ECOLOGICAL RECYCLING AGRICULTURE

Guidelines for farmers and advisors Vol I - IV

Farming guidelines

Economic guidelines

Marketing guidelines

Farm examples

Vol IV: FARM EXAMPLES

Wijnand Koker, Karin Stein-Bachinger

Baltic Sea Region Programme 2007–2013

Part financed by the European Union (European Regional Development Fund and European Neighbourhood and Partnership Instrument)

BERAS implementation
Baltic Ecological Recycling Agriculture and Society

Baltic ECOLOGICAL RECYCLING AGRICULTURE and Society

In the BERAS Implementation (2010 - 2013) project a network of farms and social initiatives focusing on building the link within the whole food chain from farmer to consumer has been established to achieve a good environmental status of the Baltic Sea. The transnational project is part-funded by the European Union and Norway – The Baltic Sea Region Programme 2007 – 2013.

What does BERAS mean?

Ecological Recycling Agriculture is based on local and renewable resources and has the potential to

- reduce more than 50 % of the nitrogen surplus
- reduce the phosphorus surplus significantly
- avoid synthetic pesticides and enhance the natural control of pests through diverse crop rotations
- reduce greenhouse gas emissions through low input of external resources and increased carbon sequestration
- improve soil fertility and natural nitrogen reserves through legume cultivation
- protect biodiversity
- increase reliance on regional food supply
- enhance rural development in the region

An ERA farm is an ecological farm in line with the European Organic Regulations (EC No 834/2007) and additional criteria:

Crop rotation: at least 30 % legumes

Balanced livestock/land ratio: 0.5 - 1.0 animal livestock unit per ha

Self-sufficiency in resources: more than 80 % self-sufficient in fodder and manure

Effective nutrient recycling: within the farm and between farm cooperations

Ecological Recycling Agriculture
Guidelines for Farmers and Advisors

The Box of Guidelines contains

Vol. 1	Farming Guidelines
Vol. 2	Economic Guidelines
Vol. 3	Marketing Guidelines
Vol. 4	Farm Examples

BERAS *implementation*
Baltic Ecological Recycling Agriculture and Society

Imprint

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BERAS implementation
Baltic Ecological Recycling Agriculture and Society

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Vol. 4 Farm Examples

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Catchment area of the Baltic Sea

BERAS future

Following the conclusion of the EU project BERAS Implementation in 2013 a Network Agreement has been concluded to further develop BERAS and secure the continuation of the concepts both in the Baltic Sea Region and to share our competence and building alliances with initiatives in other parts of the world.

Preface

Resilience of our ecosystems is at stake

Despite various measures the eutrophication of the Baltic Sea is not decreasing and the resilience of multiple ecosystems is at stake. In this situation business as usual is not an option. New approaches are needed creating a safe operating space within the environmental boundaries. BERAS develops and implements practical examples where innovation and entrepreneurship from a multisectorial engagement flows into realistic, fully integrated ecological alternatives for the whole food chain - from farmer to consumer.

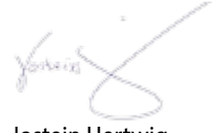
BERAS - background and main concepts

The BERAS concepts have been developed through two transnational projects part-financed by the European Union and Norway (the Baltic Sea Region Programme), BERAS (2003 – 2006) and BERAS Implementation (2010 – 2013). It is the common efforts from the partnership from nine countries around the Baltic Sea (Sweden, Denmark, Germany, Poland, Belarus, Lithuania, Latvia, Estonia and Finland), Russia and Norway and includes national and local authorities, universities and research institutes, advisory services, ecological and environmental NGOs, farmers' organizations, food chain actors and finance institutions.
The concept of Ecological Recycling Agriculture (ERA) is based on many years of research and studies on how organic farms can be organized to be truly sustainable and environment-friendly and has demonstrated its potential related to reduction of nutrient leakage from the farm, soil carbon sequestration/climate effect, biodiversity and increased soil fertility. BERAS has also successfully started the implementation of fully integrated, full scale examples of regional Sustainable Food Societies (SFS) in all countries in the Baltic Sea Region. The consumer engagement concept "Diet for a clean Baltic" offers a sustainable lifestyle with consumption of enough and good food without threatening the environment of the Baltic Sea or the planetary boundaries.

Guidelines for farmers and advisors

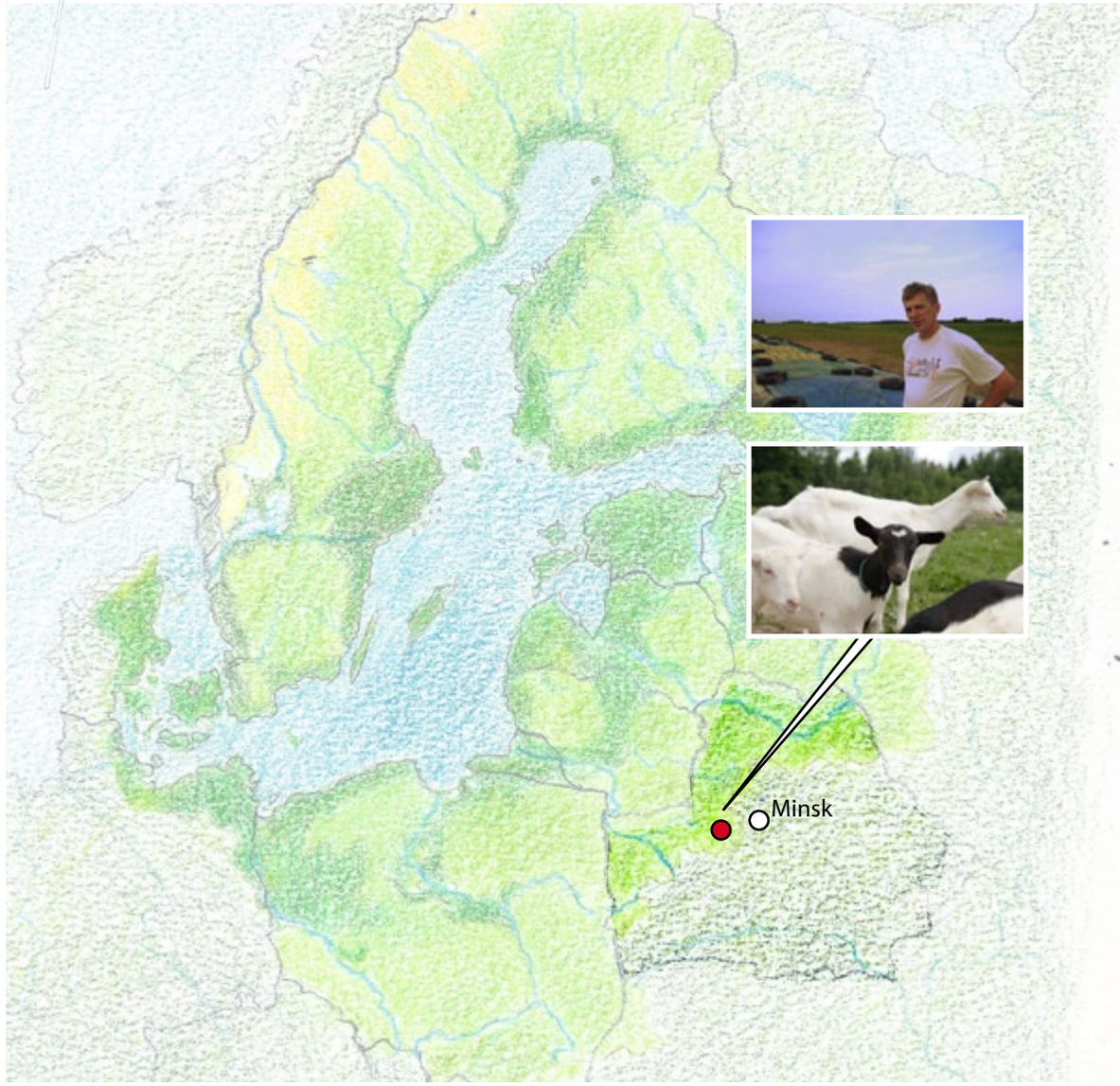
The Guidelines for Ecological Recycling Agriculture focus on the work by the farmer. It is the result of a transnational Baltic Sea Region cooperation by farmers, advisors and researchers. With the guidelines, we hope to encourage and help conventional farmers to convert to ERA farming as well as to support organic farmers to optimize their system towards recycling agriculture.
We want to thank each of the individual authors of these Guidelines for their dedication to the work and also for the coordinating function performed by Dr. Karin Stein-Bachinger at the Leibniz-Centre for Agricultural Landscape Research in Germany.

Artur Granstedt
Associate Professor
Project Coordinator



Jostein Hertwig
Attorney at Law
Head of BERAS Secretariat

BELARUS



DAK Goatfarm

Dzmitry Lutayeu and Anna Makarava

About the farm and its history

The farm in the landscape

The farm is located in the Dzerzhinsky district, 20 km south-west from Minsk. It is a quiet place with a picturesque landscape, with a small lake and forest. The farm is owned by the family of Dmitri Krylov and Halina Vauchanina and they employ 6-9 persons depending on the season.

History and personal motivation

„DAK“ Farm was founded in 1992. Initially, the government provided 10 ha of land, and then the land area was extended three times. Now Dmitri and Halina´s farm possesses 100 ha.

The first few years the farm was engaged in growing potatoes and buckwheat. In 2000 a dwelling house and piggery for 250 sows were built and the farm started from scratch in the middle of nowhere. In 2005 Dmitri and Halina decided to convert the farm to dairy goat breeding and for this purpose the farm was reconstructed.

Good results were obtained during the past 8 years: the milking herd of 212 animals is the biggest in Belarus. The farm regularly takes part in agricultural fairs and has the official status of a breeding farm. The farm produces 120 tons of goat milk per year.

Facts about the farm

Arable land	80.7 ha
Pasture	13 ha, in the water-protection zone
Forest	6.3 ha
Animal husbandry	212 dairy goats

Planning for conversion

The decision to convert to organic production was taken in 2011 after having started a cooperation with IPAAB "East-West" and having realized a study visit to Järna in Sweden, though the idea of more sustainable farming existed almost 10 years earlier. The conversion plan was complicated by the fact that in 2011 the farm received additionally 50 hectares of intensively used land (where large amounts of mineral fertilizers and pesticides had been applied), and therefore one of the goals was to engage and quickly restore soil life.

Another task for the conversion plan was taking into consideration the planned increase of the dairy goat herd. Some of the first acquired fields were heavily infested by perennial root weeds, while other fields had turned into low productive grasslands without leguminous plants.

Further challenges

Since the supply of organic manure was insufficient and because of the lack of clover in the grassland, it was not possible to start a concentrated fodder crop production directly. In spite of difficult weather conditions, the farm managed to successfully establish an 18 hectare permanent pasture. They produced whole grain silage from 14.8 hectares and the rest of the fields were harvested for hay. The prolonged and cold spring and wild boars activity led to a reduced harvest on some fields.

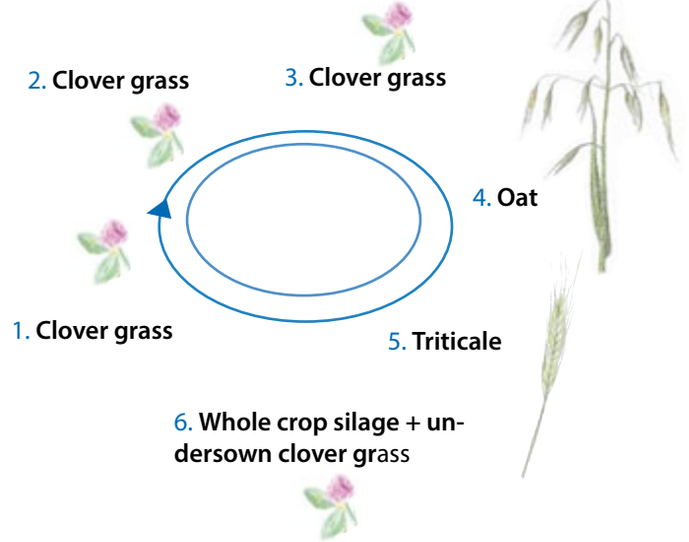
Achievements

A significant achievement of the 2012 season was the first audit of the farm for the certification of production in accordance with Council Regulations 834/2007, 889/2008. IPAAB "East-West" experts prepared the necessary documents for records' keeping in organic production, made a conversion plan and contracted the certification body Organic Standard Ltd from Ukraine.

