowledge sharing in the processes of replenishment, assortment, promotion, and product introduction. The data were gathered by interviewing the actors along the chain (from farmers to retailers, altogether 36 persons) and by focus group discussions (five discussions, with a total of 17 consumers, users of organic products). The researchers identified what knowledge the actors needed in each of the various processes, the possible lack and/or source of the knowledge as well as the actors' satisfaction in sharing that knowledge. Critical knowledge was determined by identifying knowledge that most of the actors perceived as being relevant for conducting their own part of the process or for improving their performance (actors from farmers to retailers), or helpful in making buying decisions (consumers). The concept of knowledge was used in a broad sense to include information as fragment of knowledge (mainly, explicit knowledge) as well as know-how and understanding (embedded knowledge).

### Findings and discussion

Five categories of critical knowledge emerged from 19 different kinds of knowledge the actors needed for the various processes. Although most of the actors were quite satisfied with the knowledge sharing, only a narrow portion of the knowledge that was needed was shared. Poor knowledge sharing is not unique to organic supply chains, but is found in other food chains as well (Alvarado and Kotzab, 2001; Fearné *et al.*, 2001; Sporleder and Peterson, 2003).

The focus of knowledge sharing was almost exclusively on efficient product flow. However, information about the products available did not reach consumers. Most of the actors recognised the poor quality of knowledge flow to consumers, but could not solve the problem alone. Consumers' poor knowledge about the organic products within the assortment of the stores, may further undermine their perceptions of the range of available organic products, and yet be partially responsible for the gap between sales figures and potential demand.

The details of the sales served as the main transmitter of the consumers' voice. Despite the opportunities provided by ICT, the sales data were utilised poorly in

terms of being shared among the supply chain actors and analysing the demand for organic products. The consumers were quite sceptical of the system of registering purchase details for the purpose of customising communication according to their buying habits. Nevertheless, consumers were willing to sign up for special mailing lists to receive additional information about organic products (Kottila, Rönni, in press).

Knowledge both of the target group and of the potential added value was fragmented, to a large extent embedded, and the latter was also controversial and therefore difficult to share (Small and Sage, 2005/2006). The embedded nature supports close interaction between the organic producer and the consumers to deliver that knowledge (Schmid *et al.*, 2004). However, the consumers had knowledge of the potential added value and recognised the organic products with the help of the Sun-label. This indicates the important role of actors beyond the primary members of the supply chain in delivering knowledge to consumers.

Despite the challenging conditions given the great variation in the significance of organic products and the power of different actors, the actors were able to identify shortcomings and potential improvements and even find mutual solutions, when given a special forum. The findings also demonstrated that a trustworthy relationship can evolve between actors with power imbalances and when realised, underpins knowledge sharing (Morgan and Hunt, 1984; Kottila and Rönni, 2008; Hingley, 2001).

### Practical implications

The findings suggest:

- 1) communicating more openly in order to overcome the current practice and culture of the supply chain.
- 2) more horizontal collaboration between the actors specialised in organic production to strengthen the bidirectional knowledge flow directly and/or via retailers to consumers and develop the scattered knowledge base of the added value of organic products.
- 3) better placement, assortment information available in print or electronically in stores, in-shop product demonstrations as well as proper education of the staff to improve consumers' knowledge about the assortment of organic products.

- 4) in the event organic perishables are not delivered every day, information on the days of delivery, as well as the chance to place orders in advance might be worth considering.

### Suggestions for further research

The findings suggest there is a genuine need to develop ways to share knowledge and collaborate as well as to develop methods of studying collaboration along the whole supply chain of organic products. In order to take into account the different characteristics of organic market, studies conducted in several countries, for example the Nordic countries, are preferable.

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## Organic milk – stabilizing supply and demand

The market for organic milk is not developing as rapidly as before, due to the financial situation. We think that this is only a temporary dip.

Another fact that has a moderating effect on the development of organic dairy products is the fear of surplus production.

In general there is quite a limited range of organic products on the market, which makes it difficult to get a real break-through. This situation can change through innovative solutions, which will widen the range of organic dairy products.

An important step will be to offer organic dairy products which are both regional and traceable. It's important to differentiate between products with a strong local profile and organic products. Sometimes it's quite hard for consumers to see the difference.

### Example of content:

- Current status; a picture of access and demand
  - The public sector, a large consumer of organic products
- How we handle the increasing demand for organic products
  - Increased number of suppliers
  - Financial compensation
  - Involvement
  - Small-scale production
  - “Hjordnära”
  - same concept in Skåne?
  - Organic as well as regional
- The organic product range

Pierre Hanell

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Web: www.green-n-lean.se

## We booked all broccoli in Sweden before the season started

My name is Pierre Hanell and I am running a company called Green n 'Lean Healthy Food AB. We are producing local, organic food, especially vegetarian food. We have been on the Swedish market for four years. This year we will go international and establish the company in the Nordic neighbor countries, in the UK and some other countries.

Perseverance and cooperation are the fundamentals for our company.

**Vision:** With the aim to provide the entire Swedish population with organic healthy food, we have to become one of the largest producers of organic food in Sweden.

We understood already at an early stage that we would have a problem with finding enough raw materials all the year around, especially as we only used organic ingredients from Nordic origin and very often traditional varieties like Spelt (Dinkel), Naked oats, Naked barley that not are commonly grown. Fresh ingredients as broccoli can only be purchased for a limited period in late summer and autumn and in a very limited amount.

### To ensure the availability of raw materials we have chosen three strategies built on a win-win situation

- 1) Establish close cooperation with a number of organic farmers that in the long term can guarantee our purchases. This is a continuous project.
- 2) Pre-order and contract for the amount of raw materials we need at fixed prices, at least one year prior to delivery. This gives farmers a secure income, and us a hedged commodity cost for each year.

- 3) Joint development work and investments. I.e. we share the risk that creates the trust of both parties.

### The obstacles encountered with such a plan are

**Why should farmers trust us?** – To establish close cooperation with farmers takes time and requires great commitment and perseverance. To create trust is not always easy when you start new businesses and don't have a history of large turnovers or capital. It requires commitment and honest communication.

**Have farmers the right skills?** – We must also find the farmers who are serious, have the right skills and, above all, are able to grow the crops that we want. There are always risks for farmers to shift their cultivations into something they have not previously tried. In those cases we have to give such guarantees to the farmers that they dare to make these changes.

As an example, it took us two years to persuade an organic farmer who previously was growing organic oats to switch into organic Naked oats. We guaranteed to buy the whole yield at a price that was three times higher than he got for his usual oats.

**It takes time to introduce traditional varieties in the cultivation!** - In addition, one must remember that "modern" seeds do not always fit the farmer's soil or plant zone. Normally it takes three years before the farmer can expect a proper harvest.

**Availability of organic seed is not a matter of course!** - To find the old varieties of seed grain is not an easy task and it can be very expensive before the farmers have created their own seed.

**How do we know how much raw materials we need each year?** – For us, this was a major uncertainty factor



when we created a completely new product, unknown on the market. Although five years of feasibility studies of various products and flavors, test panels and interviews with consumer and professional chefs, it was still difficult to estimate how much the product would sell. We also had difficulties in determining the amount of raw materials when we launched a new product on the market. We did not know if we would get into a new chain of stores and to what extent, and which one of the products then would sell the most, once we arrived.

**Political decisions are not always reliable!** – Public kitchens, as we invested in first, seemed like a safe customer because of the political decisions on more organic food in schools. We could not have guessed more wrong. Political decisions are there only to show a will. In the end the price rules...

**Wholesale trail buy only volume products!** – We encountered "catch 69" when schools couldn't buy our organic food due to contracts with other wholesalers. And once we established agreements with all the wholesalers, they did not keep the products in stock and therefore customers could still not be sure when or if they could receive the delivery.

We were simply forced to get enough buyers in a region in order to get our products to stock. Only then we could have a continuous sale.

**Our solution to this problem was:** – We chose to work with an already established food business where we could produce, stock and distribute our products from. This cooperation has later on deepened with joint marketing and sales organization as well.

#### **The problems which arise with such cooperation are:**

**Have food company the right skills for the production of organic products?** – The food manufacturers of today have high skills in machinery use, warehousing, logistics etc. but they lack expertise and experience on how to produce food without additives and how to manage raw materials whose properties vary according to season where each formula must be adjusted at each production stage. Organic raw materials fluctuate more since nature will have more impact on the crop than the standard seed used for conventional crops that are dressed with the same fertilizer ingredients, and then mixed up with other wheat to "always" give the same production characteristics.

**Time and uneven quality** – The raw material variations forced us to work together with the staff at the production company on how to use these ingredients without destroying them and on how to adjust certain herbs, and how to enable conditions for obtaining a qualitative, tasteful and durable product.

#### **Other things we learned along the way were:**

**No cheating:** The company must use the predetermined ingredients, and nothing else. We shall not send out products having the wrong flavor and/or texture.

**Certification:** The products must be certified so we can market them as organic. Some certificates, as Green Key Neck labels, do not always include newly developed products, which means difficulties to place the product into the right food category.

**Education:** The staff in production and sale needs to be trained and motivated for this new type of product.

**Analysis:** Correct bacterial analysis must be done on these new products. At the beginning nobody knew what kind of analysis was needed.

**Transport:** Fast carriers have to be found, so that cleaned vegetables get quickly to the food factory in time for production. Organic materials are more sensitive to long journeys. None of the major carriers in Sweden are ready today to run a delivery over the same day. We were thus linking us to the private truck owners to meet the task.

#### **In summary**

There are lots of things that must work before the main question can be solved. I.e. availability of organic ingredients is only one of the problems.

As I see it, the availability is the smallest problem, in spite of the requirements for sustainability and cooperation. It is more about taking risks at the beginning and to have the courage to believe in the product and to be able to place the product on the market.

For a startup business as Green n' Lean Healthy Food AB required a long-term commitment that focused more on ethics, health, environment and personal development, than on earning quick money.

But hopefully even this grain of a company will grow large and provide both a "clean wheat in the bag" (in Swedish SamVete = conscience) and a secure pension.

Johanna Stål

Editor-in-chief, Camino magazine

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# How do consumers handle different environmental messages?

## About Camino

Camino is the first magazine in Sweden focusing only on sustainable lifestyle. Three persons here in Göteborg started it two years ago. Our main areas are food, fashion, health, tech, culture and design. But as a difference to many other lifestyle magazines we also have a very strong social and environmental focus.

## The consumers behaviour

Presenting the 6 steps in the "buying process".

1. Information
2. Categorization
3. Attitude
4. Trust
5. Intention
6. Selling point

## Consumer types:

1. Needs to be sure about the environmental impact – sceptics
2. Wants to be an environmental citizen
3. The health conscious
4. Those that want to be part of nature

## Ability

A persons ability to act according to moral/ ethical standards has to do with two things:

1. are they aware about their action's consequences for the environment and other people affected by their actions...
2. do they take responsibility for their actions and its consequences?

## Diverging environmental messages

1. Buying local or fair trade
2. Buying local or imported eco
3. Etc.

## How do consumers handle diverging environmental messages

1. Needs to be sure about the environmental impact – sceptics.
2. Wants to be an environmental citizen
3. The health conscious
4. Those that want to be part of nature

## How to be true and trustworthy in your environmental messages:

1. Be real
2. Be open
3. Be there
4. Tell stories
5. Get other to tell status-yielding stories to their peers
6. Take part of the participation culture
7. Present eco-icons
8. Guerilla marketing / make the messages trustworthy
9. Do not use eco-certification as a curtain for bad business – the customers will see it
10. Certifications are only interesting for a small part of the population, use other tools

Pär Larshans  
 Personal- och hållbarhetschef  
 Max hamburgerrestauranger AB  
 E-post: par.larshans@max.se

# Adding care for the planet to the own brand



**Sveriges godaste hamburgare**

Max och hållbarhet  
 Inte bara blåsta burgare

Pär Larshans

Personal- och  
 Hållbarhetschef

23 år inom Max



Max  
 Ett svensk familjeföretag



2008-  
 "Det goda företaget"

Social hållbarhet

- Stöd till svaga
- Samhällsansvar
- Frivilligt ansvar
- Ledarskap

Etiskt ledarskap

- Följa lagar
- Följa avtal
- Omdöme
- Aktiva val - Firo
- Grundläggande värderingar

Ekologisk hållbarhet

- Omtanke om miljön
- Hur bidra till framtiden




Social hållbarhet - 2008





Ekologisk hållbarhet - 2008

Livsmedelspris Max vann!

Norrbottnens läns landsting  
 MILJÖPRIS


...och vinnaren av priset "Årets gröna kapitalist" är...






### Vart skulle vi börja?

- Ingen hade gjort detta förut...



- Blir det trovärdigt?



Kaj Török, Senior Advisor  
Det Naturliga Steget

### Dagens icke hållbara samhälle

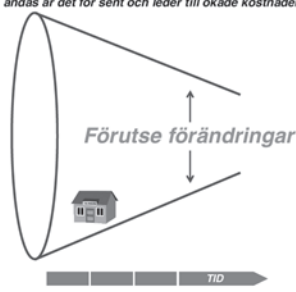
**Vi nyttjar mer och mer av våra ändliga resurser**



TID

### Påverkar företagens ekonomi

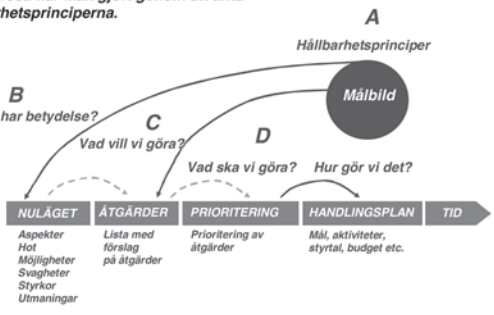
När sista fisken är slut, när luften inte längre går att andas är det för sent och leder till ökade kostnader



TID

- Råvaror och energi
- Skatter och lagar
- Lån och försäkringar
- Ryktet/Varumärket
- Allmänhet och media
- Kunder
- Ägare
- Medarbetare

Denna resa har Max gjort genom att anta hållbarhetsprinciperna.



**A** Hållbarhetsprinciper  
**B** Vad har betydelse?  
**C** Vad vill vi göra?  
**D** Vad ska vi göra? Hur gör vi det?

**NULÄGET**  
Aspekter  
Hot  
Möjligheter  
Svagheter  
Styrkor  
Utmaningar

**ÅTGÄRDER**  
Lista med förslag på åtgärder

**PRIORITERING**  
Prioritering av åtgärder

**HANDLINGSPLAN**  
Mål, aktiviteter, styrtalet, budget etc.

TID

### Hållbarhetsvision – 2030

Max hållbarhetsvision går ut på att i det hållbara samhället utsätts inte naturen för systematisk...

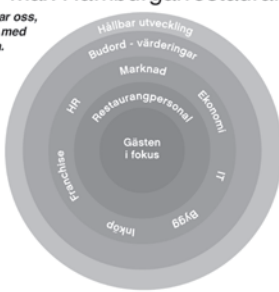
- ....koncentrationsökning av ämnen från berggrunden
- ....koncentrationsökning av ämnen från samhällets produktion
- ....undanträngning med fysiska metoder

Och, i det samhället hindras inte människor systematiskt...

- ....från att tillgodose sina behov

### Målbild: Max Hamburgerrestauranger

Hållbarhet är det vi lutar oss, alla beslut fattas i takt med hållbarhetsprinciperna.



Vi ser 2009 att vi har stora möjligheter att kombinera lönsamhet och hållbarhet

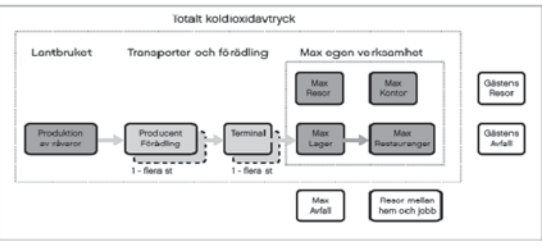
Detta är på det sätt som kartläggningen är gjord. Genom denna kartläggning så har vi kunna identifiera våra största utmaningar.

Färgernas betydelse

Hygglig detaljvalvet	Svårbedömd detaljvalvet	Beräknas inte
----------------------	-------------------------	---------------

Det kan vara svårt att få tag i rätt värden för vissa delar av kedjan (...). Dessa beror på en transportör och producenten kan ha svårt att ta fram siffror över sin egen verksamhet. För att hålla tidplan och budget kan grova uppskattningar komma att bli aktuella.

**totalt koldioxidavtryck**

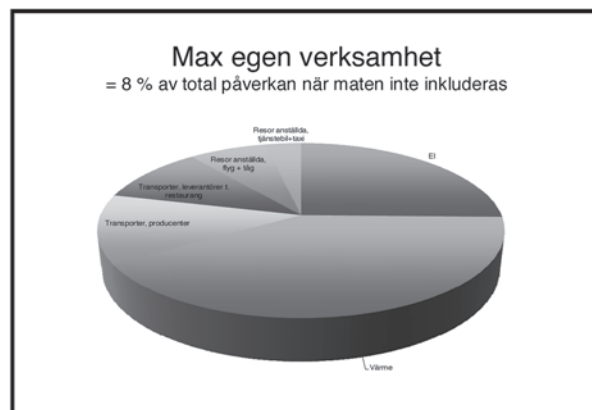
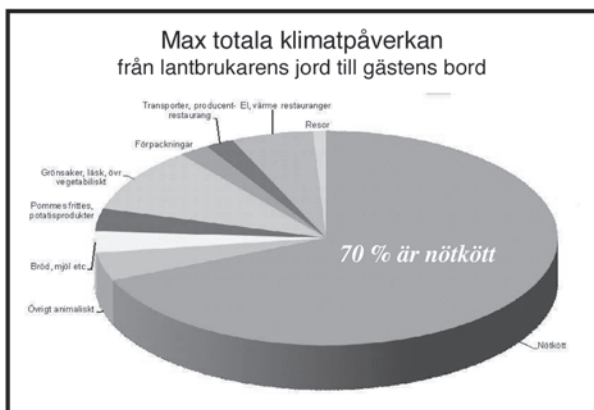


Max egen verksamhet

Max Resor, Max Körtor, Max Lager, Max Restauranger

Gästerna Resor, Gästerna Arfall

Max Arfall, Resor mellan hem och jobb



### VI KLIMATKOMPENSERAR

Vi planterar träd i Afrika

Max offers a climate compensation program where they plant trees in Africa to offset the carbon footprint of their burgers. The program is presented as a 'beträffande miljöarbete' (environmental work).

**Delifresh** kycklingsallad 11 kr  
Allt kött och vegetabiliskt vegetariskt alternativ  
1,8 kg CO<sub>2</sub>e

**Ol kycklingsallad** 11 kr  
Allt kött och vegetabiliskt vegetariskt alternativ  
1,8 kg CO<sub>2</sub>e

**Max** fiskallad 11 kr  
Fiskallad med vegetabiliskt vegetariskt alternativ  
1,8 kg CO<sub>2</sub>e

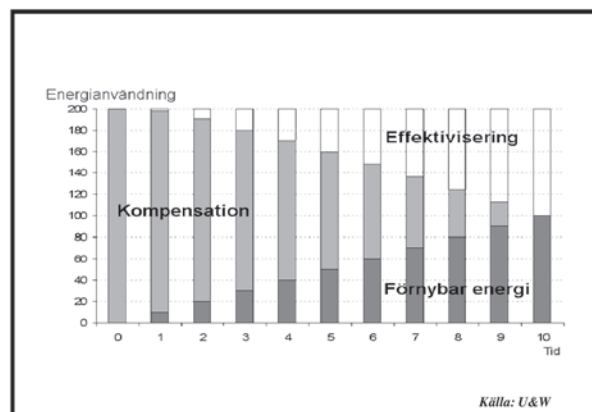
**Oreanallad** 11 kr  
Allt kött och vegetabiliskt vegetariskt alternativ  
1,8 kg CO<sub>2</sub>e

**Vägen tillad** 11 kr  
Allt kött och vegetabiliskt vegetariskt alternativ  
1,8 kg CO<sub>2</sub>e

**Chicken** sallad 11 kr  
Allt kött och vegetabiliskt vegetariskt alternativ  
1,8 kg CO<sub>2</sub>e

**Crissy Chicken** sallad 11 kr  
Allt kött och vegetabiliskt vegetariskt alternativ  
1,8 kg CO<sub>2</sub>e

På vägen mot ett hållbart Max så vill vi dock ta ansvar och detta gör vi genom att kompensera vår påverkan med en straffskatt som innebär att vi planterar träd. Detta är dock inte det slutgiltiga lösningen, den är istället att bli hållbar och tom gärna klimatpositiv.



### Vad säger omvärlden?

**Max INFO E-post – mer än 100!**

- Ingen fråga, utan ville bara säga att jag är sjukt imponerad av ert miljö (och etik)arbete och hoppas även att ni tjänar på det rent ekonomiskt. Ännu ett bra skäl att välja er framför konkurrenterna.
- Läste artikeln om er och företaget i DN för ett par veckor sen och vill bara ge er en eloge för det arbete ni gör, både vad gäller miljö och för handikappade. **Keep up the good work!**

	Max	McDonald's	Burger King
Handikappad tillgänglighet	✓	—	X
Vegetariskt alternativ	✓	✓	X
Glutenfritt alternativ	✓	✓	X
Vegetabiliskt alternativ	✓	—	X
Upplyst om klimatpåverkan	✓	✓	✓
Upplyst om miljöpåverkan	✓	✓	✓
Upplyst om etikarbete	✓	—	—
Upplyst om socialt ansvar	✓	✓	—
Upplyst om arbetsvillkor	✓	✓	✓
Upplyst om arbetsvillkor för handikappade	✓	✓	✓
Upplyst om arbetsvillkor för ungdomar	✓	—	—

Bäst i test enligt Miljöaktuellt!

### Max®

Sveriges godaste hamburgare

Max – påväg mot hållbarhet



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## Organic Plus values and their relevance to consumers: First results from the CORE FCP project

The global market for organic food has tripled in value in the last eight years and was estimated to be worth 46 billion US Dollars in 2007. The vast majority of sales are concentrated in Europe and in the US. In 2007, the European market was estimated to be worth €16.2 billion and several countries reported growth rates of more than 10%. It has grown substantially since the middle of the 1980s as a result of growing consumer demand and increased policy support including a European Regulation defining organic production (Willer and Kilcher, 2009).

However, the strong growth of the market and globalisation are seen as problems by many organic farmers and consumers and this is reflected in the debate about the conventionalisation of organic agriculture (e.g. Darnhofer, 2006; de Wit and Verhoog, 2007). Producers of organic food are concerned about globalisation because they fear competition from countries where production costs may be lower due to climatic conditions, lower costs of land and/or labour and lower production standards. Many are looking to identify special product qualities that allow them to differentiate their organic products. On the other hand, consumers increasingly criticise food products which are produced under unsatisfactory social and environmental conditions and ethical considerations are becoming more important (Browne *et al.*, 2000; Carrigan *et al.*, 2004; IGD, 2008). European organic consumers appear willing to pay a higher price for regionally or locally-produced food, or to directly support small farmers in disadvantaged (mountainous) areas (e.g. Zanoli, 2004). Very successful 'fair milk price' projects have been initiated by organic dairy farmers in Austria and Germany (Anon, 2006; Thiele and Burchardi, 2006). Other ethical arguments could also be used to differenti-

ate organic products in a growing market, where organic products compete with other ethical claims such as local foods and 'Fairtrade', especially if they relate to what is important to consumers and are communicated well.

The CORE funded project Farmer Consumer Partnerships (FCP) aims to develop innovative generic communication arguments that can strengthen the link between producers and consumers in the European organic sector (for further details see Padel and Gössinger, 2008; Zander and Hamm, 2009). The aim of this contribution is to present some first results of the project.

### Methods

In the first stage of the project ethical concerns and values that have been reported as important to various stakeholders of organic food and farming in the literature were examined and categorised, guided by the Corporate Moral Responsibility Manual (Brom *et al.*, 2006). Concerns including those expressed in the four principles formulated by IFOAM (health, ecology, fairness and care) were contrasted with the new European Regulation (EC) 834/2007 to identify so called organicPlus values that go beyond minimal organic requirements.

The results of this and of a screening of arguments used by 100 organic SME companies and farmer groups in five European countries (AT, CH, DE, IT, UK) (see Padel and Gössinger 2008) were entered in the next step. The relative relevance to consumers of seven different ethical attributes and the product price were tested by means of an Information-Display-Matrix (IDM) with about 1200 consumers in the same countries in May to July 2008. The IDM is a process tracing method aimed at monitoring the information acquisition and decision behaviour of



Table 1: Summary of ethical concerns and values

Area of impact	Ethical concerns and values	EC Regulation 834/07
Environment	Minimise pollution	Detailed provisions
	Sustainable resource use	Limited provision/ indirect
	Protection of ecosystems/ biodiversity	Limited provision/ indirect
Animals	Health and welfare	Partly/improved provision in 834/2007
Economy	Fair and equitable financial returns for farmers	Indirect
	Availability and affordability to consumer	Not directly addressed
Social	Food quality and safety contributing to human health	Largely
	Safe and equitable workplace	Not directly addressed
	Skills, knowledge and information	Not directly addressed
	Transparent and trustworthy organic food systems	Partly/improved provision in 834/2007
	Civic responsibility and care	Limited provision in 834/07
Systems and supply chains	Organic integrity throughout supply chain	Limited provision
	Local and regional supply chains and markets	Limited provision in 834/2007

Source: Padel and Gössinger (2008)

consumers (Jasper and Shapiro, 2002; Mühlbacher and Kirchler, 2003). IDM results can be analysed in different ways, in particular through the sequence and amount of information acquisition preceding the purchase decision. From the kind of information retrieved by test persons, preferences for different attributes can be deducted.

## Results

The main concerns of stakeholders of the organic sector can be summarised under principal headings according to impact on the environment, on animals, and economic and social impacts (see Table 1). Concerns about the integrity of the organic supply chain, system health or the preference for local food cannot easily be categorised according to impact.

Ethical communication arguments relating to 'biodiversity', 'animal welfare', 'regional production', 'fair prices for farmers', 'care farming', 'social criteria of production' and the 'cultural features' were chosen for further research through IDM. The importance of these different ethical attributes and the product price for the choice of the organic product was determined by the order of accession of information about each of them. According to this indicator, the most important attributes are 'animal welfare', 'regional production' and 'fair prices for farmers', followed by the product price. Only minor differences regarding the order of importance were observed between the countries (Figure 1). The analysis of the purchase decision, particularly the low share of consumers who decided for the cheaper product without

any additional 'ethical' value indicates that the majority of consumers of organic products are willing to pay a price premium for additional ethical values of organic production.

