# ECOLOGICAL RECYCLING AGRICULTURE

Guidelines for farmers and advisors Vol I - IV


Farming guidelines


Economic guidelines


Marketing guidelines


Farm examples

## Vol II: ECONOMIC GUIDELINES

Helle Reeder, Hubert Redelberger, Sarah Schmidt

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 |

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zalf Leibniz-Zentrum für Agrarlandschaftsforschung


# Vol. 2 Economic Guidelines

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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

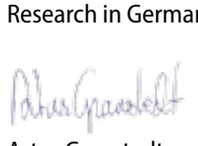
Despite various measures the eutrophication of the Baltic Sea is not decreasing and the resilience of multiple ecosystems is at stake. In this situation business as usual is not an option. New approaches are needed creating a safe operating space within the environmental boundaries. BERAS develops and 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.



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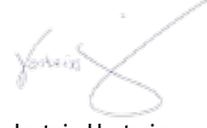

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# To look after your house

Helle Reeder

## Introduction

Economy comes from the Greek word ”oikos” which means house and ”nomos” which means custom. Economy is about looking after your house. It may be your home, farm or greenhouse but in a wider sense it could also be the national or global economy as well as the ecosystem and the biosphere.

Ecology has the same word stem as economy, and is about the relationship between living organisms and their “house”, their environment. It is obvious that these two houses are intimately connected with each other.

Ecological products often have a higher consumer price than non-ecological products because production costs tend to increase when environmentally friendly methods are used. Overall, ecological farming endeavours to use local resources, recycle nutrients, strive for self-sufficiency and enhance the services of the ecosystem. Thus the consumer price reflects more accurate production cost when considering the environmental effects of farming.

There is no ecological economy separate from conventional economy. Both are subject to today’s prevailing economic system in which the flow of goods and inputs are valued in monetary terms. As a producer you can build your brand and charge it with positive features such as clean, good and ecological. Customers, who are willing to pay for these features, will pay the premium price you ask for. However, in every business it is necessary to identify your market and set up a profitable enterprise if you want to make a living out of it.

## Everything is linked

A farm is a sum of many resources such as land, ecosystem, buildings, animals, machinery, and the most important; the people working in the enterprise or who have a connection with the farm. People are the very heart of any activity.
Another important resource is the economic basis of the enterprise. If there is a solid foundation, it is easier to handle a financial backlash when a decline in the production occurs. There is a direct link between economic performance and the efficient use and combination of resources.

The ecosystem is a resource that often we do not think about because it is "invisible" and has no price tag on it. Life is dependant upon the ecosystem. It is responsible for the wealth of species on earth, maintains soil fertility, breaks down waste and purifies air and water.

No business exists as an island, but is influenced by local and global changes. Markets, regulations, economics, and people's values vary over time and effect the economic result of your business. Also political decisions may suddenly change the rules. Therefore, keep track of what happens outside your business in order to face the changes in time.

No man is an island - everything is linked!


## To think outside the box

To convert means to leave an established farming method and take a step into the unknown. You have to think outside the box and take on an entirely new production method. Ecological farming is a system of complementary components which are highly dependent on each other and not easily substituted. To be successful in ecological farming it is necessary to take on a long-term perspective and have a holistic approach.

## What are your driving forces?

A change always starts with thoughts about your present situation. You have a vague feeling of dissatisfaction and you start looking for alternatives, for a new "house".

When you look around, ask yourself: What are my driving forces? What am I good at? What gives me joy and strength in my life?
What am I trying to achieve and how do I get it?

Many questions will spin in your head and it is easy to lose sight and heart now and then. It is quite natural in a transition process, but once you have broadened your mind you will not be satisfied with the old way of thinking. When you have the answers put them on paper, look them up when you mistrust, to remind you what you are aiming for and what is important to you.


## Prepare yourself

Once you have your vision outlined the next step will be to identify the practical agenda of the conversion. The preparations you make before converting are of vital importance for the result. Before a new production technique and new routines are established you may have to experiment to find solutions to new problems that may pop up. Planning and scheduling is a must as farming deals with living organisms and unexpected things often happens. Then you have to improvise and trust your gut feeling.

A good way to prepare yourself is to practice on an ecological farm and build a network of people who are like-minded and who will strengthen your self-reliance at moments of setback and rainy days.

And do not forget the market! Identify your market before you start producing anything. Who will buy your product? How will you reach them? What price are they willing to pay? Who are your competitors? If your customer is a wholesaler, how should the contract be designed? The better mapping of your market you do, the better decisions you make which lead to greater chances of success. You may have the best product in the world but when customers cannot find it, your work is in vain.

There is no obvious link between profitability and the size of the enterprise. If your business is small scale, you can be profitable by refining your produce, charge it with special values and focus on a well-defined market niche. This strategy is often better than being just another player on a massive market. So, define the objectives of your business and target your market.



## Calculation

The next step in your preparation is to pick up your calculator and start working with numbers. A new production method is risky and an economic calculation will give you a better basis of decision making. Before you start you have to determine the conditions that apply for the calculation such as areas, crops, number of animals, yields, prices, labour needs etc.

Another issue that you must decide is which investments must be made in the production buildings, machinery, plant cultivation or animal husbandry to meet the goals for ecological production. One way to identify these needs is to contact a certification body and ask them to inspect the farm.

An economic calculation is a framework for your new “house”. It gives you a snapshot of how your farm economy will be affected when converting to ecological production. It shows the expected profitability, how much working capital is needed and the capital costs, how much you can afford to invest and how many man-hours are required, in short, a calculation is an attempt to capture the economic impact of the conversion when everything is running as planned.

However, what cannot be captured in numbers is your ability to target and develop your enterprise. A good tool to overcome this blind spot is the risk assessment. Such an analysis indicates the economic outcome if there is a decline in price, loss of production, higher costs for capital, labour or other inputs. When you have finished your calculation ask yourself: Is the outcome reasonable? Are the expectations underlying the calculation realistic?

Whatever happens on a farm affects its economic performance. Try to take the bird´s view and keep all inherent pars at a steady level. Your enterprise will be as good as the lowest stave of the barrel.

## Be the captain

To make sure that your "house" grows and develops as desired you have to follow up what is going on in it. You do this by the current accounting. Book keeping is not only to satisfy tax authorities but it is the primary tool to steer towards the vision you have in mind. A simple but reliable accounting gives you sound information of the state of your business and of its strengths and weaknesses. Whether you are in a conversion phase or beyond it, it is necessary to examine the numbers now and then, to make sure your next step strengthens the framework of your new "house". It also gives you the chance to be the captain of events and not the fireman.

# How to build your new house

Helle Reeder, Hubert Redelberger & Sarah Schmidt

## Fundamentals of interdependence

Ecological farming is dependent on the ecosystem – a "house" of living organisms – as well as on the market, the "house" of economy. In any system, or in any "house", the relationship between the parts is more important than the individual parts themselves. The components of ecological farming depend on one another and are therefore not easily substituted, e.g. the sequence of crops in the crop rotation has a strong interdependence, and therefore also affects the farm economy. To farm sustainably means to use renewable resources wisely, recycle nutrients and build a viable enterprise.

## Utilize farm resources in a new way

How do you utilize farm resources sustainably with best possible returns? Well that is the challenge. The economic guidelines will highlight some economic aspects of how this can be done in forage-based production and in crop production. The focus will be on ruminants as they provide the main basis of the ERA (Ecological Recycling Agriculture) farming system.
It will also exemplify the concept of low-input strategies[1] and give some examples of cooperations between ecological farms.

1 Low input in the sense of high self-sufficiency, intensified measured to recirculate nutrients and strengthen the ecosystem services associated with soils.



## New opportunities

Every farm is unique with its own conditions. There is a great spread in profitability between ecological farms as well as between conventional farms, but many ecological farms perform equally well as conventional farms and in many cases better. To be successful in ecological farming it is necessary to take a long-term perspective and have a holistic approach .The changes you make by converting entail risks but also bring new opportunities.

In every risky business it is advisable to be moderate in your calculations and prepare the conversion properly step by step. New production techniques and new daily routines have to be established. An action plan where you plan and schedule the conversion is a very good tool for implementing the necessary changes. Another good tool is patience. The economic benefit does not come overnight but gradually when all the pieces fit together.

## Who will buy?

The most important thing you have to do before you start the conversion process is to ensure there are buyers of your produce. In many countries and regions a higher price is paid for certified ecological products than for comparable conventional goods. It presupposes access to ecological dairies, bakeries, shops and butcheries. Sometimes there are no adequate marketing opportunities for ecological products present. In that case it can be necessary to handle processing, logistics and marketing by the producer, which is not suitable for all farms.


## Is your production suitable to convert?

To begin with, define your current position by looking at the following table. Where does your farm fit in?

## Production methods

| Type of Production | Intensive | Average | Extensive |
|---|---|---|---|
| **Dairy cows** | Intensive feeding of concentrates<br>Insufficient own fodder<br>Use of ET-bulls<br>A lot of maize for silage (>25 % in the crop rotation) | Tie stalls<br>Loose house system<br>High proficiency level<br>Grazing | High proficiency from forage based feeding<br>Grazing<br>High proportion of grassland<br>Own recruitment<br>Straw |
| **Suckler cows** | High performance breeds<br>High livestock density per ha | | Grass based rearing |
| **Crop farm** | Intensive use of pesticides and mineral fertilizers<br>Humus break down<br>High weed pressure<br>> 50 % hoe crops in the crop rotation | Use of manure<br>Less use of chemicals | Experience in mechanical weed control<br>Diverse crop rotation (clover/ grass ley)<br>Fodder-dung cooperation with other farms possible |
| **Pigs** | Stable with fully slated floor<br>Difficult to change building<br>Large purchases of feed | Use of straw | Use of straw<br>Open yard |
| **To convert** | **Difficult** | **Easier** | **Easy** |

This table shows that the more intensive production method you practise the more difficult it is to convert. The drop in crop yields might be larger as it takes longer to re-establish soil vitality. The drop in milk yield depends on how much the feeding strategy will be changed.



## Other factors that facilitate the conversion

- Your farm economy is reasonable stable
- You have enough land to produce enough fodder
- You have an opportunity to rent more land if necessary
- You can adjust your housing system
- You have storage facilities and can easily adjust them
- You enjoy making forage and think the grazing period is important
- Your work force is not fully utilized
- The people working on your enterprise are adaptive and open to innovations
- You like doing business and think active marketing to processors and traders is important
- You are part of a network of advisors and producers specialized in ecological farming

Not all farms are suitable to convert to the same extent. For example, a conversion of extensively working sheep farms or suckler cow farms do usually not require major changes in daily routines or cost structures. In other types of farming large investments might be necessary because e.g. housing systems do not meet with the standards of ecological production. This is often the case with intensive pig, poultry and beef production.