The near future

Several main tasks for farmers and advisers in the year 2013 will be the following:

- Providing 100 % organic feed for the whole herd, including cereals needs, providing high-quality pastures for the animals, solving the problems with the old unproductive fields.
- Providing the animals with concentrated feed was difficult because there are no certified cereals on the Belarusian market. One more important challenge is to provide livestock with 100 % own fodder.
- Forming a 6-year crop rotation in order to fulfill the above mentioned demands: 3 years of clover grass – spring oats (with organic manure before plowing) – winter triticale – whole crop silage with clover-grass undersown.



Sustainable Food Societies (SFS) and plans for the future

Only a couple of years ago the farm owners had a problem to market the produced milk and a large part of the time was spent managing direct sales and deliveries at the regional market. However in the last year a close cooperation was started with two web-shops which now act as important parts of the establishment of a SFS and sale organic homemade and traditional local food focusing on organic and sustainably produced food. One of the shops (www.ecaeja.by) started in August 2012 and now already has more than 300 customers and about 20 suppliers. Today the products from the "DAK" farm are greatly demanded on the market, both because of their unique character and for the engagement of the farmers. All the farm products are sold on the local market in Minsk.

Moreover, at present time farmers invest in the construction of a milk processing unit with the possibility to produce a wide range of products from goat's milk (consumption milk, yoghurt, sour cream, cottage cheese and different types of mozzarella cheese as well as hard cheese). According to the conversion plan the farm will be totally converted by the end of 2013 and will be the first farm in Belarus with farm-based small scale organic milk processing.

The farm plans to maximize its use of the pastures and to increase the herd size to 300 milking goats. The "baby boom" will take place in spring 2013 – more than 400 kids will be born.

The plan for the years 2014-2015 is to develop agro-ecological tourism on the farm starting with construction of several guesthouses. Vegetable production is also one of the potential branches to develop.

DAK Goatfarm

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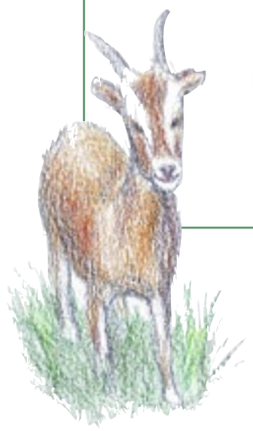

http://www.dak.by (later in english)

Photos:
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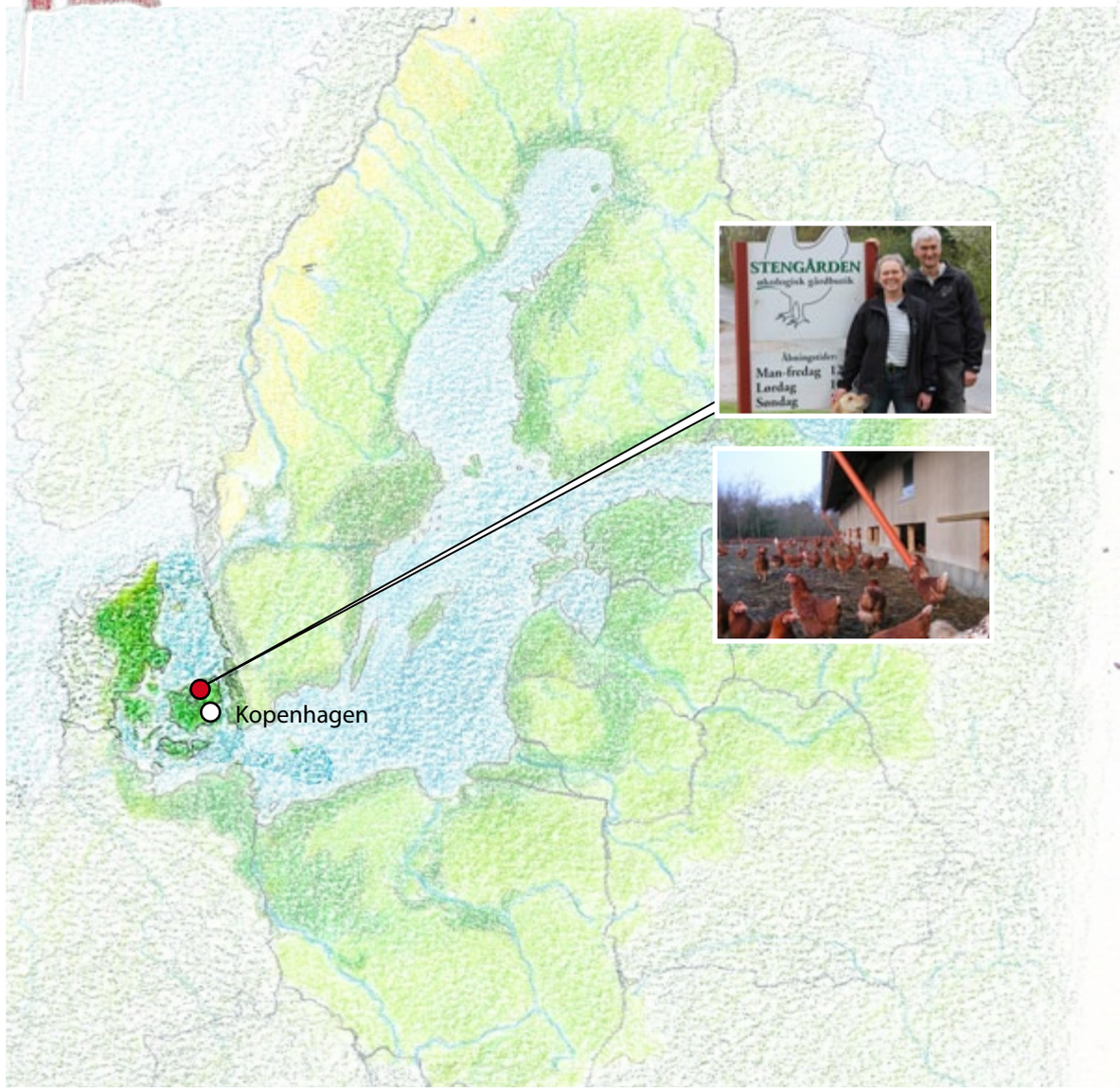
DENMARK



Stengården – mixed farm

Henning Hervik

History

Elisabeth and Jens Otto Rasmussen are educated engineers and they worked full-time. In the second half of the 90s they began looking for a new house. Their parents were farmers – therefore it was natural for them to look for a farm. In 1997 they bought Stengården. Stengården was a small dairy farm situated in the center of North Sjælland. The farm was in convenient distance to their working places.

Personal motivation

In the beginning the farm was a hobby - a place to live and raise their children. Up through the 90s there had been a growing awareness of problems with chemical residues in the food and what it did to our health. Due to information campaigns and a growing confidence to the fact that organic farming could solve the problem - consumers started asking for organic food.There were no doubt in Elisabeth and Jens Otto's minds – this farm had to be certified organic.

But it could be nice if they made an income from the farm. Elisabeth started with some vegetables and some layers for the household. They produced more than they could eat and the next step was easy – she started selling the surplus at the road.

Stengården is situated right next to a busy domestic road, and due to the fact that Stengården was the only organic farm offering farm sale, the number of costumers rose very quickly. Since the beginning – Elisabeth and Jens Otto have been focused on adjusting the production to the demand of the costumers.

Facts about Stengården 2012

Arable land	55 ha
Pasture	22 ha
Natural pasture	14 ha
Buildings, roads, trees, lakes etc.	5 ha
Cooperating with neighbor organic farmers	26 ha
Major soil type	Sandy clay
Precipitation	670 mm (550-850 mm)

The farm in the landscape

The landscape of North Sjælland is characterized by rolling hills. Forests and lakes are scattered throughout the whole area. Many people live in the rural areas and work in Copenhagen. There are farmers in this area who farm more than 1,000 ha but many farms in the area are serving as a home for part-time or hobby farmers. Elisabeth and Jens Otto own 18 ha and till now they rent between 75 and 80 ha.

Crop rotation

The arable land is mainly following this crop rotation:

1. **Winter wheat + under sown clover grass**
2. **Ley**
3. **Ley**
4. **Oats or spring wheat**
5. **Oats or spring wheat and potatoes**

a. **Fodder radish/mustard/rye grass as catch crop.** If it's necessary to control perennial weed there will be no catch crop.

Yield

Oats	4.8 t/ha
Spring wheat	3.5 t/ha
Winter wheat	3.8 t/ha
Ley	6 t DM/ha
Potatoes	22 t/ha
Pasture	4.5 t DM/ha

The vegetables and strawberries follow their own crop rotation. Catch crops and legumes are a natural part of the rotation. More than 30 varieties of vegetables are grown on Stengården.

Comments on the crop rotation

Stengården wants to be self-supplied with all feed for the animal husbandry. They still have to find methods to grow sufficient protein with the right content of amino acids. Sunflower would be OK, but it has not been possible to grow that crop. Sunflower is ripening late and harvesting in the end of September beginning of October is a challenge! Field peas is not possible because of a dense population of pigeons.

Feed requirements for layers and beef cattle

The beef cattle's main feed is grass/clover and grass. In summer all the cows are grazing the pastures and the forest grassland. In winter the cattle is staying in the barn. Winterfeed is wrapped mini-big bales of clover grass, straw. Small calves, cows with two calves get feed grain as a supplement. All feed for the cattle is produced on the farm.

The layers are fed with a mix of feed grain from the farm supplemented with protein from outside the farm. 75-80 % of the feed is produced on the farm. All layers have access to a poultry run which includes the fruit orchard.

The typical composition of feed ration for the layers

Winter wheat	22 %
Spring wheat	22 %
Oats	30 %
Soya beans, organic	10 %
Corn gluten, conventional	3 %
Fish meal	3 %
Shells	8 %
Minerals	2 %

Animal husbandry

In the planning of which kind of animal husbandry that was suitable for Stengården, Elisabeth and Jens Otto found beef cattle very useful. The beef cattle could utilize all the silage and hay made on the clover grass and the deep litter collected in the barn during the winter could be used as a fertilizer for the grain as well as the vegetables. The annual production has been determined of the demand, and the number of animals produced has gone up over the years. Today there are 25 cows, and that is the capacity of the stables. In the beginning egg production turned out to be a very profitable production – the costumers just kept buying and the farm shop ran out of eggs. They rebuilt the old cow shed to layers. The old cow shed could house 1,200 layers and a fruit orchard was planted in the poultry run. The fruit trees were necessary to make an environment, where the layers felt safe. The production of fruit was a side effect – some years it is profitable but not every year! The main objective is to make the layers feel safe, when they walk in the poultry run.

Fact:
On Stengården there are 0.5 LU/ha

After a few years Elisabeth and Jens Otto found that the old cow sheds never could meet the layers requirements for a good climate. It was difficult to clean the stables as often as necessary and there were no possibilities to expand. Jens Otto designed a new poultry house – a house that

- was easy to work in,
- gave a layer friendly environment and
- met all regulations.

In 2006 the new poultry house was finished and the production went from 1,200 to 3,000 layers. From the beginning the poultry house has been functioning as expected. The feed is produced in the eastern end of the building, and conveyors transport the feed into the house. Other conveyors transport the eggs from the nest boxes to the western end of the house, where they are packed. Approximately every 14 weeks the poultry house is cleaned. To make the cleaning easy, the entire inventory is hoisted up under the roof, and a bobcat + 2 people can clean out the house inventory within three hours. The chicken manure is brought to the field where it is stored under plastic till it can be applied to the next crop.

Direct marketing

The main goal is to sell as many products as possible directly to the consumers, because it gives the highest turn over to the farmer. This is the main objective in the marketing strategy, and the turnover has gone from below 15,000 €/year to 650,000 €/year - one third of the turnover are own products and the rest is re-sale. During the same period the number of employees had gone from less than a person to fulltime employment of Elisabeth and Jens Otto + 2½ persons in the field and 1½ in the farm shop.

When the layers moved out in the new poultry house, they left the old poultry house empty, but not out of use. Elisabeth and Jens Otto felt they could get more customers if they expanded the assortment like a full scale supermarket. (According to Danish laws you can only establish supermarkets in urban areas – but a farm shop with a wide assortment is allowed). After a dialogue with the local authorities, plans for the building were approved by the municipality. In 2008 a new farm shop incl. service facilities was opened.

All meat, vegetables, potatoes, fruit and berries produced on Stengården are sold from the farm shop. 40 % of the eggs are sold in the supermarket and the rest is sold to a wholesaler.
Authenticity is a trademark and that is important for Elisabeth and Jens Otto. Stengårdens farm shop is selling the farms own organic products as an alternative to the supermarkets in the area. They never follow the price level in the supermarkets in the area, but they set their own price level.
It sounds easy, but Elisabeth and Jens Otto are aware of the fact that it is hard work! They must be able to respond to all changes in demand, make adjustments in the production and buy more or less additional to the shop. You must be able to make that kind of decisions!