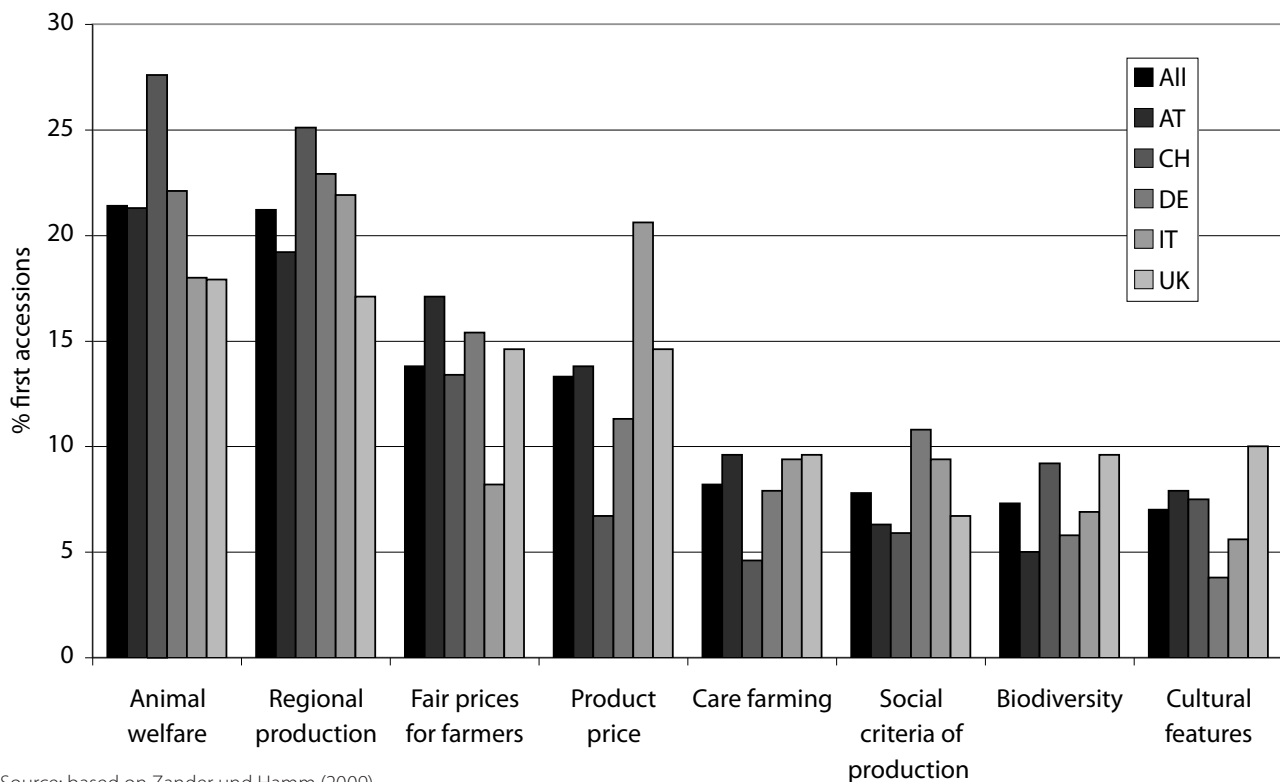
## Conclusions

Since the beginning, organic food production has included a broad range of values ranging from care for the soil and the environment, animal welfare and human health to social aspects and the people affected by the organic supply chain. A broader range values than covered by European organic regulations remain part of the core concept of organic farming for producers and consumers today.

An increasing number of individual companies and some certification bodies have introduced activities concerning ethical attributes of organic production. However, no comprehensive and accessible framework could be identified that provides practical support and tools for ethical management, for the verification of organicPlus activities and for the communication between producers and consumers.

Our results show that a considerable proportion of consumers would be willing to pay a further premium for some 'ethical' attributes of organic products. OrganicPlus products offer an opportunity for product differentiation if such ethical qualities are effectively communicated in an increasingly competitive market.

Communication concepts should focus on attributes that are most important to consumers, such as 'animal



Source: based on Zander und Hamm (2009)

Figure 1: Relevance of attributes: Share of attribute in all first accession incidents (%)

welfare', 'regional production' and 'fair prices to farmers' in order to be successful. Further research will investigate how these attributes can be communicated and further explore the consumers' willingness to pay.

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# Hur säkrar vi förmågan till innovationer och lärande?

## Min tilnærming

Temaet for mitt foredrag er: hvordan styrker man evnen til innovasjoner og læring? Relatert til den økologiske matvaresektor melder følgende spørsmål seg: 1) *Hvem* er, eller hvor finnes, økomat-innovatørene? 2) *Hvorfor* går de inn i en slik omstillings- og læringsprosess? 3) *Hva* finner de ut at de må gjøre for å nå sine visjoner? Hvordan forsøker de å skaffe seg et rom der innovasjon og læring kan gi en varig vekst?

Spørsmålene gir en retning for nøkkelbegrepene i mitt tema. I økomat-sammenheng handler "innovasjon" – ikke kun om en ny dyrkingsmetode eller nytt kontrollregime, men om en *praksis* som omfatter et nytt samspill innen et nettverk av ulike aktører. Dette dreier seg om et aktivt samvirke mellom mennesker og mellom mennesker og natur, inkludert naturens produkter. (Leeuwis, 2004; Morgan og Murdoch, 2000). Innen slike praksisfellesskap får "læring" karakter av å være noe mer enn et utvendig mål eller en spesiell kategori aktivitet. Aktørenes praksis er ikke bare en kontekst for læring. Læring er hva som endrer aktørenes evne til aktivt å engasjere seg i en kompleks økologisk praksis, forstå hvorfor de gjør det og hvordan de kan bidra til denne type radikale endringsprosess. (Wenger, 1998). Spesielt, og relatert til mitt tema, er det her tale om en "utviklingsøkologi" (Bonfenbrenner, 1979) hvor økologi-miljøer i vekst kan sammenlignes, metaforisk, med konsentriske sirkler der hver sirkel sammenbindes med den neste. Det går en linje fra den enkelte innovatør ut til lokalmiljøet, via regionnivået og til nasjonsnivået.

Mitt eget dr.gradsarbeid (Gillebo, 2007) kretset rundt dette temaet. Det ble tidlig klart at en dokumentstudie ikke ville øke min forståelse av denne type fenomen. Jeg

måtte skaffe meg direktekontakt med praksisverdenen og i 2003 gjennomførte jeg derfor dybdeintervjuer med aktive økomat-personer i tre regioner av Norge. Produksjonsvilkår og historisk/kulturelle forutsetninger varierte slik: A: flatbygder med volumproduksjon som profil, B: klimagunstige områder egnet for intensiv kvalitetsproduksjon og C: dal/fjellbygder med tradisjon for småskala produksjon og salg.

## Brudd og kontinuitet

*Hvem-* og *hvorfor-*spørsmålene nevnt foran, vil danne ramme for dette avsnittet.

Ett trekk ved den nye økomatgenerasjonen (som forskjellig fra 1970-årenes øko-pionerer) er at kjente og respekterte personer fra lokalmiljøene går i front for en offensiv salgsaktivitet. Felles for disse innovatørene er at det er viktig for dem at økologisk mat ikke framstår som noe sært og fremmedartet for vanlige mennesker. Dette hindrer ikke nøkkelaktørene fra å oppleve sitt engasjement som et brudd med konvensjonell tenkning og praksis. Bruddet erfarte jeg er knyttet til individuelle opplevelses- og erkjennelsesprosesser, men som samtidig utløser felles visjoner om å kunne gjenopprette brutte bånd mellom mat, natur og mennesker. Samtidig erfarte jeg at dette rommet for den menneskelige faktor også gir distinkt forskjellige utslag i de tre regionene. Essensene fra dataene er:

Region A: Foregangspersonene trer ikke ut av sine faste sammenhenger – tvert imot: de opererer fra de etablerte institusjoner hvor de er ansatt (landbruks-samvirke, forbrukersamvirke, rådgivning og offentlig landbruksforvaltning). Deres brudd med det konven-

sjonelle har linjer tilbake til personlige opplevelser knyttet til for eksempel synet av utpint jord, utslag av nye folkesykdommer i deres nære familie og et profitt-jag i tiden som de sterkt misliker.

Region B: Innovatørene har tilhørighet i en region tradisjonelt preget av business- og internasjonalt rettet handelsvirksomhet. De ønsker å etablere et frittstående økologisk, kunnskapsbasert produksjons- og salgsmiljø. Et slikt brudd med etablerte landbruksinstitusjoner har opprinnelse i et tidlig møte med fagkunnskap innen både økologi og økonomi/markedsføring. Et fokus mot et framvoksende moderne og miljøbevisst forbrukermarked har forsterket seg gradvis med årene.

Region C: Nøkkelatørene er oppvokst i et dalføre med tradisjon for samspill mellom landbruk og turisme (hytter, fjellstuer mv.) fra gammel tid av. Dalen bærer med seg en matkultur som flere husker tilbake på. Etter mange 10-års "fangenskap" i et nasjonalt landbrukspolitisk system har etter hvert flere oppdaget at økologi kan åpne en vei til å revitalisere en natur- og kulturbasert landbruksproduksjon i området.

*I sum:* En første oppdagelse man gjør ved å gå inn i aktive praktikermiljøer innen økomat-satsingen er at de virkelige "motorer" befinner seg på lokalt/regionalt nivå. Innovatøren vil ofte være en økobonde, men kan også være en grossist, en offentlig ansatt saksbehandler, en butikksjef eller en landbruksrådgiver. Et kjennemerke ved økomat-innovatøren er hans/hennes evne til å se sin aktivitet som del av en kultur, en historie og et samfunn de er del av. Konsekvensen av dette er at ulike individuelle brudd-opplevelser i forhold til den konvensjonelle matvaresektor ikke fører ut i et ingenmannsland, men blir kime til visjonen om en revitalisert regional, bærekraftig matregion. Det er del av innovatørenes tankegang at en økomat-satsing vil gi befolkningen i området en opplevelse av kontinuitet og sammenheng mellom fortid, nåtid og framtid.

### Divergent læring – direkte kommunikasjon

Mitt neste punkt vil bestå av en kretsing rundt hva- og hvordan-spørsmålene nevnt innledningsvis.

Fortellingene fra intervjupersonene gav et rikholdig bilde av deres hverdagssituasjon. Disse varierte mellom regionene (se nedenfor), men fellestrekkene var: oppsplittingen personene var kjent med fra tidligere mellom

produksjon, salg, rådgivning og offentlig forvaltning ville de til livs. Framfor å bli "puttet inn i bokser" – som sentrale beslutningstakere har utformet og styrer, ligger det nært for lokale økomat-innovatører å være aktive deltakere innen flere plan – eller domener, som har betydning for framgangen innen økomatsektoren. I denne sammenheng foraktes ikke teoretisk kunnskap, men slik kunnskap oppfattes som verdiløs hvis den ikke har feste i en praktisk og sammensatt virkelighet. Spesielt: betydningen av å lære av hverandre gjennom direkte kommunikasjon framstår som den viktigste kompetansestrategi. Det ligger nært å benytte en slik erfaringsbasert læringsform også som tilnærming i møte med ulike motstandskrefter som gjør seg gjeldende innen dette feltet.

Denne form for vitalitet innebærer at aktivitetene og læringsformene følger ulike mønstre i ulike regioner. Essenser fra min undersøkelse kan kort sammenfattes slik:

Region A: Angående produksjonsplanet går nøkkelpersonene sammen om en stor satsing for å fremme økologisk korn og kjøtt – nærmest som en økologisk bulkvare. De oppdager underveis at for å få en jevn produksjonsøkning må de raskt endre fokus i sitt daglige virke – varierende mellom bønder, butikker/forbrukere, rådgivningen o.a. På økonomiplanet er fokuset særlig rettet mot statens ansvar for å gjøre økologi til en økonomisk levevei, herunder få tilskudd til investeringer som en felles pakkemaskin i regionen. Innen nettverksbygging gjelder det å etablere åpne kanaler vertikalt (oppover) i matvaresystemet – mot landbrukssamvirket og sentrale myndigheter. I alle tilfellene står opplevelsen sentralt som kommunikasjonsvei: bønder samles i store grupper ute på jordene for å lære om jordstrukturer, butikkansatte inviteres med til økologiske gårdsbruk og forbrukere får se og smake økomat rundt i butikkene. Også "elitene" i maktapparatene blir møtt med kreative opplevelsestiltak som for eksempel invitasjon til økologiske julemiddager.

Region B: På produksjonsplanet rettes anstrengelsene mot å utvikle en grønnsakproduksjon av særlig høy kvalitet – som en økologisk spesialproduksjon. Til dette søker foregangspersonene å spesialisere seg innen dyrking, salg og markedsføring, og derved bygge opp en allsidig fagkompetanse i regionen. Et

solid økonomisk fundament skal sikres gjennom et helkjede- og selskapsbasert bedriftsmiljø, og markedet utgjør hovedinntektskilden. Miljøet søker å utvikle et horisontalt rettet nettverk, dvs. mot de store matvarekjeder i området, de regionale planmyndigheter og vertskommunen. Et mål for valg av dialogpartnere – uavhengig av nivå/omene – er å nå fram til grupper og personer med særlig evne til refleksjon. Promotering av et økologisk kvalitetsprodukt framskaffet i en miljøbevisst og innovativ region, skal skape tillit og høy troverdighet. Produksjonsprosesser og produsenter/leverandører skal ikles en mest mulig transparent og personlig form.

Region C: Produksjonssiden her er preget av at området var tidlig ute med å få lagt om mer enn 10 % av jordbruksarealet til økologisk, men så viste det seg at den økologiske melka bare ble blandet sammen med den konvensjonelt produserte melka på et stort meieri utenfor området. Nå ble det viktig å lære av andre småskalabedrifter og starte foredling og salg lokalt. Det som nå kan gjøre økologi til noe meningsfullt er å etablere en kopling mot stedets landskap og kultur. Økonomien ser man for seg skal sikres gjennom mange nyetablerte foredlings- og matbedrifter, lavkostnad (gjenbruk av teknologi/egeninnsats) og faste kundegrupper. Nettverksbyggingen retter seg, logisk nok, mot å etablere et lokalt samvirke mellom gårdsbruk, turismebedrifter og rådgivningstjenesten. For å bli kompetente deltakere i et utviklingsarbeid med et bygdeperspektiv, står evnen til empati (innlevelse) sentralt. Lokal praksisopplæring basert på oppsøkende virksomhet og en-til-en-samtale er den klart best fungerende læringsform. Den gode kunde er den som oppsøker dalen og som lærer seg å forstå, og sette pris på, stedets naturkvaliteter og levesett.

*I sum:* De bilder jeg har tegnet fra tre regioner illustrerer hvordan ulike utviklingslinjer kan springe ut av et felles utgangspunkt, nemlig 10 %-målet (senere forhøyet til 15 %). Et møte med praksishverdagen til noen av de som skal utføre dette arbeidet, illustrerer at utvikling av en økologisk matvaresektor ikke vil følge en rett linje; de aktive miljøer må finne sin egen vei – praktisk og erkjennelsesmessig. Foregangsmiljøene setter inn sitt engasjement på mange nivåer/domener – langs en divergent og kreativ vei. Dernest: deres erfaringsbaserte kunnskap danner kultur for en kommunikasjon som

i form framstår som direkte, situert og virkningsfull. Koplingen mellom materie (natur/mat), tanke, ord og handling bærer i seg et potensial, eller en dynamisk kraft, for et endret og mer bærekraftig matvaresystem.

Bare en ting kan stoppe en videre vekst: rammebetingelser som ikke tillater lokale/regionale miljøer å være motorer for det som videre skal skje.

### Implikasjoner

I dette sluttavsnittet fokuseres nettopp spørsmålet om rammebetingelser. Plassen tillater imidlertid bare noen korte påpekninger:

1. Min erfaring som omtalt foran, tilsier at politiske myndigheter, markedsorganisasjoner og kunnskapsinstitusjoner trenger å revidere oppfatningen om økomat som kun en ekstra varetype. I stedet bør det lyttes til den innsikt og praksis som de nye økomat-innovatører legger for dagen – med vekt på et nøye avstemt samspill mellom natur, historie, mat og menneskers tanker og handlingsmønstre.
2. Sentrale politiske myndigheter må oppdage potensialet som ligger i regional innovasjon og læring når målet er å fremme økologisk mat. Større deler av ressursene på nasjonalt nivå må desentraliseres og bidra til å skape lokale arenaer for dialog og handling på tvers av sektorer og fagområder.
3. Nasjonale markedsorganisasjoner trenger en dypere erkjennelse av at mat i tiden framover vil dreie seg om mer enn bare å dekke et fysiologisk behov og oppfylle en rekke tekniske standarder. Organisasjonene må ikke opptre som så mektige at de helt overdøyer en direkte-kommunikasjon mellom de egentlige tilbydere og etterspørre av mat. På denne måten vil matens "helhets-budskap" komme langt tydeligere til syne.
4. Forsknings- og rådgivningssystemet trenger et bevisst oppgjør med sitt gamle "kunnskapsoverførings-paradigme". Framfor tanken om å overføre kunnskap til alle de der ute som mangler kunnskap, bør kunnskapsinstitusjoner gå sammen med de praktiske innovasjonsmiljøer inn i en felles innovasjons- og læringsprosess. På denne måte kan forskere og rådgivere kombinere ny læring om en kompleks og dynamisk hverdagsvirkelighet med en aktiv deltakelse for å forbedre denne virkelighets utviklingsbetingelser.



### Konklusjon

Det finnes ingen snarvei til et økologisk innrettet matvaresystem: et varig gjennomslag må bygge på at tverrfaglige grupper rundt omkring i landet gis arbeidsbetingelser til å kunne nytte ut sitt engasjement og sin kreativitet til å revitalisere et sett av koplinger mellom mat, natur og samfunn.

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## Critical aspects of scaling up – what must not be jeopardised?

Organic food sector has developed almost dramatically in last decades. We have seen the growth of organic farming areas, market shares, wide range of industrially processed organic foods and consumer demand. We have also witnessed some promising results of the positive environmental and health effects of organic food.

At the same time critical voices have aroused around the conventionalising debate. Organic food has become closer to conventional farming with monocultures, complex delivery systems and highly processed and industrialised foods at least in the most intensive areas of organic agriculture. Conventionalising of organics has had good impact for example on widening production and consumption options for everyone in the food chain. My aim is not to “turn organic back to its roots”

or criticize conventionalising but rather to discuss what comes after organics.

To see what comes after organics we have to know where organics are now and what we have gained. Achievements of organics are greatly related to farming methods including nutrient flows, soil condition and biodiversity. Some organic farms serve in multifunctional roles conserving and maintaining traditional species and landscapes. Organic farms also guarantee some improvements on animal care but the most critical consumers keep these changes as a minor. On the consumer side organic has become respectable choice after supermarkets have taken organic food on their shelves and values of healthy food have risen.



Superficially everything seems to be okay with organics but is it really? Besides of organic agriculture there have also evolved discourses of local and quality food in academic and rural policy debates. These discourses speak on behalf of the origin of food, trust, close consumer-producer relationship and food quality. Things that current organic agri-food sector cannot absolutely secure. In addition, different kinds of alternative food networks (AFNs) have evolved around Northern countries. These networks try to solve the problems of sustainable agriculture from more diverse angles addressing concerns of social justice (e.g. Fair Trade in North), food miles, local food cultures, seasonal eating and do-it-yourself mentality.

To understand what is to be improved and what may come after organics I will give an example from Finland and from grass root level. Finland is an interesting example of development of organic food and its markets, also showing some problems of scaling up and the roles of supermarkets. On 21st century Finland has been one of the leaders with the highest percentage of land area under organic management in per cent of total agricultural area. Despite of the size of organic production, market of organic food hasn't evolved as fast. Difference is remarkable if Finland is compared to Denmark (country with similar number of inhabitants and organic farming area). In Denmark organic markets were fivefold in 2004. One explanation could be that

generally Finnish food is considered as pure and there is no need for "more" organic products. Other and more weighting notion comes from the roles of supermarkets. In countries where organic markets are bigger supermarket chains and also discount supermarket chains have been active in adopting organic foods.

Finnish supermarket chains offer organic foods among other brands, but the quality of stocked and travelled organics, their range and pricing hasn't been satisfactory for consumers. For compensating high prices, poor availability and low quality of local organic foods in supermarkets consumers have organised their own organic food groups (organic food circles). These groups order collectively food straight from producers and also organise many kind of events from cooking evenings and seminars to farm visits. Organic food circles are example of efforts to redefine sustainable agriculture in more socially and culturally sustainable way.

The benefits of scaling up are inevitable but we have to also admit that not all goals are achieved. The core problem is that current regulations of organic farming concern only small part of farming methods. Other multifunctional and social benefits turn out to be minor especially when farm size and production grows. Because of that it is important to pay attention on alternative food networks and try to see what comes after organic and what kind of policies and regulations are needed.

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## Är det möjligt att producera livsmedel för marknaden och ändå vara klimatneutral?

Dagens livsmedelsproduktion står för en stor del av samhällets klimatpåverkan. Ungefär 30 % av utsläppen av växthusgaser från svenska hushåll kommer från maten vi äter och kanske så mycket som 80 % av dessa sker i vid produktionen på gården. I primärproduktionen är 40 % av utsläppen lustgas och ungefär lika mycket är utsläpp av koldioxid<sup>1</sup>. Cirka 20 % är metan, främst från idisslande djurs matsmältning. Vilka är då de viktigaste åtgärderna för att göra lantbruket klimatneutralt, det vill säga till en lika stor kolsänka som kolkälla? Är det överhuvudtaget möjligt?

### Totala mängden "nytt" kväve in avgör i slutändan vad som läcker

Den allra största enskilda utsläppskällan (mer än 30 %) är troligen lustgas som bildas när organiskt bundet kväve bryts ner av mikroorganismerna i marken. Vid denna naturliga process blir det mesta kvävgas, som ju atmosfären till allra största delen består av. I processen bildas dock alltid lite lustgas. Ju mer biologiskt bundet kväve som ska tillbaka till atmosfären igen desto mer lustgas bildas, även om lokala markförhållanden avgör fördelningen mellan kvävgas och lustgas på varje enskild plats. Jordbruket bygger idag till stor del på ett linjärt flöde av växtnäring. Nytt kväve förs in i systemet, ungefär 200 000 ton per år, framför allt i form av handelsgödsel och till en mindre del i form av baljväxters kvävefixering<sup>2</sup>. På olika platser och vid olika tidpunkter frigörs allt detta kväve igen, allt förutom den lilla del som långsiktigt binds in i jorden. Globalt sett räknar man med att män-

niskan har dubblat den mängd kväve som binds in i det biologiska systemet. Det kväve som inte binds in i sediment och begravs djupt ner i berggrunden ska till slut tillbaka till atmosfären. Ju mer kväve som ska tillbaka till atmosfären desto mer lustgas blir det med andra ord. För att komma till rätta med jordbrukets bidrag till dessa utsläpp på ett långsiktigt hållbart sätt behöver kretsloppet mellan djur och växter och mellan stad och land slutas igen. Kväveeffektiviteten behöver också öka, till exempel genom att anpassa produktionen så att man kan använda stallgödsel effektivt samt genom att ha bra växtföljder. Detta skulle radikalt minska lantbrukets utsläpp av växthusgaser.

Näst efter lustgasemissionerna från jordbruksmarken kommer förmodligen utsläpp av koldioxid från mulljordar. Att sluta odla spannmål, grönsaker eller andra ettåriga grödor, och istället ha långliggande vallar på dessa jordar är ett sätt att minska utsläppen. Å andra sidan ger många mulljordar stora skördar av just dessa grödor, vilket gör att utsläppen per kilo livsmedel kanske ändå inte är så stor. Ett alternativ kan då vara att bygga in motsvarande mängd koldioxid genom att på mark i närheten öka jordens mullhalt. Oavsett vad man tänker om det vettiga och möjliga i en sådan lösning så måste lantbruket för att bli klimatneutralt förändra odlingen så att den bidrar till att stadigt öka mullhalten. Viktiga frågor blir då hur mycket och hur länge det är möjligt att öka mullhalten i jordbruksmarken. Det finns studier från USA som visar att omläggning till ekologisk produktion trefaldigade inbindningen av kol i marken (Pimentel et al., 2005). Ny forskning visar dessutom att marken kan binda in kol under en avsevärd tid (Soussana et al., 2007). Detta är en fingervisning om att det finns en stor

1 Sammanställning av data från Jordbruksverket, 2008. Minska jordbrukets klimatpåverkan! Del 1: Introduktion och några åtgärder/styrmedel. Rapport 2008:11.

2 [www.ssd.scb.se/databaser/makro/start.asp](http://www.ssd.scb.se/databaser/makro/start.asp)

potential i att odla på ett sätt som gör marken till en sänka istället för som idag ofta en källa till koldioxidutsläpp. Hög produktion av biomassa, fleråriga grödor, samodling av olika grödor och minskad plöjning är sätt att öka förutsättningarna att binda kol. Glädjande nog visar studier också att artrika marker, som ju dessutom har andra fördelar, samlar mer kol än artfattiga (Steinbeiss *et al.*, 2008). Nygamla metoder att "samla kol", så som "Terra Preta" som användes redan av indianer för att höja bördigheten i regnskogsmark, kan också visa sig vara användbara. Mer forskning och försöksverksamhet behövs dock för utveckling av sådana metoder.

### Idisslare som hjälper till att "samla koldioxid"

Att hälften av allt spannmål som odlas blir foder till våra husdjur är varken etiskt försvarbart i en värld där människor svälter eller klimatsmart. Stora mängder fossil energi används för att producera detta foder på sätt som också ofta minskar mullhalten. Idisslare behöver istället hjälpa oss att samla solenergi från marker som är svåra att bruka och "samla koldioxid" genom att beta naturbetesmark och äta hö och ensilage.

Ur ett klimat- och hållbarhetsperspektiv kan det vara rimligt att den areal av vallodling och betesmark vi vill och behöver ha i framtiden skulle avgöra hur mycket mjölk vi kan dricka och hur mycket kött vi kan äta. Mjölkkorna skulle behöva födas upp huvudsakligen på grovfoder och deras antal avgöras av den mängd sådant foder vi kan producera utan att det konkurrerar om åkermark. Utifrån mjölkkornas antal bestäms sedan antalet köttkor som är mjölkkornas tjurkalvar och de kvigor som inte behövs för att bli nya mjölkkor. Detta är ett exempel på mångfunktionalitet.

### Enkelmagade djur tar hand om matrester

Idag står foderproduktionen för mellan 80 och 90 % av de utsläpp av växthusgaser som grisar, höns och kycklingar ger upphov till. Om djuren istället föddes upp på matrester från offentliga kök och rester från livsmedelsindustri, skulle dessa utsläpp nästan helt försvinna. Bara transporter och eventuell behandling av resterna blir kvar. Dessutom skulle mycket mark att producera mat på, och att samla koldioxid i, frigöras. Det finns så mycket rester att vi skulle kunna äta lika mycket gris-kött som vi gör idag med en sådan foderstat (Arnqvist, 2008). Eftersom det är önskvärt att andelen mat som kasseras minskar och eftersom vi förmodligen vill äta

lite kyckling och ägg också, kanske vi inte kan äta fullt så mycket fläskkött i framtiden, men potentialen är ändå oväntat stor. För att detta ska vara möjligt utan risk för smittspridning behövs en annan skala och struktur på vårt livsmedelssystem.

### Förnybar energiproduktion på restprodukter

Att producera förnybar energi i stor skala med stora insatser av energi på åkermark är ungefär lika ineffektivt som att producera djurfoder på samma sätt. Därför ligger jordbrukets stora potential att producera biobränsle framförallt i att utvinna energi i de restprodukter som blir av annan produktion. Att använda gödsel från djuren och annat organiskt material till biogas till exempel. Det är ytterligare ett exempel på hur lantbruket skulle kunna bli mer mångfunktionellt. Matrester blir foder, som blir kött och gödsel, som blir mat och energi till människor. Dessutom finns en mängd tak på gårdar att samla solenergi på och energi i vind att fånga och i viss mån kan även i vatten i små vattendrag ge ett lokalt tillskott. Samtidigt som vi ställer om till förnybar energi måste lantbruket naturligtvis radikalt minska energiförbrukningen både för att producera och transportera maten. Transportbehovet minimeras i ett livsmedelssystem som har en skala som möjliggör energisnåla och täta kretslopp.