## Innovative farmers

To go ecological is no remedy to revitalize poor farm economy. To simply exclude chemicals and mineral fertilizers and apply for payment schemes for ecological farming is a short cut to worsen farm economy. From experience we know that farms with good financial results before conversion, usually keep up the results after. Ecological agriculture is well suitable for innovative farmers interested in new methods, in marketing and in customer proximity.

## Conversion planning – advisory service can help

After you have made a rough estimation of what changes have to be made, it is time to start planning the future farm and define the objectives. The first step is to develop a practical agenda for the conversion period and prepare a timeline for all the activities. This will bring out your innovative skills but do not forget to include the risk management and the worst-case scenario. The good and bad years might affect farm economy more in ecological systems than in conventional farming systems. If you get stuck, contact the advisory service to get support in your decision-making.

## Action plan - your steering chart

There are many things to keep in mind during a conversion process. A very useful tool to organize the conversion activities is an action plan. It is definitely worthwhile spending time and energy to compose a proper action plan and update it continually. When you note everything on paper, or more preferably, in a mini computer or an Ipad always close at hand, you do not have to waste your energy worrying yourself of having forgotten something,  or having missed some deadline. The action plan will be your steering chart and best friend to get back on track.



## Ecological objectives set the framework

In the process of conversion, farm resources have to be managed in a new and profitable way. The ecological objective you target will set the framework of your farm business. Animal welfare, fodder requirements, crop rotations, labor costs, new techniques, credit facilities, market options etc. will affect the economic outcome.

## Conversion period

The conversion period, which normally lasts two years, is a special challenge. The products are being produced according to your ecological objectives, but they can only be marketed as conventional products or products from a farm in conversion which means that the price will be the same as for non-ecological products.  Also lower yields and more working hours will bring down the result.

In the first year of conversion, revenues are often still high, because in many cases the last conventional harvest from the preceding year is sold. As there are no expenditures for conventional fertilizers and pesticides, the liquidity and returns are likely to increase.

In the second year of conversion, total revenues generally drop significantly. Having low costs for mineral fertilizers and no costs for pesticides cannot always compensate this. There might also be an increase in costs (e.g. for seeds and energy).  It is therefore necessary to plan sufficient reserves for this phase. This applies both to fodder reserves and to financial means.

In certain cases the conversion period can be shortened. This option must be discussed with the certification body or a consultant.

# Assess and plan the necessary changes

The planning situation differs whether it is a forage-based animal production or a crop production. We will start by looking at the forage-based dairy production.

## Forage-based production

### Animal density and self-sufficiency

A cornerstone in ecological animal husbandry is the balance between livestock and plant cultivation. The first step in the conversion planning is therefore to calculate the animal density of your land: Is there enough land to produce fodder for your current number of animals, or is it necessary to rent more land? Or do you have to diminish the livestock?

It is always an advantage if you can use existing data of your current production. If such data is not available, general calculation data can be used but adjust the figures to the conditions on your farm.

The objective here is to be as self-supporting as possible, not only with silage, hay and grassland for grazing but also with other feedstuffs such as fodder grain, protein feed, maize and more. The ecological standard requires 50 % self-sufficiency and for an ERA-farm it should be at least 85%. Usually farm economy benefits from low animal density and high self- sufficiency. However, take into account that home grown feed requires storage facilities and equipment for handling different feedstuff.

### Fodder plan and yields

After having estimated the animal density a fodder plan based on an ecological, feeding strategy has to be prepared. To do this you have to assume the yield levels of milk and crops.
Calculate with some 70-90 % of your conventional milk yield. Compose a fodder plan that meets the needs of this yield. Start with the acreage needed for ley, both for silage/hay and for grazing. Then calculate the area for fodder crops and protein crops.
Yields and performances under ecological management are often lower than in conventional agriculture (see following table). How much yields will decrease after the conversion depends on the previous intensity.

#### Ecological yields in % of conventional yields

| Crop | Ecological yields in % of conventional yields |
|---|---|
| Grassland intensive | 70-80 * |
| Grassland extensive | 80-100 |
| Ley, legumes, clover/grass | 80-100 |
| Cereals | 50-70 |
| Maize for silage | 50-80 |
| Field beans, lupines, peas | 60-80 |
| Winter rape | 70-80 |
| Milk/cow | 70-100 |
| Beef | 80-100 |

* Even higher levels can be achieved with adequate seed mixture of clover/grass and proper management.

As you can see from the table above the yield of clover/grass leys can equal the conventional yield with proper management, but it is better to safe guard yourself as the yields might vary more in ecological farming systems. Usually it is not a good bargain to buy forage in case you run out of it.

## Reserves of 10 - 15 %

It has been noted that ecological livestock is able to consume larger quantities of forage than conventional livestock when they have free access to it. A forage reserve of 10-15 % should be included in the fodder balance, not only because of healthy appetite but also to cover against less favourable growing seasons such as drought or continuous rainfall.

Be generous in your fodder planning the first years. When you have been farming ecologically a couple of years you know from experience how your land will answer to different crops and cultivation techniques. You can then adjust the land allocation and grow more crops for sale. In the following table you will find some guidelines for fodder planning.

Some useful numbers when calculating the fodder plan for ecological livestock. Average

| Type of fodder | Dairy cow, 7,500 kg milk/year | Heifer, up to 24 months |
|---|---|---|
| Grazing | 30-40 % of kg DM* | 50-60 % of kg DM |
| Forage (ley, hay) | 3,575-3,225 kg DM | 2,225-1,700 kg DM |
| Fodder grain (60-70 % of the concentrate) and legumes (20-30 %)** | 1,200-1,900 kg DM | 300-750 kg DM |

* Dry matter

** Consists of field beans (Faba beans), fodder peas and lupines

A total feed requirement of a dairy cow per year is approximately 6,500 kg DM spill inclusive. The sum of forage and grazing is 4,225 kg DM which ad up to 65 % of total feed.
The remaining part will consist of fodder grain, legumes, protein crops, maize and other fodder plants.

## High quality forage is the key factor

A recent study[2] has shown that there is great economic potential in high quality forage in dairy production. After peak lactation the ratio of high quality silage can be gradually increased up to 70 % without significantly affecting the milk yield as compared with a ratio of 50 % during the entire lactation.

The cost of feed is a large expense in dairy farming and has a great impact on the total farm economy. Buying large quantities of expensive concentrates to keep up high milk yields is not reasonable, neither from an economic point of view, nor from the fact that dairy cows are grazers by nature. Many successful ecological dairy farmers have discovered the potential of high nutritional quality of forage and home grown protein feeds and their profitable impact on their farm economy.
As the cost of feed is of great significance for the farm economy, feed control is therefore of great importance. Make sure that every cow gets the right ratio wherever she is in her lactation. A dairy cow of today has the genetic capacity to give a high yield; the crucial point is to supply her with first class fodder and water, good housing and good care.

## Less dependent on global feed market

To be as self-supporting as possible minimizes the vulnerability of your farm business. You are less exposed to the swinging prices on the global feed market. Currently the world grain prices are high. They might even increase further considering the fact that there will be an increasing demand for food, feed and biofuel in the future as global population increases and the climate changes.
There is also another advantage when you produce your own protein feed; you refrain from concentrates containing soy beans and do not export your ecological footprint to other countries.

2 Mikaela Patel, 2012. Effects of Increasing the Proportion of High-Quality Grass Silage in the Diet of Dairy Cows. Doctoral Thesis, Swedish University of Agricultural Sciences, Uppsala


## Grazing - a neglected resource

Grassland for grazing is often a neglected part in livestock management. The cultivation of the clover/grass leys is of fundamental importance for the economy, whether it is used for silage, hay or for grazing in both conventional and ecological production systems, but especially in the latter as the total amount of forage in the ecological fodder plan is larger than in the conventional fodder plan.

As for grazing, the grazing areas should be renewed regularly to keep up their freshness and ability to produce nutritious grass. This gives the dairy cow a chance to keep up her yield. A drop in milk yield due to insufficient or poor grassland is very difficult to catch up and a setback for farm economy. As a rule of thumb, calculate with 0.2 ha/cow in the very beginning of the grazing season and 0.5 - 0.6 ha/cow at the end. Watch out for the shortage in the middle of the summer when supplementary feeding of forage is often necessary.

Grazing is the cheapest way to feed the livestock as they fetch their feed themselves. No storage is needed and the cost of machinery and labour is reduced. A grazing plan is compulsory for a good grazing strategy. Estimate how many plots are needed? How large? How many animals in each plot? How to organize the rotation between different plots? How often should they be renewed? Which seed mixture fits my soils?

Yes, there are many aspects to be decided to get a successful grazing period. To have  well-cultivated grasslands and well organized grazing routines is a simple way to earn money.

Give the cow a chance to keep up her yield!



## Crop rotation plan

After having decided the fodder plan and which crops to grow, the next step is to plan the crop rotation. If you have land that exceeds the needs of your livestock you can grow crops for sale. If so, include them in the crop rotation plan.

Crop rotation is another cornerstone in ecological farming. It shall provide enough fodder, guarantee good and long term soil fertility, provide a good start for subsequent crops and keep weed pressure low.

The planning and regular revision of the crop rotation is one of the most important tasks of an ecologically managed farm. The choice of the crops within the crop rotation fundamentally influences soil fertility and thus economic efficiency.  Only if cropping area and yields are estimated and only if it is clear, which part of them is needed for fodder and which for sale, an estimation of what can be expected as revenues from sale on the market is possible.

## Manure – a heap of money

Closely linked to the crop rotation plan is the manure management plan. Manure is the fertilizer in ecological production, a valuable asset of nutrients and not a waste problem as in conventional animal production. A manure management plan shows how much is produced, to which crops it is spread, how it is stored and how and when it is spread in order to gain maximum benefit. If you have a slurry pit it is advisable to roof it so as to lessen gas emissions and prevent dilution by rain.

