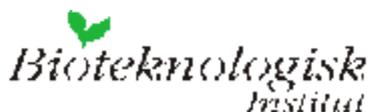


Literature Review
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EXECUTIVE SUMMARY

The market for organic products has gone from being characterised by fluctuating supply, unstable prices and arbitrary sale some 20 years ago to presently being much more organised through the introduction of a national eco-label, contractual obligation to farmers and the use of conventional distribution channels. There are two non-governmental organisations which both have individual regulations and corresponding labels less widespread. These are seen as supplements to the national legislative rules and agricultural products labelled “bio-dynamic” or “organic” must be produced in accordance with State regulations.

Organic research accelerated in the beginning of the 90s, but due to lacking unity and conformity the Danish Research Centre for Organic Farming (DARCOF) was established in 1996 by the Ministry of Food, Fisheries and Agriculture. DARCOF is a “research centre without walls” where research scientists remain in their own institutions but collaborate across institutions. Grass-root research is also a ministerial priority and is carried out by farmers. Organic agriculture is gaining importance in the educational system, e.g. contacts have been established between agricultural schools and the Agricultural Advisory Centre, and organic farming has been integrated into the conventional teaching at the agricultural schools. If a farm is authorised to organic farming it is eligible for a number of subsidies, which are conceptualised as area support. The organic advisory system is an integrated part of the conventional system, and key functions include advice on educational, economic and social issues.

State authorised organic farming was introduced in 1987, but conversion did not accelerate until 1995. In 1999, 5.4 per cent of the total number of farms in Denmark was organic and the average production area belonging to organic farms exceeded that of conventional farms. The distribution of size of land for organic farms deviates from the one of all farms in the case of a very small and large farms, hence, in both cases the relative share of farms is bigger for organic farms. Type of farming in organic farms largely corresponds with the over all distribution in the agricultural sector, where crop production is predominant followed by cattle, mixed farms and other livestock farms. The relative shares differ with respect to cattle where organic farms relatively produce more cattle, and this supports the fact that dairy products are the most important organic product category in terms of market share. Oppositely, pig production is less widespread in organic farming. The regional distribution of organic holdings is geographically unequal, about one organic holding in five is situated on the Islands, and on average these have smaller area and livestock than holdings in Jutland.

There exist little and scattered information on imports and exports of organic products. Import is limited in most areas but important for organic fodder. Export has only existed a few years but is gaining importance, however, it is restrained by the need for organic certification in the import country.

The structural differences in farms are reflected in the economics, hence gross output per holding in Jutland in 1999 was nearly twice the output on the Islands. More than 50 per cent of the organic holdings are part-time holdings but these contribute with an insignificant output share. A large percentage of arable holdings are part-time whereas most organic dairy production takes place on full-time holdings.

Motivators for converting to organic farming can by and large be divided into three areas: environmental, financial and normative motivators. Relative importance of the three cannot be established but it is suggested that potential organic farmers generally have such conditions in e.g. the production that conversion would be possible without taking an unpredictable and great risk.

General identified barriers to conversion are lack of knowledge, long-term unstable demand, lack of export possibilities and relative importance of the hectare support. More specific barriers to conversion are rules concerning the number of animal units per hectare, too large areas of rented land, worn down stables and the soil quality.

Concerning the marketing constraints organic producers are accused for lack of initiative concerning sales effort and product placement and for focussing too much on production. Another problem is the lack of product development, frequently organic products are merely analogue to already existing conventional products (Sall&Sall, 2000).

The producer price premium is significantly higher on pig meat than on beef, which varies a lot. Premiums on milk are unknown because the settlements of accounts for whole milk are often kept confidential. The retail trade is a two-string system. Co-op Denmark plays a domineering role in the indirect sales system, since it is consumers' preferred choice as to where to buy organic food products and has the largest market share in organic products. Direct sales are also important because the distance between producer and consumer is minimised and the organic products' credibility is strengthened. The milk and meat processing industries are dominated by single firms, ArlaFoods and Friland. ArlaFoods has an extensive organic product line with own brand. In addition to Friland's organic product line Friland markets products that are labelled with a guarantee-label from a society for the prevention of cruelty to animals.

Organic products account for about 3 per cent of the total sale of food products, but the size of market share varies a lot between product categories. Milk is the most important category representing a market share of 20 per cent in 1999. Processed food has been launched with limited success and presumably because consumers do not find processed food to be in

accordance with organic principals/values. Also, production of processed foods is subjected to technical production constraints.