The near future

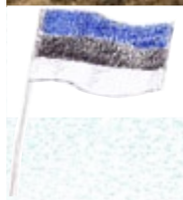
More land with a better land location is a goal for the future. In the last year Stengården rented more land from the municipality. Other organic farmers in the neighborhood are interested in cooperation between their farm and Stengården. Right now Elisabeth and Jens Otto have signed a contract buying 17 ha from the neighbor farm.
On short term there will be produced grain for bread and clover seed on these fields.

Stengården

Elisabeth & Jens Otto Rasmussen
Høveltevej 40, 3460 Birkerød
Denmark

http://www.stengaardenoko.dk/

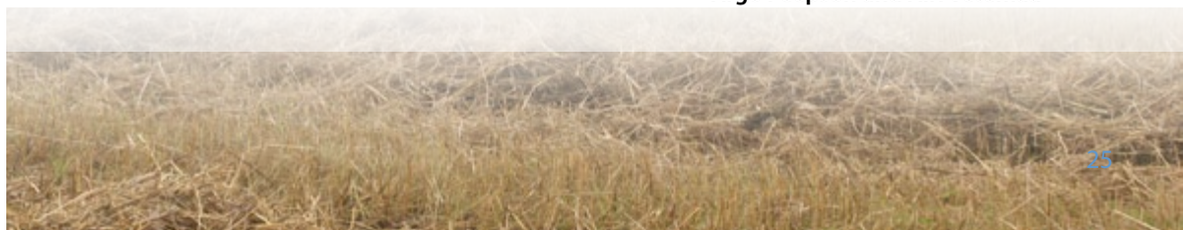
Photos:
© Elisabeth Rasmussen



ESTONIA

Mätiku farm – milk production

Argo Peepson and Airi Vetemaa



Organic farming is highly suitable in such a landscape

Mätiku farm is the organic family farm of Aivar and Helga Pikkmets. It is situated in West-Estonia, Oidrema village, about 45 km from Pärnu, 130 km from Tallinn and about 35 km from the Baltic Sea.

This area is characterised by large natural areas (bogs, forests, semi-natural habitats). The soils are quite poor and stony and also quite variable, e.g. among other types, peat soils and rendzina are present. The landscape is mosaic and most of the fields are situated ca. 5-7 km from the farmhouse.

Besides cultivated grasslands Mätiku farm is managing semi-natural habitats (wooded pastures) that are rich in biodiversity and valuable from a cultural heritage point of view.

History

During the Soviet period, Aivar Pikkmets, the owner of Mätiku farm, graduated from agricultural college and began his working career in the local "kolkhoz" (collective farm) as a mechanic. Eventually he became the chairman of the kolkhoz. After the collapse of collective farming systems in 1991 Aivar and his wife Helga Pikkmets started farming on their own. In the beginning they had only 3 cows and 10 hectares of agricultural land. They did not have any idea of organic farming at that time. Since then the farm has grown remarkably – both in quantity and quality. Now also the young generation is taking over some responsibilities – three of Aivar's and Helga's six children are involved in the farm's management. The other children are also making their contribution whenever it is needed.

Personal motivation and conversion to organic farming

The conversion of the farm to organic started in 2001. Why organic? As the farm is located in a less-favoured area, it became clear that in these conditions the use of large quantities of fertilizer and synthetic pesticides doesn't give the expected yields and therefore it is not only environmentally responsible, but also economically rational to produce organically. Organic farming area-based support was also a quite important factor in the decision making process. The understanding of the organic system came with the years. Aivar Pikkmets emphasizes now: ***"Organic farming is not just a production method, it is a way of living."***

For the conversion to organic farming it was necessary to make a number of changes in production system and planning.

One of the most significant changes was the introduction of crop rotation and the use of clover-grass mixture in the rotation. In the process of finding the best solution for crop rotation – to produce enough feed, maintain and improve soil fertility – the rotation has been changed several times. As the soils are variable, there is no single crop rotation, up to five different rotations are used.

The two main rotations are:

Rotation 1

1 Winter cereal + clover-grass undersown
2 Clover-grass
3 Clover-grass
4 Spring cereal + break crop (manure in spring)
5 Spring cereal (manure in autumn before seeding the winter crop)

Rotation 2

1 Spring cereal + clover-grass undersown (manure in spring)
2 Clover-grass
3 Clover-grass

The use of clover-grass silage was also introduced and subsequently the share of hay in feed rations is nowadays significantly smaller than in the past. With silage it is much easier to produce high quality fodder than with hay – the summer is often quite rainy in this area.

Facts about the farm in December 2012

Agricultural land	354 ha
Semi-natural pasture	17 ha
Animal stock	50 cows, Estonian Holstein (production 8,800 kg)
Housing	Loose-housing deep-litter cold barn (2001)
Manure system	Deep-litter
Milking system	2 times per day, 2+3 milking parlor, 5 DeLaval Milkmaster milker
Roughage system	Round bale silage system
Soil type	Loam, peat soil, rendzina; organic matter content 1.7 – 3.4 % (Corg), P 10 – 160 mg/kg, K 40 – 370 mg/kg
Annual precipitation	650 mm
Employees	3 + Aivar and Helga

According to Aivar the most difficult part of the conversion process was to find the best technology and practices suitable for the organic farming. Training and advice were a lot of help here.

Some remarks:

- A good solution is for example the undersowing of rye – this is not a very common practice.
- The weed harrow for mechanical weed control of cereals is an absolute must in the organic system.
- It has been possible to start cultivation earlier in the spring as the soil structure has improved mainly because of growing the clover mixture.
- For seven years now the ploughing is done in spring using a plough-packer to reduce the tillage.

Mätiku farm has 50 Estonian Holstein milking cows in the herd. The production is 8,800 kg milk per cow.
All fodder is produced by the farm: silage, hay, cereals and turnip rape cake and oil, only minerals and salt are bought in (about 4 t/year) and some cereals from other Estonian organic farms in few years when the farm's own yield has failed due to harsh weather conditions.

It has been quite difficult to maintain the high milk yield after the requirement of 100 % organic fodder for ruminants in 2010. In that year the yield was only 7,500 kg per cow. To solve this problem Aivar started to grow turnip rape and press the oil-cake on-farm with simple equipment purchased from China. The results have been quite good.

Feeding is free all year round and animals are grazed during the summer period (ca. 7 months) – the grazing area is about 70 hectares. During a hot summer period the cows are grazed on wooded pasture, where they can find shelter from the sun, and only at night the cows are grazed on regular pasture. There is some extra work with this solution, but in this way it is possible to maintain high milk yields even during hot summer days.

In addition to well thought-out feeding, animal welfare is also considered to be very important: all cows are known by names, the family is interacting with them on a daily basis and animal health is monitored every day. Cattle have scratching equipment, which is nowadays common, but was not at the time introduced in Mätiku farm. According to Aivar the milk yield increased ca 500 kg per cow per year after purchasing this equipment.
All manure produced is used by the farm for field crops and for the renewal of grasslands.

Total feed requirement

Roughage	Silage 1,000 t, hay 100 t; 125 t straw and 300 t hay for deep litter
Cereals	150 t (bruised)
Turnip rape oil and cake	12 t

Milk production

Unfortunately most of the milk, ca. 20 t/month, is sold as conventional milk (in 2012 mostly to Lithuania with the average price of 0.30 €/kg), because there is not any big dairy in Estonia which is processing organic milk.

Since summer 2012 about 9 tonnes per month (with the average price of 0.36 €/kg) is sold as organic raw milk. This milk is sold through vending machines situated in supermarkets in Tallinn. The sales have been good and feedback from consumers very positive. Mätiku farm was one of the initiators behind launching the selling of organic milk in this novel way.

Crop production

Yields in 2012

Oats	2 t/ha
Spring wheat	2.3 t/ha
Barley	1.5 t/ha
Winter rye	1.6 t/ha
Winter turnip rape	1.7 t/ha

Mätiku farm has 354 hectares of agricultural land (including 70 ha cereals and 284 ha of grassland), in addition there are 17 hectares of semi-natural pasture. Winter rye, winter turnip rape, barley, oats, spring wheat and clover-grass are cultivated on the farm and most of it is used for fodder. As the summer 2012 was rainy, the grain yield was low and also the quality of hay was poor. To meet the nutritional needs of animals some cereals will likely have to be bought from other regions in Estonia in this year.

The near future

Plans to start on-farm milk processing are quite serious and also for investing in a milking robot. Finding opportunities to sell milk as organic to processors is a continuous family activity.
As consumer demand for organic products is growing, political support is also expected to continue in the development of organic farming and processing.

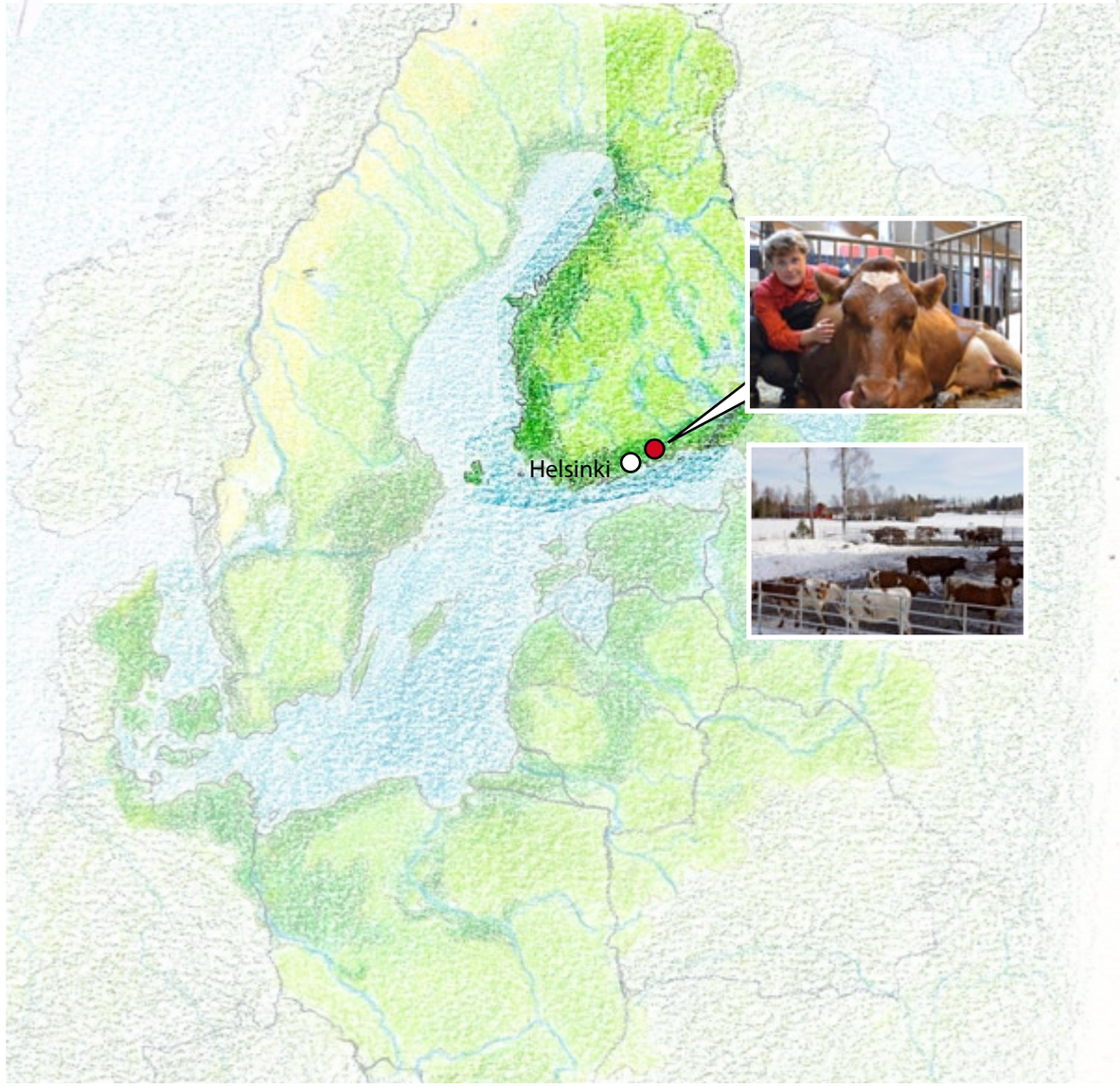
Aivar Pikkmets: *"To be sustainable every organic farmer should grow himself the fodder that the animals need. It is possible to have healthy cows and to get high yields with your own fodder."*

Mätiku farm

Aivar and Helga Pikkmets
Oidrema Village
Koonga Parish
Pärnu Country
Estonia

Photos:
© Tatjana Lind and Airi Vetemaa

FINLAND



Peltomäki farm –Milk production

Leena Saari, Kim Westerling, Jukka Kivelä, Pentti Seuri

Introduction to conversion

History

After taking over the farm from her parents in 2008, Arja began the process of converting the fields from conventional to organic production. Arja Peltomäki has a degree in animal husbandry and worked as an executive manager in Organic Farmers Association (Luomuliitto), so becoming an organic dairy farmer was a natural choice. A new and modern loose-housing cowshed was built in 2009 and in July 2011 Peltomäki farm began the process of converting the animals to organic as well. After converting to ecological agriculture, the farm has maintained a high milk production of 9,200 kg ECM.