## Bird's eye view

Having come so far in your conversion planning it is time to look through the action plan again. Think systemically, take the bird's eye view and consider:

- Is there a balance between the number of animals and the land used for fodder crops?
- Is there enough acreage reserved for fodder grain, protein crops, hay and other feedstuff with respect to lower yields?
- Is there enough grassland for grazing?
- Are there enough clover/grass leys for forage including reserves?
- Is there a satisfactory crop rotation between different crops?
- Is the manure distributed among the right crops?
- Will you have crops for sale on the market?

When you feel you can say YES you have come far in your conversion planning for ecological dairy production. Much of what is said above can generally also be applied to mother cow and sheep production.
Now we go on and calculate the working hours.

## Labor plan

One very important part in your calculations is to estimate the workload. This is a difficult task but absolutely necessary. If you have a running production you know how many hours are needed approximately. Otherwise there are standards which will help you to estimate the hours.

Another important part concerning the labor is to communicate the new objectives of your farming to your staff. Try to be as clear as possible, explain the changes you are about to make and allocate responsibility for different tasks. If people feel they are part of a team and that their opinions are taken seriously, people usually are open to new innovations. People are the most valuable asset on your enterprise. Try to build a team of people who can join forces with you. It will make things much easier.
Do not overestimate your own capacity. It is not sustainable to fall in bed exhausted every night. If you have a family this will exhaust your relationship as well.



# Investments in housing, animals and machinery

## Housing

In ecological standards there are special requirements as to animal welfare and animal space. In many cases a reconstruction of the housing system is needed.

It is important that you keep up the production during the reconstruction period. This might be difficult if you will do the rebuilding yourself as the time of the reconstruction shifts your attention to building details and the management of the diary heard is set back because of your lack of time. This in return will result in a drop in milk yield, failure to detect animals in heat, or other problems, all of which have a negative effect on the farm economy.

If a large-scale reconstruction lies ahead, it is advisable to consult different construction companies and request offers. If you plan to invest in a completely new barn, include a building foreman in your investment budget and keep your focus on your current production. It is also advisable to reconstruct/build first and convert thereafter. Otherwise it will easily become messy if you try to do both things at the same time.

Make a list of what has to be changed in your production buildings, in storage facilities and feed equipment. Attach price tags and include the sums in the investment plan on the next page.

## Dairy herd

If you plan to enlarge your herd by own recruitment you have to start saving all your heifers in advance. If there are not enough of them you have to make additional purchases. Try to buy from one or two farms to keep infection pressure low. Depending on your fodder situation you can buy young heifers or pregnant ones. The important thing is to fill up the barn as soon as possible to reach its full capacity. Include the additional purchase of livestock in the investment plan on the next page.

## Machinery

Take a critical look at your machinery. Are there items that have to be replaced in the near future? If so, include them in the investment plan. Release money by selling the equipment you do not need any longer, such as sprayers and mineral fertilizer spreaders.

As the making of forage is so essential in milk production you should go in for top class forage machinery chains. That chain is your tool to be sure you can harvest the ley at optimum time and speed and secure high quality forage. The quality of the harvest will have a crucial impact on profitability during the following housing period as well as on the total farm economy.
As ecological farming systems are gaining ground, new green technology is also developing. In Sweden for instance System Cameleon[3] has become increasingly popular among ecological farmers because of its multi functionality.

Another innovative machine is Combicut[4], the weed cutter developed by a Swedish ecological farmer. It cuts "the weeds and costs", especially the thistle is damaged and prevented from growing.

System Cameleon

Combicut

3 http://www.gothiaredskap.se.
4 http://www.justcommonsense.eu



## Investment plan

Investments increase the capital costs significantly of the farm for many years to come. It is therefore important to get the investment planning right from the beginning. Pay a visit to the bank and check up your credit facilities and interest rate. Decide the depreciation and add the interest expense to your costs.

The following table is a simple example of a list of investments that are needed to meet ecological standards. The figures should of course be replaced by real numbers of your own.

Example of a simple investment plan, estimation, €

| Type of investment | Investment cost |
|---|---|
| Curry-comb | 12,000 |
| Reconstruction of stable for young stock, lean–to-roof, concrete slab | 25,000 |
| Fee to producer's association | 3,000 |
| Open yard for 50 cows, incl. fences, connection to manure pit | 30,000 |
| Reserves | 10,000 |
| **Total investments** | **80,000** |
| Funding | |
| Own capital | 20,000 |
| **Loan** | **60,000** |

Source: Hubert Redelberger

The investment plan should cover all the investments and additional costs that are connected to the conversion. Both additional working capital and reserves should also be included.

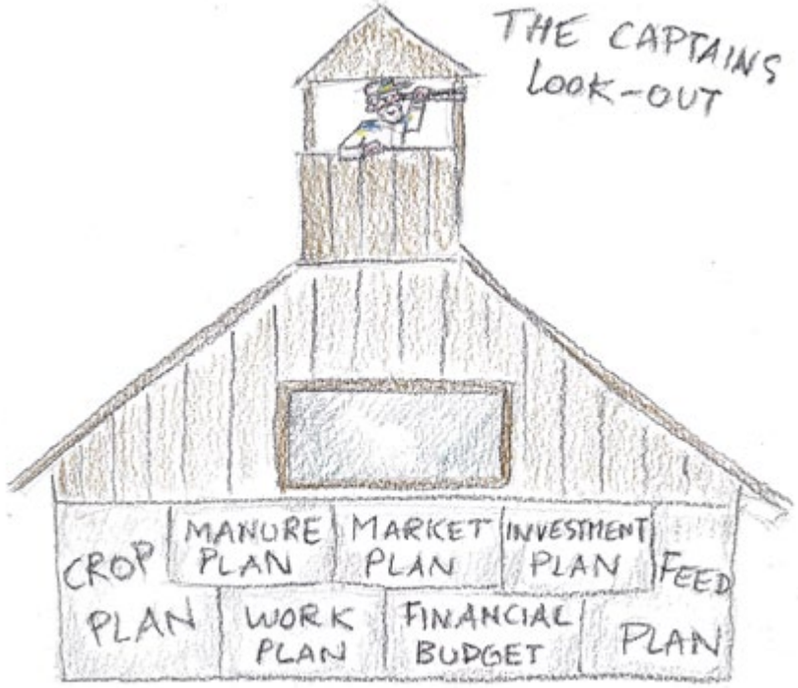
# Your new "house"

There are of course many details that still need attention, but the overall conversion design for ecological dairy production is now prepared. By including all the calculations and plans in the action plan we now have a good overview about what has to be done and what investments are to expect. To make the action plan complete you have to add a time table. Be generous with time. Things always take longer than you expect.

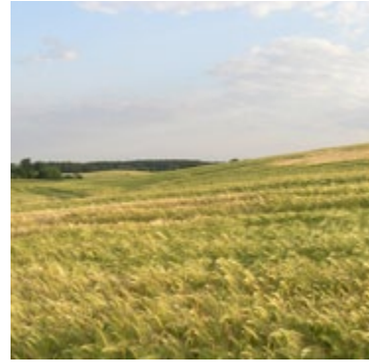
The building blocks of your new house are now in place, and so is your action plan for conversion.

## Your new farm house as well as your action plan

**Try to keep the action plan alive after conversion and update it once in a while.**





## Crop production

The focus of the cash crop farm is on the marketable harvest from crop growing. It is advisable to continue to cultivate those species which have performed well and delivered stable yields. Use site specific advantages. However, marketing opportunities have to be checked up in the first step and marketing concepts must be designed. Do not hesitate to negotiate the price with your potential customers. The higher the price you get the more it compensates a smaller yield.

## Crop rotation

As mentioned before, crop rotation is fundamental in ecological farming. It shall guarantee good and long term soil fertility, provide a good start for subsequent crops and keep weed pressure low. Price, quality and yields are the key factors that determine your revenue.

## Fertilization

As you have no access to manure there has to be a proportion of at least 30 % legumes in your crop rotation. The major part of the legumes should consist of fodder legumes.

It is also possible to buy additional ecological fertilizers approved in the ecological standards. Another way to secure plant nutrition in the long run is to cooperate with an animal farm. The crop farm gets access to manure and the clover/grass and legumes in the crop rotation can be delivered to the animal farm. This enables the recirculation of nutrients and a possible solution for dairy farms short of land. The exchange should be settled on market terms and benefit both farms. Preferably there should be a written agreement to avoid confusion.

## Green technology and new ideas

In recent years a green technology is making progress in ecological crop production. Young innovative farmers want to increase the yields by experimenting with new methods of technology, cultivation and timing. They come together in groups, not least in social media like Facebook and exchange ideas and experiences. Their view is that ecological crop production is a young branch and holds a lot more to discover and develop. Many of them also find it natural to cooperate.

## Estimate yields

The yield decline of cash crops in the first years after conversion is often a little lower than in the following years under ecological management. This is because weed pressure on cropland is lower during the first years after conventional management, and the following crop can benefit from the easily available mineral fertilizers of the foregoing management. A further factor influencing yields is the position of a species within the crop rotation. Data collections for Ecological Agriculture give further indications for possible yields and performances.

Special species in crop rotation - here spelt - Triticum aestivum ssp. spelta – can bring high sale prices if there is a market for them.



## Farm economy

To convert means to leave your "comfort zone" and make a radical change in your way of farming. You feel it is the right step to take, but at the same time you are concerned about how your farm economy will be affected. One way of overcoming this feeling is to make a financial budget covering the conversion period.  A budget is a qualified guess of future business activities, but based on market trends and a general outlook. It is a useful tool to become the captain of events and not the fireman.

This chapter will give you a general idea of revenues and costs in ecological farming. It will also highlight some differences in farm economy between ecological and conventional farming systems and give a few examples of model calculations.

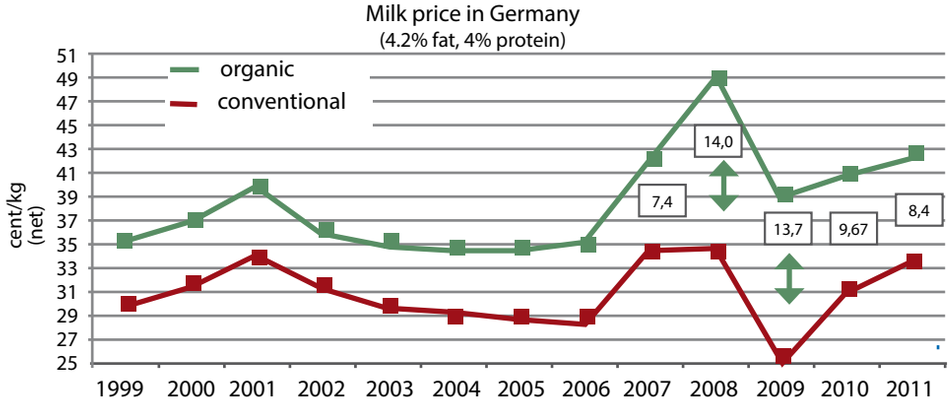
The figures have reference to German conditions, but much of what is said here is common to other countries as well. Corresponding information for Denmark, Poland and Sweden are given in the selected country studies.