### Att gynna mångfald – det viktigaste redskapet

Att bygga på mångfald på alla nivåer, i sort/ras-, fält-, gårds-, region- och landnivå men även i lösningar och idéer har visat sig vara viktigt för lantbrukets utveckling mot hållbarhet. Ju mer interaktioner mellan mångfalden desto mer effektivt och mångfunktionellt kan det bli (Foley, 2005). Mångfalden kommer att vara viktig för vår möjlighet att anpassa oss till de väntade och oväntade förändringarna i klimatet som vi inte kan undvika. Den biologiska mångfalden är också viktig, för det är de arter av växter och djur som den består av, som generar ekosystemtjänster så som bördiga jordar, biologisk reglering, lokalklimat, kvävefixering, rent vatten och genetisk mångfald till friska utsäden. Den biologiska mångfalden gynnas av mångfald i alla andra skalor.

För att bibehålla dagens produktionsnivåer och samtidigt fasa ut de fossila resurserna behöver lantbruket ta hjälp av lokala ekosystemtjänster och förnybara resurser. Stor lokal ekologisk kunskap krävs för att på ett medvetet och klokt sätt kombinera produktion av mat

och samtidigt underhålla och gynna alla de funktioner i agroekosystemet som gör produktionen möjlig. Att samarbeta med jordens mikroorganismer, med den biologiska mångfalden ovan jord, med de odlade grödorna och med husdjuren för att öka mångfunktionaliteten och hitta en lagom fördelning mellan matproduktion och andra funktioner blir då viktigt. Kanske är det just det som är att producera livsmedel i vid bemärkelse. Medel för livet är ju inte bara bröd, kött och mjölk utan också luft att andas, vatten att dricka, bördiga jordar, natur att vara i, skönhet att se på, mening och delaktighet och mycket mycket mer.

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Fôrproduksjon på husdyrløse gårder er lite miljøvennlig

# Feed production on farms without animals is not environmentally sustainable

*The segregation of feed from animal production is an ecological nonsense, likely to increase the greenhouse gas emissions and environmental costs of producing animal food for humans.*

In Scandinavia organic farming movements have chosen to call themselves "ecological" and this is also the official term used by the authorities. "Ecological" envisages mutual dependencies and interactions between all the elements of a farming system, interactions which are disrupted by the ongoing segregation of plant from animal production. However, there is evidence that conventional farmers can do well even when they rely on a limited range of annual cash crops. Furthermore, farmers dedicated to either cash crops or animal husbandry can gain a high specialist proficiency that can be difficult to match by mixed farmers. This increasing specialization of modern agriculture is appealing also for organic farmers, as many appreciate the advantage of a simplified management and of reducing investments to a limited range of equipment. This note draws the attention to the fact that segregation of plant from animal production is likely to reduce the ecological sustainability of food production and increase the negative impacts on the environment, while the total long-term productivity is likely to be reduced.

## Methods and definitions

Food supply to the human society is considered the main goal of agriculture and other relevant goals, as for example production of bio-energy, are not discussed here. A holistic approach is used, where a farming system is defined as the total of land and farms involved in the

production of a food commodity. Thus a cash crop farm producing raw material for feed concentrates is part of wider farming systems which includes animal farms. On the other hand, a dairy farm that uses no imported feed can be considered an autonomous farming system (Figure 1). The basis for this is the recognition of the

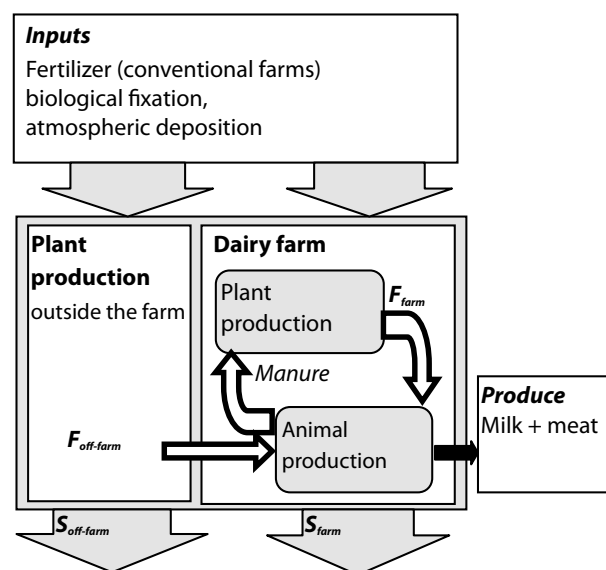


Figure 1. Major nitrogen flows related to a dairy farm system. Produce: the N amount in the net sale of milk and livestock.  $F_{off-farm}$ : net N amount in purchased feed.  $F_{farm}$ : N in the feed produced on the farm. The N surplus on the dairy farm ( $S_{farm}$ ) is the difference between the total N input into the farm (fertilizer, biological fixation and atmospheric deposition, purchased feed) and the nitrogen in the produce P. The total N surplus is the sum of  $S_{farm}$  and  $S_{off-farm}$ . The latter is the N surplus on the cash-crop farm.

trophic chain: all food for humans, including meat and milk, depends on plant production. Many of the topics mentioned are relevant world wide, however here they are discussed mainly in a Scandinavian or European context.

#### **Segregation of feed production from animals: consequences on the animal farm**

The use of imported feed allows a better formulation of the feed ration, and thus potentially a better digestion and assimilation, lower methane emission from enteric fermentation and better nitrogen use efficiency. In the case of dairy cattle, imported feed enables to easily meet the energy demand of high yielding cattle at peak lactation. High yield per cattle has been suggested as a strategy to increase energy and N efficiency, since it reduces the losses related to body maintenance per litre of milk. However, a review of N-budgets of dairy farms spacing from northern Italy to Norway, showed that the N-surplus at the farm level increased with the share of imported feed (N-surplus = N-inputs – N-in-sold-milk-and-livestock). The reason is a reduced N-efficiency of plant production on farms with a large share of imported feed (Bleken *et al.* 2005). Several mechanisms are likely to contribute: plants utilize large manure applications less efficiently than small ones, farmers with surplus of manure may pay less care in using it efficiently, and farmers may find it more convenient to purchase feed rather taking initiatives for reducing plant losses during harvesting, storage and grazing. The magnitude of these losses (Steinshamn *et al.*) makes them a key factor for the efficiency of plant production.

In addition to increasing the N-loss from the animal farm per litre of milk, imported concentrate feed has also a "N-cost" related to the N lost during production on the cash crop farm. The total N-surplus at both the animal and the cash crop farm contributes to the eutrophication of fresh water and coastal areas and it is a potential source of nitrous oxide, and important greenhouse gas (GHG). The resulting increase in nitrous oxide emission counteracts a possible benefit in reduced methane emission (also an important GHG) obtained by adding purchased energy feed in the ration. This topic is presently under debate and object of international research.

#### **Segregation of feed production from animals: consequences on the cash crop farm**

*Nutrient supply:* On conventional farms N-needs can be easily met by application of chemical fertilizer, otherwise biological fixation in symbiosis with leguminous in green manure crops is needed. In a Nordic climate, biological fixation by a spring crop before a main crop, within the same season, is not feasible or less effective compared to overwintering green manure leys. However, unless the shoot biomass is removed during the summer, the N-fixing activity is reduced while the risk of leaching of nitrogen and other nutrients from the decaying shoot biomass is increased. An interesting alternative could be the use of shoot biomass for biogas production, with the additional benefit that the slurry from the biogas plant can be applied as manure in the spring. This however depends on the availability of a nearby biogas unit, and it is difficult to see the advantage of using herbage for biogas rather than converting it to animal proteins upon feeding it to ruminants. In any case, the repeated sale of crops to be used as feed elsewhere constitutes a removal of nutrients. In the case of grains (cereals, rape, beans) removal of phosphorus and sulphur from the field can be a problem, while phosphorus accumulation in soils of animal farms may lead to a risk for pollution, also due to the direct supplementation to the animals. In the less common case of whole shoot biomass sale (silage, hay) the removal of potassium can be a threat to organically managed soils with little inherent nutrient reservoirs.

*C-sequestration:* Evidences from a huge number of long-term trials show that the inclusion of leys in a crop rotation always maintains higher carbon contents in the soil than annual crops alone. The increment in soil C content mediated by leys is larger than what can be obtained by the incorporation of manure. The incorporation of crop residues tends to have smaller effects, and in some case no effects or even negative effects have been observed (Rasse *et al.* 2005). Reduced or no tillage has also been shown to have positive effects on the soil organic matter, but again evidences are contrasting and local environmental conditions seem to play a decisive role. However, as far as mitigation of CO<sub>2</sub>-emissions is concerned, the relevant question is the total sequestration/emission from the whole animal farming system. In theory a lower C-sequestration on the cash-crop farm can be compensated by a higher C-sequestration on the animal farm. Evidences that the C content in the soil can



reach a saturation level (Stewart *et al.* 2009), above which incorporation of larger amounts of plant residues are fruitless, suggests that an even distribution of leys and manure with annual crops would result in higher total C-sequestration; this is still a much debated question.

*Soil aggregate stability and pollution:* Although a large share of the increased anthropogenic atmospheric CO<sub>2</sub> concentration originates from soil cultivation, the potential for C-sequestration in cultivated soil is unlikely as large (again, this is debated). The inclusion of leys in an annual crop rotation has however many other positive effects on the crops yield and the environment. Leys improve aggregate stability, an effect which is more than a consequence of the increased C content in the soil alone. Aggregate stability makes the soil more "tolerant" for mechanical disturbance and compaction by tractors. On a field with only annual crops, erosion increases not only because of longer periods of soil exposure without a crop protection, but also because of the lower aggregate stability after a few years without leys. This leads to pollution of fresh waters through phosphorus and nitrogen leaching. On the field itself, the increased soil erosion leads on the long term to an impoverishment of the finest and best soil fraction (humus and clay). For the crop, a better soil structure means better root development, deeper root penetration and larger water supply through better water infiltration and storage. As a consequence nutrient uptake is also improved. On ecological farms the introduction of rotation with annual crops is probably the most effective management against perennial weeds in cereals. A classical example of the beneficial effects of crop rotation is provided the Continuous Broadbalk. Wheat Experiment at Rothamsted. Started in 1943, the treatments with adequate nutrient supply (either as animal manure or chemical fertilizer) has been able to provide stable yields for 100 years (about 3 ton wheat per year), and increasingly higher wheat yields with the adoption of new varieties, herbicides and fungicides after 1950 (to about 6–7 ton per years around 2000) without crop rotation. Introduction of leys on part of the experiment in 1975 has risen the wheat yield in the first year after leys to 9–10 ton per year (Johnston 1994).

*Biodiversity and pathogen reduction:* the presence of animals and thus green forage crops, leys and permanent meadows interwoven with annual cash crops necessarily increases biodiversity. Leys are perfect means of reducing soil born pathogens of annual crops. According to

Altieri 1999), the instability of agroecosystems, which is manifested as the worsening of most insect pest problems, is increasingly linked to the expansion of crop monocultures.

### Conclusion

"Ecological feed production" on farms without animals breaks those ecological relationships and interactions which make mixed farming

- probably the one with lower GHG emissions per unit of product
- best for maintaining soil fertility and reducing soil erosion
- the most productive
- more bio-diverse and thus more robust to pathogens

compared to feed production on farms separate from animal production.

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## Dyrkningssystemernes effekt på produktion og miljø

Moderne landbrugssystemer har en kraftig indflydelse på det omgivende miljø, og i Danmark er der særlig fokus på nitratudvaskning og drivhusgasemissioner fra landbruget. På det globale skala er lattergas ( $N_2O$ ) en af de væsentlige drivhusgasser (Mosier *et al.*, 1998), og i Danmark er landbruget langt den største kilde til udledning af lattergas. Der stilles i stigende grad krav til landbruget omkring reduktion af drivhusgasudledningerne, og tiltag til reduktion af udledningerne af  $N_2O$  og metoder til lagring af kulstof i jorden er derfor påkrævede. Bæredygtige landbrugssystemer skal også opfylde behovet for tilstrækkelige mængder og kvalitet i fødevarerne. Økologisk jordbrug har visse fordele i disse sammenhænge, men der er også behov for forbedringer (Berntsen *et al.*, 2004; Olesen *et al.*, 2005).

I økologisk jordbrug er afgrødeproduktionen i betydelig grad afhængig af jordens frugtbarhed for at sikre næringsstofforsyningen. Jordfrugtbarheden vedligeholdes især via sammensætningen af sædskiftet (grøngødning og efterafgrøder) og via anvendelse af husdyrgødning (Olesen *et al.*, 2009). En forbedret anvendelse af disse for at forbedre afgrødeudbytter og reducere emissionerne til miljøet kræver en dybere forståelse af næringsstoffomsætningen i jorden og af effekterne på afgrøde og ukrudt.

I 1997 blev der igangsat et langvarigt økologisk sædskifteforsøg på tre lokaliteter i Danmark (Olesen *et al.*, 2000). I 2005 blev forsøget modificeret til også at inkludere et konventionelt sædskifte. De tre lokaliteter repræsenterer typiske jorder (sand, lerblandet sand og sandblandet ler) og klimaforhold for dansk landbrug. Designet af det nuværende 8-år gamle sædskifteforsøg tillader forsøgsmæssig adskillelse af effekter af helårs-

grøngødning, efterafgrøder og gødning. Dette giver mulighed for at gennemføre en differentieret analyse af forskellige dyrkningsstrategier. Dette langvarige forsøg er udnyttet til en integreret undersøgelse af produktivitet og kvælstofstrømme i økologiske dyrkningssystemer.

### Langvarigt sædskifteforsøg

Forsøget gennemføres på tre forsøgssteder i Danmark (Jyndevad på sandjord, Foulum på lerblandet sand, og Flakkebjerg på sandblandet ler). Der anvendes tre firemarkssædskifter, som sammenlignes på rotationsniveau (dvs. som gennemsnit af de fire år i sædskiftet). Alle marker i sædskifterne er repræsenteret hvert år. I forsøget indgår tre faktorer i to gentagelser:

1. Sædskifte og dyrkningsform (konventionelt og økologisk)
2. Efterafgrøder (uden (UE) og med (ME)).
3. Gødningsniveau (uden (UG) og med (MG)).

Forsøget blev igangsat i 1996 med dyrkning af vårbyg på alle forsøgssteder. Det første forsøgsår var 1997. I perioden 1997 til 2004 blev forsøget gennemført med tre økologiske sædskifter (tabel 1). I 2005 blev forsøget omlagt til to økologiske og et konventionelt sædskifte (tabel 1). Fra og med 2005 indgik der ikke længere nogen behandling, som både er uden efterafgrøde og uden gødning (tabel 2).

I første og anden rotation anvendtes som efterafgrøder både kvælstoffikserende (f.eks. kløver og vintervikke) og ikke-kvælstoffikserende (f.eks. rajgræs, cikorie og rug) arter i renbestand og/eller i blanding. I tredje rotation anvendes en blanding af kvælstoffikserende og

Tabel 1. Afgrøder i forskellige sædskifter i forsøget i forskellige perioder (O er økologiske og C er konventionelle sædskifter).

	O1	O2	O4	C4
1. rotation 1997-2000	Vårbyg:udlæg	Vårbyg:udlæg	Havre <sup>ME</sup>	
	Kløvergræs	Kløvergræs	Vinterhvede <sup>ME</sup>	
	Vårhvede <sup>ME</sup>	Vinterhvede <sup>ME</sup>	Vintersæd <sup>ME</sup>	
	Lupin <sup>ME</sup>	Ært/byg <sup>ME</sup>	Ært/byg <sup>ME</sup>	
2. rotation 2001-2004	Vårbyg:udlæg	Vårbyg:udlæg	Vinterhvede <sup>ME</sup>	
	Kløvergræs	Kløvergræs	Havre <sup>ME</sup>	
	Havre <sup>ME</sup>	Vintersæd <sup>ME</sup>	Vårbyg <sup>ME</sup>	
	Ært/byg <sup>ME</sup>	Lupin/byg <sup>ME</sup>	Lupin/byg	
Lokaliteter	Jynde vad	Jynde vad	Foulum	
		Foulum	Flakkebjerg	
		Flakkebjerg	Flakkebjerg	
3. rotation 2005-2008		Vårbyg:udlæg	Vårbyg <sup>ME</sup>	Vårbyg <sup>ME</sup>
		Kløvergræs	Hestebønne <sup>ME</sup>	Hestebønne <sup>ME</sup>
		Kartofler	Kartofler	Kartofler
		Vinterhvede <sup>ME</sup>	Vinterhvede <sup>ME</sup>	Vinterhvede <sup>ME</sup>
Lokaliteter		Jynde vad	Jynde vad	Jynde vad
		Foulum	Foulum	Foulum
		Flakkebjerg	Flakkebjerg	Flakkebjerg

<sup>ME</sup>Efterafgrøde i ME-behandlingen.

Tabel 2. Behandlinger i forsøget fra 2005

Sædskifte	Produktionssystem	UE	ME	ME
		MG	UG	MG
O2	Økologisk planteproduktion med grøngødning	X	X	X
O4	Økologisk planteproduktion	X	X	X
C4	Konventionel planteproduktion	X		X

MG: husdyrgødning (økologisk) eller handelsgødning (konventionel).

UG: Ugødet. ME er med efterafgrøde, og UE er uden efterafgrøde.

ikke-kvælstoffikserende arter i O2 og O4, mens der udelukkende anvendes ikke-kvælstoffikserede arter i C4.

Gødningsniveauet i de gødede parceller i første og anden rotation svarende til 40 % af kvælstofbehovet ifølge Plantedirektoratet inden nedsættelse af kvælstofnormerne i forbindelse med Vandmiljøplan II (Plantedirektoratet, 1997). Gødningen blev givet som gylle i mængder svarende til ammoniumindholdet i gødningen. I tredje rotation svarer gødningsmængderne i O2 og O4 til i gennemsnit 70 kg total-N/ha, hvilket svarer til den maksimalt tilladte import af konventionel husdyrgødning i økologisk jordbrug. I C4 anvendes handelsgødning i mængder svarende til Plantedirektoratets normer for 2004/05, i gennemsnit 110 kg/ha og der korrigeres ikke for årsvariation i afstrømningen.

På Jynde vad vandes alle afgrøder. På Foulum vandes hele forsøget efter kartoflernes behov. På Flakkebjerg vandes kartoflerne så vidt muligt. Produktionen fra kløvergræsmarken i O2 snittes og efterlades på marken i UG. I MG bortføres denne produktion. Der regnes med 3 slæt i løbet af året. Al halmproduktion snittes og nedmuldes eller henligger på jorden.

I O2 og O4 kontrolleres frøkrudt ved mekanisk ukrudtsbekæmpelse i de systemer, hvor dette er muligt. Rodkrudt bekæmpes ved jordbearbejdning forår eller efterår. I C4 bekæmpes ukrudt, sygdomme og skadedyr kemisk, og udsæd bejdses.

### Resultater og diskussion

Udbytterne fra de tre forsøgslokaliteter er vist for de enkelte afgrøder i tabel 3. Som gennemsnit af de gødede

Tabel 3. Kerne, frø og knoldudbytter i de enkelte afgrøder på de tre lokaliteter (JY: Jyndevad, FO: Foulum, FL: Flakkebjerg) i gennemsnit af 2006 til 2008 (t tørstof ha<sup>-1</sup>).

Sædskifte	Gødning	Efterafgr.	Vårbyg			Vinterhvede			Hestebønne			Kartoffel		
			JY	FO	FL	JY	FO	FL	JY	FO	FL	JY	FO	FL
O2	-	+	2.9	4.5	2.7	0.7	3.2	3.0				4.5	6.1	5.1
	+	-	3.5	4.6	3.6	2.2	5.6	3.9				5.8	7.2	5.5
	+	+	5.2	5.0	3.4	2.6	5.4	4.1				6.2	6.4	5.8
O4	-	+	2.7	4.0	2.5	0.8	2.4	2.8	1.1	2.9	1.2	4.2	5.8	4.0
	+	-	3.7	3.6	3.1	2.2	4.6	3.2	2.5	2.6	1.5	5.8	7.0	5.8
	+	+	5.0	5.0	3.7	2.3	5.3	3.7	1.9	2.6	1.4	6.0	7.1	5.7
C4	+	-	4.9	5.3	5.1	5.7	7.8	7.0	2.7	3.2	2.2	9.0	8.9	8.3
	+	+	4.7	5.4	5.1	5.7	7.4	7.4	2.5	3.2	2.6	8.8	8.3	8.2

Tabel 4. Gennemsnitlige tørstofudbytter af alle afgrøder i sædskiftet på de tre lokaliteter i gennemsnit af 2006 til 2008 (t tørstof ha<sup>-1</sup>).

Sædskifte	Gødning	Efterafgrøde	Jyndevad	Foulum	Flakkebjerg
O2	-	+	2.0	3.5	2.7
	+	-	2.9	4.4	3.2
	+	+	3.5	4.2	3.3
O4	-	+	2.2	3.7	2.4
	+	-	3.6	4.4	3.4
	+	+	3.8	5.0	3.6
C4	+	-	5.6	6.3	5.6
	+	+	5.4	6.1	5.8

behandlinger og afgrøder gav de konventionelle behandlinger reduktioner i udbytte på 19, 46, 23 og 28 % i henholdsvis vårbyg, vinterhvede, hestebønne og kartoffel. Udbyttereduktionen var i gennemsnit 29, 21 og 37 % på henholdsvis Jyndevad, Foulum og Flakkebjerg. Det var således især vinterhveden, der gav lavere udbytte under økologisk dyrkning, hvorimod der ved anvendelse af både efterafgrøder og husdyrgødning blev opnået højere udbytter i økologisk end konventionel vårbyg.

I de økologiske sædskifter bevirkede undladelse af gødning udbyttereduktion på 29, 51, 16 og 20 % i henholdsvis vårbyg, vinterhvede, hestebønne og kartoffel. Udbyttereduktionen var i gennemsnit 46, 16 og 25 % på henholdsvis Jyndevad, Foulum og Flakkebjerg. Undladelse af gødning var således mest alvorlig på sandjorden ved Jyndevad, hvorimod den gunstige forhistorie på Foulum forud for iværksættelse af forsøget i 1996 stadig er med til at mindske udbyttereduktionen ved undladelse af gødning.

I kornafgrøderne blev det største merudbytte af efterafgrøder opnået i sædskiftet uden kløvergræs (O4). Der var en positiv effekt af gødningsbehandlingen på udbytte af hestebønne på Jyndevad, hvilket indikerer at andre næringsstoffer end kvælstof er begrænsende her.

I gennemsnit af alle afgrøder i sædskiftet blev der opnået lidt større udbytter i sædskifte O4 end i O2 (tabel 4).

Dette var særligt tilfældet på Jyndevad, hvor udbyttet i O4 var 14 % større end i O2, hvorimod der ikke var forskel på gennemsnitsudbytterne i de to sædskifter på Flakkebjerg. På Flakkebjerg var der endog større udbytter i O4 end i O2 i sædskiftet uden tilførsel af gødning. Dette skal ses på baggrund af, at der i O4 i forhold til O2 er en yderligere bælgssædsafgrøde (hestebønne), som bidrager til udbyttet. Især på Flakkebjerg er udbytterne i de øvrige afgrøder derfor øget så meget, at det kan kompensere for den manglede bælgssædsafgrøde. Det skyldes formentlig, at kløver-græsset over de forudgående to sædskifter har bidraget til at øge jordens frugtbarhed, som herved sikrer højere udbytter. En sådan frugtbarhedseffekt er langt vanskeligere at opnå på sandjorden på Jyndevad, hvor en stor del af det mineraliserede kvælstof tabes ved udvaskning.

Mængden af både frøkrudt og rodukrudt er målt hvert i forsøget. I de økologiske systemer har mængden af frøkrudt ligget stabilt over de seneste otte år. Derimod har der været en stigning i mængden af rodukrudt i løbet af forsøgsperioden. Særlige problemer har været tidsler på Flakkebjerg og kvik på Jyndevad. Introduktion af kartofler i sædskiftet har dog medvirket til at begrænse mængden af rodukrudt.

Målinger af kvælstofudvaskning i forsøget viser store effekter af efterafgrøder på N-udvaskningen, især i de

situationer, hvor der er foretaget en stubbearbejdning om efteråret i behandlingerne uden efterafgrøder. Sådanne stubbearbejdninger er ofte nødvendige for at bekæmpe rodukruddet.

Målinger af lattergasemissioner i vinterhvede har på både Foulum og Flakkebjerg vist de største samlede emissioner i de konventionelle systemer. Der har dog også kunne konstateres betydelige emissioner fra de gødede økologiske systemer. Når der korrigeres for udbytte i systemerne er der kun ringe forskel i lattergasemissioner per produceret enhed, dog med en tendens til lavere emissioner i O4 med efterafgrøde.

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# Mikronäringsämnen i livsmedel och foder – problem och möjligheter

Vilken potential finns det att optimera mineralämnesinnehållet, speciellt innehåll av mikronäringsämnen, i foder och livsmedel i ekologisk växt- och djurproduktion utifrån:

- platsens förutsättningar
- gårdens produktionssystem
- utfodringsstrategi, betesdrift
- val av gröda/sort
- odlingsåtgärder, gödsling?

Nedan ges exempel på några mer specifika frågor vi kommer att diskutera på workshopen:

- Är halterna av mikronäringsämnen för låga i våra livsmedels- och fodergrödor i förhållande till människors och djurs behov?
- Interaktioner mellan mineralämnena, kan obalanser ställa till problem?
- Vad betyder en lokal produktion baserad på platsens förutsättning för grödors innehåll av mineralämnena och speciellt innehåll av mikronäringsämnen? eller för system med hög självförsörjning av foder och/eller betesbaserad produktion?
- Hur kan vi jämma ut obalanser mellan olika områden/mellan olika produktionssystem genom samarbete vad gäller näringscirkulation eller genom ökat kretslopp mellan stad och land?

Workshopen syftar till att presentera aktuell kunskap om mikronäringsämnen, fånga upp problem och lösningar utifrån erfarenheter i praktiskt lantbruk, diskutera konsekvenser för livsmedelskvalitén, samt behov av forskning.

Vi kommer ha några som inleder med olika aspekter på mikronäringsförsörjning i foder och i livsmedelskedjan. Vi kommer också ha inlägg om problem, relaterade till spårämnen, som iakttagits i det praktiska lantbruket.

## **Inledarnas forskningsinriktning:**

*Ingrid Öborn* är professor i växtodlingssystem vid SLU i Sverige. Hennes forskningsinriktning omfattar närings- och spårämnesdynamik (flöden och balanser) i jordbrukssystem i relation till jordbruksproduktion, produkternas kvalitet och systemens miljöpåverkan. I forskningen ingår betydelse av platsspecifika faktorer, speciellt markens modermaterial (markmineralogi och geokemi) för markbördighet och markens förmåga att leverera växtnäringsämnen till grödan.

*Espen Govasmark* är senior forskare vid Bioforsk, Avdelningen för mark och miljö i Norge. Hans forskningsinriktning är spårämnen i mark och grovfoder och även betydelse av organiska restprodukter för spårämnesförsörjningen, speciellt av koppar och zink. Espen har även studerat upptag av selen i olika grödor.