Personal motivation

For Arja, the most important reason for converting to ecological agriculture was animal welfare, because she believes that organic production is the best way to take care of the animals. Arja knows that usually life expectancy of cows increases in organic production and that winter time outdoor recreation, characteristic to organic, improves the health of cloven hoofs. Arja's goal is also to produce milk that she wishes to drink herself, yet another good motivator to convert to organic.

The farm in the landscape

Peltomäki farm is situated in Myrskylä in South Finland, approximately 90 km from Helsinki. The landscape is very characteristic to southern parts of Finland, with fairly flat surfaces and agricultural fields and mixed forests. Small creeks and streams collect the water from the fields to Ilola River. This river is only about 30 km long and eventually ends up in Pernaja Bay and the Baltic Sea. The dairy farm, however, is rather uncommon in this region, since cereals are mainly grown in South Finland. The slightly rolling land around the farm is very suitable for grass cultivation.

Facts about the farm 2012

Arable land	61 ha + Koskinen 94 ha, total 155 ha (+ 28 ha of rented fields in conversion)
Pasture	12 ha
Animal stock	72 Ayshire and Holstein cows + heifers and calves, total 100 animal units
Housing	Loose-housing barn (2009) for the cows, calves in group stalls and igloos
Manure system	Slurry
Milking system	1 milk robot (Lely)
Roughage system	Three horizontal bunker silos (6,000 m^3) complemented with round bales
Soil type	Mainly heavy clay, some clay loam soils (clay content 40 %), humus content 6 %
Precipitation	650 mm
Employees	One full time employee + summer trainee

Economy/marketing

Organic markets have been developing fast during the last few years in Finland, and thus Valio Ltd, the biggest dairy processor (approximately 60 % market share) in Finland, was seeking new producers during spring 2011. Logistics is an important part of the production chain; when Peltomäki farm joined the organic milk collection circle, three smaller farms were dropped out to conventional collection. But the organic dairy sector in Finland is still in a developing phase at the moment, especially with regards to marketing. Small dairies could play an important role, because they have invested in new products intensively. Valio's marketing strategy of organic dairy products is unclear, because Valio is not making new agreements. Related to Valio's rather limited product portfolio, supply exceeds demand. Due to the leading role of Valio as a market agent, any old or new producer is highly dependent on Valio.

Planning for conversion of the farm operations

Cooperation and joint crop production plans are needed, because Peltomäki farm owns only 61 ha of fields and the area requirement for silage production is about 100 ha. Therefore Arja does crop rotation plans for the whole area of 155 ha, the fields from Koskinen farm included. Half of the arable fields from Koskinen are located fairly close, only a couple of kilometers away, the rest are located further away. In addition Peltomäki farm needs to buy silage from two (Takala and Kallio) farms situated over 10 km away. In the future, however, Arja is pursuing to increase grass yields with better cultivars and seed mixtures. But for the moment Peltomäki farm has been able to maintain high production levels after the conversion, which is mainly due to good health and long life of the cows.

Feed requirement for 72 cows + heifers and calves, in total 100 animals

	Pasture t (DM)	Roughage t (DM)	Cereals t 86 % (DM)	Protein crop t 86 % (DM)
Cow	20	310	135	85
Young stock/heifers	10	90	15	5
Total	30	400	150	24 + 66

Pasture

There is only 12 ha pasture area available (technical restriction for larger pasture). Pasture is on arable land and renewed every 4th year; calculated annual yield 2.7 t DM/ha.

Roughage

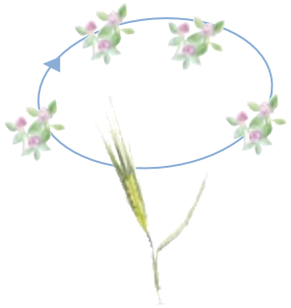
Clover grass ley, 105 ha (calculated annual yield of 3.8 t DM/ha).

Cereals

50 ha (calculated annual yield of 3.0 t/ha).

Protein crop

Peas with mixture of oats, 25 ha 2.2 t/ha, 40 % peas); in addition 66 t protein fodder is purchased (industrial processed protein-fodder, rape seed as a main component of raw material)



Crop rotation

Arja does crop rotation plans in cooperation with Koskinen farm in order to ensure sufficient feed for the cows.

Crop rotation in Peltomäki fields: 5 years
Barley + undersown grass, 4 years of ley

Crop rotation in Koskinen fields: 5 years
Cereal + undersown grass, two years of ley, cereal crop, broad bean/pea

Comments on the suggested crop rotation

- Roughage feed is sufficient at the moment, but some silage and wheat has to be bought from Takala and Kallio farms (10 % of total feed)
- Peltomäki farm has a problem with clover grass that is disappearing on the second year.

  Either pathogens or high nitrogen intensity in form of slurry are probable causes. On the third year clover can be found only in small patches, obviously clover is grown too often in the crop rotation.
- In order to improve the crop rotation, the optimum situation would be that Peltomäki and Koskinen would operate within a unified crop rotation:

  Year 1 Cereal (barley) + undersown grass
  Year 2 Ley
  Year 3 Ley
  Year 4 Divided for two crops: Cash crop (35 %) (protein crop); Cereal-vetch mixture for silage (65 %)
  Year 5 Oats-pea mixture
- Fertilizing strategy: Peltomäki farm should avoid spreading slurry during the first two years of crop (clover grass), in order to avoid suffocation of clover.

The most important thing for Peltomäki farm is to improve the amount and quality of grass clover. By advancing the first cut, Arja is aiming to produce silage with higher D-value. This would mean higher protein content in the forage, which could reduce the need of purchasing expensive protein feed. There have been discussions to try whole new forage crops, for example alfalfa or whole-crop cereal silage (grain-vetch mixture) for better quality of feed, but there are not much experiences from these crops. In 2012 Peltomäki was able to expand the feed production capacity by renting 28 ha of fields (conversion phase). These fields would be suitable for clover grass, since no clover has been cultivated for decades and they are assumed to be free of clover pathogens. This would increase the amount of silage. For the future Peltomäki farm has planned to increase production to over 100 milking cows. This would require way over 200 ha of fields which would require more co-operations with neighbouring farms.

The present situation

As for the moment, Arja is satisfied because of receiving premium from organic milk. However, the conversion period was tough from the economic point of view, since organic feed was costly, but she only received the standard price from the milk. Valio Ltd. pays 63 cents per litre of organic milk while the price of conventional milk is 43 cents per litre (about 30 % less).

The cereal yield level on Peltomäki farm is reasonable; however the high yield of cereals is based on 20 t of purchased bonemeal fertilizer (Viljo) annually. In the long run ley production needs some adjustments in order to ensure efficient biological N-fixation. This enables allocation of manure for cereals instead of purchased fertilizer. Thanks to co-operation, the number of animals and available field area is in balance and ideal crop rotation will be achieved.

The near future

Peltomäki farm has a future scenario of expanding the milk production by increasing the amount of cows to over a hundred. This means that she has to acquire a second milking robot as well. She has also been investigating the possibilities to invest in a small scale ice cream or cheese processing facility that could improve the economy of the farm.

Pältomäki farm

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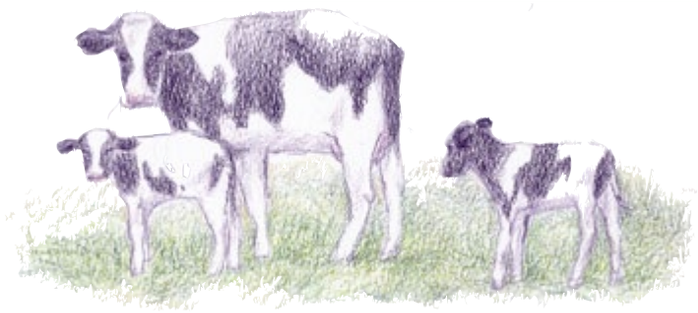


Photos:

GERMANY

Neuheim farm - mixed farm with dairy goats

Gustav Alvermann

Introduction to the conversion

History

Sören's father Dieter Kötting bought Neuheim farm in 1970 after quitting the family owned business in Dortmund. It was a mixed farm with crop production and dairy cattle, a type of farming that had a long tradition in this region of Angeln (north eastern Schleswig-Holstein).
When Dieter took over the farm he stopped the milk production and specialised instead in crop production and pig fattening, making the farm production much less labour intensive. He employed one external farm worker to help him produce crops on the farm's 100 ha arable land and take care of 1,000 fattening pigs.
This region has fertile and slightly loamy soils and production was good. During his final years of farming yields were close to 10 t/ha for winter wheat and barley and 4.5 t/ha for winter rapeseed produced in a short crop rotation.

Personal motivation

There is not a high percentage of land in the region of Angeln that is farmed organically. It is about the same as the average percentage in northern Germany with 3-4 % of the total arable land. During the past 5 years, energy crops for biogas for electricity and heat have been very profitable and this has led to an increased production. The most dominant crop for biogas production is corn.
In such circumstances, a great deal of motivation is needed to shift to organic agriculture. Sören Kötting became motivated while doing his apprenticeship on different farms of the 'Bioland' organic farming association and studying organic agriculture at the University of Kassel. For him, it was clear: Either organic agriculture or no agriculture! So when he took over the farm from his father in 2009, he started the conversion to organic production. When planning cultivation measures, Sören considers the soil to be a living organism that needs to be nurtured and cared for.

Farm data in August 2012

Arable land	130 ha
Grassland	0.5 ha
Forest	2 ha
Precipitation	750 mm
Soil characteristics	Mainly loamy (about 92 %) to light loamy soils, P-content class C (good supply), K-content class B (sufficient supply)
Animal husbandry	Planned - 35 dairy goats for cheese production in own dairy for sale in farm shop
Employees	Expected creation of new jobs due to the increase of on-farm processing in the near future

Geographic location and facilities at Neuheim farm

Neuheim farm is located only a few kilometres from the town of Kappeln and is close to 'Schlei' beach on one of the long bays along the Baltic Sea coast. The farm is located in the county of Schleswig-Holstein which lies between the North Sea and the Baltic Sea. The soils in this area were formed during the ice age.
All of the farm's 130 ha of arable land are located in a circle around the farm centre, which is a big advantage. The area is very flat making land management relatively easy.
The maritime climate has both advantages and disadvantages for organic farming. On the one hand it is probably not going to be too cold or too hot, and usually there are no prolonged periods of drought. However, during the main vegetation period in May and June there is insufficient rain. On average, the area receives 750 mm of rainfall per year, but the main precipitation occurs too late, from July to November. During this period there is a constant 60 - 70 mm per month which makes the sowing of winter cereals nearly impossible. This has been a serious problem especially during the conversion period.
The farm buildings reflect the multifunctional nature of the farming in former times. The older buildings were built in the 19th century in a U-form. Here you can find quite large space suitable for the drying and storage of cereals. The former cowshed will be used for other purposes.

Concept for arable farming practices

Neuheim Farm was specialized in cereals and rapeseed production before the conversion. In the mid-term planning, as the organic agriculture system becomes established, cereals will continue to be the dominant crop.

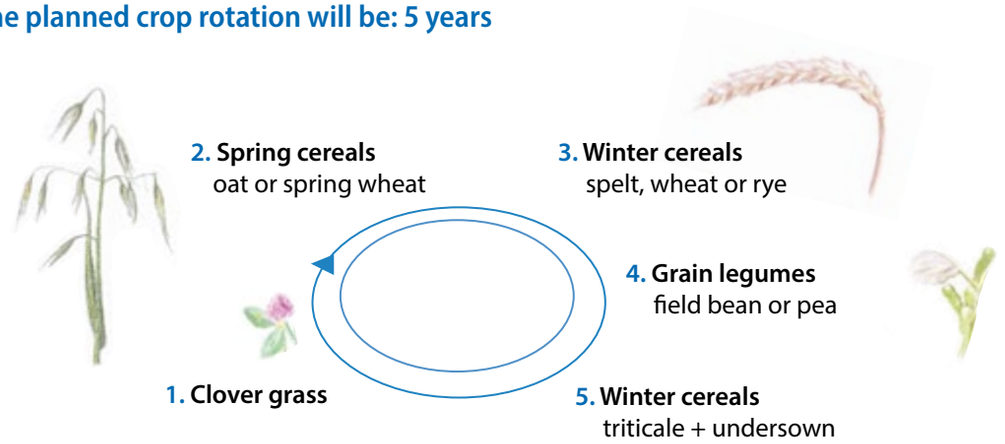
In addition, grain legumes will be grown as leaf crops and increasingly clover grass mixtures will be included in the crop rotation. Field beans have proven to be the best grain legume up to date. Field trials with peas in pure stands and in mixtures with cereals or mustard are being carried out. However, field beans have been more successful so far.