## Revenues

### Estimate prices

The price difference between ecological and conventional goods differs from product to product and from region to region. In some countries there are market report organisations that centrally indicate the achieved sale prices for different ecological products. These bodies can be helpful in getting more precise figures for your own planning. Try to be as realistic as possible in your estimation of sales prices.
In general, the price of ecological products is affected by the price of conventional goods. This is the case for the milk price and wheat price in Germany as you can see in the following two figures.

Milk price of conventional and ecological milk, € cent/kg

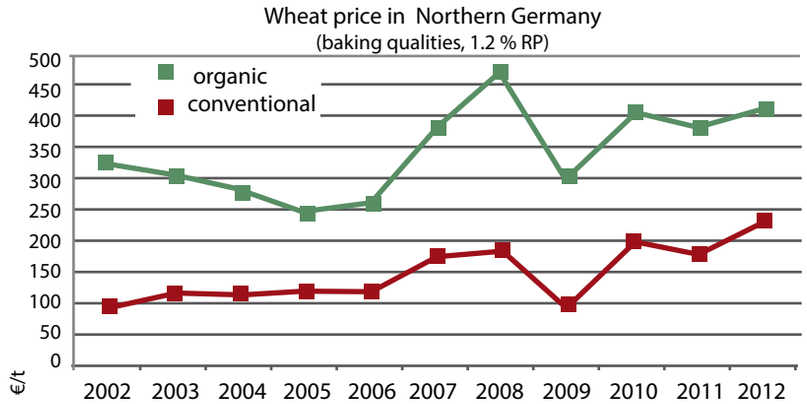



Source: Hubert Redelberger, 2012, data from Bioland and AMI.
Further information from Bioland http://www.biomilchpreise.de

The price difference between ecological and conventional milk – the ecological premium - varies between 6 cent and 14 cent during 1999-2011. In recent years the average ecological premium has varied between 8 cent and 10 cent.



Wheat prices of conventional and ecological wheat, €/t




Source: Hubert Redelberger 2012. Data from AMI and Bernd König GmbH. Further information from http://www.ami-informiert.de

The price difference between ecological and conventional cereals has varied between € 150 and € 200 per ton.

## No cash but long term benefit

A special challenge of economic calculations of ecological farms is the strong interdependence of different crop rotation components and farm activities. The cultivation of clover/grass leys for silage making, for example, does not bring any revenues, because the product is not sold. However, fodder costs can be saved and furthermore, high yields of the following crops are possible due to the nitrogen fixation via clover/grass leys.

## Promotion of ecological production in countries around the Baltic Sea

In many countries there are special payments for ecological production. These payments are incorporated into the economic calculations but should be displayed separately so as to identify their significance on the overall result.

In view of the financial crisis in Europe and the difficulties to reach an agreement in the on-going negotiations concerning the new CAP programme starting 2015 there might be cut downs in economic support for ecological farming and changed conditions that will affect farm economy.

How dependant is your business of the single payments and of the Agri Environmental Schemes for ecological farming?

Countries around the Baltic Sea promote ecological production with different payment schemes for different crops and animals. The following table shows the approximate support for ecological cereals per hectare. Further information about the support for ecological farming can be found in the websites listed at the bottom of this page.

Promotion of ecological farming in six countries around the Baltic Sea, €/ha

| | Year 1-2 | Year 3-5 | The following years |
|---|---|---|---|
| Denmark[I] | 140 | 13 | 0 |
| Estonia[II] | 119.2 | 119.2 | 119.2 |
| Finland[II] | 141 | 141 | 141 |
| Germany[IV] | 210 | 170 | 170 |
| Poland[V] | 200 | 200 | 200 |
| Sweden[VI] | 168 | 168 | 168 |

I Typical support for a farm during and after conversion to ecological farming
II Support also for other crops and animals. For further information: http://www.organic-europe.net/estonia
III Support also for animals. For further information: http://www.organic-europe.net/finland
IV Average support. For further information: http://www.oekolandbau.de/erzeuger/oekonomie/foerderung
V Support also for other crops. For further information: http://www.fadn.pl
VI Support also for other crops and animals. For further information: http://www.jordbruksverket.se



Denmark and Germany has a higher support the first years of conversion while Estonia, Finland, Poland and Sweden have the same support from the first year of conversion and onwards. The commitment period is usually five years.
In Denmark the farmer can also apply for support under the Rural Development Program for extensive or environmentally friendly farming practices, €110 /hectare.
Finland, Estonia and Sweden have also support schemes for animals.

## Identify new cost structures

When the possible revenues are known, the costs structure must be identified. As mineral fertilization and pesticides are renounced, these costs will decline. Costs for seeds and plants are usually somewhat higher. Weed control can result in higher fuel and machine costs due to mechanical treatment with curry-comb, cultivator or plough. Young stock has to be reared with natural milk which might be more laborious and involve higher costs. On the other hand the calves will have a better start in life.

If you get stuck here, there is often a set of publications available for planning with guiding values in tabular form. You should only use such tabular values if you cannot get your own figures. To calculate your machine costs (such as maintenance, fuel, lubricants, insurance) there are also general data for guidance[5] .

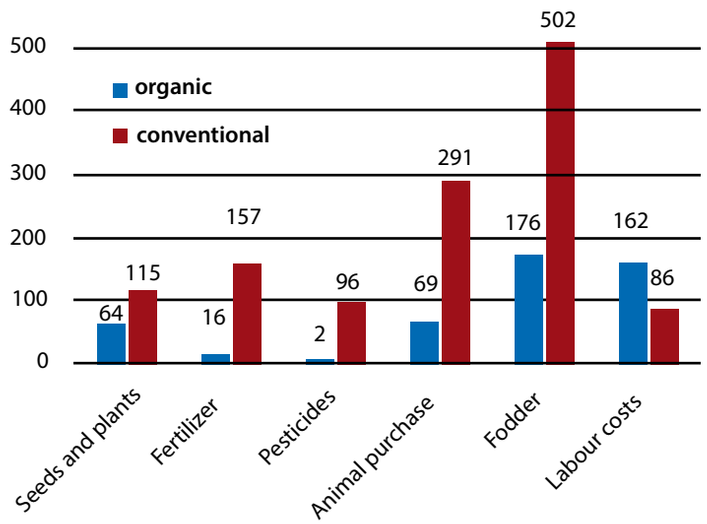
You can compare these data with your own figures and make a reasonable estimate. Many times you can use your own farm records and numbers as a starting point and adjust them to the new conditions. If you will set up a completely new farm business you have to rely on average farm data for your calculations.

As for other costs, such as costs for insurance, administration, book keeping services, farm tenancies, leasing, etc. there are often only marginal changes.

5 Redelberger, H., Rettner, S. 2012 Direktvermarktung analysieren, planen, optimieren, buero@redelberger.info

A few other costs will emerge such as costs for the ecological control body, the producers association and perhaps for marketing. The next figure shows a comparison between costs in ecological and conventional farming systems.

Comparison of costs between ecological and conventional farming systems. €/ha




Source: BMELV: Buchführungsergebnisse 2010/2012 Berlin 2012.

For further information http://www.bmelv-statistik.de/de/testbetriebsnetz/buchfuehrungsergebnisse-landwirtschaft/



## Model calculations for forage-based production in Saxony, Germany

By model calculations for a dairy farm and a suckler farm it is possible to estimate how a conversion affects farm economy. The conditions of the model calculations are shown in the following table.

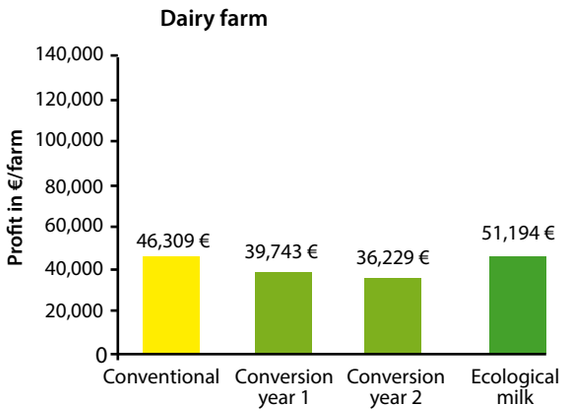
Conditions of model calculations for forage based production in Saxony, Germany

| | Dairy farm | Mixed suckler- and arable farm |
|---|---|---|
| **Manpower** | 2.5 family workers | 3 family workers, 1.3 hired labor |
| **Arable land** | 60 ha | 160 ha |
| **Grassland** | 30 ha | 140 ha |
| **Cash crops** | 45 ha grain crops (wheat, barley, triticale) | 128 ha grain crops (wheat barley, triticale) |
| **Forage growing** | 7 ha maize for silage, 8 ha clover/ grass ley, 30 ha true meadow | 32 ha clover / grass ley, 140 ha mowing pasture / true meadow |
| **Animal husbandry** | 60 cows, 7,500 kg sold milk per year | 200 suckler cows, sale of sucklers at the age of about 9 months |
| **Buildings** | Free stall barn with resting boxes for cows, stable for young stock, machine/storage hall | Deep litter house, machine/storage hall |

Source. Redelberger, H., Stichel, J. 2010 Betriebswirtschaftliche Erfolgsfaktoren einer Umstellung auf ökologischen Landbau in Sachsen. LfULG Heft 21/2010. Dresden.

The profitability of these two model farms are shown in the figures on page 40 and 41.


## The profitability of dairy farms in Saxony where the promotion of ecological farming and the premium for ecological milk is higher than in other regions.