*Lena Hulthén* är professor i klinisk nutrition vid Avdelningen för klinisk näringslära, Institutionen för medicin vid Göteborgs universitet. Hennes forskningsinriktning är mineraler, främst järn, järnmetabolism, järnbrist och järnet i kosten. Vid avdelningen bedrivs forskning kring spårelementens biologiska funktioner och människans behov av mineralämnena. Interaktioner mellan olika mineralämnena är också en viktig forskningsgren samt dess betydelse för ämnesomsättning och näringsstatus.



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## Nya lantbrukare inom ekologisk produktion – vilka kunskaper och kompetenser behövs för rekrytering och utveckling?

Allt fler lantbrukare är intresserade av att producera ekologiskt men tvekar inför en omläggning av produktionen av flera olika orsaker. Några vanligt förekommande begränsningar är:

- tillgången på kunskaper och erfarenheter kan vara svår att hitta i gängse informationsflöde eller från lantbrukarens ordinarie kontakter med rådgivning och marknad.
- många djurproducenter har för liten areal i förhållande till besättningsstorleken för att tillräcklig mängder grovfoder.
- få eller inga ekologiska producenter i de nätverk där man som lantbrukare ingår, bristen på goda exempel eller någon att bolla funderingar och tekniska svårigheter med.

Dessa begränsningar åtgärdas på olika sätt i olika delar av landet men det är värt att diskutera möjligheten att minska begränsningen av utvecklingen genom att bättre förse lantbrukarna med det man efterfrågar. Därför kommer vi i denna workshop diskutera hur kunskaper och kompetenser kan tillhandahållas lantbrukarna bättre än hittills, t.ex. genom:

- några rådgivare med djupare kunskaper kring ekologisk produktion regionalt. Allt högre kompetens om ekologisk produktion hos flertalet rådgivare generellt
- olika former av samverkan mellan gårdar för att uppnå säkrare foderförsörjning och förbättrad lönsamhet
- ekologiska lantbrukare som mentorer, utbyte mellan olika företagare med och inför omläggning till ekologisk produktion

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# Hur får vi fler ekoproducenter?

## Hur får vi fler ekoproducenter?

### 1. Framåtsyftande produktionsutveckling

Den ekologiska produktionen ska driva utvecklingen mot mer hållbara och konkurrenskraftiga produktionsmetoder.

### 2. Trovärdigt regelverk

Regelverket och certifieringen ska vara trovärdig för producenter, konsumenter och övriga aktörer i livsmedelskedjan.

### 3. Professionell rådgivning

Konkret och detaljerad rådgivning ska finnas tillgänglig för alla intresserade producenter och rådgivningen ska vara anpassad till den enskilde producentens situation.

### 4. Avsättning för produkterna

## Hur?

### 1. Framåtsyftande produktionsutveckling

#### Forskning- och utvecklingsarbete

### 2. Trovärdigt regelverk

#### Regelarbete

### 3. Professionell rådgivning

#### Kompetensutveckling

### 4. Avsättning för produkterna – till skäligt pris

#### Aktörssamverkan – kontrakt

## 1. Forskning- och utvecklingsarbete

- Långsiktig forskningsstrategi
- Treåriga ramprogram
- Tvärvetenskapliga projekt för hela livsmedelskedjan
- Utvecklingsarbete inom förädlings- och handelsled
- Utvecklingsprojekt för att ta fram konkurrenskraftig produktionsteknik

## 2. Regelarbete

### EU-regler

Rådets förordning (EG) 834/2007;

Kommissionens förordning (EG) 889/2008

### KRAV-regler

Informera om regler och regeltolkningar

[www.sjv.se/ekoregler](http://www.sjv.se/ekoregler)

Driva frågor i EU

## 3. Kompetensutveckling (produktion)

### För lantbrukare

Mentorskap

Enskild rådgivning

Kurser och fältdagar

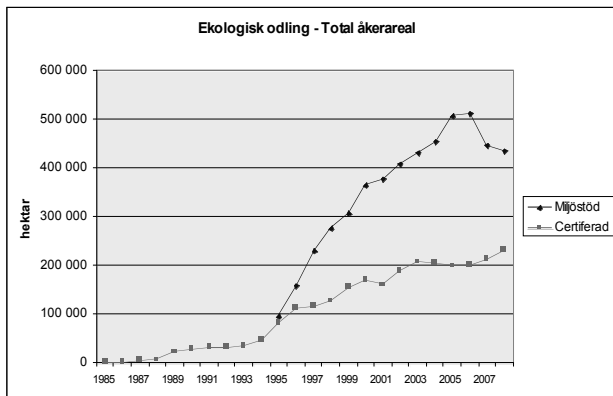
### För rådgivare

”Bas-eko-kurser”

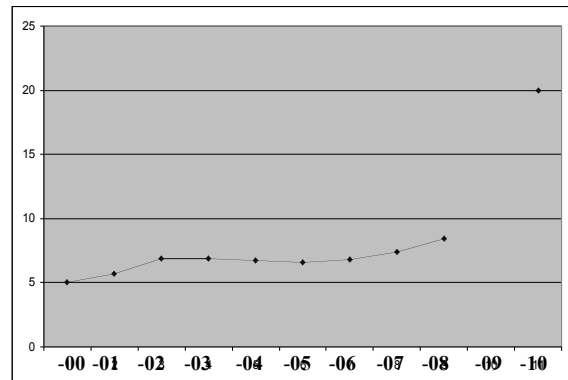
Specialiserade fördjupningskurser

### Gemensamt

Deltagardrivna forsknings- och utvecklingsprojekt



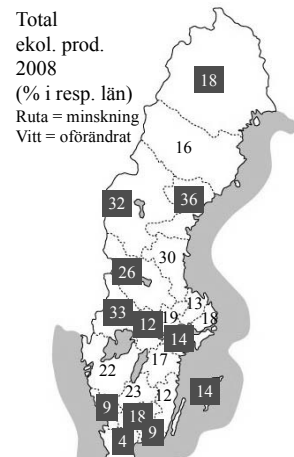
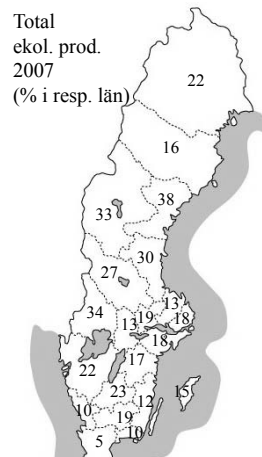
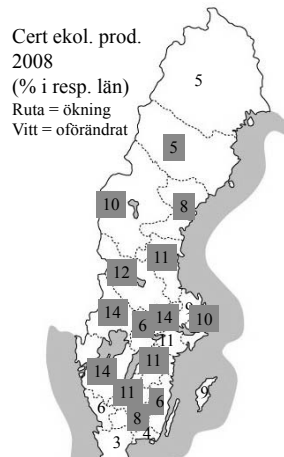
Procent certifierad ekologisk areal (mål 2010 = 20 %)



Fördelning av Certifierad ekologisk areal i Sverige (%) 2008



Fördelning av Certifierad ekologisk areal i Sverige (%) 2008



*Carmen Calverley*

*National expert on organic farming for the EU Commission,  
Directorate General for Agriculture and Rural Development*

## New organic regulation in the EU

The new organic Regulation (EC) No 834/2007 on organic production and labelling and its implementing Regulation (EC) No 889/2008 is applying from 1 January 2009. The new legislation sets out a complete set of objectives, principles and rules for organic production, labelling and control with a clearer structure and greater readability. The Member States have to implement these new rules as part of their official controls. In most Member States the control of organic production is delegated to private

control bodies or to control authorities. However, in order to protect consumer interests, prevent fraud and ensure the quality of the national organic control system, the Member States have to monitor and supervise control authorities or control bodies. What elements are important for the monitoring and supervision of control authorities and control bodies? How can the Member States and control bodies or control authorities work together on the implementation of the new organic legislation?

*Machteld Huber*

*MD, Louis Bolk Institute, The Netherlands*

## Food for health and well-being – Development of concrete research priorities

The Technology Platform ‘Organics’ of the IFOAM EU Group developed in 2008 the ‘Vision for an Organic Food and Farming Research Agenda to 2025’. The next aim is to develop a Strategic Research Agenda (SRA) to present to the EU by end of 2009. The Vision paper identified 3 main thematic areas:

1. Empowerment of rural areas, 2. Ecofunctional intensification and 3. Food for health and well-being.

Each area has a coordinator, who has the task to formulate the SRA for the specific thematic area. The coordinator formulates Key Challenges about the main research areas. These will be discussed during a broad consultation among researchers and trade companies,

during several workshops. Also ideas are generated there for connected research goals. For the thematic area ‘Food for health and well-being’ the following Key Challenges have been formulated:

1. Concept development quality & health, 2. Measurement tools, 3. Best practice development, 4. Safeguarding quality along the whole food chain, 5. Processing technologies, 6. Health effect studies, 7. Communication to consumers.

In the Workshop these Key Challenges will be discussed, connected research goals will be identified and priorities will be pointed out.

# Creating food futures: the value of fairness in our shared food futures

We offer a participant-centred, active workshop that aims to draw you into thinking about, learning, and contributing to a discussion on our shared 'Food Futures'. Presentations designed to provide food for thought will start off our discussions.

## **Introduction: Our Food Futures**

This presentation sets out some of the key discussion themes of our workshop. It takes as a starting point the fact that global transformations in food supply and consumption are placing our food security at risk. Is there genuine scope for creating food futures that embrace considerations such as ecological sustainability and social equity as well as placing good food on the table - and making money?

*Presenter: Cathy Rozel Farnworth, Editor of the book 'Creating Food Futures: trade, ethics and the environment'.*

## **Presentation 1: Food Print Analysis**

The cost of food prices does not reveal the full cost of production and supply: prices generally do not include environmental and social costs. In this workshop we discuss the development of a new tool, foodprint analysis that aims to help us understand better the real cost of food, and how, where and for whom these costs arise. We discuss how dependent domestic consumption has become on producers elsewhere who might not receive a fair price and on farming systems that might not be sustainable.

*Presenter: Susanne Johansson*

## **Presentation 2: Creating a Fairer Trading Field: African organic growers and the export market**

Due to East Africa's geographical location, a wide range of organic products can be grown throughout the year. It is relatively simple to convert as traditional practices are de facto organic.

Our products target local and regional markets, and also the export market. Over 90 % of organic production is carried out by small holder farmers with an average land holding of 2 ha. They receive training in organic procedures, food safety and better field management from processors, exporters and NGOs. Since the farmers work as a group they receive social benefits and improve their negotiating power. However, important challenges remain for processors and exporters such as myself. We invest substantial sums to enable farmer certification, we commit to buying the product from farmers at the agreed price, we are responsible for post-harvest management, for processing to the required standards, and for packaging and labelling to international standards. Despite all these efforts there is no guaranteed market or price commitment. Importers only want bulk cargo and will not accept African retail packaging. Some products like vanilla cannot be exported in bulk, so we need niche markets where we can receive a better price.

We know that buyers are interested in fair/ ethical / social issues and many exporters are asked to assure good social standards in their companies. We wish to see international lobbying for better prices, secure markets and access to niche markets.

*Presenter: Mansoor Nadir, Director / General Manager, Uganda Crop Industries Ltd (Sezibwa Estate, a spice farm which has been organically certified plus 750 outgrowers, the majority of whom are women.)*



**Creating Food Futures: trade, ethics and the environment**

*Editors: Cathy Rozel Farnworth, Janice Jiggins and Emyr Vaughan Thomas*

Foreword by Jules Pretty

<http://www.gowerpublishing.com/isbn/9780754649076>

Drawing upon examples of innovative food chains in Europe, Canada, Africa and Latin America, leading academics and practitioners challenge the idea that individuals are powerless in the face of global supply chains and the legal apparatus protecting these chains. The authors do not, however, underestimate the scale of the task at hand. They explore the tensions and dilemmas inherent in innovative practice - such as the ethics of mainstreaming, balancing a variety of goals and the ways in which success is defined - as well as presenting success stories and explaining how they were achieved.

Review: 'A thought-provoking mix of insights from different disciplines, discourses and case studies into the challenges in creating a more ethical and fairer food system able to deal with supermarket power, flawed supply chains and inequitable access to resources and power. In the book the meaning of environment, food literacy, fair trade, and the importance of food practices, trade rules and policies all come under scrutiny.' – Geoff Tansey, Joseph Rowntree Visionary for a Just and Peaceful World, Member [and Trustee], Food Ethics Council

Moderatorer: Ylva Persson, SVA och Svensk Mjök  
samt Ulf Emanuelson, SLU

## Hur mår lantbrukets djur? – Strategier för bättre hälsa och välfärd

Inom den ekologiska djurhållningen finns en uttalad vision om låg användning av läkemedel. Det finns även farhågor om att effektiviteten minskar hos vissa av de veterinärmedicinska preparat som används i dag och därmed en generell önskan om att minimera användningen. Denna workshop kommer att diskutera principer för optimala skötselsystem för bibehållen god hälsa och välfärd med låg läkemedelsanvändning.

Workshopen inleds med korta föredrag av praktiserande veterinärer och forskare med god inblick i hur situationen för våra vanligaste husdjur ser ut i Sverige idag och som också representerar olika sätt att arbeta med hälso- och välfärdsfrågorna. Därefter vidtar en gemensam diskussion.

- Hur mår djuren i det ekologiska lantbruket och hur mäter man det?
- Hur ser ett optimalt sköteselsystem ut och hur definierar man det? Vilken inverkan har t.ex. djurflöden, djurtäthet och gruppstorlek?
- Är det genetiska material som används idag lämpligt för ekologisk produktion?

Workshopen avslutas med fortsatta diskussioner om behovet av framtida forskning och rådgivningsinsatser liksom behovet av utvidgade/specialiserade nätverk för forskare och praktiker. Förhoppningsvis landar vi i några konkreta åtgärder för arbetet att nå målen om bättre djurhälsa och djurvelfärd.

Moderatorer: Ylva Persson, SVA och Svensk Mjök  
samt Ulf Emanuelson, SLU

### Eva Heldmer

Jag blev färdig veterinär 1980 och är specialiserad inom svinens sjukdomar. Svenska Djurhälsovården har varit min arbetsplats sedan 1982. Under åren har jag träffat på många olika sätt att föda upp grisar på. Inom den konventionella produktionen har utveckling gått mot större besättningar med strikta rutiner och med omgångsproduktion det vill säga att stallavdelningarna töms, tvättas och ibland också desinfekteras innan nya djur sätts in. Sjukdomar förebyggs med vaccinationsprogram, saneringar och man har även byggt in ett smittskyddstänkande i uppfödningen. Under senare år har olika krafter försökt att öka eko-produktionen men utan att fråga sig hur detta skall/kan göras utan att sjukdomar uppstår. Ekologiska grisar är inte mer sterila än konventionella grisar och kan därför drabbas av samma sjukdomar som de konventionella. När jag började följa besiktningsfynden, det vill säga de fynd som görs av besiktningsveterinärerna i samband med slakt, på grisar slaktade som KRAV såg jag att de mer och mer fick problem med luftvägsinfektioner, parasiter och ledproblem. Dessa upptäckter finns dokumenterade i projektet "Nyckeltal för djurhälsa och djurskydd hos ekologiskt uppfödda grisar". Jag har speciellt intresserat mig för ledproblemen man ser hos eko-grisen och genomförde därför en förutsättningslös studie i projektet "Varför har ekologiska grisar mer ledanmärkningar än konventionellt uppfödda grisar".

### **Jan Hultgren**

Jag blev veterinär 1981 och arbetar sedan många år på Institutionen för husdjurens miljö och hälsa vid SLU i Skara. Min forskning har till största delen handlat om effekter av inhysning och skötsel på hälsa, beteende, välfärd och produktivitet hos mjölkkor. Det har bland annat rört sig om elektromagnetiska fält under högspänningsledning, så kallade ströspänningar i stallinredning, elektriska kodressörer, golvutformning för bundna och lösgående kor, särskilda problem i stora besättningar, klövsador och fruktsamhetsstörningar. Jag har använt mig av såväl experimentell som epidemiologisk metodik. För närvarande arbetar jag med bedömning av djurvälfärd och så kallad riskbaserad offentlig kontroll av djurskydd hos flera djurslag, samt med jämförande studier av välfärd hos djur och människor i samband med slakt eller avlivning av djur.

### **Désirée S. Jansson**

Jag arbetar på Enheten för Djurhälsa och Antibiotikafrågor vid Statens Veterinärmedicinska Anstalt (SVA) och Institutionen för Biomedicin och veterinär folkhälsovetenskap vid SLU

Jag har arbetat med diagnostik, forskning, rådgivning och undervisning om fjäderfä (och i viss mån vilda fåglar) sedan 1995. Min forskning rör framförallt bakteriella och parasitära sjukdomar hos vilda och tama fåglar.

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## Weed management strategies: Use of weed suppressive cultivars and allelopathic cover crops

The weed competitiveness of cultivars produced during the history of crop breeding is generally poor. There has been much successful work to produce varieties resistant to pests such as fungal diseases and insects, but there has been no corresponding effort to design crop plants with superior weed-suppressing ability under field conditions. There are currently no commercial varieties bred for high resistance to weeds, but some studies are being carried out on traits important for competitive ability in various crops. Breeding strategies for the development of highly weed suppressive cultivars must verify all the necessary steps in the breeding process in situ, on a whole-plant perspective and within a relevant agro-ecological context. Crop breeding will therefore require strong multidisciplinary collaboration between agronomists, physiologists, ecologists and molecular biologists.

Use of a crop rotation is often a successful weed management strategy, while also increasing diversity in the agroecosystem. Introducing crops or cultivars with enhanced allelopathic effects against weeds into the crop rotation could be an effective way to maximise this weed control effect. Allelopathy is defined as any direct or indirect, harmful or beneficial effect of one plant on another or on microorganisms through the production of chemical compounds that enter the surrounding environment. Such allelopathic effects include direct influences of root exudates actively excreted into the rhizosphere (i.e. increased competitive ability), and/or pre-crop influences, where allelopathic compounds are released during the decomposition of plant residues. An ongoing project is studying the influence of possible suppressive effects of cover crops on soil-borne plant pathogens and weeds under the cold temperate environmental conditions prevailing in Sweden.

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# Organic seed production and its role in vegetable supply chains

## English summary

Denmark has done considerable efforts to meet the demands from the EU when it comes to using organic seed in organic agriculture. The Danish seed companies have also been involved in the practical production, yet, the demand was not quite as expected. Possibly because the cultivars produced was not in demand by the vegetable growers or because too large quantities were produced. Therefore the Danish production, at present, is limited. Questions to be put forward in the supply chains might therefore involve: what cultivars do the producers want and in which quantities? At the same time efforts should tackle how to make the seed production feasible in order to make seed companies interested in the organic seed production. It is important to focus on organic seed to secure one of the organic principles – self-reliance, and at the same time close the organic circle from start (seed) to end (product).

## Økologisk frøproduktions rolle i grøntsagsforsyningskæder.

I Danmark har man gjort en betydelig indsats for at tilvejebringe økologisk udsæd for at imødekomme EU's lovgivning om at det udelukkende er økologisk producerede frø, der må bruges inden for økologisk landbrug. Danske havefrøfirmaer forsøgte sig på et tidligt tidspunkt med produktion af økologisk udsæd. Efterspørgslen var dog ikke helt som forventet. Enten fordi man ikke fik produceret de sorter som grøntsagsproducenterne ønskede, eller også fordi man fik produceret større mængder af udsæd end der reelt var et marked for. Status er derfor at produktionen af økologisk grøntsagsfrø næsten er indstillet. Det er nærliggende at konkludere, at der er behov for betydelig mere interaktion i den økologiske

forsyningskæde for at få belyst, hvilke sorter ønsker de økologiske producenter at dyrke og i hvilke mængder? Samtidig er det relevant at sætte fokus på, hvordan man gør produktionen rentabel, så flere firmaer vælger at sætte økologisk frøproduktion på dagsordenen. Det er vigtigt at få løst udsædsproblematikken, så der findes økologisk udsæd på markedet af de arter og sorter, som de økologiske grøntsagsproducenter efterspørger. Her ved opnås en større integritet, idet økologisk jordbrug i mindre grad bliver afhængig af det konventionelle jordbrug og i større grad lever op til økologiens princip om selvforsyning og samtidig sluttet den økologiske cirkel fra start (frø) til slut (produkt).

## Forbrug af økologiske grøntsager

I Danmark er forbruget af økologiske grøntsager i perioden 2003–2007 steget fra 16.954 til 26.414 tons (www.statistikbanken.dk). En væsentlig andel af forbruget vedrører gulerødder. Detailomsætningen af økologiske friske gulerødder er i perioden 2003–2007 steget fra 8.394 til 11.659 tons. For gulerødder blev der i 2007 givet 83 tilladelser til i alt 750 mio. ikke-økologiske gulerødsfrø. Dette svarer til ca. 71 % af det samlede areal dyrket med økologiske gulerødder i 2007. Der er således stadig markant mangel på økologisk udsæd, selvom udbuddet af forskellige økologiske sorter i frødatabase er steget fra 5 forskellige sorter i 2006 til 12 sorter i 2007 og videre til 17 i 2009. På trods af det øgede sortsudbud, fik økologerne i 2007 tilladelse til brug af ikke-økologisk ubejdet udsæd af yderligere 34 sorter (Plantedirektoratet, 2008).

Af de 317 tilladelser, der er givet til grøntsagsafgrøder er de 240 begrundet med ønsket om alternative sorter til de udbudte (Plantedirektoratet, 2008).

### Nye typer grønt

Ser man på nye trends inden for fødevarerområdet, begrænser udbuddet af økologisk babyleafsalat sig til spinat, rucola og vårsalat. I det konventionelle udbud findes endvidere forskellige bedestyrer.

For vårsalat gælder, at der i den danske økologiske frødatabase, er to tilgængelige økologiske sorter.

Under særlige forhold står angivet at sorterne ikke er afprøvet i Danmark eller under lignende forhold. Det samme gør sig gældende for en anden populær babyleaf salat – rucola. For begge salattyper ligger en generel tilladelse til at anvende ikke-økologisk ubejdset frø. I spinat er økologisk produceret udsæd tilgængeligt for seks sorter. Tre af disse sorter er åbent bestøvede (OP-sorter) og én af disse er allerede udsolgt. Endvidere er der tre hybrid-sorter tilgængelige.

### Forsyningskæden

Forsyningskæderne indenfor økologiske grøntsager bør tage udgangspunkt i økologisk produceret udsæd (Peer-enboom, 2004) og det er da også et lovkrav i henhold til Rådets forordning (EØF) nr. 2092/91 af 24. juni 1991 om økologisk produktionsmetode for landbrugsprodukter.

For at bidrage til at sætte frøet mere i fokus i forsyningskæden og se nærmere på behovet for kommunikation mellem kædens aktører, er der ved Aarhus Universitet igangsat et ph.d projekt omhandlende 'Frøkvalitet i et kædeperspektiv'. Projektet skal blandt andet

- synliggøre for kædens aktører inklusive forbrugeren, hvordan frøkvalitet påvirker produktkvaliteten i babyleaf-produkter
- Undersøge behovet for øget interaktion mellem frøproducenter, frøfirmaer og andre medlemmer af forsyningskæden samt synliggøre mulige interaktioner.

Forsyningskæden vedrørende babyleaf-produkter består af forældre, frøproducenter, frøfirmaer, grøntsag-producenter og restauranter/grossister/supermarkeder. I selve kæden er der begrænset kontakt mellem de enkelte aktører (Deleuran, 2009). I den økologiske forsyningskæde kommer det til udtryk ved at den økologiske udsæd, der produceres ikke nødvendigvis kan afsættes. Der skal derfor mere fokus på, at det er de sorter, der efterspørges, der også frøproduceres økologisk – i mængder som harmonerer med forbruget inden for sorten. Når det drejer sig om babyleaf-produkter har en undersøgelse blandt

økologiske forbrugere vist, at der er større interesse for et stort udbud af produkter i forhold til både kvalitet og pris (Deleuran, 2009).

### Dansk økologisk grøntsagsfrøproduktion

Dansk havefrø har et godt ry og er sædvanligvis af en meget høj kvalitet. De danske avlere er dygtige og omhyggelige i deres arbejde, og deres indsats bidrager væsentligt til et højt kvalitetsniveau. Det har givet stor tillid til den danske havefrø-branche fra udenlandske importører. Dette element bidrager i høj grad til den gode historie, som i større og større udstrækning efterspørges af forbrugerne i lighed med at forbrugerpræferencerne i høj grad går mod danske produkter (Deleuran, 2009).

Typisk er det arter såsom spinat, karse, radise, krysantemum, pak choi, hvidkål og bladbeder, der kan frøproduceres i Danmark. Sent modnende arter såsom løg og gulerod er de senere år blevet frøproduceret på sydlige breddegrader. Der har dog tidligere været en dansk gulerodsfrøproduktion og de danske havefrøfirmaer har i høj grad bidraget til udviklingen af dyrkningskoncepter for økologisk havefrø f.eks. i innovationsprojektet "Økologisk produktion af grøntsagsfrø" med en samlet bevilling på 1.575 mio. DKR, hvor frøbranchen bidrog med 25 % finansiering. Projektet viste, at tunnelproduktion er en metode til forbedring af udbytte og kvalitet. I projektet var udvalgt særligt vanskelige arter som blomkål og porre, og resultaterne er meget positive (Deleuran & Boelt, 2005). Metoden er endvidere anvendelig i situationer, hvor man ønsker at forhindre indkrydsning fra nærtliggende arealer, vilde arter og evt. GM-materiale (Boelt & Deleuran, 2005). Efterfølgende blev det i projektet Frøvækst Øst vist, at tunnelproduktion i praksis er økonomisk attraktiv ([www.froevaekst.dk](http://www.froevaekst.dk)). Tunnelproduktionen kan være en måde at fremskaffe mindre frøpartier af god kvalitet og sikre at der er et udbud af økologisk udsæd fra arter og sorter, der ellers kan være vanskelige at fremskaffe.

Udover tunnelproduktionen har der i Danmark været arbejdet med økologisk frøproduktion af spinat og kina-kål. Den økologiske produktion koster ca. en trediedel udbytte i forhold til konventionel produktion. Det til trods, er der ikke megen økologisk frøproduktion, der foregår i Danmark. Tal fra en rundspørge i den danske frøbranche marts 2009 viser at der i indeværende år planlægges økologisk frøproduktion på 35 ha karse (ca. 35.000 kg frø) og 4,5 ha hybrid-spinat (ca. 5.000 kg frø) fordelt på



to firmaer. Alt frøet er til eksport. En firmaudmelding er at deres økologiske produktion for tiden er en serviceproduktion. Udgifterne i produktionen (håndlugning, ustabile udbytter) modsvarer ikke den pris, der kan fås for frøet og dermed hænger økonomien ikke sammen (Veldhuizen, 2009).