Clover grass is important for many reasons. It is effective in weed control helping to regulate thistles in the fields. Furthermore, it is essential for nitrogen fixation to ensure a high preceding crop effect for wheat. By comparison, legumes that are cultivated as catch crops are less competitive in this region because of the late harvesting of cereals. These legume catch crops cannot be sown before mid August and so will probably not be able to fix adequate amounts of nitrogen during the remaining short growing season. Only a specific share of white clover grass undersown in cereals can supplement the amount of legumes.

How to most effectively use clover grass in the crop production continues to be a central issue. As mechanical mulching takes a lot of effort and hinders nitrogen fixation other options need to be considered. These include:

1. Transfer-fertilization: Clover grass is mown, dried and blown with a chopper onto a manure spreader and spread on the growing crops as a top-dressing. Alternatively, the second cut can be spread onto the stubble of harvested cereals to fertilize the next crop in advance. Sören has tested various alternatives at considerable cost in 2012. The results in terms of yield are not yet available.
2. Fodder-manure exchange cooperation with a dairy farm: The nearest organic dairy farm is about 30 km away. There is a demand for fodder, but the costs for transport are too high. Sören is looking for a farm close by.
3. Biomass - compost exchange cooperation with a biogas plant: This alternative is similar to 2. above. There are conventional biogas plants using maize as a substrate close to the farm. However the organic standards of the ‚Bioland' association, where Sören is a member, do not allow for use of non organic compost. Sören's preference would be to have his own small biogas plant that is specialized in grass fermentation and has an effect of 70 kWh.

The planned crop rotation will be: 5 years



Comments on the crop rotation and soil tillage

In addition to the cultivation of legumes, soil tillage is another central aspect of the farm's crop production concept. To maximise the protection of living organisms in the soil it is important not to turn over the soil too deeply (max 10 – 15 cm).

Sören only wants to cultivate the topsoil. However, the cultivator alone cannot be used for seed bed preparation due to the wet autumn nor for turning over the clover grass. Sören purchased a plain plough with 10 shares and 3 meters of working width – an 'ovlac mini' for turning over the clover grass, but unfortunately this cannot be done in one operation. Therefore, Sören applies the special practice of 'tilling at optimal soil structure'.

Using this technique, the clover grass is cut by the cultivator in late autumn or in spring when spring cereals are sown. If necessary, the field can be lightly cultivated again. This technique activates soil organisms which break down and incorporate organic matter into the soil making it porous within a few weeks. Using this method the clover grass field can be turned into a seed bed by ploughing 12 – 14 cm deep.

Yields

Winter cereals	4-5 t/ha
Spring cereals	2-3 t/ha
Grain legumes	2-3 t/ha
Cereals/grain and legume mixtures	3-4 t/ha
Clover grass	7 t/ha

Dairy goats – a completely new farm endeavour

In the spring of 2012, a herd of dairy goats was bought. Sören's wife Julia, was working on a dairy goat farm. The owners were planning to retire and wanted to sell their herd. So the decision to start with dairy goats was made in all haste. The whole family was in agreement.

From 2013, they will milk approximately 35 goats and make cheese from the milk, which then will be sold directly to the consumers in the farm shop. The necessary facilities are being built.

Apart from taking advantage of the lucky opportunity to take over the herd of goats, another very fundamental consideration has influenced their decision. This new endeavour is very different from the machine-intensive and seasonal crop cultivation.

Keeping dairy goats is very labour and land intensive – similar to row crops. This makes it possible to increase the farm's income by increasing the amount of labour, but not increasing the amount of land. This is unlike cereals, where little labour, but a large area is needed to gain sufficient income.

Agricultural land has recently become very expensive making it difficult to expand production through land purchase. Therefore the start of the goat farming allows for internal growth.

Marketing

This small scale dairy goat enterprise will cover all steps from production to processing and direct sale to consumers in the farm shop, allowing the value added through processing to remain within the farm economy. In contrast cereal production is large scale. The harvest leaves the farm in 25 ton lorries, after been dried, stored and pre-cleaned. Sören has approximately ten potential buyers for his grain.

These include :

- a local producer group,
- an organic wholesaler supplying a fodder plant and a bakery,
- another mixed – fodder producer,
- a big mill,
- an agent, who sells to the whole of Germany and
- an internet platform for trading.

Sören also tries to sell locally to other farmers, particularly grain legumes and fodder crops. So far the demand for organic cereals has been good and Sören has not had any serious marketing problems since he took over the farm.

The near future

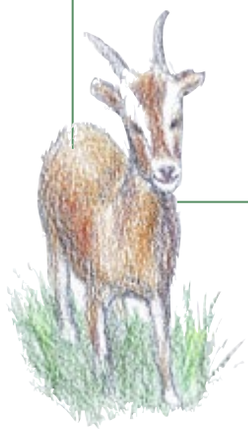
Sören, Julia and their children Zora, Jaro and Frieder have managed the shift to organic farming very well. The expansion of farm activities to include dairy goat husbandry, cheese production and a farm shop requires a lot of time and effort. These activities also bring many possibilities for increasing the basic value addition beyond the basic crop production. For young farm managers, this opportunity is a key to future success, especially if the price of land continues to increase.

Other options to improve the economy of clover grass production include having free range hens in a mobile shed or geese for grazing, beef cattle and an on-farm biogas plant. These would increase the demand for labour beyond what the household could supply thus creating new job opportunities.

All in all, the farm will have changed from a low-labour system with a high nutrient turn-over per ha, to a system with a very low level of nutrient surplus and a potential for value addition and employment creation.

Hof Neuheim

Sören und Julia Kötting
Hof Neuheim
24276 Kappeln



Photos:
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POLAND

Piotr Zdziarski farm - crop production and animal husbandry

Bożena Błaszczyńska, Justyna Lesiewicz

History

Piotr Zdziarski is the owner of the multigeneration organic farm with family meat processing and organic chicken production of Piotr's father Maciej Zdziarski. After taking over the farm from his father, Piotr began the process of converting his fields into organic ones in 2000.
For many years members of the family have been specializing in organic food production. The farm is a member of Kuyavian-Pomeranian Regional Assembly Association of Organically Food Producers EKOLAND, approved by certification body AGRO BIO TEST. In 2009 it was awarded at the national competition for the best organic farm. Piotr Zdziarski won the second place at the provincial stage.

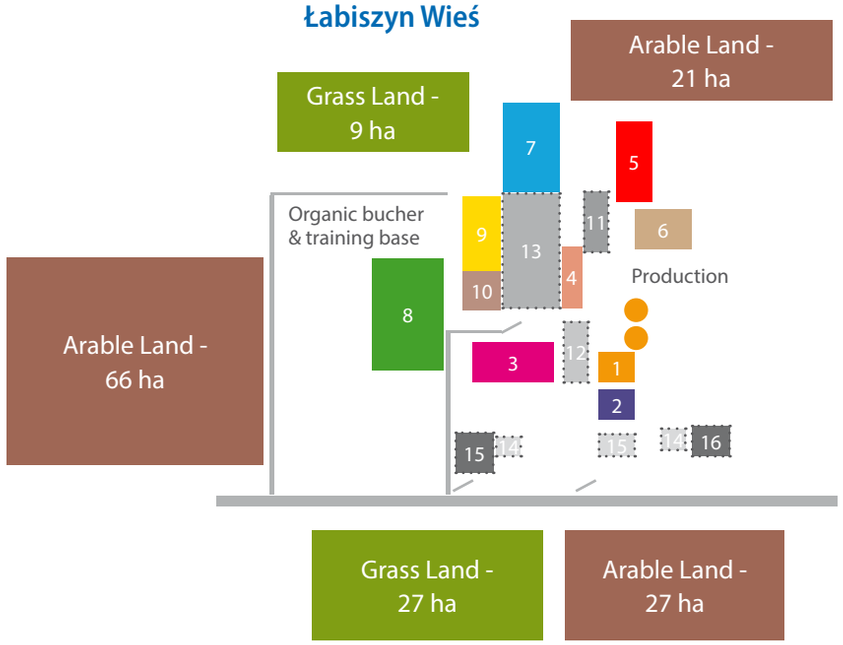
Farm location

The farm is located within the Żnin district, 30 km from Bydgoszcz city at the area of Natura 2000, close to the Noteć river. The landscape is characterized by many watercourses (streams, creeks, small rivers). Many pastures and meadows constitute the grounds for fodder in animal husbandry.

Personal motivation

Piotr decided to convert his farm out of concern for family traditions, health and environment. Therefore Piotr's grandfather Wincent is still helping to plan the crop rotations till this day.

Plan of the organic demonstration farm Łabiszyn Wieś



1 fodder storage, mixing, silo
2 fattening shed
3 piggery
4 sows
5 pigs- sheds system(seasonal)
6 mobile poultry house
7 cowshed
8 processing & farm shop
9 storage of farm products
10 training room
11 slurry pit
12 dung floor
13 farming equipment
14 household sewage treatment, segregation of waste
15 16 houses

Facts about the farm

Total area of the farm	150.70 ha
Arable land including grasslands	114.41 ha
Permanent meadows and pastures	36.29 ha
Average precipitation	One of the lowest in Poland, near 550 mm/year.
Quality of soil class	III-VI.

Economy / marketing

Piotr sells animals reared on the farm to the family's processing and to the butcher's organic shop ROLMIĘS, which is close to Piotr's farm and was established in 2002, as the first in the country.
It was the answer to market needs. Before there were only processed fruits and vegetables on the market available, but products of animal origin were missing. Now ROLMIĘS sells their fresh meat and other products to different organic shops, mainly in the voivodship. They have a refridgerated truck to supply nearby towns. The basics for economic calculations were done during the conversion of the farm by the certifying authority AGRO BIO TEST.

Piotr Zdziarski actively takes part in fairs, markets, different organic competitions and other events promoting organic agriculture and his own farm. He gives many interviews for television and newspapers.

Comments

- At the time of conversion Piotr had a problem with overgrowing weeds, he didn't have proper machinery and equipment. It took time to learn.
- Cooperation with other farmers is really important.
- Before the conversion he went to other organic farmers to get advice.
- He didn't know which crop rotation should be implemented - it was done by trial and error.
- Breeding, adaptation of proper breed to new conditions, adjustments of premises took time.
- The certification process demanded to fill in too many forms and documents.
- Nowadays there are big problems with purchasing organic pigs and poultry.

Plant production

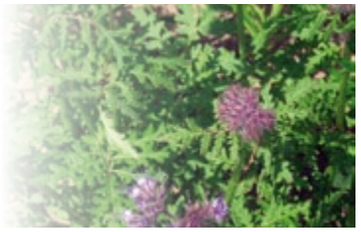
The farm is organically managed with crop production and animal husbandry in a closed system. The total number of LU/ ha is 0.67 which allows a balance between feed and fertilizer at the farm. The agricultural crops consist of: winter rye, oat, mixed grass, clover grass and alfalfa for the silage, winter wheat, winter barley, barley and peas as well as yellow lupine. The owner uses a 4 years crop rotation including underplants, intercrop and aftercrop as a protein crop: alfalfa, serradella and clover.

Yields

Barley	3 t/ha
Winter wheat	4 t/ha
Winter rye	2 t/ha
Yellow lupine	2 t/ha
Oats	2 t/ha

Crop distribution	Area, ha	Percentage
Winter rye	17.4	11.6
Barley + peas	10.0	6.6
Clover, grass, alfalfa	47.1	31.3
Winter wheat	5.9	3.9
Oat	16.5	11.0
Winter barley	10.2	6.8
Yellow lupine	7.1	4.7
Pastures	7.3	4.9
Meadows	28.9	19.2
Total	**150.7**	**100**

Fertilizing at the farm is carried out on the basis of animal manure and also underplants, intercrops and aftercrops as a green manure and a source of nitrogen.



The owner of the farm uses plant protection products attached at authorized lists of products allowed for use in organic agriculture. Weeds in agricultural crops are removed mechanically by specialized agricultural equipment. Crop farming is carried out on the basis of the bio-dynamic calendar.