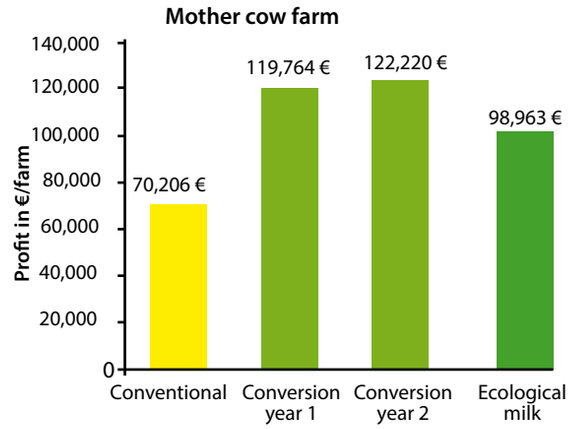



This model dairy farm is a typical family farm in Germany. Before conversion the profit is about € 46, 000. During the conversion period of two years the farm gets an additional subsidy of € 324 per hectare of arable land and grassland to promote the conversion. Ecological standards must now be met and changes in crop rotation and in feeding plans will increase the costs. The milk cannot yet be sold as ecological milk so the profit drops.  After two years, the dairy production is certified and the milk can now be sold to a higher price with an ecological premium of 8 cent per kg. This will improve farm economy as the support for conversion in this region drops sharply per hectare from € 324 to about € 200 the 3rd year after conversion and onwards.

Marketing of ecological milk with an ecological premium price is possible in almost every region in Germany. However, the access to ecological dairies and premium prices has to be checked up in every case and every region before calculating the economic performance of conversion.



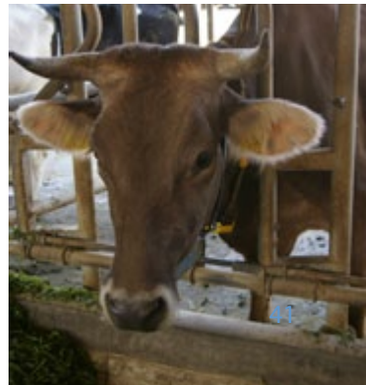
## The profitability of a mixed farm with suckler cows and arable land in Saxony, Germany

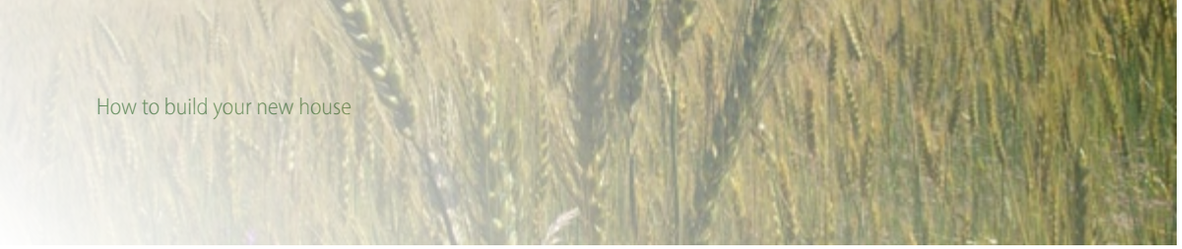



This model suckler cow farm is run by a company of two families and is bigger than an average farm in Germany. The profit of farms depending on grassland and suckler cows in Germany is generally low. In this farm a substantial part of the profit depends on EU-subsidies on one hand and on the earnings of arable crops on the other hand.

The profit of the conventional farm before conversion is about € 70,000. During the conversion period of two years the farm gets an additional subsidy of € 324 per hectare of arable land and grassland to promote the conversion.  Parts of the crops can be sold at higher prices as fodder to other ecological farms.

The additional costs for fodder components after conversion are low because the conventional farm was already managed extensively with no input of fertilizer on grassland and little purchased inputs for the suckler cows. In this case the subsidy over-compensates the losses in yield and the profit increases.






After the conversion period this type of farm can sell the sucklers to other ecological farms, but this will not result in higher prices, as there is no specific ecological premium for suckler calves. The profit after the conversion period is still higher as compared to the conventional farm, because of the subsidies for ecological farming which are about € 200 per hectare in this specific region of Germany. The sales of ecological crops with premium price contribute to farm economy but the subsidies make up a great part of the profit of ecological farms after conversion.

However, model calculations show what is possible to achieve under certain conditions with proper management. A change in conditions can easily overturn the outcome. Every farm is unique and requires individual calculations. The given examples of economic performance of ecological farms in Germany cannot easily be transferred to other farms and regions. Instead the possible effect and feasibility of converting to ecological farming should thoroughly be examined on each farm.

## Risk assessment

There is always a risk with all calculations concerning the future outcome. Forecasting and model calculations are more or less a qualified guess. It is therefore necessary to include a risk calculation, a worst case scenario, to identify the weaknesses involved in the calculations. Examples of risk assessment is to calculate how the farm economy will be effected if the milk price changes +/- 5 % , the costs changes +/-10-20 % or the interest rate changes +/- 1 %. It is also important to know how dependant your farm business is of the CAP rules and the direct support schemes.

## Useful information

In general, figures and studies on economic topics of ecological farms can be found at http://www.link.de



# Low-input strategy and cooperation

In the following chapters we will highlight the concept of low-input strategy for a dairy farm in Germany and give some examples of cooperations between ecological farms.

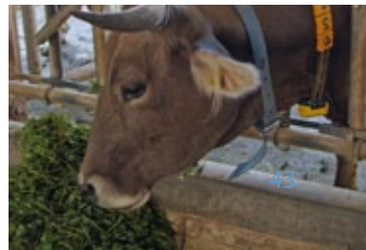
To use low input of resources is another way of running an ecological dairy farm. The strategy is based on less intensive breeds, high proportion of high quality forage and restrictive rations of concentrates.

## Low-input[6] strategy for ecological dairy farms

A couple of dairy farms in Germany pursue the low-input strategy. These farms are mostly located in the south of Germany. They are characterized by highly efficient forage utilization and a restrictive supply of concentrates. The concentrates are produced on the farm but in pure grassland regions additional concentrates need to be bought.

The low-input strategy demands high quality forage, which must be cut early in the year to gain high energy contents. Farms, that only feed hay, usually have hay drying equipment on the farm. During summer time the cows are fed exclusively on grazing. Some of the farms aim at seasonal calving in the winter to be able to feed high-energy forage in the first third of lactation.

6 Low input in the sense of high self-sufficiency, intensified measured to re-circulate nutrients and strengthen the ecosystem services associated with soils.




Low-input dairy farms work to some extent with less intensive breeds, e.g. *Fleckvieh (Simmental)* or *Braunvieh*. Compared to dairy breeds the cows and calves of these breeds are better paid as they are more of a meat-type breed. The farms have low replacement rates of 20 % or lower as the raising of heifers is very cost-intensive so the aim is that cows should stay in herds for at least five years to achieve economic viability.

These farms are mainly family farms and employ less external staff per cow than bigger intensive dairy farms. However, in other countries like New Zealand, this system is also widely used on large-scale dairy farms.

Low-input dairy farms partially sell their milk directly to the consumers via their own dairy or supply creameries with special compensation schemes, e.g. hay milk. The price difference between hay milk and silage milk is approx. 5 cent per kg milk.

The following performance values are extracted from an evaluation of 20 ecological, Demeter certified dairy farms in Southern Germany (see table page 45).
These farms feed between 1 to 1.2 tons of concentrates per cow and year. Milk yields on well-managed farms reach up to 4,300 kg milk per cow by only feeding forage. In general, milk yields reach between 5,600 and 6,400 kg ECM per cow. The farms are being characterized by high efficiency of concentrates, as they feed approximately 170 g of concentrates to produce 1 kg ECM.



Data from ecological, Demeter certified dairy farms with low-input strategy in Southern Germany

| | Unit | Group 1: hay | | Group 2: hay and silage | |
|---|---|---|---|---|---|
| | | 25 %[I] | aver-age | 25 % | Average |
| **Dairy cows** | Quantity | 41 | 37 | 55 | 47 |
| **ECM per cow** | kg | 5,756 | 5,641 | 6,611 | 5,976 |
| **Concentrates[II]** | Ton per cow | 1.24 | 1.13 | 1.11 | 1.05 |
| **Concentrates needed to produce 1 kg of milk** | Gram/kg milk | 214 | 200 | 167 | 174 |
| **Performance of forage[III]** | Kg milk/cow | 3,232 | 3.326 | 4,304 | 3,865 |
| **Acreage of forage** | Ha/cow or LU | 0.91 | 0.87 | 0.74 | 0.84 |
| **Corrected reproduction rate** | % | 20.7 | 22.6 | 25.2 | 25.9 |
| **Sale of milk** | €/ cow | 2,760 | 2,725 | 2,897 | 2,607 |
| **Other sales (e.g. calves)** | €/cow | 1,070 | 1,163 | 1,261 | 1,213 |
| **Premiums** | €/cow | 297 | 290 | 303 | 297 |
| **Total sales** | €/cow | 4,097 | 4,178 | 4,461 | 4,118 |
| **Concentrates** | €/ cow | 465 | 415 | 432 | 387 |
| **Forage** | €/ cow | 1,506 | 1,809 | 1,629 | 1,711 |
| **Other direct costs** | €/cow | 397 | 417 | 382 | 406 |
| **Total direct costs** | €/ cow | 2,368 | 2,641 | 2,443 | 2,504 |
| **Wages incl. family labor** | €/ cow | 908 | 1007 | 852 | 930 |
| **Other fixed costs** | €/ cow | 898 | 999 | 768 | 881 |
| **Total costs** | €/ cow | 4,174 | 4,647 | 4,063 | 4,315 |
| **Profit[IV]** | €/cow | -77 | -469 | 398 | -197 |

Source: M. Haugstätter, Beratungsdienst Schwäbisch Hall, 2012 (not published)

I The best 25% (sorted by profitability) of the group
II Mainly grain (wheat, rye, barley, triticale) and legumes like dry peas, field beans or lupines
III The milk yield per cow only by forage feed
IV Including costs for family labor

## Cooperation **between ecological farmers**

The concept of cooperation can look different depending on the need of both partners. The following concepts are common in Germany and in other countries as well.

### Fodder-manure cooperation

One form of cooperation that is of growing importance is the exchange of fodder and manure between cattle/dairy- and crop farms usually referred to as "fodder-manure-cooperation". The farms involved are normally within short distances for example 10-30 km, because bulk fodder and cattle manure require big transport facilities with high costs.

A crop farm without livestock needs clover and other legumes in its crop rotation to keep and improve its soil fertility but the farm has no direct use for the fodder crops itself. Mulching is costly and results in a reduced nitrogen-fixation. A crop farm without livestock usually has no machines for harvesting and processing fodder crops.