### Økologisk grøntsagsproduktion

Der er tre forskellige typer økologiske grøntsagsavlere og de tilskriver brugen af økologisk udsæd forskellig prioritet (Rubitschek, 2004):

1. Prioritet for økologisk udsæd (lukket økologisk cirkel)
2. Prioritet for genetiske egenskaber (bedst udøvende sort)
3. Prioritet for lav frø pris (typisk konventionel udsæd)

### De økologiske forbrugere

Økologiske grøntprodukter på supermarkedets hylder kan, som det fremgår af ovenstående, både stamme fra økologiske frø og ikke-økologiske ubejdsede frø. Dette kan skabe stor forvirring og tab af interesse for økologiske produkter for den bevidste forbruger. 'For a product to be called and labelled organic it should have been produced from start (seed) until end (the product the consumer is buying) in an organic way' (Peerenboom, 2004). Peerenboom (2004) beskriver økologisk produktion og økologiske produkter som en følelsesbetonet forretning og konkluderer at forbrugeren hurtigt vil holde op med at købe økologi, hvis han føler sig snydt. Der er for nærværende ingen danske undersøgelser, der viser hvor stor betydning valget af frøkilde (konventionel eller økologisk) har for forbrugerne.

Økologisk jordbrug bygger på tre grundlæggende principper: Kredsløbsprincippet, forsigtighedsprincippet og nærhedsprincippet. Idegrundlaget for økologi imødekommes bedst, hvis hele forsyningskæden fra frø til slutprodukt imødekommer disse tre principper.

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# Organic plant breeding to increase agricultural biodiversity

## English summary

The paper presents a system analysis of the seed sector with respect to the potential of organic plant breeding. The author concludes that national and EU-regulations in combination with the financial system related to the seed sector have contributed to the decrease in diversity both between crops and within crops in modern agriculture. The decrease in biodiversity violates the aims and principles of organic farming, and leads to agronomic problems, in particular epidemic plant diseases. Hence, there is a need for organic plant breeding and supply of more diverse and more adapted varieties. However, organic plant breeding will not be profitable within the current market conditions. In order to make organic plant breeding possible, legal and logistic solutions must be developed to bypass the current system. The author concludes that the most promising way seems to be participatory plant breeding of uncertified home saved populations rather than development of new pure line varieties approved within the official certification scheme.

## Økologisk planteforædling til forbedring af biodiversiteten i agerlandet

### Markedsvilkår for planteforædling

Moderne maskiner som mejetærskere og tørringsanlæg har gjort korndyrkning til en mere sikker og rentabel afgrøde, og korndyrkning er blevet fremmet af diverse landbrugsstøtteordninger. Korndyrkning er derfor blevet fremmet på bekostning af eksempelvis græs og roer, og udgør i dag over halvdelen af det danske landbrugsareal. Mellem 80 og 90 % af kornarealet udgøres af vårbyg og

vinterhvede, og indenfor hver af disse afgrøder dyrkes bare 3–5 nært beslægtede sorter på over 80 % af arealet. Der er således sket en helt ekstrem indsnævring af diversiteten af både afgrøder og den genetiske diversitet indenfor afgrøderne.

Når en sygdom spredes i en naturlige population af dyr og eller planter, vil nogle individer være modtagelige, mens andre vil være resistente/immune. Hvede, byg og også havre er selvbestøvende, og i selektionen af moderne sorter er alle planter indenfor en sort af disse afgrøder genetisk fuldstændig ens. Er én plante modtagelig for en sygdom, så er alle planter indenfor sorten modtagelig. Alle planter indenfor hver sort har behov for optagelse af næringsstoffer på samme tid, og alle planter skygger og konkurrerer med ukrudt på den samme måde. På denne måde er monokulturer af de selvbestøvende kornafgrøder meget følsomme over for miljøpåvirkninger.

Moderne planteforædlingsmetoder har gjort, at det nu kun tager ganske få år at udvikle en ny sort af eksempelvis korn. En ny sort er beskyttet mod kommerciel salg af såsæd, men alle kan frit anvende sorterne til forædling af nye sorter. Ny sorter udvikles hele tiden og der er derfor en stor udskiftning af sorter på markedet, og ofte er en sort kun på markedet i 2–5 år. Planteforædling finansieres normalt på den måde, at en privat planteforædler kan opkræve en royalty af en ny godkendt sort, og på de ganske få år, en sort er på markedet, skal den finansiere hele forædlingsprogrammet. Det har betydet, at planteforædlingen er blevet meget kortsigtet. Der forædles kun nye sorter i de største og dermed mest rentable afgrøder, og forædlingen indsnævres til at krydse de højest ydende sorter med hinanden, og udvælge de

bedste til nye sorter. Langsigtet forædling, præforædling og forædling af små afgrøder kan ikke finansieres i privat regi på de eksisterende markedsvilkår, og det samme gælder forædling af sorter med en begrænset anvendelse, eksempelvis forædling til anvendelse i økologisk jordbrug eller til regioner med særlige klimatiske krav og begrænset produktion.

For at tjene penge på langsigtet forædling er det nødvendigt med andre markedsvilkår, og dette er den primære årsag til, at planteforædlingen i stigende grad ønsker at gå ind i forædling af GMO, for på den måde kan der indføres patenter på udviklingsarbejdet. Genmanipulerede planter må i modsætning til normale sorter ikke anvendes i forædlingen af nye sorter, og forrentningen af investeringen i planteforædlingen kan på den måde udvides fra de 2–3 år på en almindelig sort til hele 20 år, som et patent løber. Hvor den normale forædling kommer landmanden og samfundet til gavn i form af højere udbytte eller bedre kvalitet, så har man med de bedre beskyttelser af patentrettigheder mulighed for at indkræve en langt større andel af denne fortjeneste til planteforædleren. Al langsigtet planteforædling går derfor i dag i retning af GMO, og næsten al planteforædling i små afgrøder og nicheanvendelse af afgrøder er enten stoppet, under afvikling eller er begrænset til GMO-forædling.

Efterhånden som al langsigtet planteforædling indsnævres til GMO-forædling, og sorter herfra ikke kan anvendes til den almindelige forædling, vil den almindelige forædling gradvis afvikles. Der er i dag 8 planteforædlere af landbrugsplanter tilbage i det nordiske område, og sandsynligheden taler for, at disse i de kommende år vil blive yderligere reduceret i både antal og i aktiviteter.

### Fleksibilitet og klimaændringer

Når så stor en del af landbrugsarealet i en region dyrkes med samme sort, vil der være et kolosalt selektionspres for at udvikle nye virulente smitteracer af sygdomme. En af de vigtigste årsager til den hurtige udskiftning af sorter af byg og hvede er derfor modtageligheden for svampesygdomme. Meget tyder på, at klimaændringer i fremtiden vil stille større krav til sorteres tilpasnings-evne, og vil dermed forstærke de negative effekter i homogeniseringen af afgrøde og sortsvalget i det moderne landbrug.

Handel med såsæd er reguleret af national lovgiv-

ning, som igen har ophæng i ikke mindre end 11 EU-direktiver. For at kunne handle med såsæd skal sorten være godkendt og optaget på EU's sortliste. Dette kræver, at sorten har bestemte egenskaber. Blandt andet må der ikke være genetisk variation i sorten, og den skal være genetisk stabil. Herudover stilles forskellige krav til såsædens kvalitet, hvilket blandt andet indebærer, at såsæden kun må indeholde én enkelt sort, som ikke er forurenset med andre sorter, eller at det er tale om en sortsblending af få sorter, hvortil der stilles de samme krav som til de enkelte sorter. Udviklingen mod monokulturen i agerlandet er således ikke blot en utilsigtet negativ konsekvens af markedsvilkårene, men er nedfældet som et krav i lovgivningen.

Der er ny lovgivning på vej, som muligvis vil tillade en begrænset dyrkning af nogle af de sorter, som ikke længere er optaget på sortlisten. Dette er lovgivningen omkring de såkaldte bevaringssorter. Imidlertid har denne lovgivning været på vej siden 1998, og implementeringen er gennem hele denne periode blevet obstrueret af lobbyister fra de europæiske såsædsfirmaer, og alt tyder på, at der i den nye lovgivning vil komme så mange begrænsninger på dyrkningen og adgangen til bevaringssorter, at det i praksis ikke vil få nogen betydning for biodiversiteten i agerlandet, eller for adgangen til relevante sorter for det økologiske landbrug.

Flere steder i Norden arbejdes der med vurdering af gamle sorters potentielle anvendelse i økologisk jordbrug. På Mørdrupgård ([www.moerdrupkorn.dk](http://www.moerdrupkorn.dk)) har vi sammenlignet gamle sorter med moderne sorter under økologisk dyrkningsbetingelser og fundet, at de moderne sorter kun giver et merudbytte i kerne i forhold til de aller ældste på 10–20 %, men de gamle sorter har til gengæld et højere halmudbytte og et højere proteinindhold. Tages dette med i betragtning, så er det overraskende små forbedringer 150 års planteforædling har ført med sig for det økologiske landbrug.

### Økologisk landbrug

Bortset fra nogle enkelte spredte projektstøttede aktiviteter er der i dag stort set ingen forædling af landbrugsplanter til økologisk landbrug, og der er ingen udsigt til, at det vil blive muligt på de gældende markedsvilkår. Økologisk landbrug har i dag adgang til at dyrke de sorter, som er forædlet til konventionelt landbrug, men efterhånden som disse begrænses yderligere, og gamle sorter forsvinder fra sortlisten, vil adgangen til

relevante sorter i økologisk landbrug blive yderligere begrænset.

Økologisk landbrug har en målsætning om at regulere sygdomme, skadedyr og næringsstofforsyning med hjælp af en kombination af diversitet og valg af tilpassede sorter. Landbruget og også det økologiske landbrug bevæger sig længere og længere væk fra denne målsætning, og der er et stort behov for at igangsætte økologisk planteforædling til afhjælpning af situationen.

### Hvad er økologisk planteforædling?

Planteforædling er kun i begrænset omfang omfattet af regelsættet for økologisk produktion. Det er ikke tilladt at anvende gensplejsede sorter i økologisk produktion, men bortset fra dette er planteforædling stort set ikke omfattet af regelsættet for økologisk produktion. De sorter, der anvendes i konventionel produktion kan i vid udstrækning også anvendes i den økologiske produktion. Imidlertid er dette ikke det samme som at sige, at der ikke er forskelle i målsætninger og metoder mellem økologisk og konventionel planteforædling.

Der er gjort forskellige forsøg på at beskrive økologiske planteforædling, og selvom arbejdet med at definere det endnu ikke kan siges at være tilendebragt, kan der fremdrages forskellige vinkler, der kan bruges til en forståelse for emnet.

### Økologisk planteforædling

#### kan karakteriseres ud fra 3 kriterier:

**Kriterium 1: Planteforædling specifikt til økologisk jordbrug.** Med dette kriterie forstås, at den økologiske planteforædling er rettet mod at udvikle sorter, som specifikt har til formål at blive anvendt i økologisk produktion. Det betyder, at gensplejsning ikke falder indenfor denne kategori, men det betyder også, at planteforædling i retning mod at udvikle sorter med resistens mod eksempelvis en kornsygdom som meldug næppe kan kaldes økologisk planteforædling al den stund, at denne sygdom også er af afgørende betydning i konventionel produktion, og udviklingen af en resistent sort sandsynligvis også ville finde udbredt anvendelse i konventionel produktion. Derimod kan der argumenteres for, at forædling af en sort med henblik på at udvikle bedre ukrudtskonkurrence eller resistens mod en frøbåren sygdom i højere grad kan kaldes økologisk planteforædling, da disse karakterer ville have større vægt

for sortsvalget for en økologisk landmand end for en konventionel landmand. Endvidere vil forædling af en afgrøde, som har større udbredelse i økologiske jordbrug en i konventionel jordbrug også betegnes som mere økologisk end forædling af en afgrøde, som anvendes ligeså meget eller mere i konventionelt jordbrug. Eksempelvis dyrkes halvdelen af den økologiske hvede i Danmark som vårhvede, mens der i konventionelt jordbrug sort set kun dyrkes vinterhvede i Danmark. Det har som konsekvens, at dansk konventionel hvedeforædling er koncentreret om forædling af vinterhvede.

#### **Kriterium 2: Planteforædling for økologisk landbrug.**

Formålet med økologisk planteforædling bør ikke blot være at tjene penge på at afsætte nogle sorter på det økologiske marked. Planteforædlingen skal også have som formål at løse nogle af de problemer, som det økologiske jordbrug står med. I mange tilfælde vil der naturligvis være et sammenfald mellem de to kriterier, idet sorter, der løser specifikke problemer, også vil have et stort afsætningspotentiale, men omvendt er det ikke givet, at de sorter, der rent faktisk afsættes også er de sorter de sorter, der ville løse de største problemer. I en situation, hvor der kun forædles ganske lidt til økologisk produktion, så vil det for planteforædlingen være lettere at udvikle sorter indenfor de fagområder, som der i forvejen arbejdes med, eksempelvis meldugresistens, mens det ikke nødvendigvis er de problemer, som har højest prioritet for det økologiske jordbrug. Dette kriterie kræver altså, at der ikke blot som under Kriterie 1 foreligger en analyse af markedspotentialet for en sort indefor økologisk jordbrug, men forædlingsmålene skal vælges på baggrund af en analyse af, hvilke problemer det økologiske jordbrug har, som kan løses ved hjælp af planteforædling.

#### **Kriterium 3: Planteforædling af og i økologisk jordbrug.**

Med dette kriterie forstås, at planteforædlingen foregår på økologisk dyrkningsbetingelser. Relevansen af dette kriterie er ikke blot, at det sikrer selektion af planter, der egner sig til dyrkning under økologisk forhold, men vigtigere er, at det sikrer den økologiske integritet. Eksempelvis anvendes der i dag hybridsorter i økologisk produktion, som fremavles under forhold, som ikke ville kunne lade sig gøre uden indsats af konventionelle pesticider. I produktionen af hybrider udvikles indavlslinier, som

ofte er så sygdomsmodtagelige og svage i vækst, at de ikke ville kunne holdes i live uden indsats af kemikalier, som ikke er tilladte i økologisk produktion. Det giver økologisk jordbrug et forklaringsproblem, når produktionen så at sige baseres på sorter, som er afhængig af vedligeholdelse i et pesticidbaseret konventionelt såsædssystem. Det samme kan siges om sorter, som er modtagelige for frøbårne sygdomme. Ved at forædningen foregår under økologiske betingelser sikres den økologiske integritet.

### Mål for økologisk planteforædling

At udvikle nye sorter i et økologisk planteforædlingsprogram, der i større eller mindre udstrækning lever op til de ovenfor anførte kriterier, vil nok forbedre dyrkningsvilkårene på kort sigt ved at tilvejebringe sorter, som i højere grad lever op til de økologiske landmænds behov, men det vil ikke i sig selv ændre afgørende på de problemer med manglen på genetisk diversitet, som lovgivningen og markedsvilkårene medfører.

Der er tilsyneladende ved at blive skabt opmærksomhed omkring det aktuelle og potentielle problem med forsyning af relevante sorter, men med mindre der gribes til massiv offentlig støtte til økologisk planteforædling, så vil det være nødvendigt enten at fokusere denne på meget få afgrøder, eller også måder findes meget billige metoder til planteforædling. At fokusere på få afgrøder vil som ovenfor anført medføre en yderligere homogenisering på afgrødeniveauet, og jeg mener derfor, at der er særligt behov for at igangsætte forædling også på afgrøder, som kun dyrkes i begrænset omfang, netop for at forbedre vilkårene for dyrkning af dem, og dermed forøge afgrødediversiteten. Dette vil kræve, at der findes praktiske og logistiske veje, som ændrer de juridiske og markedsmæssige vilkår for planteforædlingen.

Planteforædling går meget kort fortalt ud på at skaffe sig en mangfoldighed, og at vælge det bedste ud fra mangfoldigheden. Ved at krydse to sorter, så får man et afkom med forskellighed, som i gennemsnit ligner forældrene; nogle er bedre, andre er ringere. I almindelig planteforædling går 99 % af arbejdet ud på at finde de bedste, og at sørge for at disse bliver fuldstændig rendyrket, så de kan godkendes efter reglerne for sortsgodkendelse. Som omtalt er disse regler meget skrappe, og det er de primært for at sikre planteforædlerne mod utidig konkurrence. Det er handelsrestriktioner, som er lavet i planteforædlerens interesse, og som ikke har ret

meget med forbrugerbeskyttelse at gøre. Men for den økologiske planteforædling på alternative markedsvilkår kan alle disse regler vise sig at være af mindre betydning. I det økologiske landbrug er forskelligheden i afgrøden i de fleste tilfælde en direkte fordel, og man kan derfor spare sig alt besværet med at fjerne den. Dermed sparer man den største omkostning ved almindelig planteforædling.

Krydser man to sorter, så vil en stor del af det dårligste afkom forsvinde af sig selv i konkurrencen med de bedre tilpassede planter, og udbyttet af afkommet vil ligge tæt på, eller endog over gennemsnittet af forældresorterne. Forsøg med sådanne krydsningspopulationer (composite cross populations) viser, at de især hvis de omfatter krydsninger mellem flere sorter er fuldt konkurrencedygtige med renliniede sorter med hensyn til udbytte og eksempelvis bagekvalitet i hvede. Det praktiske problem er således primært, at det ikke er lovligt at forhandle såsæd af krydsningspopulationer. Spørgsmålet er dog, i hvilken udstrækning dette vil være nødvendigt.

En krydsningspopulation vil have et længere tidsperspektiv end en moderne kommerciel sort. En population vil dynamisk tilpasse sig virulensudviklingen hos patogenerne, og diversiteten vil begrænse sygdomsudviklingen, fordi afgrøden består af mange genetiske forskellige individer. Der er derfor ikke behov for at skifte sort så tit. Erfaringer fra England, Tyskland og Ungarn viser, at den samme population er i stand til at tilpasse sig meget forskellige klimaer og jordbundsforhold. Der er således ikke behov for at etablere mange forskellige populationer på samme måde, som der er behov for mange forskellige rene sorter til de forskellige anvendelser. Til gengæld vil det kræve, at landmanden opformerer sin egen såsæd, da det ikke vil være lovligt at udveksle såsæd i større mængder. Det vil først og fremmest kræve, at landmanden har adgang til et såsædsrenseri, og lærer sig procedurer for renholdelse af mejetærskere og lignende for adskillelse af afgrøder, men jeg mener, at det er praktisk gennemførligt i hvert fald som supplement til det eksisterende system for produktion og forædling af de rene sorter. Planteforædleren bliver således mere at betragte som en konsulent i et system, hvor landmanden selv deltager i planteforædlingen (participatory plant breeding).

Jeg er selv gået i gang med etablering af populationer indenfor afgrøderne purpur hvede, vårhvede, flerårig hvede, nøgen og dækket vinterhavre, sortbyg, purpurbyg



og spelt, men der er behov for indsats indenfor mange afgrøder også såsom vinter-ærter, vinter-hestebønner og mange andre. Nogle af disse afgrøder vil have en begrænset udbredelse, og forædlingen vil være lidt mere besværlig end blot at krydse to topsorter af hvede eller byg. Derfor vil det ikke blive gjort af den almindelige kommercielle forædling, men ved anvendelse af populationsdyrkning er det realistisk at frembringe materiale, som for en langt mindre udgift vil være dyrkbart til glæde for både landmænd, forbrugere og biodiversiteten.

Hvis man erkender, at forædling af specialafgrøder til økologisk landbrug ikke bliver en profitabel forretning på eksisterende markedsvilkår, og i stedet fokuserer på de praktiske, juridiske og logistiske problemer ved udvikling af alternative planteforædlingssystemer, så åbner der sig et helt ny perspektiv for samarbejde. Jeg vil derfor opfordre til, at flere aktører i Norden går sammen i en koordineret indsats om etablering af populationer af forskellige afgrøder for at forsyne det økologisk landbrug med en bred vifte af afgrøder.



# Ekologisk mat i storkök – ett kliv framåt mot högre andel ekologiskt

De höga målen för ekologisk mat i offentlig sektor i Sverige kan nås inom befintliga ekonomiska ramar. Även med små steg kan man komma långt. Workshopen ger idéer och goda exempel på hur man kan arbeta med att ställa upp och verkställa lokala mål för upphandling av ekologiska varor i linje med den svenska Aktionsplan 2010.

Konsumenternas efterfrågan på ekologisk mat ökar hela tiden och storkökens kunder ställer allt större krav på ekologiskt och rättvisemärkt. Vet de ansvariga i storköken vad de yngre kunderna vill ha och varför? Och hur gör man för att komma igång och anpassa menyer och matlagning till dagens miljö- och klimatmedvetna storkökskunder? Det finns många frågor alltifrån hur pastan blir ekologisk och klimatsmart till hur upp-

handlingen kan anpassas. Kostchefen har stor makt över matbesluten i en kommun men är också mycket ensam. För att kunna arbeta med förändringar mot mer ekologiskt är det viktigt att se nya positiva chanser i rollen som kostchef.

Workshopen anordnas av Ekologiskt Forum i samarbete med Ekologiskt Marknadscentrum och Centrum för uthålligt lantbruk (CUL) Ekologiskt Forum är en mötesplats för alla som vill verka för en utveckling av den ekologiska produktionen och konsumtionen från jord till bord och för skapandet av ett långsiktigt uthålligt lantbruk. Ekologiskt Forum är ett oberoende och politiskt obundet projekt vid Kungliga Skogs- och Lantbruksakademien.

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Maja Söderberg  
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## Ekologiskt och klimatsmart

Maja Söderberg, författare till boken "Majas klimatmat" berättar om varför hon blev "skolvegetarian" och om skolans roll i att göra henne till en människa med stort engagemang för omvärlden. Dessutom pratar hon utifrån följande frågor:

- 25 % (eller varför inte 100 %) ekologiskt med bibehållen budget – går det? Och vilka är i så fall knepen?
- Både kökspersonal och elever längtar efter mat lagad från grunden, med bra råvaror. I konkurrensen om elever är skolan med egen kock en vinnare.
- Om dagiset som introducerade salladsbord och barnen som började äta grönsaker.

Margareta Lennartsson

Director of Policy, Garden Organic Ryton, UK

Birgitta Rämert

Associate professor, Department of Plant Protection Biology,  
SLU, Alnarp

# Organic gardening for sustainable development

Gardening has always been a popular activity in both the UK and Sweden, and still we are at present experiencing a surge in interest that is greater than ever. It is the interest in growing food that is particularly strong with the gardening retail sector reporting record sales of vegetable seeds and 'grow your own' products becoming the biggest opportunity for decades. In tandem with this, the demand for allotments has increased with waiting lists becoming longer and even being closed in some areas in the UK.

Our outdoor growing space, be it the garden, the allotment, the school or community garden or just a small growing space nearby is now not only valued as place for relaxation and where people can recharge both spiritually and physically, but it is also recognised as an important space for learning, for reconnecting with nature and the food we eat, and a place where people can take practical actions to adopt sustainable lifestyles.

Access to land and also to knowledge and skills are important keys for encouraging and supporting people to engage at a practical level. The current interest and willingness among people to get involved combined with the fact that 82 % of UK and 67 % of Swedish households have a garden or access to outdoor growing space clearly offer a unique opportunity. Now is the time for the benefits of gardening to be realised and for public engagement in growing to take its role in delivering towards a range of national objectives; environmental and social objectives as well as objectives related to health and well-being.

## Environmental benefits

A range of environmental benefits can be achieved through gardening. The green garden corridors have been

shown to have a vital role for maintaining biodiversity in our urban areas, providing habitats for birds and other wildlife. Domestic gardens are also recognised for their role in conserving genetic resources through *in situ* conservation of many plant species, including food crops. Gardening, including home composting and home food production, will help to address climate change issues offering ways of reducing the carbon footprint of the households. In terms of land management the use of organic growing methods will help to improve the health of the soil and protect the stores of carbon within it. Using gardens for diverse plantings will ensure that the land provides areas for infiltration of rainwater and thus helps to prevent flooding in urban areas.

## Health and well-being

Gardens, as well as the activity of gardening, have been shown to have a positive impact on peoples' health and well-being; the result of both the physical activity and the use of the garden as a space for mental relaxation and stimulation. Growing fruit and vegetables is also likely to provide nutritional benefits to health by raising people's awareness of healthy eating and by providing increased access to fresh fruit and vegetables, which in turn should influence peoples' diets. The impact of practical involvement in growing on children's diets is subject to a number of ongoing studies.

## Food security

Access to high quality fruit and vegetables, the superior taste and flavour in particular, is for many the main reason for growing food in their garden. Access to produce that has not been sprayed with pesticides is another common reason. At a strategic level, home production of

fruit and vegetables has an important role in contributing towards food security, providing access and availability to fruit and vegetables at an affordable price and thus a 'safety net' within the food supply system. Clearly in most households, the produce from the garden is likely to be only a small proportion of the requirement, though case studies have shown that producing 50 % of the fruit and vegetable requirement is both achievable and realistic for many. It is however, important to recognise that public engagement in home food production, even at a very small scale, will be beneficial in terms of raising peoples' awareness and reconnecting them with the food supply system. It is a way of increasing both 'food democracy' and levels of 'food literacy'.

### Stronger communities

Community and domestic gardening, home food production and the celebration of the produce grown are all activities that can help to build stronger communities, encouraging social inclusion as well as supporting people to gain skills necessary for independence. Garden Organic believes that gardeners and home food production should feed into local food networks thus connecting individual gardeners in the wider community network. Local food networks enhance feelings of security and increase contacts between community members in a locality. In short, they build social capital from engagement and practical activities on the ground, which in turn leads to community development in its widest sense.

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*Gareth Davies*  
 Head of Knowledge Development,  
 Garden Organic Ryton, UK

## The ecological benefits of organic gardening

Organic gardening, allotment production and smallholding are increasing in popularity in the UK as ecological problems associated with long food supply chains are becoming more apparent. Producing at least part of the food you eat and/or sourcing it close to home are seen as important in making a positive contribution to ecological sustainability both locally and globally. Recently, local food production and sourcing have also been seen to be potentially equally important in increasing food security, as the consequences of resource depletion, especially of oil and key agricultural nutrients like phosphate fertilisers, becomes apparent. Evidence about the positive impacts of organic gardening has been steadily accumulating, mirroring the increased research on organic farming and markets. Generally organic gardening methods are seen as making important contributions to ecological sustainability, improving food quality and

personal well-being. In this paper we focus on the first of these and discuss the ecological benefits of gardening organically and put this in the context of the overall ecological footprint of organic gardening in the UK.

### Organic gardening has positive environmental benefits in three principle areas:

**Biodiversity:** organic gardening places an emphasis on diversity and the ecological principle that biodiverse systems are also resilient. Organic gardeners should use a diverse array of plant species and varieties as food crops, as cover and green manure crops, and as attractants for beneficial insects. Many organic gardeners cultivate a range of varieties and there is increasing interest in the UK in growing 'heritage varieties' which help conserve genetic diversity (especially of food crops) Organic gardeners are also encouraged to set aside areas for wildlife

(e.g. wood piles, small ponds) and these help promote biodiversity and compost bins have been shown to be good for garden wildlife. Organic gardeners should not use broad spectrum pesticides that are also very damaging to flora and fauna. Gardens also provide wildlife corridors through urban areas and connect rural and urban brown field sites which, in the UK, are becoming increasingly important as wildlife refuges.

*Eco-services:* in an urban setting gardens provide various eco-services. The most obvious service is flood prevention and, in recognition of this, it has recently become a requirement in the UK to apply for planning permission to pave over front gardens for car parking. Collecting rain water and using it also reduces the use of treated fresh water which also has an environmental resource cost. Other areas in which gardens can provide services are in waste reduction and minimisation. Composting organic matter from the home significantly reduces waste transport costs and helps to close the nutrient cycle in food systems. Gardeners are also encouraged to be resourceful and often recycle a large amount of material that would otherwise enter waste streams adding to environmental costs.