Animal production

Organic farming is based mainly on livestock, meat breeds of Hereford maintained on deep litter, with free access to the pasture, pigs-breed Złotnicka Pstra, (in the period from spring to autumn) in sheds system and poultry in a mobile poultry house.

All fodder for animals comes from Piotr's farm: hay silage with clover, alfalfa and grasses and mineral additives coming from organic fodder mixing SBP Pasze Sp. z.o.o.

The livestock of the farm is sold to the family meat processing ROLMIĘS, which was created as the first in the country.

Type	Shallow litter Number of animals	Deep litter Number of animals	Period of stay Cowshed, months	Period of stay
Cows		24	6	
Young bulls		12	10	
Young heifers		11	6	
Calved heifers		11	6	
Sows	30		6	
Sows in satelite	7		6	
Piglets	450		6	
Boars	4		6	
Fattening pigs	118		8	
Laying hens	20		12	
Broilers	1500		2	

Demonstration farm

The farm was entered into the national list of the organic demonstration farms within a closed system regulated by the Council regulation (WE) nr 834/2007 dated on 28th of June 2007 regarding organic production and labelling organic products. Bushes, natural reservoirs, tree-covered areas and dams are shelters for wild birds, little animals and at the same time constitute buffer zones for organic crops belonging to the farm of Mr Zdziarski.

Educational base

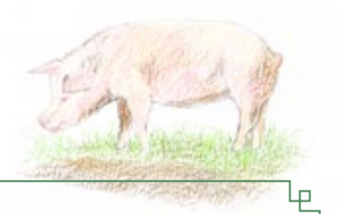
Piotr Zdziarski graduated in agriculture and after that he made his degree in marketing. At the farm he gives lectures for Polish and foreign visitors. Workshops and trainings for advisors, farmers, students are regularly conducted at the farm. Piotr Zdziarski cooperates with universities and scientific research institutions.

Technical resources

Buildings located within the farm are adjusted to the standards of the European Union. Houses are separated from the technical part of the farm. The farmer uses the following machines: weeder, mechanical removal and a cultivator. Thanks to the funding from the European Union the farmer increased the number of livestock and modernized the machinery at the farm, built manure and slurry tanks. In order to protect the environment, the farmer conducts waste, water and sewage management. In addition, the owner has silos for grain as fodder storage.

Farmer's wish for the future

Well-functioning, stabilized market where prices will be adequate for the products of organic production and processing. He hopes that one day it will be profitable for the farmer who produces and processes. According to the farmer, Polish law does not limit him in any way.



Piotr Zdziarski farm

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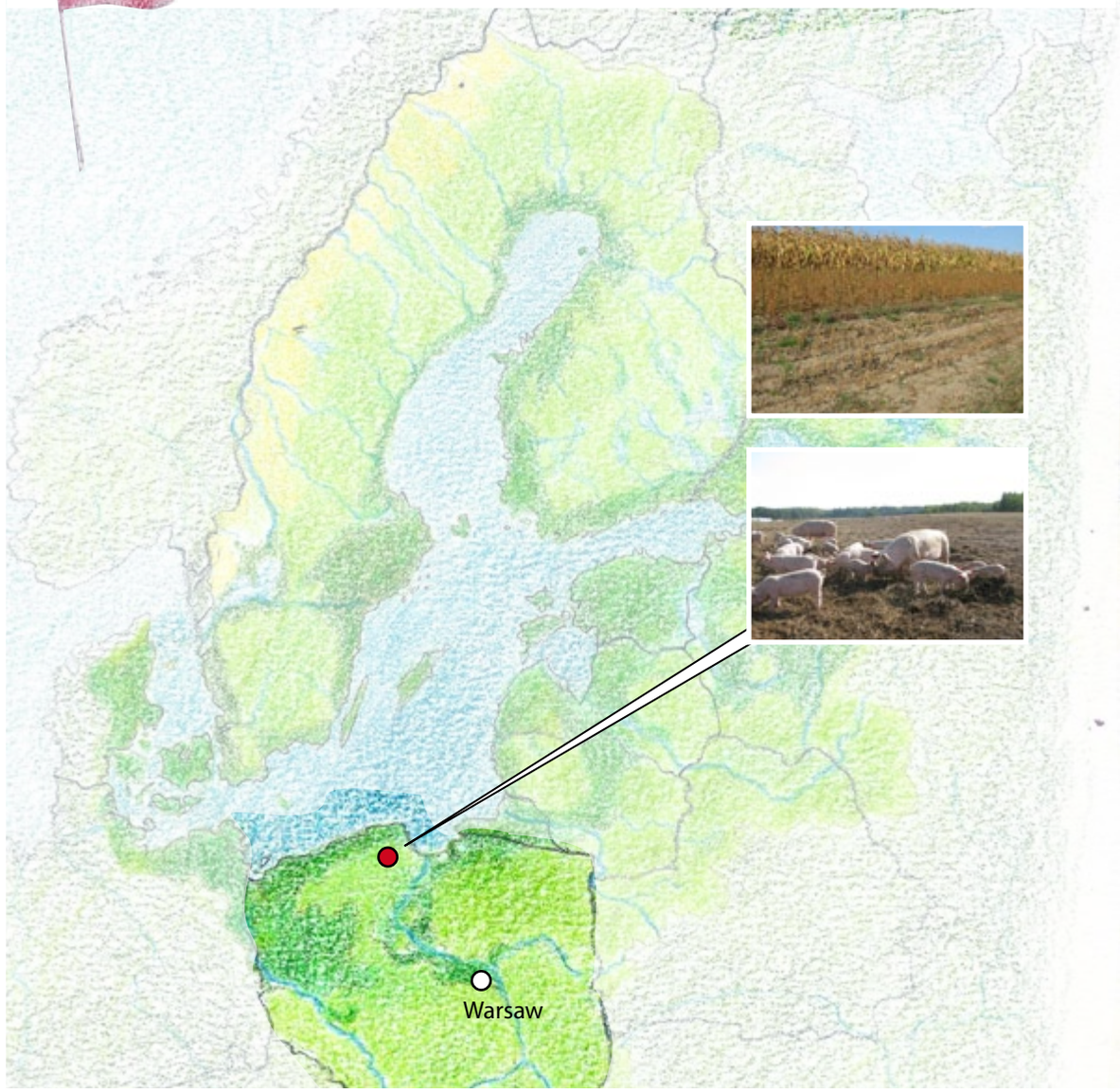
POLAND



Plotta farm

Aleksander Banasik

History

Jacek Plotta's family has been involved in the agricultural production for over 100 years. Jacek always had a passion for farming. He graduated at the Agricultural University in Poland and since 1991 he runs the farm himself. Originally the farm was multidirectional. In 2005 farmers got interested in organic production. The first idea for the activities of the farm was organic beef cattle and horses, but due to the low profitability of this type of production at that time, the idea was abandoned.
He started pig production, not only for economic reasons, but also because of his affection for these animals.

In the beginning of the production they had problems to sell the products. The farmer was looking for purchasers in whole of Poland. It was a difficult time for him. But in 2005, he found a good buyer - a large organic company.
After a while, Jacek was invited to Denmark where he won the necessary expertise and could strengthen the cooperation. He signed a profitable contract to export pigs. In 2007 he completed an internship in organic farming in Denmark and began to implement their solutions on his farm. According to Polish standards, Jacek's farm is classified as a large pig farm.

Personal motivation

Jacek has an extended family - six children. He dreamed about providing them with a healthy and prosperous life. He realized that ecological farming is the way to make his dreams come true. In 2005 he began the conversion to the ecological system and in 2007 became a certified organic farm.

Facts about the farm

Type of service	Area in ha
Arable land	82.25 ha
Natural pasture	12.00 ha
Orchards	0.14 ha
Natural Utilities - UP	0.93 ha
Total agricultural land	**95.32 ha**
Others (habitat, roads, etc.)	2.00 ha
Fallow lands	23.35 ha
Forests and wooded land	15.00 ha
The total area of farm	**135.67 ha**
Soil type	Clayey soils (10-25 % clay) Humus content 3-5%
Precipitation	550-560 mm (characteristic for the region)
Animal stock	30 sows +recruitment, up to 600 porkers in year
Housing: winter	2 piggeries for winter period
Outdoor system of grazing	Danish booths
Manure system	Solid manure and slurry

The farm in the landscape

The farm is located about 45 km from Gdansk and thus about 45 km from the Baltic Sea. It is situated among moraine hills and forests. The shape of the landscape with many lakes, rivers and streams is the result of the glacier activity. Natural conditions and the predominance of average quality class soils determine the agricultural character of the region. Grain, potatoes and legumes are the predominant crops. The fields of the farm are drained and closely located to the farm centre.
With regard to geographical and climate values it is a beautiful location, forests abundant in mushrooms and clean lakes. So more and more farmers decide to convert to the ecological system to be in line with nature.

Economy / marketing

In the beginning of organic production, the biggest problem turned out to be the sale. The farmer wanted to receive a fair price for his healthy products. In 2007, as a result of marketing activities, he contacted a representative of a large company of organic meat – "FRILAND". The negotiated prices were profitable.

On the farm a simple rule of thumb is applied: the meat production's volume is adjusted to the quantity of feed available for that year. So, when the farm is short of food, piglets are sold. This practical rule allows the farm to be on a high level of self sufficiency in feed. In cooperation with an advisor from PODR in Gdansk a conversion plan (agri-environmental) has been drawn up.

Currently, in collaboration with UWM Assoc., Prof. Joseph Tyburski, a farmer leads an experiment in organic cultivation of corn and soybeans as a protein source. In case of a positive experiment, the purchased feed will be phased out.

The farm operations in ERA scheme

Crop rotation is set mainly due to the production of pig feed (grains, cereals, legumes including lupins, peas, experimentally soybeans, clover grass silage). The farmer started growing maize to reach a very good seed yield - about 5 tons/ha. Missing nutrients are purchased as premixes in an amount of 3 %. The main driving force for the plant rotation is a large percentage of red clover, which is the basis for organic livestock keeping in outdoor systems. Some red clover is grown for seeds. The cultivation of this plant gives a very large increase in yield in subsequent years. For the enrichment of the fodder and the avoidance of GMO soybeans, Jacek made a successful attempt on soybean cultivation himself. He received a satisfactory yield of 2 tons/ha on poor soil.
All efforts are taken in one aim, to ensure feed requirements for livestock.

Technology and keeping of animals is based on sixteen Danish booths. The minimum area of pasture (mixture of grass with legumes) per sow is a 300m^2 fence with wire and an electrical grid. In the future Jacek will have a permanent net fence to protect livestock against wild animals. Jacek uses new technology on his farm, largely based on practical experience gained in Denmark. The species of sows are Danhybryd, characterized by a very high fertility and milk yield, very good rearing piglets and adapted to field conditions. The selection of the pig breed was due to sales opportunities.
The entire breeding herd is based on cereal crops (wheat, rye, barley, oats), legumes (soybeans, peas, field peas, lupins), green fodder (grass legume, clover), corn and on the ecology premixes (Dolfos and Shaumann) and fishmeal. Depending on the period of fattening, different proportions are used according to the nutritional principles. The feeding is important, according to the requirements of environmental law and good farming practice.

The management of the farm according to ERA principles was not easy, especially in the first phase of the conversion process. Difficulties encountered :

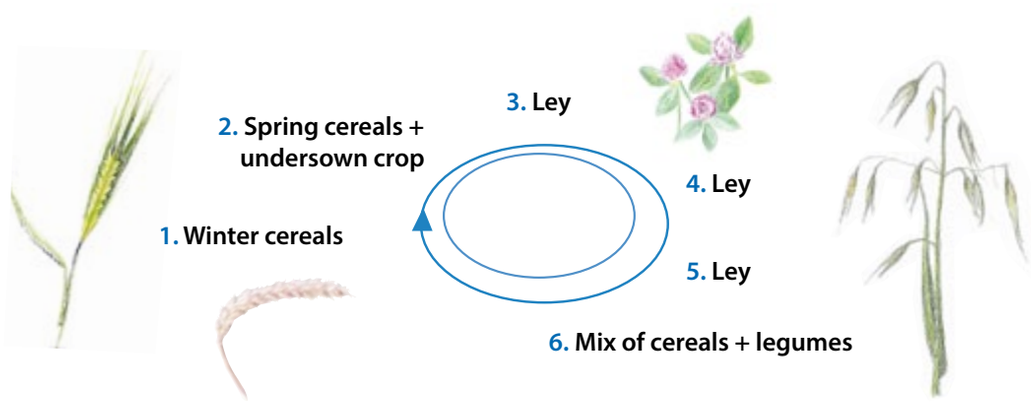
1. Lack of acceptance by the local community
2. Initial problems with selling
3. Excessive bureaucracy and a multitude of control
4. Initial lack of practical and ecological knowledge

After years of trials and errors Jacek acquired high knowledge and now takes advantage of counseling the University of Agriculture and local agricultural advisors. All this is reflected in improved health of Jacek and his family. In his opinion, it was worth to make changes.