The livestock farm is permitted to harvest the clover/grass and in return delivers an amount of manure equivalent to the number of cattle that can be fed with the harvested fodder area. The fodder area is prepared, cultivated and harvested by the livestock farmer. The transport and use of the manure is paid or provided by the crop farmer. This cooperation does not require any financial transactions. Nevertheless, some farmers set up an agreement, sell the clover and buy the manure.

In a similar fashion there are also cooperations between crop farmers and pig or poultry farmers. However, the distance between these farmers can be long and therefore result in high transport costs.

### Cooperation in processing and marketing

Another very common form of cooperation aims at building up efficient marketing and processing. These concepts can be very large scaled (i.e. building up a dairy factory like "Upländer Bauernmolkerei" in Hesse), or smaller scaled like sharing a small-scale on-farm cheese production.

### Cooperative use of farm machinery and equipment

Other concepts are about sharing expensive machines like harvesters, trucks etc. Usually two or more farms purchase a machine together and participate in all following costs such as maintenance and repairs. Another, less common way, is when one farm buys a machine and sells his labour including the machine to the second farm. This concept is sometimes used for soil cultivation to buffer high workload in spring and autumn. Some farms establish and share storage facilities for grains, potatoes or legumes in a cooperative way.
A well-functioning cooperation is not only cost saving but a nice way of keeping company as farming is becoming more and more a solitary occupation.

### In short

- Economy and ecology is intimately connected with each other.
- Every farm is unique with its own conditions and possibilities.
- Define your market and sales channels.
- Make an action plan before converting and keep it alive.
- Think outside the box and see the possibilities.
- Build a network of people whom you trust and who have the same spirit as you have.
- Be patient. The economic benefit does not come overnight but gradually when all pieces fit together.
- Profitability is not automatically connected with a farm's size. A successful farmer is the one who can use his resources sustainably and efficiently, whatever size they have.
- Long term economic viability is only possible when standing on your own legs with no crutches.

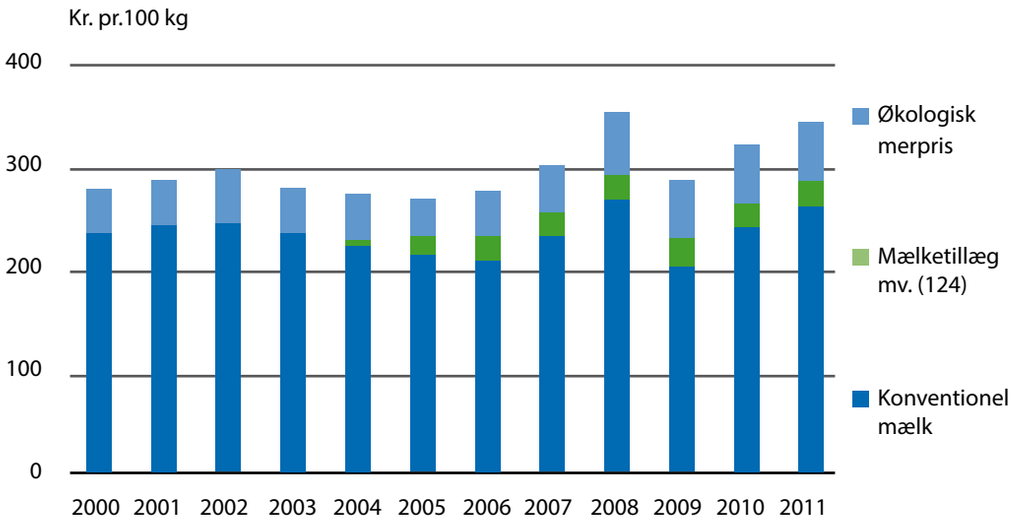
# Selected country studies

## DENMARK

### Estimate sales prices

In general, the price of ecological products is affected by the price of conventional goods. This is the case for the milk price as the premium price is added to the conventional price (see next figure).

The price premium of ecological milk (light blue) 2000-2011, Dkr/ 100kg




Source: Calculations by M. Tesdorpf, on the basis of information from Arla Foods.

The price premium for ecological milk was 0.579 Dkr/kg milk in 2011.
The size of the price premium is decided by the market situation and has been fairly stable during the last years.
The term "maelketllaeg" is an additional payment per year to all milk producers . The size of this payment varies from year to year depending on the annual result of the dairy.

In Denmark there are serveral smaller dairies but their milk price is not included in the figure. They usually pay a slightly higher milk price but mostly process only local milk. A well known dairy for ecological milk is Thiese.

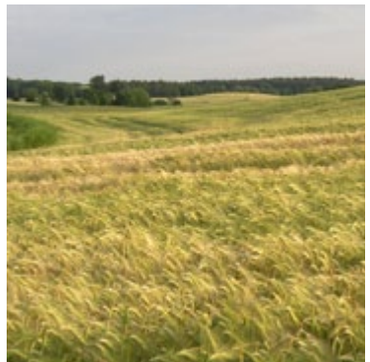


### Price of ecological and conventional cereals

Price of ecological barely 2007 - 2012


Source: Viedencentret for Landbrug

The price of ecological cereals in Denmark closely follows the price of ecological cereals in Germany, as Germany is the largest importer of Danish cereals. However, if the price differences exceed 75 Dkr, which is the cost of transport from Eastern Europa, then Germany will import from there.In 2011 the prices of ecological cereals boomed due to the scandal in Italy and many importers turned to Denmark because of its reliability.



## Promotion for ecological farming in Denmark

The commitment period for ecological farming is five years. Often the ecological farmer can apply for payment for extensive or environmentally friendly farming practices as well, €110/hectare (see next table).

Payments for ecological farming in Denmark, €/hectare

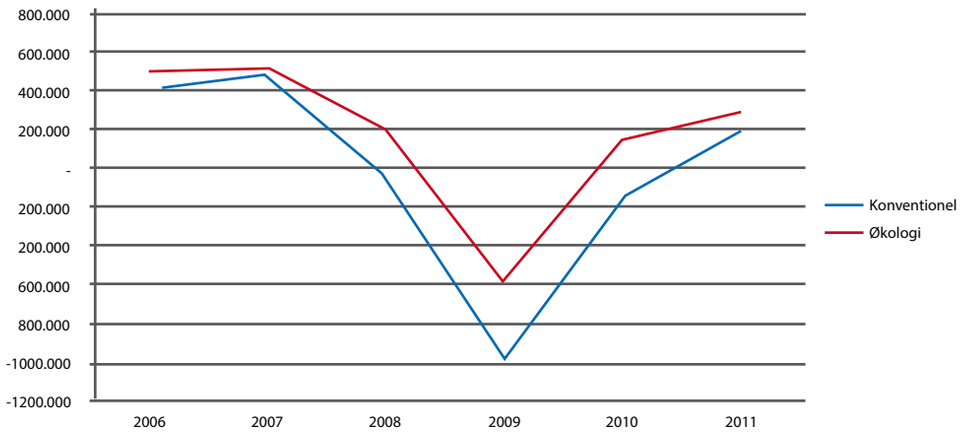
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| Conversion support | 140 | 140 | 13 | 0 | 0 |
| Extensive farming | 110 | 110 | 110 | 110 | 110 |
| Total | 250 | 250 | 123 | 110 | 110 |

Source: Oekolandmand. http://www.okolandmand.nu
More information also from http://www2.naturerhverv.fmv.dk

## Comparison between ecological and conventional diary production

The following figure shows the current economic result for ecological and conventional diary production during 2006-2011. The numbers are based on approx. 3,000 conventional and approx. 300 ecological farms.

The economic result of full time dairy producers in Denmark 2006-2011




DkrKilde: Økonomidatabasen, Videncentret For Landbrug.

The result of ecological dairy production is higher all through 2006-2011. The dip in 2009 is the result of the deep, global financial recession and the subsequent decline in consumer demand for dairy products. The whole dairy sector experienced an increasing pricing pressure with falling milk prices and a negative impact on farm economy. However, the ecological dairy producers were more able to adapt their production to the new situation, reduce their costs and increase their efficiency.

In 2011 the gap between the economic results of ecological and conventional dairy farmers were closing up as the cost of ecological protein fodder had increased more than that of conventional protein fodder.

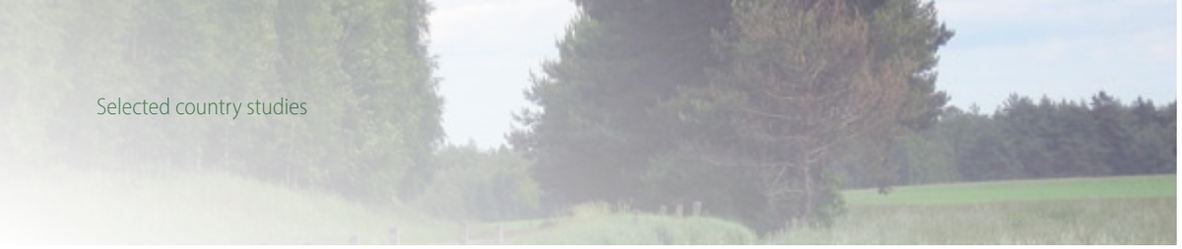
In the following table more background information is given to the figure on page 50 . The size of ecological farms is somewhat larger than conventional farms; both the size of dairy herds and arable land is larger.

Comparison between ecological and conventional diary production 2007-2011, Dkr

| Ecological | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Acreage, ha | 146 | 158 | 169 | 170 | 169 |
| Diary cows | 119 | 132 | 143 | 151 | 155 |
| Cows/ha | 1.23 | 1.20 | 1.18 | 1.13 | 1.09 |
| Profit/loss | 530,509 | 204,731 | -586,395 | 161,553 | 287,024 |
| Conventional | 2007 | 2008 | 2009 | 2010 | 2011 |
| Acreage,ha | 110 | 118 | 125 | 134 | 140 |
| Diary cows | 116 | 128 | 137 | 149 | 151 |
| Cows/ha | 0.95 | 0.92 | 0.91 | 0.90 | 0.93 |
| Profit/loss | 493, 072 | -39, 529 | -995,761 | -147, 237 | 200,768 |

Kilde: Økonomidatabasen, Videncentret For Landbrug. Uddrag.

Useful information: In general, figures and studies on economic topics of ecological farms can be found at http://1.naturerhverv.fvm.dk/vejledning_om_oekologisk_jordbrug-sproduktion.aspx?ID=2137





# POLAND

## Estimate sales price

In general, the price of organic products is affected by the price of conventional goods. In the following table, you will find the average yields and prices of organic production compared to conventional production in %.