*Reduced resource use:* gardening is generally regarded as a low environmental impact activity and research at Garden Organic bears this out. Organic gardening has a reduced environmental footprint as compared to buying the same type of food in a supermarket. This is because home food production reduces the distance food has to travel from plot to plate thus reducing the 'food miles' associated with modern food supply chains, and also because organic gardeners use as many home produced inputs as possible. The Garden Organic Guidelines reflect this and encourage gardeners to move towards gardening with as many locally sourced products as possible, as opposed to sourcing manufactured products through long supply chains. In addition to this it seems that organic gardeners adopt lifestyles with an overall reduced footprint to bring reduced resource use into other aspects of their lifestyles, which will in the long run reduce resource use at a community level.

The speech and discussion will focus on discussing the positive environmental benefits of organic gardening in the context of our study on the ecological footprint of organic gardening.

*Else Mikkelsen*  
*Director of The Danish Garden Society*

## The impact of gardening on peoples' health and well-being

All over the world there is an increasing interest in research results showing the impact of the physical environment on people's health and wellbeing. An expression of design and health in landscape architecture is to be found in the movement around healing gardens, i.e. gardens that in different ways may influence the visitor in a positive way.

Research about the impact of gardens on people's health and wellbeing was formerly carried on in isolation by different research disciplines, such as medicine, environmental psychology, and in recent years, landscape architecture. Today a change can be noticed. Collaboration transcending professions and research boundaries takes place.

From a theoretical design and landscape point of view it is important to show, that one benefits from being in a garden environment while also trying to find an answer to the question of how and why one may benefit. For thousands of years there have been ideas to the effect that man's health and wellbeing will be influenced in a

positive way by spending time in natural surroundings, wild nature as well as closed gardens.

Beneficial properties are attributed to daylight, fresh air and greenery.

The theories will shortly be presented primarily based on literature from Sweden.

Gardens surrounding residential homes in cities help to create a less stressful everyday environment. Results from a study made in Sweden, show that having access to a garden has a significant positive impact on stress. There is also a significant positive relationship between frequency of garden visits and stress prevention. The study also shows that the amount of verdancy in the garden is crucial to the restorative quality. The results indicate that verdant gardens in the city may play an important part in restorative environment, irrespective of the citizens' socio-economic background, gender or age.

Results from studies carried out in Sweden and Denmark will be presented.

*Per G Berg*

*Professor Department of Urban and Rural Development,  
SLU, Uppsala*

## Gardening in urban areas – potential for the future?

For half a century, gardening in cities has been phased out successively in OECD large towns and cities all over the world. One major reason is the current oil-driven primary production and globalisation of the food market that most of the cities in the industrialised world are dependent upon. Yet leisure time cultivation has remained a strong practice for a significant part of the population – particularly in the Northern European countries. For the former Soviet countries in the east – gardening in countryside plots, was even a part of an informal food security system, in times of economic recession and/or political change.

Today gardening inside and close to cities in OECD countries and former soviet states have declined to a level, where basic nourishment of the population may be seriously threatened if current oil-based primary production is challenged. And for large parts of modern cities this can be expected to be the case in our time, with a number of emerging resource crises lying directly before us. Peak oil, predicted shortage of phosphorous and other minerals, metals and water can be expected to profoundly displace the production-consumption

flows – from a global system to more localised systems of food production.

Local food production systems can be defined within a range of scales – from macro-regional food systems (like the Mediterranean or Baltic Sea Regions) to small-scale cultivation and gardening systems inside cities. Gardening also belongs to the repertoire of recreation activities and a timeless contact with green and blue areas for health reasons. Gardening is, finally, a part of the organisational aspect of the city, potentially having important structuring roles in several scales of green and in particular at the boundary zones, between built and green structures in the city.

Urban gardening is suggested to become more important over the next decades, playing important roles in the housekeeping and recycling of physical resources (energy, food, water and organic waste) but also for the management of informal economic resources, for biodiversity development, for structuring the city, for promoting social encounters, for enhancing cultural expression and for providing synaesthetic (intersensory) experiences for inhabitants in different urban settings.



# Engaged gardening organisations in the workshop

## Garden Organic

*Director of Policy Margi Lennartsson and  
Head of Knowledge Development Gareth Davies*

Garden Organic is a national charity working to inspire, encourage and support individuals, community groups and schools to grow organically. Through research, demonstration gardens and educational activities the organisation aims to help people lead more sustainable lives. Garden Organic has been at the forefront of the organic horticulture movement for over 50 years and is a leading authority on organic growing. The organisation is dynamic, influential and committed and we are engaged in a range of activities designed to 'get people growing'.

Specialist areas include:

- Organic gardening advice, research and knowledge exchange with gardeners and growers to facilitate active learning.
- Schools network, consisting of almost 6000 schools, with a free educational programme which helps pupils learn about food and organic growing
- Conservation of genetic diversity through our Heritage Seed Library, which protects over 800 varieties of rare vegetable seeds from the threat of extinction.
- Home composting network with over 600 Master Composter volunteers working to promote and support home composting in different areas of England
- Educational demonstration gardens at Garden Organic Ryton near Coventry and the Walled Organic Kitchen Garden at Audley End in Essex.

For more details on these activities please see our website at <http://www.gardenorganic.org.uk>

Garden Organic is the working name of Henry Doubleday Research Association (Registered Charity 298104)

## Haveselskabet Denmark - The Danish Garden Society

*Director Else Mikkelsen*

The Danish Garden Society is a countrywide, independent and non-profit society for about 45.000 garden owners. The purpose of the society is to give new knowledge and exciting inspiration to the members, and also to give the members the most joy from their gardens.

"Haven" - (The garden), the magazine for the members of the society, is published 11 times a year.

The Danish Garden Society consists of about 150 local member circles and branches. Local committees arrange thousands of local activities during winter and summer. "Open private garden" all over the country is a very popular activity.

Homepage for the The Danish Garden Society is: [www.haven.dk](http://www.haven.dk).

## FOR

*FritidsOdlingens Riksorganisation FOR Sweden / The Swedish National Organisation of Leisure Gardening Societies.  
Secretary Leif Thorin*

FOR is an umbrella organisation for amateur gardening societies having nationwide coverage. It was founded in 1989 by the three biggest gardening societies: The Swedish Horticultural Society, The Swedish Federation of Allotment and Leisure Gardeners and The Society of Gardening Amateurs. Today it has 16 member societies, now also such as Swedish Rose Society, The Swedish African Violet Society and The Swedish Herbal Society. Altogether, they have more than 70 000 members.

The purpose of FOR is

- to improve the co-operation between different national leisure gardening societies
- to represent the leisure gardeners in relations to e.g. the government and the University of agricultural sciences
- to increase the interest for and knowledge about gardening in Sweden.

FOR supports its member societies and organizes information and guidance on organic gardening to the public. FOR also supports advanced guidance and other activities by the University of agricultural sciences which are of vital interest for leisure gardening. Since 1992 FOR is arranger of the biggest gardening fair in Sweden – since 2002 together with Stockholm International Fairs (Stockholmsmässan). Every year, it has about 60 000 visitors. FOR is organizer of one of the exhibition halls, about 150 lectures for the public and 5 – 6 advanced seminars for professionals. Web-site [www.FOR.se](http://www.FOR.se)

### **Svenska Trädgårdsförbundet Finland**

*Director Nina Holmlund*

Svenska Trädgårdsförbundet rf (Finland, founded in year 1946) is a central organization for horticultural associations in the Swedish speaking areas of Finland. Among our member associations, which all are located in the coastal areas of the country, there is both such with professional producers as members and such with private gardeners as members. We publish the monthly magazine *Trädgårdsnytt*. For more information please visit our website [www.tradgard.fi](http://www.tradgard.fi)

As an organization Svenska Trädgårdsförbundet is also a member of the national Finnish central organisation for horticulture, Puutarhaliitto ([www.puutarhaliitto.fi](http://www.puutarhaliitto.fi)). Both the Finnish and the Swedish speaking organizations provide their members and the public with information about all the horticultural production sectors for professional growers and for hobby gardeners.

### **Det norske hageselskap Norway – The Norwegian Horticultural Society**

*Professor Gustav Redalen*

The Norwegian Horticultural Society was founded in 1884. It is a member-led society, dedicated to promoting the knowledge, skill and practice of horticulture. The society has about 26 000 members and includes about 360 local societies organizing yearly about 3 000 meetings, tours etc.

The society is responsible for the magazine “Norsk Hagetidend”, 10 issues per year, and has a website [www.hageselskapet.no](http://www.hageselskapet.no). We produce books, have an advisory service by e-mail, letters and telephone, and have established a network for designing gardens to a reasonable price for members.

The Norwegian Horticultural Society act as a consumer organization for horticulturists, regarding control of the germinating ability of seeds, testing of garden tools, reduction of the slug problem (*Arion lusitanicus*) etc.

In addition to amateur horticulturists, we work also for planning of good living areas, green lungs in the cities, green outdoor areas in schools, kindergardens, institutions and homes for the elderly.

The Norwegian Horticultural Society is an environmental friendly society, working for compost-making, reduction in the use of pesticides and fertilizers, and promoting organic growing. For a long time we have argued for the positive health effects of getting fresh air and physical activity in the garden. More recently we have started focusing on the positive effects of green surroundings on our health.

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## Organic agriculture in relation to food security of developing countries

*A study was conducted to investigate the differences in farm production, input use and farm income between organic and conventional systems in three regions (Uttaranchal, Madhya Pradesh and Tamilnadu) of India. From each region, 40 organic and 40 conventional farmers were interviewed with semi structured questionnaire. The results showed that input costs were less in the organic system while either total farm yield or net margin was righter in the organic system in two of the three regions. In Tamilnadu specializing in rice production, rice yield was less under organic system while net margin did not differ significantly. In addition, the IFPRI-IMPACT model was used to find out the impact of large scale conversion to organic farming on food security of Sub-Saharan Africa. The model showed that large scale conversion to organic farming in Europe and North America will not have major impact on food security of Africa and large scale conversion in Sub-Saharan Africa will improve the local food security.*

Global food production and yield of cereals and other crops increased for the past few decades. The world daily calorie consumption increased from 2550 kcal per person per day in 1981 to 2800 kcal per person per day in 2003 (FAOSTAT, 2005). Global food production at present would be sufficient to provide everyone with his minimum calorie needs if available food was distributed according to need (Von Braun et al., 2003). However, a recent report on food insecurity in the world showed that there are still 848 million people undernourished in the world (830 million in developing countries), most of them living in rural areas (FAO, 2008). India, one of

the emerging economies in the world, increased food production through green revolution technology, and became self sufficient in food production in 1990s. However, India is still home for 231 million undernourished people (175 million in rural areas), which is more than in Sub-Saharan Africa, 212 million (FAO, 2008). This highlights that food security is more a matter of food distribution than on food production *per se*.

Thus, other ways of improving food access than merely increasing external inputs is needed and organic agriculture can be part of such a solution. The recent UNEP-UNCTAD, 2008, report says that 'organic agriculture is a good option for food security in Africa'. The FAO conference on OA and food security, May 2007, observed that OA has the potential to contribute to sustainable food security through improved household nutrient intake, resilience to food emergency situation and contribution to healthy diets (Scialabba 2007). Therefore, this paper discuss the following questions

1. Is organic agriculture a viable option for improving food security of small holding farms in India?
2. What are the consequences on food security after large scale conversion to organic farming in developed and developing world?

### Materials and Methods

Quantitative and qualitative data was collected about household information, farm related information including livestock use, method of production and income, etc from 40 organic and 40 conventional small holding farmers from each of the three regions such as Tamilnadu from south India, Madhya Pradesh from central India, and Uttarakhand from North India for the first objective.

Table 1. Yield, input cost and income difference in conventional and organic systems in India.

Tamilnadu region	Conventional	Organic	P value
Rice yield (kg/ha)	4270	3400	*
Input cost (Indian Rupees/ha)	3976	2682	*
Net margin (Indian Rupees/ha)	25900	21835	Ns
Uttarakhand region	Conventional	Organic	Relative %
Total crop production (kg/ha/yr)	2845	3250	114
Keeping for home consumption(kg/ha/yr)	2046	2168	106
Total net margin (Indian Rupees/ha/yr)	14500	15200	105
Madhya Pradesh region	Conventional	Organic	P value
Irrigated cotton yield (kg/ha)	1694	1260	*
Rain fed cotton yield (kg/ha)	1187	1044	Ns
Net margin without premium (Indian Rupees/ha)- Irrigated cotton	28974	25234	Ns
Net margin without premium (Indian Rupees/ha)- Rain fed cotton	18900	19541	Ns
Net margin with premium*(Indian Rupees/ha)- Irrigated cotton	28974	30730	
Net margin with premium*(Indian Rupees/ha)- Rain fed cotton	18900	24134	

\* price premium 20 percent of gross margin were added in the organic system

IFPRI's IMPACT model was used for the second objective. The International Center for Research in Organic Food Systems (ICROFS), together with International Food Policy Research Institute (IFPRI), modeled the potential impacts of large-scale conversion to organic farming on food availability and world market prices at regional and global levels to the year 2020 using IFPRI's IMPACT model (Halberg *et al.*, 2006). Two main scenarios were established, respectively organic conversion in high-input agricultural systems in Europe and North America and conversion of the low-input agricultural systems in sub-Saharan Africa (all African countries in south of the Sahara desert).

The main assumptions were that organic yields in the high input agricultural systems would be only 50 to 85 percent of conventional yields, while they would be 90 to 150 percent of conventional yields in low input agricultural systems. This rather conservative estimate was then tested with different assumptions of how the yields will grow over time due to technological and managerial improvements in organic agriculture.

### Results

*Household level:* In two of the regions organic farming increased or stabilized yield by efficient use of resources at small holding farm (Food availability), or tended to increase income for buying food (Food access). In addition the organic system reduced input costs compared to non organic system, thus making the household less vulnerable to debt. Organic system produced 80 per

cent of the conventional rice yield in conversion period in Tamilnadu region (Table 1). However, there was no difference between organic and conventional rice in net margin, though no price premium was added.

Food output per unit area-time is the relevant factor for food security rather than focusing on single crop yield. Organic system produced more food and income per unit time-area compared to conventional system in Uttaranchal region (Table1).

In general, most of the research focused on main crop yield without considering the intercrop yield, but yield from intercrop is also important for small farmers to get additional yield for home consumption and selling extra produce for additional income. In Uttarakhand and Madhya Pradesh region, average yield of various intercrops were higher under organic than conventional systems. Likewise, organic farmers kept more for home consumption rather than selling to market, where as conventional farmers sold more to repay the cost spent for the input or debt (Table 2).

Increasing income of small farmers will improve food security through food access components. Results showed that there was no difference between organic and conventional cotton in net margin (price premium was not added). However, organic cotton produced slightly more net margin in rain fed conditions though no premium were added. End of the season, organic farmers received 20 percent of their gross margin as premium from BioRe private ltd company. Organic farmer's had

Table 2. Yield (Kg/farm/year) from intercrops in Uttarakhand and Madhya Pradesh regions.

	Uttarakhand		Madhya Pradesh	
	Conventional	Organic	Conventional	Organic
Cereals	200(15)	390(24)	400(7)	487(12)
Pulses	125(13)	164(21)	97(6)	111(9)
Oilseeds	42(17)	60(19)	300(3)	350(2)

Note: values in ( ) number of farms out of 40

higher net income (premium added) in both irrigated and rain fed condition compared to conventional system when organic cotton received premium (Table 1).

*Regional level:* The scenario of the conversion of the high input agricultural systems showed that conversion to organic farming of large parts of Europe and North America would not raise global food prices significantly compared to the baseline IMPACT scenario – but only under an assumption of higher productivity gains (yearly yield increase) in organic compared with conventional crops. This is a real challenge for the further development of organic agricultural systems, and will probably only be possible with increased investments in research into eco-functional intensification, better nutrient recycling and plant breeding partly using new smart techniques.

Regarding the conversion of the low input agricultural systems, the baseline IMPACT scenario projected that the area with cereals in Sub-Saharan Africa would increase by 20 percent and the yields per hectare would grow by almost two percent per year. But still, due to a high population growth, there would be an increasing dependence on food imports to Sub-Saharan Africa and food security would be compromised, with an increasing number of malnourished children (18 percent more in 2020 compared with 1997). Large-scale conversion to modern, organic agriculture could significantly reduce the needs for food import, thus making the countries less dependent on fluctuating world market prices. This is shown in Figure 1, where the import in “Other coarse grain” was projected to decrease two-three percent by 2020 in the organic low input scenario compared with the expected 17 percent increase in imports in the baseline scenario. Thus, in the organic scenario, where an increased yield growth rate was assumed, the import would possibly be replaced by a small surplus (shown in Figure 1 as negative import) if the expected yields of organic crops could be realized. At the same time, food

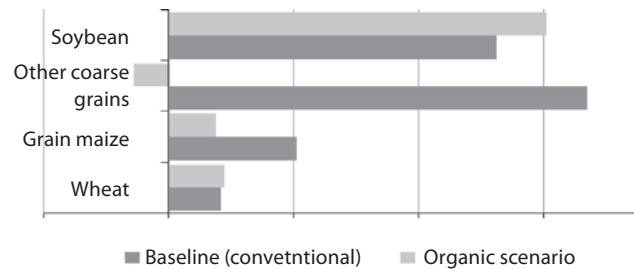


Figure 1: Changes in net trade in important food crops for sub-Saharan Africa Projected for scenarios of large-scale conversion to organic farming until 2020 (Percent increase in import until 2020 in the baseline and in an organic scenario) Source: ICROFS and IFPRI 2006.

access among the rural poor would improve because of (the assumption of) increased yields in traditional food crops such as cassava and sweet potatoes.

### Conclusion

Organic agriculture seems to be a viable option for improving food security of small holding farms by – under certain circumstances – to increasing total farm yield, income and by reducing input cost. OA can contribute significantly to improving food security among small-holder farmers in developing countries, and a large-scale conversion has the potential to reduce the future dependence of food imports in Sub Saharan Africa. However, such a positive scenario depends on well-designed training and extension focusing on building human, natural and financial capital. There is also a huge need for more research and innovation to improve local farming systems and adaptation of agro ecological principles.

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# Consumer health aspects of organic vegetables and fruit

Many consumers of organic food are convinced that organic food is best for human health, while most scientists agree that none of the many published studies have provided definitive proof of any health benefit. The questions are if, how and why organic fresh fruits and vegetables generally have a different composition than corresponding conventional products, and to what extent such differences have consequences for the health of the consumer.

## Differences in composition between organic and conventional plant foods

The organic regulations forbid the use of synthetic pesticides and fertilisers, and limit the use of natural sources of plant nutrients and plant protectants. The restrictions on pesticides mean that the organic farmers must rely on supporting the crops' natural defences, e.g. by using resistant varieties and rotate different crops on the soil. The restrictions on fertiliser use means that less nutrients are available to the plants on organic farms. The yields of well-managed organic crops tend to be 10–40 % lower than for corresponding conventional crops. The difference in nutrient supply to the plants results in systematic differences in the plants' physiology and composition. One of these effects is that they become more resistant to pests and diseases and better able to compete with weeds, another is changes in the contents of vitamins, minerals and secondary metabolites.

### Vitamins

A reduction in the nutrient supply to the plant increases the content of vitamin C and reduces that of  $\beta$ -carotene.

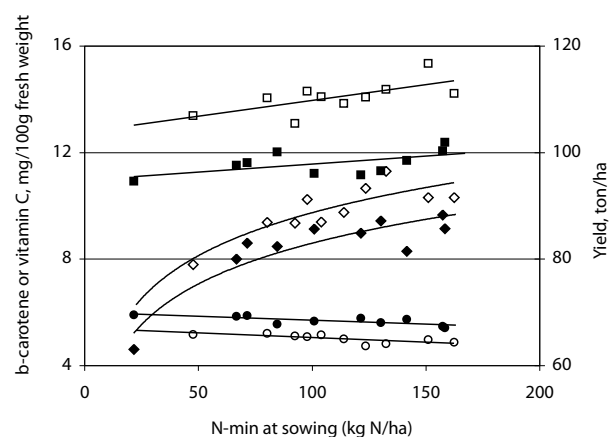


Figure 1. The effect of different levels of organic fertilisation on the vitamin content and yield of carrots. Squares are beta-carotene, circles vitamin C and diamonds yield. Open symbols are data from plants grown in 1995, filled symbols 1996. Redrawn from (1).

In this example (Figure 1), different levels of fertiliser demonstrated the systematic effect of fertilisation level as well as the large effect of year (weather). Typical fertilisation intensities in organic and conventional farming are approximately 95 and 140, respectively. However, the direction and magnitude of the differences are systematic consequences of the production system. A meta-analysis found 11 % higher concentration of vitamin C (from 17 studies) and 9 % lower of  $\beta$ -carotene (from 9 studies) (2). Such data are not available for other vitamins.



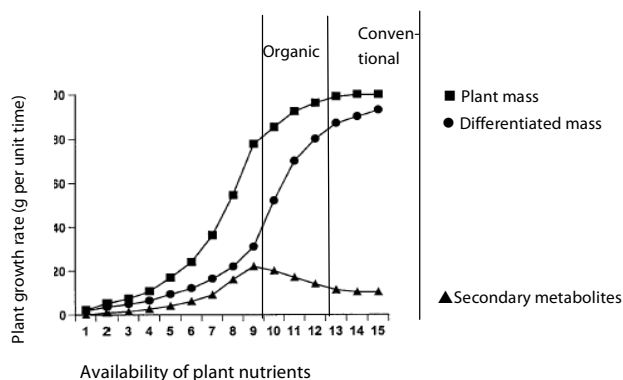


Figure 2. The relation between plant growth rate and formation of secondary metabolites. The graph (data from 3) summarises research on wild plants growing in nature. The vertical lines indicate ranges typical of main categories of agricultural systems.

### Plant secondary metabolites

Secondary metabolites, also known as phytochemicals, are compounds synthesised by plants but not involved in the plant cell's primary metabolism. They include colours, scents and natural pesticides that protect the plant against pests and diseases.

Most studies show 10–50% higher concentration (fresh weight basis) in organic fruits or vegetables compared with conventional ones. No quantitative meta-analyses have yet been published, however, the author estimates the average difference to be at least 10% (Figure 2) (4).

### Minerals

A comparison of the official UK tables on the composition of 20 fruits and 20 vegetables from around 1936 with the 1991 edition with data from foods analysed in 1984–1987 (5) showed significant reductions in either vegetables, fruit or both for Ca, Mg, Fe, Cu and K, most of them by of 20–30%. This is partly caused by a decrease in the dry matter content (by 3% in vegetables, 9% in fruits), where most studies comparing organic and conventional produce find lower dry matter content (more water) in conventional samples (6).

### Consequences for consumer health

For most food components the dose-response relationships are not known well enough to determine if a moderate change in food content will make any difference for health (7).

### Vitamins

Epidemiological studies show that increasing the intake of fruits and vegetables reduces the risk of cancer, cardiovascular disease and other diseases. (8). However, intervention studies show that supplementation with vitamin C or beta carotene provide no reduction in the risk of cancer (9) nor in mortality from cardiovascular disease (10), in fact significant toxic effects are more common than significant beneficial ones (Figure 3).

People who consume vitamin C from supplements or fortified foods or eat 2 portions or more per day of fruits and vegetables or their juice, get more than the Recommended Daily Intake (RDI) of 60 mg/day, so for them a higher level in the organic produce provides no known added benefit. For people with a very low intake of fruits and vegetables, increasing a very low figure by 11% will be too small to have any measurable impact on their vitamin C status. So increased vitamin C in organic fruit and vegetables will only benefit very few people in countries like Norway.

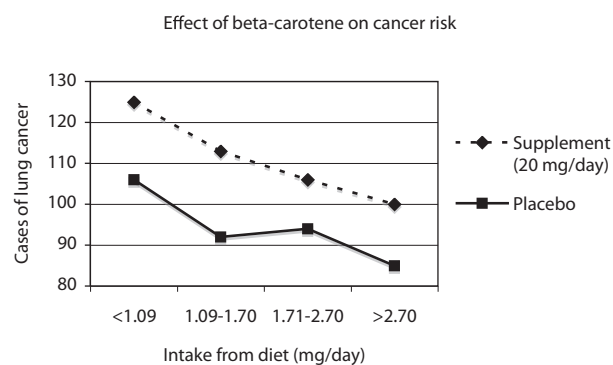


Figure 3. Relations between intake of  $\beta$ -carotene from either food (vegetables and fruit) or supplements and the number of cases of lung cancer during 6 years among male smokers. Each of the 8 data points represents approximately 3380 persons. Data from (11).

For  $\beta$ -carotene it has been shown even more clearly than for vitamin C that there is no benefit of increasing the intake in people who are not deficient in vitamin A (9, 10), so a moderate difference in the content makes no difference for health.

### Minerals

Vegetables and fruits are not important sources of minerals in the European diet, with the exception of vegetarians, who could benefit from a 20 % higher concentration of Fe, combined with 11 % more vitamin C, which promotes Fe absorption.

### Plant secondary metabolites

It has been calculated (12) that a 60 % increase in the intake of vegetables and fruit, from 250 g/day to 400 g/day, would reduce the incidence of cancer by 19% and the mortality from CVD by 16 % (on figure 3, this corresponds to moving from 2nd to 4th quartile, reducing the risk by 14 %).

Apart from vitamin C,  $\beta$ -carotene and minerals, plant secondary metabolites are the only type of compounds where fruits and vegetables are the main source, so by exclusion they are the most likely cause of the health benefits. The concern is that most secondary metabolites are toxic when ingested in high amounts, in accordance with their role as natural pesticides. However, this is also the case for most vitamins, minerals and other compounds considered beneficial. Also most of them have not yet been tested in appropriate experimental designs (13), so we do not know how they may work or by how much. It is therefore not justified to substantially increase one or two compounds at the expense of others, until we are certain that such a change is beneficial and safe. However, this means that if organic produce contains 10 % more of these compounds than corresponding conventional foods, then switching from conventional to organic fruits and vegetables will reduce the risk of cancer and CVD for an average consumer by 3.2 and 2.6 %, respectively (one sixth of the benefit of increasing the intake by 60 %). This would constitute a substantial contribution to the improvement of public health.

### Conclusion

There are definitive, systematic differences in composition of organic and conventional fruits and vegetables. In terms of public health, most of the differences are too small to have any impact on the health of consumers.

However, the increased level of secondary metabolites (phytochemicals) in organic produce could reduce the risk of cancer and cardiovascular disease, potentially preventing several thousands of deaths per year, if everyone in Sweden switched their fruits and vegetables to organic. Additionally, a higher content of iron and vitamin C would benefit certain vegetarians at risk for iron deficiency, although this would only affect a small section of the population.

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## Feeding only forage – good for humans but not always for sheep

In organic production feeding ruminants with large amounts of forage is encouraged. According to several studies, meat produced on forage based feed rations or grazing also has a healthier fatty acid composition than when large amounts of concentrates are used. However, feeding only forage has been questioned, if it is suitable to sustain genetically high producing animals.

To investigate how ewe nutritional status and lamb muscle fatty acid profile are affected by feeding only forage, a two year study, funded by the Swedish Board of Agriculture, was conducted. Both years ca 50 crossbred ewes were studied from early pregnancy to weaning. They were grouped and fed either silage or silage and concentrates (max 50 %, according to KRAV regulations).