Feed requirement

Production volume is adjusted to the quantity of available food in the year. When adverse weather conditions and yields are low the feed demand is calculated and adjusted to the final number of pigs. Then part of the piglets is sold. With the help of consultants for animal and crop production a calculation of feed needs was made for the next couple of years. They have drawn up different crop rotations for the subsequent years. One of the most important factors is the composition of the fodder.
Protein is an important component. Therefore legumes have a very high proportion in the crop rotation.

Crop rotation



Comments on the suggested crop rotation

- Spring cereals: oats, wheat or mixture, experimental maize
- Winter cereals: rye, wheat, triticale
- Protein plants: field beans; lupine - but which are slowly withdrawn due to fungal diseases ; experimental soya - a promising plant in the future.
- Three year ley in combination, some fields constitute pasture for livestock - good basis for preventing weeds, some of them give hay for the winter time.
- Yield (t/ha): cereals from 3-4 t, clover seeds 0.3 t, hay about 4-5 t DM, soya satisfactory yield: 2 t on poor soil; maize (seeds): 5 t.
- Fertilizing strategy: Composted manure until spreading on the field. Its production covers the entire demand of fertilization. Solid manure is applied before spring sowing (ca. 40 t/ha), slurry above all on winter grain in the spring (ca. 20 t/ha).
- Rearing grazing: A very high growth of cereals after grazing was observed (weed control, natural fertilization).

Comments on the animal keeping

Technology of rearing grazing is based on Danish patterns. These methods are still rare in Poland. Using this technology brings both benefits and problems. The advantage is a good health of the animals. The natural conditions - tasty food, without stress - help to get better production results. But there is also another important, difficult aspect - the water supply and work organization. Work at the herd should be defined as daily or periodic, depending on the life cycle of the animals. The daily work consists of feeding (one time) checking the efficiency of watering, turning down the straw to a specified length (very short in summer and longer in autumn) and a review of the stock and the fences. Periodical service includes: changing the place of grazing, the shift of sows and piglets (from the pasture to the pig shed and vice versa), mating control after birth and castration to the seventh day after birth. However, the most important challenge is providing fresh water. The purchase of drinking bowls and a complete water system is necessary. The hardest time is in early spring and late fall when frost comes. At that time it is very difficult to provide water permanently.

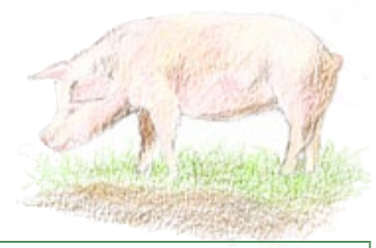
The present situation

Currently 90 % of the revenues come from sales to the Danish company. The purchase price of pigs is guaranteed by a contract. Farmers can sell an unlimited number of pigs. The export price is double than domestic. Therefore, the farm wants to increase the production gradually. The only limitation will be the base of the fodder. Crop production is conducted as shown above, under the crop rotation. In 2011, yields were not satisfactory. However, the most important thing for Jacek is self-sufficiency in feed, especially protein. Therefore he cannot increase the production.

For his work, the farm has received many awards. One of them is the second place in the national ecological competition, under the patronage of the Minister of Agriculture and Rural Development in 2012.

The near future

The farmer sees a future in organic farming and pig production. Sometimes he even thinks about doing the processing and sale of the meat on his own farm. But this issue is very difficult. National law is very strict and greatly hindered the establishment and operation of such business. If the farmer wants to decide for the operation he must wait for a relaxation of the rules.



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SWEDEN

Stora Elghammar - Milk production

Introduction to a conversion

History

In connection with the change of ownership of the Stora Elghammar farm, Jakob Jurriaanse was able to lease it. The farm, which had been specialized in animal production for many years, is, by Swedish standards, classed as a medium large dairy farm.
Jakob is especially interested in ecological agriculture with a specialization in milk production. He studied agriculture in Holland and since 2000 he has worked on different farms in Sweden, mostly as head cowman on ecological dairy farms.

Personal motivation

Jakob's dream is to run his own ecological farm, being as self-sufficient as possible so he does not need to purchase soya imported from South America as a feed concentrate. The 15th March 2011, when he took possession of the farm, was the starting date for the conversion of the whole farm from conventional to ecological (ERA - ecological recycling agriculture) production.

The farm in the landscape

The farm is situated in Sormland, ca. 80 km south east of Stockholm and 15 km from the Baltic Sea. The landscape, with many lakes and watercourses (streams, creeks and small rivers) is characterized by forest and agriculture land. The bedrock comes to the surface here and there in the gently undulating landscape. The fields are well drained and lie well positioned around the farm centre.

Economy/marketing

As a dairy farmer, with specialized knowledge in primary production, there are not many alternatives for marketing ecological milk. The only possibility at this time is Arla which has a monopoly in many parts of Sweden. Delivery to this dairy provided the basis for the economic calculations that were done by the consultancy firm LRF konsult.
Two operational plans were drawn up for a complete conversion of production (both crop and animal production) – one with and one without the eco-supplement (The eco-supplement constituted at the time of these calculations 38 % of the basic price for Arla milk). When the costs for one full time employee were included the eco-supplement for milk proved to be essential for a positive economic result.

More information: helle.reeder@konsult.lrf.se

Facts about the farm in March 2011

Arable land	136 ha
Natural pasture	25 ha
Animal stock	70 cows SLB - Swedish lowland cattle (production 10,600 kg ECM) plus recruitment, 10 steers up to 18 months
Housing	Loose-housing barn (built 1999) for the cows, young cattle in the old cowshed, calves in single boxes after 3 weeks in a group
Manure system	Slurry
Milking system	1 milk robot (Lely)
Roughage storage	550 m^3 silo complemented by round bales
Soil type	Clay loam (clay content: 25 – 40%), humus content: 3 – 6 %, P-Al class III (I – V) K Al class IV (I – V)
Precipitation	550 mm (characteristic for the area: dry early summers)
Employees	One employee

Planning for conversion of the farm operations

A crop production plan, based on the farm's own potential, with a high level of self sufficiency in feed and manure, was drawn up. A simple rule of thumb for milk production was applied: twice the amount of area in hectares than the number of milk cows is needed to more or less cover the feed/manure needs of the farm. This meant that a reduction in the number of milk cows to ca. 65 individuals and a reduction of milk production to 8,500 ECM was necessary. This had to happen slowly as the purchased feed was phased out. In the new management plan all the bull calves were to be sold after the milk-only period.
Jacob planned a complete conversion which meant that their milk could be sold as ecologically certified (KRAV) milk after 18 months on the condition that Arla signs a contract for them to deliver ecological milk. There was no guarantee of this from the beginning because many dairy farms had recently converted to ecological milk production.
With the help of a consultant for animal and crop production a calculation of feed needs was made where roughage formed the basis of the whole arrangement.

Feed requirement (based on 65 cows + recruitment)

	Pasture t (DM)	Roughage t (DM)	Cereals t 86% (DM)	Protein crop t 86 % (DM)
Cows	56	237	111	59
Young stock/heifers	47	74	3.5	1
Total	103	311	115	60

Pasture — The pasture needed for young stock (47 t) is covered by natural pasture land. The cows require ca. 17 ha pasture on arable land (with a calculated annual yield of 3.3 t/ha).

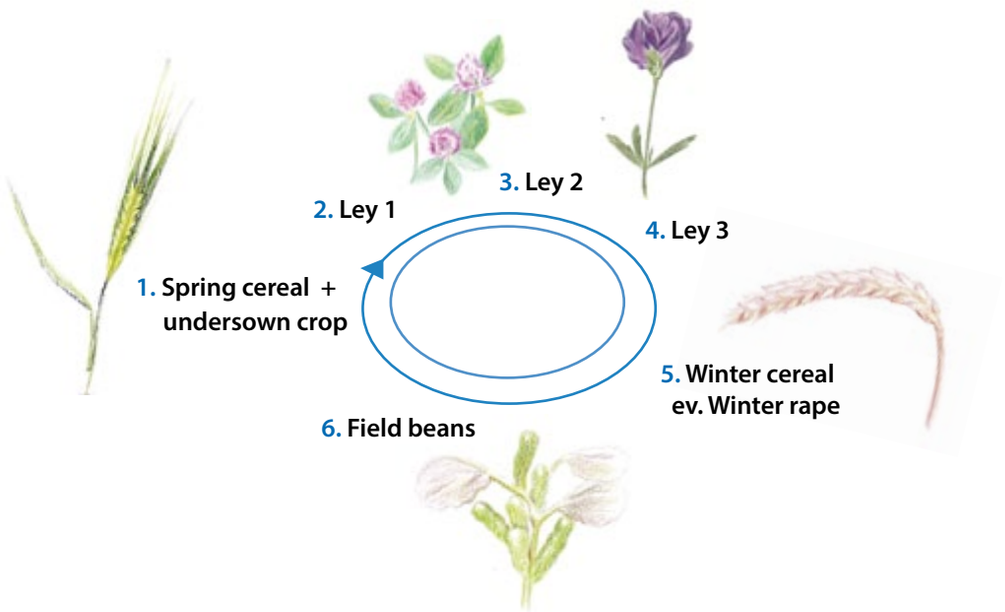
Roughage area — 52 ha (calculated annual yield of 6 t DM/ha).

Grain — 42 ha (calculated annual yield of 2.7 t/ha which is 32 % under normal yield)

Protein crop — Broad bean (Vicia faba L.) 24 ha (calculated yield 2.5 t/ha) which can be partially replaced by peas and/or winter rape.

Different crop rotations and alternatives were discussed in order to ensure that feed requirements as well as crop nutrition needs and a weed control strategy are met and resulted in the following:

Crop rotation: 6 years



Comments on the suggested crop rotation

- Roughage feed is more than sufficient.
- Cereal needs are covered when the winter cereals produce a higher yield than the spring cereals.
- Spring cereals: Oats, barley or a mixture to harvest when ripe or as whole cereal silage.
- Maximum 2 ley harvests before planting the winter cereal, 1 ley harvest before winter rape.
- Successful ley establishment is crucial for the whole crop rotation!
- Broad beans are a very valuable protein feed (35 %), should however be researched concerning production techniques.
- Year V gives the possibility to alternately grow winter rape in order to optimize milk production.
- Ley mixture: the proven mixture for the area initially and later adjustments to a farm specific seed mixture as required.
- Three year ley in combination with correctly executed soil cultivation, good basis for preventing weed.
- Fertilizing strategy: Slurry (ca. 20 t/ha) above all on wintergrain in the spring. The rest of the manure is applied before spring sowing and ley. The first year´s ley is however selfsufficient in nitrogen.

Most important was a sufficient supply of roughage, both in terms of the amount and quality: the pasture area needed to be increased to 17 ha. Phasing in the new crop rotation required that most of all the roughage feed area needed to be increased. Just one month after taking over the farm, 18 ha of arable land adjacent to the farm became available for leasing. There was no great change in the production arrangements but it did allow for more cows. The result was a better use of the existing stable and dairy equipment and as a result an increased milk production.

The present situation

No sale of eco-milk in the near future, something that has major economic consequences.
Besides this the supplement for eco-milk was decreased during the year and at the time of writing was only 23 % of the basic price. Jacob decided to wait with the conversion of the animal production to ecological management and for the time being to maximize the milk production through the purchase of feed concentrate**.**

Yields

Oats	1.8 t/ha
Barley	3.8 t/ha
Winter cereal	3.8 t/ha
Broad beans	3 t/ha
Ley	6 t/ha

Crop production during 2011 has in the main gone well. It has been a good year for crop production with rain in the early summer and a long warm fall**.**

However, the roughage was barely sufficient, partly because the phasing in of the crop rotation plan takes time and partly because the number of animals was greater than planned for. The portion of legumes is expected to increase, Jacob is focusing on alfalfa in the leys, which gives greater crop security in long-lying leys in an area prone to early summer drought.

The near future

As soon as there will be a market for ecological milk the farm can be converted completely to ERA. Moreover, thoughts about starting up on-farm milk processing exist as well as plans for investing in the feeding system to reduce future work load.