Average yields and sale´s prices of conventional and ecological production 2006-2008 (Nachtman 2009).

| | Yields | | Price |
|---|---|---|---|
| **Specification** | **Average for Poland, conventional t/ha** | **Ecological yields in % of conventional =100%** | **Price of ecological products in % of conventional products** |
| Wheat | 3.87 | 72 | 128 |
| Triticale | 3.38 | 100 | 100 |
| Rye | 2.3 | 101 | 129 |
| Oats | 2.27 | 105 | 97 |
| Potato | 18.9 | 100 | 170 |
| Milk l/cow | 4,430 | 76 | 91 |

Average yields for Poland are low as more than half of the agricultural land in Poland is located where the soils are poor and where even the conventional yields are low. In most cases the ecological yields are lower than in the given table. The basis for the numbers in the table comes from 300 ecological farms.



## Promotion for ecological farming in Poland

In Poland the subsidies for ecological farming systems are the same for all regions. The next table shows the current payments. The commitment period for ecological farming is five years.

Payments for ecological farming systems in Poland, €/hectare

| Type of land | Payment, €/ha/year |
|---|---|
| Permanent grassland | 70 |
| Arable land | 200 |
| Vegetables | 350 |
| Herbs | 275 |
| Permanent orchards | 400 |

Source: http://www.minrol.gov.pl/eng/content/view/full/18575
(RURAL DEVELOPMENT PROGRAMME for 2007-2013, page: 238)

During the transition period the payment per hectare for arable land is € 215. The transition period is two years for arable land, grassland and vegetables and three years for orchards.

In the first edition of the Polish Rural Development Programme there was a support for livestock but in the current Second Program there is no such support anymore. The conversion period for livestock is the same as prescribed in the EU Regulation No 834.2007.

http://eur-lex.europa.eu/ LexUriServ/LexUriServ.do?uri=CONSLEG:1991R2092:20080514:EN:PDF

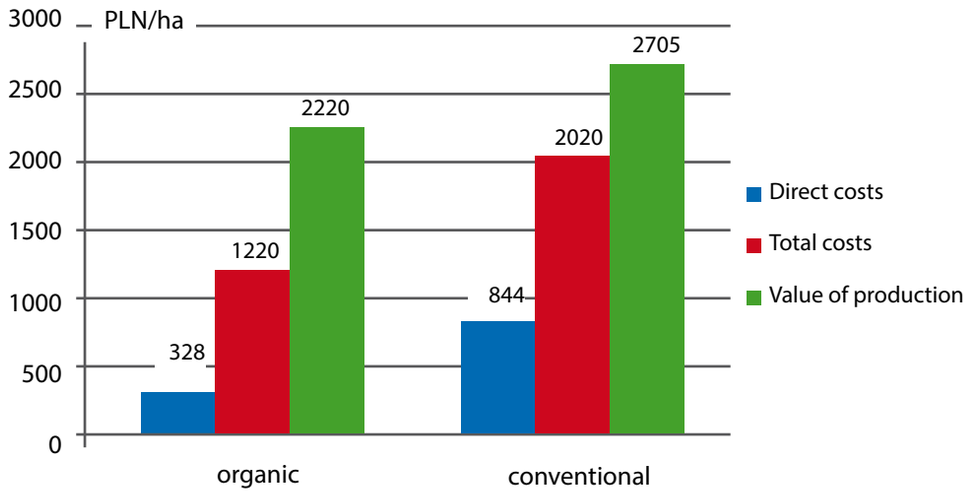
## Identify new cost structures

There is often a set of publications available for planning with guiding values in tabular form. You should only use such tabular values if you cannot get your own figures. To calculate your machine costs (such as maintenance, fuel, lubricants, insurance) there is also general data for guidance:
http://www.itep.edu.pl/wydawnictwo/inne.php?id=koszty_eksploatacji_maszyn
http://www.cdr.gov.pl/pol/wydawnictwa/poradnik_PROW.pdf

You can compare this data with your own figures and make a reasonable estimate. You can often use your own farm records and numbers as a starting point and adjust them to the new conditions. If you will set up a completely new farm business you have to rely on average farm data for your calculations.

The following two figures show the costs and value of ecological and conventional winter wheat and potato.

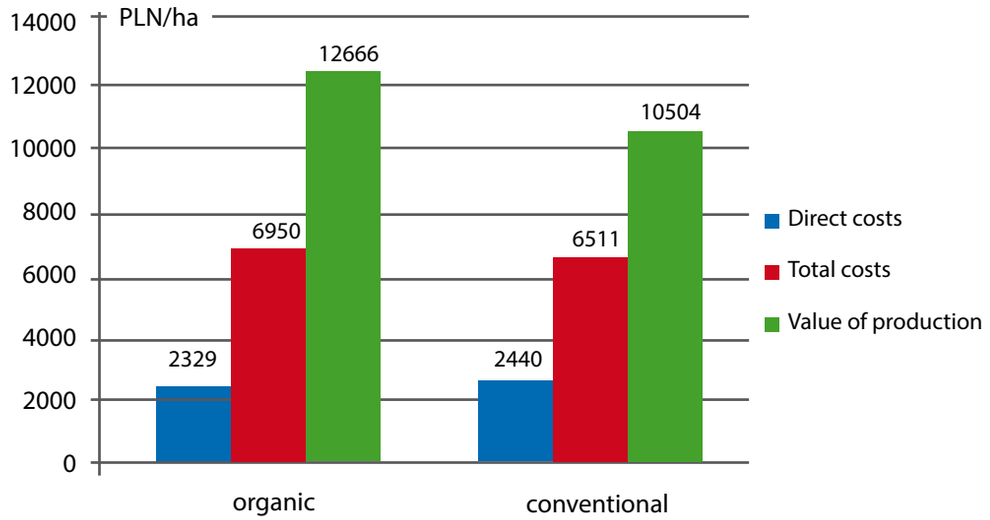
Comparison between costs and value of ecological and conventional winter wheat production in 2008. PLN/ha




Source: Nachtman 2009.



Comparison between costs and value of ecological and conventional potato production in 2008. PLN/ha




Source: Nachtman 2009.

### Comparison between ecological and conventional production of cereals

It is not fair to compare a single ecological crop with a single conventional crop as the economic result for an ecological crop is totally dependent on crop rotation and animal manure. However, the next table gives you an idea of the economic differences between the two production methods.

Costs and gross margin in selected Polish farms (Nachtman 2009)

| Crops | No of fields | Costs PLN/ha | | Gross margin PLN/ha | |
|---|---|---|---|---|---|
| | | Ecological | Conventional | Ecological | Conventional |
| Winter wheat | 19 | 328 | 1,138 | 1,901 | 2,046 |
| Winter triticale | 27 | 200 | - | 1,592 | - |
| Rye | 23 | 151 | 620 | 1,381 | 849 |
| Oats | 31 | 159 | 656 | 910 | 519 |
| Potato | 22 | 2,329 | 3,053 | 10,337 | 6,364 |

Although the data are from 2009, the relationship between the prices are more or less the same today.

## Comparison of the economic performance of Polish ecological and conventional farms in 2010.

Economic results of crop farms and dairy farms. 2010

| Variable | j.m. | Crop farms | | Dairy farms | |
|---|---|---|---|---|---|
| | | Organic farms | Total farms | Organic farms | Total farms |
| Agricultural lands | ha | 80.7 | 49.9 | 24.5 | 21 |
| Livestock load | LU/ha | 0.02 | 0.21 | 1.07 | 1.67 |
| Total outputs | PLN | 87,172 | 196,175 | 75,224 | 116,187 |
| Relation total output to total costs | | 0.88 | 1.23 | 1.16 | 1.22 |
| Crop outputs | PLN | 83,956 | 189,335 | 12,113 | 27,985 |
| Crop outputs on 1 ha | PLN/ha | 1,040 | 3,793 | 495 | 1,336 |
| Animal outputs | PLN | - | 3,473 | 62,060 | 87,117 |
| Animal outputs on 1 LU | PLN/ LU | - | 2,510 | 2,961 | 4,352 |
| Total costs | PLN | 99,382 | 159,435 | 65,110 | 95,315 |
| Direct costs | PLN | 25,910 | 65,445 | 19,654 | 42,708 |
| General economic costs | PLN | 37,384 | 42,579 | 22,104 | 26,284 |
| Subsidies to operating activities | PLN | 111,042 | 58,361 | 44,215 | 24,964 |
| Gross value added | PLN | 132,285 | 143,112 | 76,095 | 71,279 |
| Gross margin | PLN | 61,262 | 130,730 | 55,570 | 73,479 |
| Gross income of farming | PLN | 91,272 | 92,600 | 53,125 | 45,573 |
| Gross income of farming per full-time paid employee | PLN/ FWU | 72,409 | 57,931 | 27,035 | 26,929 |

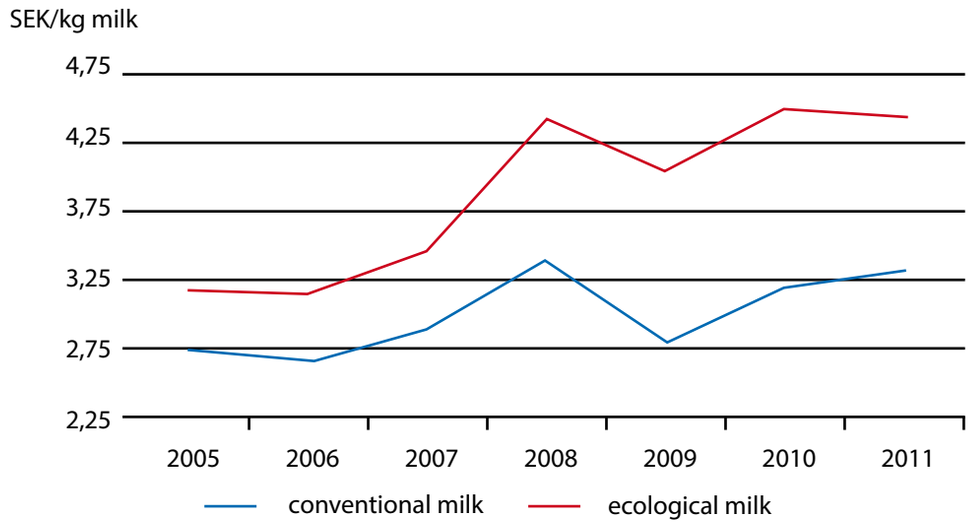


# SWEDEN

## Estimate sales prices

In general, the price of ecological products is affected by the price of conventional goods. This is the case for the milk price as the premium price is added to the conventional price (see next figure). The price includes additional payments.