There were significant differences in ewe weight and body condition and in several blood metabolites, showing difficulties for ewes with more than one lamb to thrive on only forage. This was especially evident in year

2, probably because the nutrient content of the silage was lower that year. The results also showed that the main stress on the ewe was during lactation. Figure 1 shows the mean content of urea in blood serum, where a level below 4.0 mmol/L indicates a low nutritional status.

After weaning half of the lambs remained on their initial diet while the other half changed to the other diet. The lambs had free access to either silage or silage and concentrates in amounts approved by KRAV. Weight gain was significantly lower in the group that was fed only silage. Lambs were slaughtered 5 weeks (year 1) or 8 weeks (year 2) post-weaning. Within year the n-6/n-3 fatty acid ratio in *M. semispinalis capitus* increased with duration of concentrate feeding. Meat with a high ratio is considered less healthy for human consumption. The muscle fatty acid profile was more influenced by the pre-weaning than by the post-weaning diet.

In conclusion, if pregnant and lactating ewes are to be fed with only forage, the nutrient content of the forage needs to be very high to maintain nutritional status if the ewe has more than one lamb. Body condition and milk production will otherwise decrease. Moreover, lamb growth will be adversely affected, even if the meat may be healthier for human consumption.

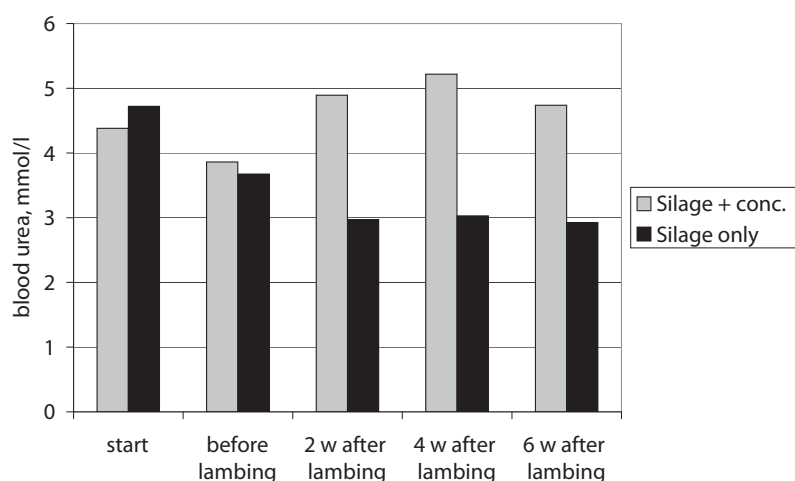


Figure 1. Urea in blood serum from ewes in year 2 of the project.

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# Plant metabolites for healthy plants and healthy people

Compounds classified as secondary metabolites are those that do not play a direct function in plant growth and reproduction. Nevertheless, these compounds often have importance for plant defence against attacks from pest insects or pathogens. There is also an increased awareness of the relation between secondary compounds and the health benefits of a proper diet that includes a large proportion of fruits and vegetables.

The aim of the project "Plant metabolites for healthy plants and healthy people" (2008–2012) is to contribute to competitiveness for food production in northern regions by generating basic knowledge on how climate, agroecosystems and insect feeding influence the synthesis and regulation of secondary metabolites in brassicaceous plants that play a role in plant protection and human health. The project will focus on glucosinolates, which are sulphur-rich secondary metabolites specific for brassicaceous plants.

## Effect of agroecosystem and climatic parameters on secondary metabolites

The content of secondary metabolites in brassicaceous plants has been shown to vary depending on the specific conditions during plant growth. To increase the predictability of the content of secondary metabolites, field- and phytotron- studies have been designed to determine the influence of agroecosystem including soil type, organic/synthetic fertilizer regime and plant species, on the occurrence and quantities of glucosinolates and other secondary metabolites. In addition, the importance of climatic parameters, such as temperature, day-length, light quality and light quantity, on the production and genetic regulation of secondary metabolites are being investigated.

## Secondary metabolites and insect- plant interactions

Secondary metabolites, especially glucosinolates, are associated both with plant defence in brassicaceous plants and with attraction of specialised insects (e.g. *Delia floralis*, *Plutella xylostella*, and *Mamestra brassicae*). Herbivory also induce changes in the content and profile of secondary metabolites that may have an impact on herbivore development. In field and laboratory studies, the effect of secondary metabolites on specialised insects will be investigated. The information acquired will be used to design plant protection strategies such as push-pull systems, where insect behaviour is manipulated to control damage within a field. An additional aim is to investigate the possible use of secondary plant metabolites in traps and plants to attract and infect brassica pest insects with insect pathogenic fungi.

## Project organisation and management

This project is coordinated by Dr. Richard Meadow (richard.meadow@bioforsk.no), Bioforsk, Ås, Norway. Project collaborators at Bioforsk are Dr. Maria Björkman, Dr. Tor J Johansen, Dr. Ingeborg Klingen, Dr. Geir Kjølberg Knudsen, Dr. Inger Martinussen, Dr. Jørgen Mølmann and Dr. Randi Seljåsen. National collaborators are Prof. Atle Bones, NTNU, Trondheim and Dr. John Beck Jensen, University of Tromsø. International collaborators are Dr. Nick Birch and Dr. Derek Stewart, SCRI, UK, and Dr. John Pickett, Dr. Toby Bruce and Dr. Lesley Smart from Rothamstead Research Centre, UK. This project is financed by The Research Council of Norway.

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## Allelopathic cover crops – effects on plant pathogens and weeds

The aim of this project is to evaluate both the possible suppressive effect of cover crops have on soil-born plant pathogens, and the restraining effect these crops may have on weeds. Plant pathogens and weeds are severe bottle necks in the organic farming and the knowledge of how to decrease their effect is of economic importance for the farmers. Up until today no studies on allelopathic cover crops have been conducted in the environmental conditions prevailing in Sweden.

Allelopathy is defined as any direct or indirect, harmful or beneficial effect of one plant on another or on a microorganisms through the production of chemical compounds that escape into the environment. International studies show an allelopathic effect in a number of species from the plant family *Brassicaceae*, for example

mustard (*Sinapis alba*) and rapeseed (*Brassica napus*), but also in Graminae-species, such as Westerwoldian ryegrass (*Lolium multiflorum* var. *westerwoldicum*) and rye (*Secale cereale*).

Preliminary results from a screening study in the green house mimicking the Swedish environment and using Westerwoldian ryegrass (*L. multiflorum* var. *westerwoldicum*), rye (*S. cereale*), mustard (*Sinapis alba*) and oil seed raddish (*Raphanus sativus* var. *oleiformis*) as cover crops, indicate a reduction of both emergence and biomass production in tested weeds and a restraining effect on tested plant pathogens for some of the cover crop used.

The project is ongoing and funded by the Swedish board of Agriculture.

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## Bioenergy production in organic farming

Bioenergy production from local bio-resources has a great potential. It is important to reduce dependency on fossil fuels and decrease green house gas emission in organic agriculture. Both biogas and bioethanol can be produced in organic farming and significantly contribute to the sustainability of organic farms. Soil fertility is the basis for organic agriculture: it has been of concern that the fertility might decline if most of the organic residues were converted into energy and only effluent from anaerobic digestion process was recycled. However, by intelligent management of organic residues and crop rotation it is possible to avoid decrease of soil fertility and at the same time produce renewable energy.

Organic raw materials originating from organic farming was selected. Clover grass (dried and silage) dried grass from meadows, maize (fresh and silage), vetch

and rye were tested. Theoretical biogas and bioethanol yields were calculated. Biogas potential batch tests were performed for each substrate individually and the obtained yield in the lab was compared to the theoretical one. Moreover, lab biogas reactor treating a mixture of manure and the different energy crops was evaluated with respect configuration and performance. Combined production of biogas and bioethanol based only on energy crops and whey permeate was also tested. Based on the results an outline of a medium sized plant for co-production of biogas and bioethanol has been made. It is expected that the on-farm production of the bioenergy would improve not only sustainability of such a farm but as well economics.

The presented study is part of the BioConcens project (<http://www.bioconcens.elr.dk/uk/>).



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## Baltic Sea project BERAS

### **The results from the Baltic Sea project BERAS show: the nutrient load from agriculture can be reduced by 50 %**

The purpose of the BERAS-info project is to disseminate information about the results from the 3-year INTERREG III B BERAS (Baltic Ecological Recycling Agriculture and Society) project that ended in March 2006 and the LOF (Local Organic Food) project implemented together with Eldrimner in Sweden and partners in Estonia and England that ended in March 2007.

The experiences from the case studies of 50 ecological recycling farms and local food systems in the eight EU countries around the Baltic Sea have been documented and scientifically evaluated in terms of their consequences for the environment, resource use and the economy as well as their social impact. In total 52, researchers from different disciplines in the eight participating countries and a large number of concerned actors participated. The results, presented in seven reports published by CUL, SLU and in several scientific articles, show how it is possible to carry out agriculture in the Baltic Sea region in a way that can cut the nutrient load to the Sea by half, greatly diminish the use of fossil fuel energy in the food chain and completely discontinue the use of chemical pesticides. Information about these BERAS project results is relevant for the various actors in the food chain including farmers, advisors, politicians and decision makers and who could participate in an eventual BERAS follow-up project, BERAS Implementation, for which funding has been applied from the EU-BSR regional structural fund INTERREG IVB.

The BERAS projects well documented case farms are dispersed among the different production areas in the countries and are well suited to function as demonstration farms.

Information activities include:

- a) Courses and conferences for various actors in the food chain, politicians and decision makers, advisors and consumers.
- b) Demonstration farms with field days, demonstrations and courses on ecological recycling agriculture as a farming system with integrated crop and animal production, effective use of manure in relation to the different crops nutrient needs as well as demonstrations of nutrient management measures such as dam constructions, soil and manure management and farm-based biogas production. Walking paths with information posters and demonstrations will be further developed at Skilleby experimental farm and established at a few other BERAS case farms.
- c) Demonstrations of local food processing, distribution and consumption as aspects of efficient resource use in production, consumption and recycling and production of information material (see examples from BERAS final conference [www.jdb.se/beras](http://www.jdb.se/beras)).
- d) A special school project where to study the history of the content in a Bag of Groceries is in a group work where they did practical environmental consequence analysis and collaborate with school meal personnel. EU funds for a more elaborate project are being applied for in collaboration with Södertälje local government and its responsible dietician.

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## Biological control of pests attacking cereals in Sweden

The bird cherry-oat aphid, *Rhopalosiphum padi*, is an important pest species in spring sown cereals in Sweden. *R. padi* has mainly been controlled by spraying with pesticides. However, with the increasing demand for organically produced food, organic farmers must rely on biological control of pests by natural enemies to suppress pest species under economic thresholds. It is well known that spiders and ground beetles act as biological control organisms of pest insects, hence offering ecosystem services to farmers. Natural enemies are found to be most effective at suppressing *R. padi* if they are present in the field before the aphid arrives. Common generalist predators in spring sown cereals in Sweden are spiders in the genus *Pardosa* and ground beetles in the genus *Bembidion*. These species are present in the field when the aphids arrive. Previous studies have found that *Pardosa* and *Bembidion* can find and predate bird cherry-oat aphids even at low densities, hence being potential biological control organisms. What we do not know is if they also have the potential to predate on each

other. When two predators that share the same prey also feed on each other we call it intraguild predation (IGP). If *Pardosa* and *Bembidion* feed on each other in the field this could potentially affect their efficacy as biological control organisms in spring sown cereals.

### Aim of my PhD:

My PhD-study aims at evaluating the potential for IGP between *Pardosa* and *Bembidion* in the field and to determine what the implications are for the natural enemies' efficacy as biological control organisms. I will also study if there is an effect of the species relative abundance on the occurrence of IGP, and if the occurrence of IGP is changing over the growing season. This research is important in order to get a more thorough understanding of the natural enemies' interactions in the field. This knowledge is needed to understand how to improve biological control of *R. padi* in organic farming of cereals in Sweden.

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# Public food system strategies to protect environment, soil and groundwater

## The case of organic food in Copenhagen

There is increasing focus on the role that food procurement and institutional food service can play in promoting sustainable production and consumption. Many metropolitan areas adopt strategies that include initiatives involving public kitchens and food procurement offices. In a number of countries sustainability policies have been launched aiming at increasing the volume organic foods in public. Denmark is one of them. Public policies supporting the use of organic foods in the public sector have been around for a decade and municipalities has taken corner actions aiming at increasing the share of organic and sustainable foods in food service.

Copenhagen is one of them and protection of soil and groundwater plays an important role in this strategy. The aim of this paper is to present this case and demonstrate how public food systems can integrate organic foods in

the public food service supply chain. The municipality aims at reaching a level where food consumption in public institutions is 90 % organic and this goal is pursued through the participation in the Green Cities network. Civil servants and catering professionals from the different Green Cities municipalities work together in a network on Organic Food and aims at strengthening the inter-municipal cooperation on conversion into organic food through information and knowledge-sharing. The paper presents concrete examples of the constraints and opportunities in this type of strategy as well as some concrete tools for monitoring the progress through the use of metrics.

The paper is including experiences from working at the Organic Food Project at Municipality of Copenhagen.

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## Mussel meal as a protein source in diets for organic laying hens and broiler chickens.

The first limiting amino acid for poultry is usually methionine. To fulfill the birds' requirement conventional diets are mostly supplemented with synthetic methionine but this is not allowed to use in organic production. Today it is possible to use 10 % conventional feed ingredients e.g. corn gluten meal relatively rich in methionine, but European council regulation indicates that organic poultry should be fed 100 % organically produced feed stuffs from 2012. Therefore it is a high need for development of new high quality protein feed ingredients to assure organic egg and poultry meat production in the future.

Fish meal is rich in methionine and is frequently used in organic diets for layers today. However, the escalating cost of production in combination with a short supply of organically approved fish meal is likely to limit the use in the future. Blue mussels (*Mytilus edulis*) are a potential source of protein because of their high methionine content. Dried mussel meat meal would serve as a high quality protein source but also benefit the coastal environment since mussels are able to filter immense volumes of waters and hence, effectively clean sea waters from agricultural wastes such as nitrogen and phosphorus. Mussel meal has also the potential to be approved as an organic feed ingredient.

Several experiments, both long- and short term, have been performed to evaluate effects of mussel meal in poultry diets. The inclusion level of mussel meal, replac-

ing fish meal, has been from 3 % up to 15 %. Important production parameters as laying percentage, egg weight, feed intake and feed conversion rate for laying hens and live weight, feed intake and feed conversion rate for broiler chickens have been unaffected by the exchange of protein source. Also egg quality parameters such as shell deformation, shell breaking strength, cracked and dirty eggs were unaffected. Significant results were shown regarding egg yolk pigmentation where the yolk pigmentation increased with increasing levels of mussel meal.

However, mussels may temporarily be contaminated with the toxin okadaic acid and histological evaluation of the effects on morphology of the digestive tract of laying hens has been carried out. Okadaic acid at a level just above tolerance limit for human consumption, did not have any adverse effects on animal health or production parameters and no histological changes indicating disturbances in the digestive tract were observed.

Thus, from nutritional and ecological point of view these experiments indicate that mussel meal may be a very interesting protein source in organic poultry production. In contrary to conventional fish farming, no extra resources (feed) have to be added either. The future use of mussel meal depends on the success of further experiments, the access to fish meal and the willingness of the market to develop the processing technique to make the price of mussel meal competitive.

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## **Market communication of small-scale food producers – cascading of messages and effects of agreements throughout the value chain**

This recently launched project investigates how small-scale businesses may strengthen their market positions and create new markets through more efficient communication of grounds for added values. Successful communication of grounds for added values from producer to consumer is a key factor for market success. Agreements and contracts constitute important types of communication. Today knowledge of how messages and expectations change throughout entire chains of actors is lacking. Knowledge of agreements and contracts exists but knowledge of foods, different types of agreements and the Swedish situation is lacking.

This project investigates how messages are cascaded throughout the value chain and how small-scale food businesses communicate added values of their products to the market. It concerns minimizing the well known

effect that a message change from the original sender to the final receiver, i. e. some components may disappear or be distorted and some may be added.

Communication regarding products from producer to consumer is followed along different lines of actors, for instance from producer through processor to wholesaler, retailer and end consumer. Different types of products are investigated, such as dairy products and fruit products. The actors are interviewed and physical communication through e. g. labels, displaying and web pages is analyzed. Furthermore, the nature and consequences of different types of agreements between producer and buyer are investigated.

The project is funded by the Swedish Farmers' Foundation for Agricultural Research (Stiftelsen Lantbruksforskning).

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## Prospects for a Swedish production of organic soya

Soyabean (*Glycine max*) is one of the major crops in the world with Brazil, USA and Argentina as leading producers. Soyabean is used both for food and fodder all over the world. Today there is a general discussion on the drawbacks of soyabean production connected to introduction of GMO-varieties and increased deforestation of Brazilian rain forest.

In general, soyabean is very sensitive to photoperiod and most cultivars will only develop flowers when daylight is less than 14 hours. It will often not set seed if the night temperature falls below 10° C. The soyabean cultivars are divided into 13 maturity groups; 000 (earliest) to X, based on their response to photoperiod. The 000-cultivars are adapted to the production areas in cooler climate such as mid-Europe.

In Sweden, soyabean has been an important ingredient for fodder and food for many decades. The idea of a domestic production was subject to plant breeding programmes in the late 1940's, unfortunately with little success.

New cultivars – GMO-free – originating from Canada has today changed the cropping possibilities dramatically. For Sweden, especially an organic production of soya would be valuable to the organic livestock production.

Hence, we have in field demonstrations and experiments in southern Sweden (Scania and Öland) during 2006–2008 studied soya bean production as a basis for

commercial production of conventional and organic soya.

Generally, protein content of Swedish grown soya amount to 40 % and yield to 1600 kg ha<sup>-1</sup>. We have in all experiments seeded soya in the period May 20<sup>th</sup> to June 6<sup>th</sup> in order to reduce risk for frost damage during emergence and this strategy has so far proven successful. Seeding has been carried out by standard seeding machine at 12,5; 25 and 50 cm row distances and 100–130 kg seeds ha<sup>-1</sup>.

In one demonstration about 3 ha of soya was cultivated organically. Perennial weeds such as *Elymus repens* proved to be the main obstacle and reduction of yield was observed. Modern physical weed control methods such as weed harrowing and stale seed bed can likely reduce the weed problem.

A Swedish soya production would be beneficial to organic agriculture and food industry because it can guarantee GMO-free products, reduce transportation (resource use) and provide a domestic high-quality plant protein source.

Further field experiments of cultivars and development of the cropping systems is however needed before a large-scale production will emerge.



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## Mikronäringsämnen i vallväxter

- Varierar innehållet av mikronäringsämnen mellan olika vallväxter?
- Finns det även skillnader i mikronäringsämnesinnehåll mellan olika sorter av samma art?
- Hur påverkas upptaget av mikronäringsämnen av konkurrensen i en blandvall?
- Förändras innehållet av mikronäringsämnen över säsongen?
- Finns det skillnader mellan arter och sorter i hur mycket mikronäringsämnen de tar upp från olika jordar?
- Hur förhåller sig växternas innehåll av mikronäringsämnen till energi-, protein-, och fiberinnehållet?

Av de 14 mineraler som är livsnödvändiga för växter räknas åtta som mikronäringsämnen. För människor och djur krävs det ytterligare fem makro- och mikromineraler i kosten för att undvika bristsjukdomar. Järn (Fe) är exempel på ett mikronäringsämne som hos växter behövs vid fotosyntesen och som hos djur ingår i hemoglobinet i blodet.

Växternas tillväxt och produktion beror på såväl genetisk potential som yttre faktorer såsom väderlek och skötsel. Genom att välja växter som är väl anpassade till den aktuella platsen och gödsla dem rätt skapar

man förutsättningar för en god avkastning. De mer kända makronäringsämnena kväve (N), fosfor (P) och kalium (K) är de som oftast begränsar avkastningen, men på senare tid har även brist på mikronäringsämnen i jordar och grödor blivit alltmer uppmärksammat. På gårdsnivå finns det på sikt en risk för nettobortförsel av näringsämnen i form av avsaluprodukter så som mjölk, kött och foder om utförseln inte kompenseras av inköpen av foder eller gödsel .

### Söka svar ...

Sommaren 2009 ska innehållet av mikronäringsämnen i olika vallväxter och sorter analyseras. Växtproverna samlas in från de befintliga sortförsöken runt om i Sverige och kompletteras med ett kärlförsök med bla örter lämpliga för vall. Parallellt analyseras jordarnas innehåll av näringsämnen. Målet är att hitta arter eller sorter som har en god upptagningsförmåga av viktiga mineraler på jordar med låga halter. Följande sommar kommer några arter/sorter att odlas i renbestånd och i blandningar i syfte att undersöka hur konkurrens påverkar näringsämnesinnehållet. Även innehållet av mikronäringsämnen vid olika skördetidpunkter under säsongen kommer att undersökas.

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## The role of boron for perseverant, healthy ley legumes and efficient nutrient uptake.

Boron (B) has during the last century been considered as an essential micronutrient for higher plants. More and more data support the view that B has a function in important life processes in animals and humans, and that critically low concentration in food and feed can result in deficiencies that contribute to severe diseases. Even lower organisms like nitrogen fixing bacteria (*Rhizobium*) and mycorrhizal fungi are dependent on B for the establishment and development of symbioses with their host plants. Boron deficiency may therefore result in decreased supply to the host plant of a range of plant nutrients. As symbiotic organisms sometimes can protect plant roots from soil-born pathogens, nutrient deficiencies limiting these organisms may also lead to higher prevalence of root diseases.

Boron deficiency occurs in large parts of the world especially on coarse soil, in areas with large humidity and in areas with intensive agricultural systems. The bedrock in Scandinavia is especially poor in B. High concentrations of plant available nitrogen in the soil are known to diminish plant uptake of B.

The upcoming investigation will focus on the role of B for perseverant, healthy ley legumes and an efficient

N-fixation and nutrient uptake in organic ley- production systems. The following parts will be examined in the study:

- (i) the establishment and perseverance of legume plants in the ley crop, due to the influence of soil B content
- (ii) the content of B (and other nutrients) in the ley crop (grass/clover mix stands) in relation to soil B content
- (iii) evaluation of possibly measurable biological indicators to grade the role of B in the development of symbioses ( e.g. *Rhizobium*, VA-mycorrhiza) and root health in the legume plants and
- (iiii) effects of B supply.

The investigation will be implemented with a combination of greenhouse and field trials. Relevant soils and ley crops (grass/clover mix stands) will be chosen, due to their properties concerning: geological origin, production system, crop management, and content of B (and other nutrients) in soil and plant samples.

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## Local food logistics

Local and regional food is facing increasing interest in society and among consumers. An important selling argument is that short transport distances can improve freshness as well as reduce negative environmental impact, but this requires that the transport is handled effectively. While the small and irregular material flows makes this a challenge, previous studies have indicated potential for improvement by utilization of coordination and route optimization. Furthermore, integration of the local products in conventional supply chains may further improve the competitiveness as well as environmental performance of the local products. The overall objective of the current project is to map out and analyze local food logistics, to identify bottlenecks and develop and demonstrate possibilities for improving logistics efficiency.

A survey<sup>1</sup> with 78 small-scale producers from 18 of the 21 counties of Sweden was conducted during 2007–2008. Diversification was a common strategy; the producers utilized on average four (up to 11) separate sales channels and most of them sold their products to private customers as well as retail shops and/or restaurants. Likewise, several distribution alternatives were used in parallel, including on-farm collection, own-account transport and

cooperative or third-party transport. For own-account transport, personal vehicles or minivans were primarily used, with a load rate of about 50%. Transport was ranked by the producers as the most important factor to constrain business development. Therefore, developing coordinated transport and integrated logistics solutions appear as key priorities for the sector.

Based on the mapping study and in dialogue with stakeholders, we conduct case studies where important concepts are developed and demonstrated. These include transport coordination using optimization tools, and integration of small-scale producers in the electronic information systems of large-scale retail chains. The project is supported by Vinnova.

<sup>1</sup>Partial results are published in a Swedish report: Björklund, H., Cardoso, M., Gebresenbet, G., Gossas, C., Hallberg, C., Ljungberg, D. och Strömblad, F. 2008. De lokala matproducenterna och dagligvaruhandeln: Kartläggning – hinder och möjligheter – förslag. Livsmedelssverige / SLU. ISBN: 978-91-85911-59-2

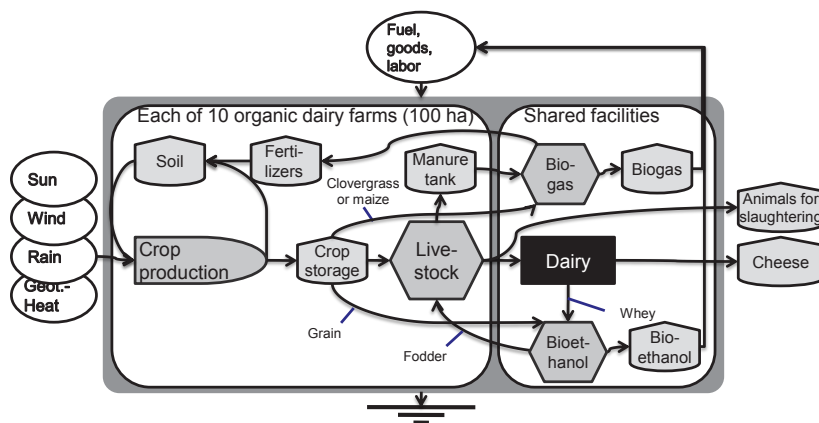
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# Energy and emergy evaluation of potentials for energy self-sufficiency in Danish organic dairy farms by production of biogas and bioethanol



The contemporary food production and thus human life supporting system is in crisis. One obvious way to enhance agricultural resilience is for farms to increase self-sufficiency with necessities such as fuel, fodder and fertilizer. Our research seeks to uncover these potentials for Danish organic dairy farming.

The setting is a theoretical model of a farm-cooperation of 10 farms of 100 ha each producing only milk and animals for slaughtering and being self-sufficient with fodder and fertilizer. The question is if they can be self-sufficient with energy by means of shared biogas and/ or bioethanol production facilities. The method is mapping of energy, emergy (embodied energy measured in solar energy joules) and mass flows in different scenarios, that are based on empirical data from Danish dairy farms concerning mix of crops, crop yields, livestock input/output and fuel and electricity consumption.

In various scenarios different utilization of the produced crop is tested. Biogas is produced from manure

and either clover grass or maize, and the effluent is fed back to the fields as fertilizer. In another scenario bioethanol is produced from grain and whey originating from the dairy cheese production, and the effluent is fed back to the livestock as a protein-rich fodder. The figure illustrates the overall boundaries of the studied system, and the different energy and mass flows that are included in the study.

Results compare the different scenarios in terms of mass, energy and emergy flows, thus including direct and indirect energy. Overall resource and energy efficiency are evaluated.

Research to broaden the scope of self-sufficiency to include processing, distribution and selling thus examining the tradeoff between economy of scale and energy used for distribution is in progress; energy used for processing, distribution and trade should be supplied by agriculture as well in order to increase overall resilience of food supply system.

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## Utilization of synergies between enhanced biological control through selective biodiversity and targeted crop rotation

In this project we aim to develop a ecologically-based management system that relies on combined effects of conservation biological control and pest lifecycle distribution.

The project combines laboratory studies with semi-field experiments and large scale field experiment.