Stora Elghammar farm

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Photos:
© Madelene Eriksson

SWEDEN

Ingelstorp Agricultural High School – Dairy production

Hermann Leggedör

Background

The farm and agriculture high school at Ingelstorp was previously managed by Kalmarsunds Gymnasieförbund. On July 1, 2011, the Kalmar-Kronoberg-Blekinge regional section of the Swedish Rural Economy and Agricultural Society (Hushållningssällskapet HS) took over the school and farm. Ingelstorp farm is fairly typical of the open grassland agriculture in Kalmar County with its medium-large herd of 63 dairy cows.
In January 2013, the region's three agricultural high schools (Ingelstorp, Gamleby and Ingelstad) will be put under unified management. Agricultural production is a key component of the education program Ingelstorp offers.

Conversion to ecological recycling agriculture

The take-over by HS made it possible to continue agricultural training at Ingelstorp. At the same time, a need for a stronger organic focus was seen. Ingelstorp had had positive experience of organic crop production on about 60 ha during the past decade. Today, 187 ha of cropland have been converted. A smaller part, 74 ha, continues to be conventionally farmed for educational purposes. Piglets and a small flock of sheep are also raised conventionally. In addition, there are 15 riding horses in Ingelstorp's equine education program. According to the rules for organic production in Sweden, manure from these types of conventional animal production may be used in certified organic crop production.

The farm and its surroundings

Ingelstorp farm is located in the region Kalmar län, west of Kalmar and 8.5 km from the Baltic coast. The area is characterized by open fields and intensive agriculture. Organic milk production is based on the farm at Ingelstorp, where the milking facility is also located, plus two other areas of cropland, Nygärde and Kylinge. A fourth parcel of land, Kläckeberga, is the center for conventional production.
In addition to agricultural education, Ingelstorp also offers education in animal care, operates an equestrian center and offers single courses in the natural sciences at secondary school level. The Agricultural High School is accredited, i.e. graduates of Ingelstorp are eligible for admission to university studies.

Economy and the market

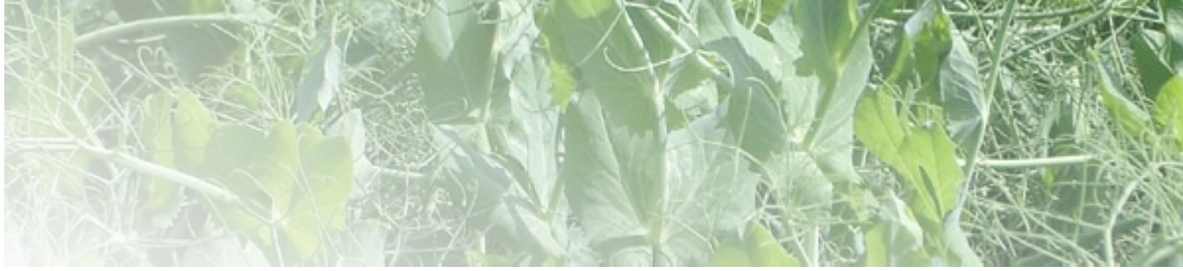
Economic incentives were the main reason for converting to organic dairy production. Without the contract with Arla Foods, the conversion would not have taken place. There was and still is no alternative to primary bulk production for this farm. There are, at the moment, no plans for developing facilities to produce processed dairy products. At the start of 2010 Ingelstorp was one of the very last farms to be contracted for delivery of organic milk to Arla Foods. Since 2010, Arla Foods no longer accepts new producers of organic milk, as its supply of organic milk is sufficient. In early 2011, organic milk producers, including Ingelstorp Agricultural High School, were paid a bonus of 1.48 SEK/kg over the basic price. Payment of the bonus began in June 1, 2011, when Ingelstorp started the six-month period of quarantine required for certified organic production. At present – October 2012 – the bonus Arla offers is lower, 0.78 SEK.

Arla Foods currently has a surplus of organic milk. Some argue that the surplus is a result of Arla being late to develop new organic dairy products despite an adequate supply of organic milk. The reason for the surplus, according to Arla, is a decline in demand for organic milk. Arla has publicly argued that consumer prices for milk may be too high. This is a reflection of the low value the company assigns to primary bulk production, and especially organic milk, for retail food chains.

Ingelstorp farm is expected to be productive and to bear its own costs. The costs of education and instruction, on the other hand, are covered by the publicly sponsored vouchers that accompany students, of all ages. However the additional costs associated with agricultural education mean that the farm can never be as fully efficient as a single-mindedly market-oriented farm.

Current data on the organic production at Ingelstorp in 2011, when the farm started producing organic animals

Cropland	186 ha
Natural pasturage	27 ha
Herds	63 Holstein, SRB and some Jersey cows, 30 mature cows, and 30 young
Stall system	Free stalls and slatted floors, built in1982; stall for young cows, consisting of free stalls and slatted floors. Previous slatted floor boxes have either been converted into free stalls or are not used, as the rules for organic production do not allow them. For educational purposes a stall for 30 fixed cows remains. The cows formerly kept in those stalls were sold.
Manure system	Slurry
Milking equipment	Heringbone parlor milking system
Fodder storage	Silo storage, 4 supplemented by loafsilo on cement slab and round bales
Soil types	Light clay (75 %), clay (20 %), loam (5 %); humus content 3-6 %; P-Al class III, K-Al class III
Precipitation	500 mm/year
Work force	2.25 full-time workers in the milkproduktion, 3 in the fields, and 0.8 for the horses. A total of 6.05 yearsworker. It is important to note that the staff also take care of the non-organic pigs, the horses, and 85 ha of conventionally cultivated cropland, plus some instruction of students.



The conversion to ecological recycling agricultural (ERA) production

The conversion reflects the desire of the farm to be self-sufficient in feed and be able to support a herd of 90 cows. The plan envisioned 187 ha of organic cropland, which corresponds to the established Swedish norm of 1.8–2 ha of cropland per cow and year, including recruitment.
Most of the farm land consists of light soils. These are sensitive to prolonged dry periods, a common occurrence in late spring/ early summer in this area. Irrigation is not an option. During the conversion process a decision was taken to reduce the size of the herd and base dairy production on 63 milking cows and recruits. This gives good prospects to achieve fodder self-sufficiency and leave some capacity for raising grains and fodder for the market.

Traditionally, Ingelstorp has a good record in terms of milk production (9,500–10,000 kg/cow/year) and has been successful in breeding to increase the herd's productivity. According to the conversion plan, only young cows that are to be recruited to the herd will remain on the farm. Other young animals will be sold as quickly as possible.
An important part of the conversion process was the ongoing dialogue between different advisers, the staff and those responsible for the management of the school. Consultations got under way in May 2008. It was necessary to agree on ERA strategies for crop and fodder production and weed management. Also KRAV rules, e.g. for stall environment, needed to be met.

The social environment in an agricultural high school or any enterprise with a number of specialized employees is much more complicated than on a family farm and the decision-making process leading toward conversion, too, has many turns. It is essential to secure agreements on all decisions and to keep information flowing throughout the organization. Internal courses and study-visits to other farms are recommended as a way to build consensus and improve communication.

Current (2012) ERA crop production

	Acreage (ha)	Harvest (tons/ha)
Spring barley	27.75	3
Oats	16.95	3-4
Winter wheat	28.80	4
Ley 1	25	6
Ley 2	25	6
Ley 3	34	The harvest varies if a winter crop is planted.
Ley 4 +	12.05 (incl. perennial ley and pasturage)	
Peas	17.19	2.5
Total organic production	186.74	

The first priority is to produce enough nutritious and appropriate fodder for the dairy herd. Only then the potential for raising cash crops for human consumption or fodder for sale to other farms can be exploited.

Should the conventional pig production be converted to ERA production in the future the farm will need to produce additional ecological fodder.

Fodder needs and milk production

The production necessary to support at least 9,000 kg/cow/year is presented in the table below. This means that a net 8,000 kg is sold; the remainder goes to calves in their first 12 weeks. The calculation includes young cows, with a presumed first calving at 27 months.

	Tons	ha
Ley fodder	240	40
Whole crops	43	8
Grain	90	27 (50 % winter, 50 % spring)
Peas	30	12
Rapeseed	23	9*
Cultivated pasture	40	14 ha for the milk cows
Natural pasture for grazing, heifers	35 (assuming 1,5 tons DM/ha)	27
Supplementary fodder production on 20 ha in case of dry period		
Subtotal: 130 ha cultivated of the available 187 ha		
Area remaining for production of cash crops 57 ha		

*) May be substituted or combined with broad beans or, on exception, with purchased concentrated protein fodder.

Comments

Ingelstorp farm has the potential to produce up to 10,000 kg of milk per cow and year. Grazing on cultivated grassland was estimated on the basis of 720 kg DM/cow/ grazing period for 55 cows milking during the summer months. Carefully planned renewal of the cultivated grasslands is very important. Fodder ley production is the farm's Achilles heel. It is essential that there is sufficient labor so that the ley can be harvested when in its prime. Otherwise, the energy content will suffer, and it may be necessary to purchase a complement of concentrated protein fodder. Renewal of cultivated leys at three-year intervals is necessary in order to maintain the protein content.

Future prospects and goals

- The farm has sufficient crop land for protein production. Peas are generally grown as a complement. Broad beans can only be grown on certain fields.
- The first priority must be self-sufficiency in fodder. The timely harvesting of leys to ensure quality fodder must be prioritized in the farm planning.
- Buying feed concentrates should be avoided.
- Experiment with different crops such as whole crop mixtures with legumes and cereals perhaps even winter rape.
- Assess the possibilities to grow vetch, broad beans, peas and lupine to meet fodder needs and improve crop rotation and weed control.
- Utilize the potential for producing cash crops for the market as this is favorable for the crop rotation and for the farm's profitability.
- Recognize the importance of education for employees and the smooth information flow to motivate and clarify coordination and responsibility.
- Assess the possibilities of producing more food and horticultural crops like vegetables and potatoes for the school's and other institutional kitchens.
- Assess the applicability of building a new more practical stall for young animals – for the sake of the animals, the work environment and the quality of instruction.
- Assess the possibilities to collaborate with a planned biogas facility in Norra Möre, the coastal district immediately north of Kalmar.

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Södertörn University in Sweden is lead partner of the EU project BERAS Implementation. The University conducts education and research to develop and disseminate knowledge on how human activities affect the natural world, as well as how to create the right conditions for environmental, social and economic sustainable development.

The Biodynamic Research Institute in Sweden works with long term on-farm studies to develop ecological and biodynamic agriculture for Nordic conditions with a focus on soil fertility, the environment and food quality.

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www.emu.ee

Estonian Organic Farming Foundation (EOFF)
www.maheklubi.ee

LATVIA

Latvian Rural Advisory and Training Centre
www.llkc.lv

LITHUANIA

Aleksandras Stulginskis University
www.lzuu.lt/pradzia/lt

Baltic Foundation HPI
www.heifer.lt;
www.heifer.org

Kaunas District Municipality
www.krs.lt

POLAND

Institute of Soil Science and Plant Cultivation – National Research Institute
www.iung.pulawy.pl

Kujawsko-Pomorski Agricultural Advisory Centre in Minikowo, www.kpodr.pl

Polish Ecological Club in Krakow, City of Gliwice Chapter
www.pkegliwice.pl

Independent Autonomous Association of Individual Farmers 'Solidarity'
www.solidarnoscri.pl

Pomeranian Agricultural Advisory Center in Gdańsk
www.podr.pl

GERMANY

Leibniz-Centre for Agricultural Landscape Research, www.zalf.de

DENMARK

The Danish Ecological Council
www.ecocouncil.dk

BELARUS

International Public Association of Animal Breeders "East-West"

PURPOSE

The environment of the Baltic Sea is endangered. Input of plant nutrients from highly intensive and specialized agriculture are a main source. BERAS Implementation can solve this problem through a systemic shift to Ecological Recycling Agriculture in association with the whole food chain from farmer to consumer.

WHO CAN USE THE GUIDELINES?

The guidelines will help farmers and advisers to practice and develop Ecological RecyclingAgriculture. This type of agriculture will improve the environmental conditions of the Baltic Sea. They can be equally used for educational purposes, by decision makers and by politicians.

CONTENTS

The guidelines consist of four books that cover the following topics:

The Farming Guidelines give basic practical recommendations for implementing ERA and present proven agronomic measures and optimization strategies for effective nutrient recycling within the farm and between different farm types during and after conversion. Included are Software Tools that help to assess and improve sustainable crop rotation planning and nitrogen fluxes on a farm level.

The Economic Guidelines give advice and support to farmers how to plan the conversion process and highlight how the changes to ERA farming will affect farm economy.

In the Marketing Guidelines farmers can find support and ideas on how to more effectively promote and sell organic and ERA products.

The Farm Examples provide a personal presentation of different farms around the Baltic Sea, mainly farms in conversion to ERA, their challenges and future plans.

The books are available at www.beras.eu in digital form.

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