**Price of conventional and ecological milk. SEK/kg milk**

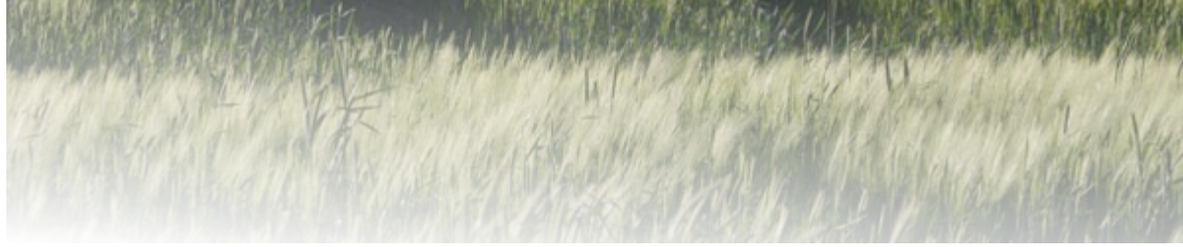



Source: Swedish Dairy Association

During 2005-2010 the premium price for ecological milk varied between 0.48-1.16 SEK/kg milk and peaked in 2010 with 1.33 SEK/kg milk.

Many dairy farms ended their conversion during 2010 and started to deliver ecological milk[7].The engine of the ecological market has always been ecological dairy products but in 2011 the market slowed down and today there is a substantial overproduction which has resulted in a lowered premium price. There are several farms in line to start delivering ecological milk but today the doors are closed.

7 All ecological milk in Sweden is certified according to a national standard; KRAV, which is a higher standard than required by the EU ecological regulation.



The price of ecological cereals is very dependent on the market situation. It is also dependent on the size and quality of the harvest in neighboring countries. The domestic market for ecological cereals is small and Sweden imports about 20 % of its market needs per year.

Pool prices of ecological cereals, SEK/ton

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 |
|---|---|---|---|---|---|---|
| **Winter wheat** | 3,080 | 3,030 | 3,050 | 1,820 | 2,370 | 3,200 |
| **Winter wheat, fodder** | 3,080 | 3,030 | 3,050 | 1,820 | 2,300 | 3,200 |
| **Rye** | 2,950 | 3,010 | 2,460 | 1,600 | 2,690 | 3,200 |
| **Triticale** | 2,950 | 2,910 | 2,960 | 1,750 | 2,050 | 2,910 |
| **Spring wheat** | 3,250 | 3,280 | 3,120 | 2,130 | 2,700 | 3,750 |
| **Oats** | 2,900 | 3,280 | 3,110 | 1,410 | 2,700 | 3,000 |
| **Oats, fodder** | 2,550 | 2,530 | 2,910 | 1,280 | 2,510 | 2,810 |
| **Spring barely** | 3,080 | 3,030 | 3,050 | 1,800 | 2,240 | 3,210 |
| **Malting barley** | 3,300 | 3,230 | 3,410 | 1,830 | 2,820 | 3,750 |
| **Peas** | 3,810 | 3,850 | 3,650 | 2,850 | 3,850 | 3,900 |
| **Peas, fodder** | 3,500 | 3,410 | 3,190 | 2,440 | 3,450 | 3,500 |
| **Faba beans** | 3,500 | 3,510 | 3,310 | 2,330 | 3,420 | 3,500 |
| **Rape seed** | 7,250 | 6,480 | 6,070 | 5,630 | 6,260 | 5,100 |

Source: Lantmännen, Sweden. http:// www.lantmannenlantbruk.se

The harvest and yield of winter rape has been extremely successful in 2012 and the price is soaring. In recent years, the acreage grown with peas has declined in favor of faba beans.

The number of farms with ecological livestock production has grown more rapidly than farms with ecological crop production during the last years. This has resulted in a shortage of domestic fodder grain and protein crops. According to a report published in the beginning of 2012 some 50,000 ha are missing[8]. Today this shortage is covered by imports but opens up a great business opportunity and a possibility for cooperations between ecological crop farms and livestock farms for mutual benefits. The crop farm delivers fodder grain and protein crops to the livestock farm and benefits from perennial leys and manure in its crop rotation. The livestock farm, especially the farm short of land, benefits from increased self- sufficiency and locally grown animal feed.

## Promotion of ecological farming

In Sweden the promotion of ecological farming is part of the Agri-environmental payment scheme in the Rural Development Programme. There are two different levels of payment for ecological farming; certified production and non-certified production. The level of payment is the same for the whole country. The commitment period is five years and the payment is the same for all five years.

Payments for certified and non-certified ecological farming, SEK/ha

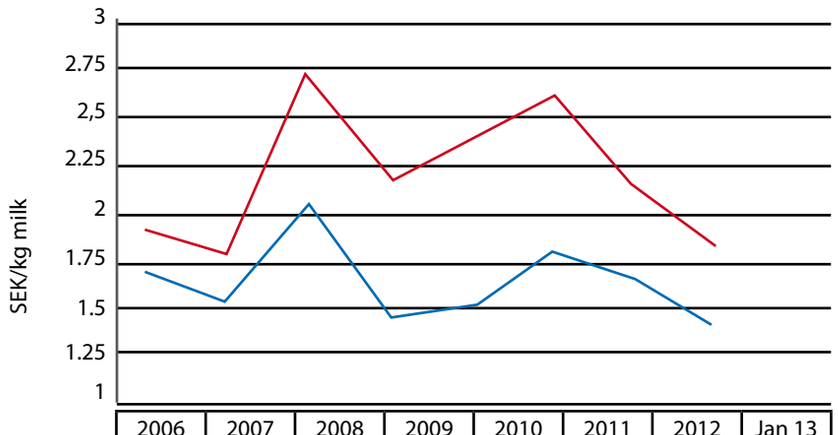
| | Certified ecological production | Non-certified ecological production |
|---|---|---|
| Cultivated grassland | 350 | 0 |
| Cereals, protein crops | 1,450 | 650 |
| Fodder beet, other annual crops | 1,450 | 650 |
| Oil seeds, linseed, peas, breeding of ley seeds | 2,200 | 1,100 |
| Potato, sugar beet, vegetables | 5,000 | 2,500 |
| Fruits, berry culture | 7,500 | 3,750 |
| Livestock, per unit | 1,600 | 800 |

Source: The Swedish Board of Agriculture. http://www.jordbruksverket.se

8 Lars Jonasson. Regional balance of ecological fodder. 2012

A common key figure used in Sweden to measure the profitability in dairy farming is milk price over feed cost. The development of the key figures during 2006-January 2013 is shown in the next figure.

Milk price over feed cost. SEK/kg milk




| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Jan 13 |
|---|---|---|---|---|---|---|---|---|
| conventional | 1.7 | 1.55 | 2.1 | 1.45 | 1.5 | 1.8 | 1.65 | 1.4 |
| ecological | 1.9 | 1.75 | 2.75 | 2.15 | 2.45 | 2.65 | 2.15 | 1.8 |

Source: Ekologiska lantbrukarna nr 1 2013. http://www.ekolantbruk.se

The costs for feed includes the fodder for the dairy cow and her calf and the costs for home grown feed. The milk price is an average price including additional payments.

The profitability of Swedish dairy production has decreased steadily during the last years due to increased volatility in milk price and fodder prices. Arla foods, the largest producer of ecological dairy products in Sweden and in the world, has gradually cut the premium price from SEK 1.33/ kg milk to SEK 0.77/kg milk. As the figure above shows, there was a heavy dip in profitability in 2009 and many farmers have not yet been able to catch up and restore their farm economy before the current dip. The situation today is extremely trying and many dairy farms shut down their milk production.

## Comparison between ecological and conventional crop production

Model calculations are a useful tool to show different scenarios of how farm resources can be utilized and their impact on farm economy. However, model calculations are always theoretical calculations where the conditions are fixed and reality does not interfere.

The model calculation below shows the difference in the profitability of conventional and ecological crop farming. The basis of the scenario is two farms, one conventional and one ecological, which both cultivate 100 hectares of arable land.

The conventional crop farm cultivates winter wheat, spring barley (oats) and winter rape. The ecological crop farm cultivates winter wheat, spring wheat, spring barley (oats), winter rape, fodder peas and green manuring in a seven-year crop rotation. The economic outcome is shown in the following table.

Calculation of gross margin 3 of conventional and ecological crop production. SEK

| | Conventional production | | | Ecological production | | | Difference |
|---|---|---|---|---|---|---|---|
| | Ha | Gross margin 3 per ha | Total gross margin 3 | Ha | Gross margin 3 per ha | Total gross margin 3 | Total gross margin 3 |
| Winter wheat | 60 | 3,018 | 181,080 | 14.3 | 6,801 | 97,157 | -83,923 |
| Spring wheat | | 2,333 | 0 | 14.3 | 5,702 | 81,457 | 81,457 |
| Spring barley (oats) | 20 | 2,351 | 47,020 | 14.3 | 4,376 | 62,514 | 15,494 |
| Winter rape | 20 | 3,607 | 72,140 | 14.3 | 8,383 | 119,757 | 47,617 |
| Fodder peas | | 0 | 0 | 14.3 | 6,086 | 86,943 | 86,943 |
| Green manuring | | 0 | 0 | 28.6 | -1,001 | -28,600 | -28,600 |
| Total | 100 | | 300,240 | 100 | | 419,229 | 118,989 |

Source: Lars Jonasson, Regional balance of ecological fodder 2012

The calculations are based on production branch calculations published by The Agricultural Society in 2010. Branch calculations show the gross margin at different levels and are based on the accounting of revenues and costs of a single branch of production. Level 3 shows revenues minus all costs (variable costs and costs for labour, buildings and equipment).

The difference in the economic performance is 1,189 SEK/hectare in favour of ecological production despite that one third of the area is cultivated with green manuring.

Useful information: http://www.jordbrujsverket.se, http://www.hush.se, http://www.ekolantbruk.se

# Appendices

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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.

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www.pkegliwice.pl

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www.podr.pl

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### 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 Recycling Agriculture. 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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