We are developing a system where two key pests of cabbage and onion (*Delia radicum* (L.) and *D. antiqua* (Meigen.)) [Diptera:Anthomyiidae] are controlled using 1) crop rotation to disrupt the lifecycles and 2) semi-permanent selective flowering strips to enhance the parasitoid *Trybliographa rapae* (Westw.) [Hymenoptera: Figitidae] and soil inhabitant generalist predators. *T. rapae* attacks both *Delia* pests and, therefore, is not disrupted by the crop rotation and provides a less disturbed system. Semi-permanent flowering strips will provide nectar resources and our hypothesis is that increased supply of nectar and shelter can be translated into an increased pest regulation. The flower strips can also be used as overwintering sites for natural enemies. This will enable stabile populations of the parasitoid and general predators.

In order to be successful in our project we need to increase our knowledge on: 1) which flowers the parasitoid and the herbivores use as nectar sources 2) which cues the parasitoid uses to find both their host and flowering

plants with accessible nectar 3) and also how the female parasitoids make the trade-offs between nectar and hosts in semi-field experiments.

We have evaluated different plants with respect to their potential role as nectar resources for both the herbivore and the parasitoid. Flower attractiveness was tested in a two-choice olfactometer and nectar utilization was tested in cages where the insects were introduced to flowering plants for 3 and 6 hours and then weighted. We have also studied which impact the different flowering plants have on the longevity of the insects.

Our preliminary results indicate that *T. rapae* is attracted and can utilize nectar from dill (*Anethum graveolens* (L.)), buckwheat (*Fagopyrum esculentum* (Moench.)) and sweet alyssum (*Lobularia maritima* (L.)). Common borage (*Borago officinalis* (L.)), coriander (*Coriandrum sativum* (L.)) and chamomile (*Matricaria chamomilla* (L.)) were both unattractive and were not utilized as nectar resources. *D. radicum* were attracted to dill (*A. graveolens*), buckwheat (*F. esculentum*) and sweet alyssum (*L. maritima*), and could utilize nectar from all three plant species. The herbivore and parasitoid seems to a high degree be both attracted and able to feed on nectar from the same flowers.

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# Rooting yards with peat on the outdoor concrete areas in organic slaughter pig production

## Effect on pig behaviour and the emission of ammonia

In organic slaughter pig production, large dirty outdoor concrete areas, contribute to nitrogen losses which are calculated to be about 4 times greater than in conventional production. Generally it is positive for animal welfare to have large areas available for movement, but it also results in that pigs spread their manure over a larger total area. Since there is a linear relationship between the area with manure and the ammonia emission, there also is a strong and direct link between dung behaviour of the pigs and ammonia emissions. If organic pig production should be environmentally credible, the pigs in some way must be persuaded to dung on a smaller area.

The purpose of the study was to reduce the NH<sub>3</sub> emission by enriching a section of the outdoor concrete area with rooting material (peat). The hypothesis was that the rooting material would stimulate the activity and the rooting behaviour of the pigs in that section. Since pigs do not want to dung where there is much activity, dunging would be limited to a smaller part of the outdoor area, outside the rooting yard. Peat was chosen as rooting material, since it is appreciated by the pigs and has a high nitrogen binding capacity. Small amounts of urine and dung in the rooting yard could then be bound by the peat.

The study was conducted in the research barn for organic slaughter pigs at LBT / SLU 's experimental farm Odaröslöv. The barn is designed with 8 pens (16 pigs per pen) housing a total of 128 growing/finishing pigs. Two batches were studied in the experiment, which included

behaviour studies, health studies and measurements of NH<sub>3</sub>-emission.

The results showed that the rooting yard on the outdoor area did not stimulate the pigs to root more or to be more active compared to pigs without rooting yards. However, pigs in pens with rooting yards tended ( $p=0.0097$ ) to root more outdoors. The hypothesis of a change in the dunging behaviour was confirmed, since the pigs avoided dunging in the rooting yard and mainly limited their dunging to the dung area. Thus, the hygiene on the outdoor area was improved and the registered NH<sub>3</sub>-emission from the rooting yards was lower (49.9 mg/m<sup>2</sup>h), in comparison to the emission from the same areas in the pens without rooting yards (108.6 mg/m<sup>2</sup>h). However, the NH<sub>3</sub>-emission from the dunging area in pens with outdoor rooting yards was noted to be higher (134.8 mg/m<sup>2</sup>h), than that from pens without such yards (80.1 mg/m<sup>2</sup>h).

It was concluded that rooting yards on the outdoor area in organic slaughter pig production is positive for the welfare of the animals. They were happily used for both rooting and lying by the pigs. The presence of rooting yards also resulted in better use of all the pen areas. However, the higher NH<sub>3</sub>-emissions registered from the dung areas in the pens with rooting yards indicated that something more has to be done. Suggestions to obtain a better hygiene on the dung area include more frequent scraping (which is facilitated by more limited dunging) or using another dunging system.



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# Role of soil parent material and soil-microbe interactions on the micronutrient status of soil and crops

Organic farming is gaining increasing interest from farmers, politicians, and consumers worldwide and especially in Europe. Generally, organic farming aims at creating a sustainable agroecological system based on local resources. This ongoing research project is designed to provide information regarding the optimum essential micronutrient (e.g. B, Co, Cu, Fe, I, Mo, Mn, Ni, Se, Zn) profile of organic products, and will encompass a suite of complementary approaches emphasizing the sustainable utilization of site specific properties and resources, including mineral rich soil parent materials, soil biological interactions in order to optimize food and feed quality. It is known that the mineralogy of different soil parent materials will influence the nutrient delivering capacity. The input of nutrients released by weathering of minerals depends upon the content and the stability of the minerals. The use of extraneous minerals (e.g. rock powders and fragments) as slow-release fertilizers maybe one way of augmenting the soil where applying chemical fertilizers is limited but there is little evidence of how beneficial this might be. Furthermore, the influence of soil minerals (and the macro and micronutrients therein) on the soil microbial community which is responsible for geochemical transformations of nutrients and mediation of nutrient transfer to plants has also not been widely studied.

Therefore, the main objectives of this PhD project is, firstly, to determine the links between mineralogy and selected micronutrient distributions in selected (Swedish and Scottish) soils combining mineralogical (e.g. XRPD, and SEM) and soil chemical methods; and secondly, to determine how mineral-microbe interactions are important in availability and cycling of micronutrients both in long-term field trials and laboratory experiments. We will also investigate the possibility of some soil amendments (e.g. rock dust) to provide feed crops with nutrients in organic farming systems. The overall project group is a joint Swedish (SLU) - Scottish, Macaulay Institute (MI) cross-disciplinary research team representing geology, soil chemistry, soil biology, plant nutrition, crop science and animal husbandry.

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# Larval parasitoids of *Lilioceris lili* (Coleoptera: Chrysomelidae) in Sweden and potential for biological control

The lily leaf beetle, *Lilioceris lili* Scopoli (Coleoptera: Chrysomelidae), is a serious pest of cultivated lilies (*Lilium* spp.) and fritillaries (*Fritillaria* spp.) (Liliaceae) in parks and private gardens in Sweden. Before implementing biological control programmes in Sweden, it is essential to know which parasitoid species already occur in the country and at which level of parasitism.

A survey of the parasitoid complex of lily leaf beetle (*L. lili*) was conducted in Sweden from 2006 to 2007. The surveys were carried out from May to July in 2006 and 2007 in three regions of Sweden: South (Skåne), South-East (Öland/Småland) and Central (Stockholm)

Four species of larval parasitoids of *L. lili* was found in the different regions and years. Parasitism rates varied between 21 % and 57 %. The most common primary parasitoid in southern regions was the ichneumonid *Lemophagus errabundus*, while the eulophid *Tetrasticus setifer* was most abundant in the central region. These two parasitoids are strictly univoltine. The ichneumonid *L. pulcher* was found in small numbers in the south and in higher numbers in the central region. This species has

two generation in Europe but all specimens of this species emerged in the same year in this investigation. The ichneumonids *Lemophagus* spp. were frequently parasitized by the hyperparasitoid *Mesochorus lilioceriphilus* in southern regions. Only one specimen of the ichneumonid *Diaparsis jucunda* was found in this study.

Parasitism rates found in this investigation are rather high and comparable to those observed elsewhere in Europe. Despite this, damage levels remain high in Sweden. These may be due to cultural practices that affect the survival of the beetle and its parasitoids. For example moving bulbs or ploughing soil around lilies most certainly has a detrimental effect on parasitoids, which remain in the soil the whole winter. Mulching, which is a common practice in some regions, may also have a differential effect on the beetle and its parasitoids. Studies focusing on the conservation of extant natural enemies in Europe, such as those of the lily leaf beetle, may increase their efficiency.

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# University of Kassel-Witzenhausen in Germany: a whole faculty devoted to organic agriculture

Witzenhausen has a long tradition in agricultural education which has constantly been evolving. A school for tropical and subtropical agriculture was founded there back in 1898. Since 1971, the agricultural education is part of the University of Kassel. Since 1995, the whole faculty has transformed itself completely into organic agriculture. Nowadays, it includes 20 professorships dealing with research and education in organic farming. The strong focus on organic agriculture turns our faculty into a unique location worldwide and our 650 students treasure it.

Since 2005, the programmes for organic agriculture lead to a six semester Bachelor of Science degree (BSc) as well as a four semester Master of Science degree (MSc). The curriculum includes not only lectures but also

multidisciplinary courses, compulsory practical trainings and working in project groups. Learning objectives for all courses are both increasing scientific knowledge and working methods as well as practical skills. In 2002, the faculty introduced a second Master programme in English language (Sustainable International Agriculture) to meet the international demand for scientific based courses in organic agriculture. This programme concentrates on organic farming under tropical and subtropical conditions. Further, since 2006 the faculty offers a third Master programme also in English language (International Food business and Consumer studies) to cover the whole organic food chain from producing, processing and marketing up to the consumers.

## Scientific departments within the faculty of organic agricultural sciences

Crop Sciences	Animal Sciences
<ul style="list-style-type: none"> <li>• Department of Organic Farming and Cropping</li> <li>• Department of Organic Vegetable Production</li> <li>• Department of Soil Science</li> <li>• Department of Soil Biology and Plant Nutrition</li> <li>• Department of Crop Production and Agroecosystems in the Tropics and Subtropics</li> <li>• Department of Ecological Plant Protection</li> <li>• Department of Grassland Science and Renewable Plant Resources</li> <li>• Department of Agricultural Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Department of Animal Nutrition and Animal Health</li> <li>• Department of Farm Animal Behaviour and Husbandry</li> <li>• Department of Biodynamic Agriculture</li> <li>• Group Animal Husbandry in the Tropics and Subtropics</li> </ul>
Socio-economic Sciences	Environmental and Food Sciences
<ul style="list-style-type: none"> <li>• Department of Farm Management</li> <li>• Department of Agricultural- and Food Marketing</li> <li>• Department of Development Economics, Migration and Agricultural Policy</li> <li>• Department of International Management</li> <li>• Department of Agricultural History</li> <li>• Department of Rural Sociology</li> </ul>	<ul style="list-style-type: none"> <li>• Department Organic Food Quality and Food Culture</li> <li>• Department of Waste Management and Contaminated Sites Treatment</li> <li>• Department of Environmental Chemistry</li> </ul>

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## Mainstreaming organic foods in the catering sector: an exploratory study of organic beef

*PhD project: "Marketing and market creation of organic production and consumption" in collaboration with Stockholm School of Economics (financed by Formas). The poster is part of research conducted within the project MAT21, SLU.*

The environmental impact of food production is a growing concern in the debate on a sustainable development, and the Swedish government therefore aims to increase the production and consumption of organic food. The purpose of this poster is to explore market conditions for mainstreaming organic beef in the catering sector by identifying factors that influence the purchase of beef. Why do not catering personnel buy more organic beef? Focus is on public (kindergartens, schools and homes for elderly) and commercial (organic and conventional) catering organizations and the interplay with wholesalers.

This exploratory study is based on 33 in-depth, semi-structured interviews with catering personnel and wholesalers in the four largest cities in Sweden, and has been continuously validated by representatives from the

industry. Although the study is based upon qualitative research methods made in a specific context, the results provide insights into a complex issue that also are relevant in other contexts where large scale businesses enter small scale food chains.

The results show that large, public catering units have strong bargaining power and are tied to public procurement regulations where factors of high quality, volumes, processing and delivery standards are important. Smaller, commercial catering units also demand high quality and volumes, but have a closer/more flexible relation with the producer/wholesaler, are more sensitive to the perceptions of end-consumers and are thus more inclined to promote organic products.

Despite the fact that organic food is a growing trend and almost half of all the meals in Sweden are consumed away from home, relatively limited research have been conducted concerning organic food within the catering sector. In order to identify the bottlenecks in the developments of the organic food markets, we need to address not only the retail sector and end-consumers, but also the catering sector that represents a large consumer group.

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## Impact of boron fertilization on seed yield of organic red clover and white clover

The production of organic red clover (*Trifolium pratense* L.) and white clover (*Trifolium repens* L.) seed has increased significantly in Sweden during the 21<sup>st</sup> Century. Due to large variation in seed yield several cultivation techniques have been investigated to improve the outcome. The amount of boron in the soil, available to the clover plants might be a key factor. In organic production boron fertilization is only allowed when a deficiency can be proved. According to old Swedish recommendations, the soil boron level should be  $>1 \text{ mg kg}^{-1}$  for clover seed production. Since boron no longer is included in the common soil mapping package, the level may be low without the farmers' knowledge. Many fields in the middle part of Sweden have lower boron concentrations than  $1 \text{ mg kg}^{-1}$  (Wallenhammar, personal experience).

Investigations in New Zealand have shown that boron fertilization may result in significantly increased seed yield of white clover and red clover in soils with low boron content (Sherrell, 1983). In plants, boron is important for flower initiation, seed development and may increase nectar production, the latter is important for a successful pollination.

In conventional farming foliar application of boron is common practice, however, in organic farming preventive measures i.e. application of fertilizer to the soil prior

to sowing are preferred. However, boron is soluble and might easily leak from the soil, thus foliar application might be more efficient.

The aim of this investigation is to study the influence of boron fertilization on seed yield and nectar production in seed crops of organic white clover and red clover in soils with low boron levels. In addition the impact of different application techniques on boron assimilation efficiency is studied. During three years, field experiments will be performed in soils with boron level  $< 0.6 \text{ mg kg}^{-1}$  in south- and central parts of Sweden. Various concentrations of Bortrac 150 will be applied to soil or plant leaves and compared with control treatment without boron application.

Parameters that will be measured are: boron content in shoot, root and seed; number of flowers per area; amount of nectar per flower; yield, vitality and purity of seed.

This investigation is financed by the Swedish Board of Agriculture.

### Reference

Sherrell, C.G. 1983. Effect of boron application on seed production on New Zealand herbage legumes. *New Zealand J. Exp. Agri.* 11, 113-117.

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## Organic certification of hotels, restaurants and catering in Germany

Innovative Public Organic food Procurement for Youth (iPOPY) is a CORE Organic research project studying how an increased consumption of organic food can be achieved by means of suitable strategies and instruments linked to food-serving outlets for children, teenagers and/or youth. One part of the system given special focus is that of certification, using Germany as a reference case and comparing it with the iPOPY countries Denmark, Finland, Italy and Norway.

In order to explore how iPOPY countries deal with hotel, restaurant and catering operations claiming organic status, inspection bodies are interviewed as to their practical dealings with such operations. Since Germany has clearly regulated this area, an initial study analyses the current status quo amongst all German certification bodies.

A questionnaire was devised to ascertain the size and scope of certified organic foodservice in Germany as well as labelling use. All 23 certification bodies were contacted and telephone interviews arranged, after an explanatory email with the interview guidelines enclosed had been received by the management. Telephone interviews took 20 minutes on average. Fieldwork was undertaken in January–March 2009. Participation was voluntary and non-compensated.

The dominant segments of the foodservice market being certified with some manner of organic claim in Germany are restaurants, institutional catering operations and hotels. Chains, franchises and objects such as bistros in retailing outlets do not figure significantly. The most common labelling used are an organic line, organic components, organic raw ingredients and combinations of these (multiple answers were permitted). Least common was labelling an entire operation organic, such as an organic restaurant. According to the estimations of the interviewees, more than half of the certified operations use less than 25 % organic produce (by purchasing volume).

Multiple labelling options affords an important opportunity for foodservice operators to use at least some organic produce, without having to become an organic operation in one step. In the forthcoming months this survey will be conducted in Denmark, Finland, Italy and Norway. Since these countries diverge slightly in their approach to certification, the status quo will be instructive.

The authors express their thanks to the iPOPY team and all German inspection bodies that took part in this survey.



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## Breeding for organic dairy production

The share of dairy cows in organic husbandry in Sweden is increasing and the need for a specific breeding program for these animals is investigated in a PhD-project at the Department of Animal Breeding and Genetics, SLU. Records of production, fertility and somatic cell count were obtained from the Swedish Dairy Association. The data contained information about 1.4 million lactations, recorded in 471 organic and 6567 conventional herds between 1998 and 2005.

Cow performance was found to differ between organic and conventional production systems. Milk, fat and protein production were lower in organic herds but the increase in kg milk from first to second lactation was larger. Fertility was better for organically managed cows, but the somatic cell count was higher indicating worse udder health. The functional traits were, however, strongly affected by the production level. When milk yield was adjusted for, the results indicated slightly worse fertility in organic production and no difference in udder health. No interactions of importance were found between production system and breed for any trait, indicating that the Swedish Red (SR) and the Swedish Holstein (SH) are equally well suited for the organic production system in Sweden.

The differences in performance between cows in organic and conventional herds raise the question whether

today's cows are well adapted to the organic production environment or if a separate breeding program should be developed. Today, the same AI bulls are used in both conventional and organic herds. This was investigated in a second study. The occurrence of interactions between genotype and production environment (GxE) was identified as genetic correlations between traits expressed by cows in organic and conventional production. Genetic correlations significantly different from unity indicates that different genes are important in the two production environments, and that separate breeding programs might be needed.

The genetic correlations were above 0.92 for yield traits, somatic cell count and most fertility traits in SH and SR in first and second lactation. Genetic correlations below 0.8 were found for one fertility trait in each breed in first lactation, and for four fertility traits in second lactation SH. The correlations indicate that GxE occur for some fertility traits but no specific pattern can be seen according to breed or lactation number. These results do not justify development of a specific breeding program for organic dairy production in Sweden. However, if the importance of traits differ between the systems, or if traits that are not included in today's breeding program are shown to be important in organic production, "organic breeding values" may be estimated in the future.

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## Suggans förberedelse inför grisning i olika ekologiska miljöer

En av IFOAMs generella principer för ekologisk djurhållning är att djurens beteendebestånd ska respekteras. I IFOAMs mer specifika normer för ekologisk djurhållning poängteras i flera olika sammanhang att djuren ska ges möjlighet att utföra sina naturliga beteenden<sup>1</sup>. När suggor släpps ut i det fria väljer de oftast att vandra iväg och isolera sig från flocken ett eller två dygn före grisningen. Suggan letar upp ett ställe som är lämpligt för grisning och bygger ett bo där. När boet är färdigt lägger sig suggan i boet och ett par timmar senare startar grisningen<sup>2</sup>. Suggans bobyggnad före grisning är ett av grisens artspecifika, naturliga beteenden. Suggan har behov av att utföra bobyggnadsbeteende även om hon befinner sig i en miljö där boets funktion (skydd och värme) inte är nödvändig. För att tillgodose detta behov ska suggor i ekologisk produktion hållas isolerade från den övriga flocken vid grisning och förses med bobyggnadsmaterial. Suggors grisningsmiljö i ekologisk produktion varierar dock både mellan och inom länder på grund av skillnader i nationella djurskyddslag och skillnader i olika regelverk för ekologisk produktion. Vi vill därför studera hur olika grisningsmiljöer påverkar suggans beteende under förberedelsen inför grisning.

<sup>1</sup>IFOAM, 2005. The IFOAM basic standards for organic production and processing. International Federation of Organic Agriculture Movements.

<sup>2</sup>Jensen, P., 1993. Djurens beteende och orsakerna till det. LTs förlag, Falköping.

I den här studien har vi undersökt suggans aktivitet och bobyggnadsbeteende före grisning i två vanligt förekommande grisningsmiljöer i ekologisk grisproduktion i Europa; hydda utomhus och grisningsbox inomhus. Vi studerade 40 suggor (lantras x yorkshire) inför deras 4 första grisningar. Suggorna födde sin första och tredje kull ute i hydda och sin andra och fjärde kull inne i grisningsbox. Suggorna filmades dygnet runt när grisningen närmade sig. Vi fann att suggorna utförde mer bobyggnadsbeteende och var lugnare under de sista timmarna före grisningen när de grisade ute i hydda jämfört med inne i grisningsbox. Mycket bobyggnadsbeteende 12–10 timmar före grisningens start var korrelerat till låg aktivitet de sista 6 timmarna före grisning och sambandet var starkare när suggorna grisade ute i hydda jämfört med när de grisade inne i grisningsbox.

Vår slutsats är att suggan utför ett betydande bobyggnadsbeteende både när den grisar ute i hydda och när den grisar inne i grisningsbox. Utomhusmiljön stimulerar däremot suggan till att utföra mer bobyggnadsbeteende. Vår tolkning av resultaten är att suggan är lugnare vid grisningens start när hon grisar ute i hydda jämfört med inne i grisningsbox. Det beror förmodligen på att suggans bobyggnadsbehov är bättre tillfredställt och att suggan är mer isolerad och mindre störd av andra suggor när hon grisar ute i hydda jämfört med inne i grisningsbox.

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## Quantitative detection methods for mapping in-field variation of *Plasmodiophora brassicae* and *Aphanomyces euteiches*

Soil borne diseases are caused by pathogens which persist in the soil matrix and in residues on the soil surface. Spatial variability within fields and variations between fields in the occurrence of *Plasmodiophora brassicae* causing clubroot of cruciferous plants and of *Aphanomyces euteiches* causing root rot of wining peas were determined on farms in south and central Sweden using quantitative PCR-assays. The molecular methods were validated by traditional bioassay techniques. Soil has been sampled using GPS from fields where the disease occurred and the results are presented as an interpolated disease map. Relations between the occurrence of pathogens and soil parameters such as pH, soil type, clay content, plant available macro- and micro nutrients are evaluated. Species-specific primers and TaqMan fluorogenic

probes were designed to amplify small regions of *P. brassicae* and *A. euteiches* ribosomal DNA. Total genomic DNA was extracted and purified from soil samples using commercial kits. The amount of pathogen DNA was quantified using a standard curve generated by including reactions containing different amounts of a plasmid carrying the *P. brassicae* or *A. euteiches* target sequence. Regression analysis showed that the assays were linear over at least 6-7 orders of magnitude ( $R^2 > 0.99$ ) and that the amplification efficiency was  $>95\%$ . A considerable (100–1000 times) variation in DNA-content was observed in the sampled fields for *P. brassicae*, while the variation was less pronounced for *A. euteiches*. Molecular methods for routine diagnosis will enable organic producers to respond to market opportunities.

Medverkande:

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Leif Strand, Ekobeställarna, Göteborg

# Lokal mat och logistik – hur ser framtidens distributionssystem ut?

Transporter är en utmaning för småskaliga livsmedelsproducenter. Oftast är det inte tillgången på transporttjänster utan själva kostnaden som blir ett problem. När du har små volymer och dessutom ligger lite avsides från de stora vägarna kan transportkostnaden utslaget på varuvärdet bli orimligt hög.

En lösning är att istället försöka sälja sina produkter i en gårdsbutik. Det är en försäljningsmetod som ger stora sociala mervärden i form av direktkontakten mellan konsumenter, producenter och olika produktionsformer. Ofta går också gårdsförsäljning och turism hand i hand.

Ur miljösynpunkt är gårdsförsäljning dock problematiskt då det ofta genererar många extra bilresor när kunderna ska ta sig ut.

## Att köra själv

En annan lösning är att producenten på olika sätt själv sköter sina leveranser. Ofta kör man då i de egna fordon man ändå har tillgängliga. Den synliga kostnaden blir då bara bränsle och den egna tiden. Räknar man på energiåtgång per kilo transporterad vara och km blir det dock jämfört med de storskaliga logistiksystemen ofta väldigt ineffektivt.

Små och dåligt fyllda bilar kan göra att lokala producenter som kör in till Bondens marknad i Stockholm orsakar större koldioxidutsläpp per kg produkt än vad en fullastad långtradare från Skåne gör. Detta är intressant, eftersom ett av skälen till att konsumenter efterfrågar närproducerat just är kortare transporter, något som alltså inte behöver betyda mindre utsläpp.

Samtidigt är det viktigt att komma ihåg det större perspektivet, där vi för närvarande lever i ett samhälle helt uppbyggt kring och beroende av regelbundna bilresor. De flesta producenter som själva levererar varor passar på att uträtta andra ärenden när de ändå är ute

och åker. Ärenden som de ändå hade varit tvungna att ta bilen till. Att själv leverera kan då handla om att utnyttja en "transport som ändå går".

## Goda exempel

Men det finns faktiskt gott om småskaliga aktörer runt om i landet som trots problemen med små volymer och avsides lägen lyckats hitta både energi- och kostnadseffektiva lösningar på hur de hantera sina transporter.

En viktig princip för deras arbete har varit samtransportering, antingen genom att utnyttja befintliga transporter i området eller genom att gå samman med andra producenter. Många har också lyckats minska behovet av transporter genom att skaffa närmare kunder eller se över den interna logistiken.

Ett starkt växande område är hemleverans direkt till privatpersoner. Det är en lösning med potential att spara in många privata bilresor. Med tillräckligt kundunderlag i ett område är det för leverantören dessutom lätt att lägga upp effektiva rutter och maximera fyllnadsgraden.

Hur ser då framtiden ut? Ett samhälle utan stora flöden av billig energi i form av olja kommer med all säkerhet inte kunna använda energi i den utsträckning vi gör idag. Vilken effekt kommer detta att ha på livsmedelssystemet?

## Mat i staden

Redan idag ser vi allt fler initiativ att starta upp mer stadsnära produktionen av mat. I bland annat England, men också i Sverige, finns också en starkt växande trend där konsumenterna själva vill börja odla en del av sin mat.

Hur kommer det här att påverka vår produktion, förädling och distribution av mat? Vilken mat kommer vi att transportera in från längre avstånd? Vilken mat odlas i närheten, eller kanske i våra städer, och vad odlar vi själva i våra trädgårdar?

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## Value creation and transmission in “pasture based beef” food networks, a case study approach

The impacts of agriculture on the physical and socio-economical environment have turned to be a focus point for the society at large and for many consumers. Certification, branding and direct contact farmer-consumer are some of the ways used in the agri-food sector to communicate to the consumers about the values embedded at farm level.

In this context it is important to understand how the different quality dimensions of a product: esthetical (taste, flavour, colour), ethical (environmental impact, animal welfare, supporting local economy) as well as meaning (history, origin), are created and transferred until the consumers; and how this process is supported by the organisation of the food network.

Our hypothesis is that crossing these two dimensions, quality and organisation, will provide an interesting perspective for improving the sharing of values in food networks.

This framework is applied to five case studies of “pasture based beef” food networks in the centre of France, representing a diversity of organisations such as public label scheme, cooperate owned brand and direct sell from farmer to consumer.

The results will be used to provide indicators that can facilitate the sharing of values in the same kind of food networks in Denmark.









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