Premiums paid to farmers and by consumers are in ranges of respectively from 10% to >100% and from 0% to 100%, but there seem to be no direct connection between premiums paid to the farmer and premiums paid by the consumers. Generally, most organic-produced products are sold as organic, with most sales problems for milk and beef products.

About 95 per cent of organic products in Denmark carry the national, official eco-label, introduced in 1990 by the government. Consumer awareness of the eco-label is high but knowledge of the underlying criteria relatively low.

The more environmentally concerned consumers are, the more they perceive organic products as being more natural than conventional ones. Consumers who are concerned with the environment are willing to pay a premium price for organic products and also buy more organic products. Consumer purchasing motives vary, but by and large purchasing motives are in accordance with product characteristics, namely considerations for the environment, animal welfare and the derivative effect of the reduction of the overall health risk. About 80 per cent of Danish consumers have purchased organic food products, but only 1-2 per cent attempt to buy it exclusively. On an aggregate level “organic” consumers live in urban areas, they are women and are more worried about food security than the average consumer.

Habits, premiums, lack of knowledge and the availability of organic products are seen as large constraints on consumption of organic food products.

1. NATIONAL POLICIES

1.1 Historical Overview

In this section significant historical highlights of organic farming in Denmark will be described briefly. The description takes starting point in Hamm and Michelsen's (1996) (here from (Wier and Calverley, 1999)) characteristics of the development of organic farming as three individual periods, namely a supply driven period, a policy-driven period and a demand driven period.

The supply driven period: The years 1981 – 1987 were characterised by an increasing awareness about organic products and the market for organic foods gained significance. The Danish organic movement was organised in 1981 with the foundation of the *Danish Association of Organic Agriculture (LØJ)*. The movement consists of farmers, consumers and processors and has established guidelines for organic farming, control procedures and a label for organic products. Co-op Denmark (FDB) started its distribution of organic products and hereby presented organic products to a new, larger audience. Previously, organic products had merely been distributed through special stores or directly from the farms (Michelsen, 1993). The packing of the products remained borrowing and the vegetables unwashed. The period was also characterised by fluctuating supply and unstable prices, primarily because the farmers' sale was arbitrary and lacked contractual obligations.

The policy-driven period: The years 1987 – 1993 were marked by the implementation of a State programme which, among other things, included financial support to organic farmers and marketing and research into the area of organic farming. The LØJ was extensively involved in the formulation of the Danish national organic farming regulations since this organisation had already formed rules independently. Additionally, the national eco-label guaranteed by the State was introduced. In connection with this, the State introduced regulations concerning organic farming and control procedures, which the farmer had to accept if he wished to produce organic products and use the State label. Supply became less fluctuating and farmers were to a larger extent bound by contractual obligations.

The demand-side driven period: In the years 1993 – 1996 a progressive marketing period was introduced by Co-op Denmark and prices were lowered by 15 to 20 per cent. This meant an increase in market share of organic products from 1-2 per cent in 1990 to 4 per cent in 1995. At the end of this period 90 per cent of the Danish supermarkets offered organic products. The retail business' sale and promotion of organic products had a tremendous effect in this period. Political support for organic farming has so far been strong both nationally and supranationally. Being the first country in Europe the Danish Minister of Agriculture and Fisheries created the "Action Plan for Promotion of Organic Food Products in Denmark" in 1995 which included 65 recommendations. Some priorities of the Action Plan were to achieve conversion of 5 per cent of total farmland by 2000 and

intensify research, development and education within the organic sector. According to the Council of Organic Agriculture the implementation of the Action Plan 1995 had been successful (Lampkin et al., 1999) and a second Action Plan was released in 1999.

1.2 Key Organisation

1.2.1 Co-op Denmark

Co-op Denmark's progressive involvement in the development of the organic market in Denmark is thought to have had a tremendous impact on the present market situation. "The interaction between organic farmer and other actors has not been guided by any 'master plan' from either party, but it seems decisive that some agents were able to guide action by visible hand efforts: FDBs loyal demand and willing payment of adaptation and advertising costs, the Danish State's support to developing marketing institutions and steady work by the conventional dairy co-operation direct servicing supermarkets both organic and conventional farmers" (Hamm & Michelsen, 1996 here from (Wier and Calverley, 1999)). The investment in an establishment of an organic product-group image and the positioning of organic products to the "entire" population as a well-known and well-assessable distribution channel has therefore had a invaluable effect on the sale of organic products.

1.2.2 Non-governmental Organisations

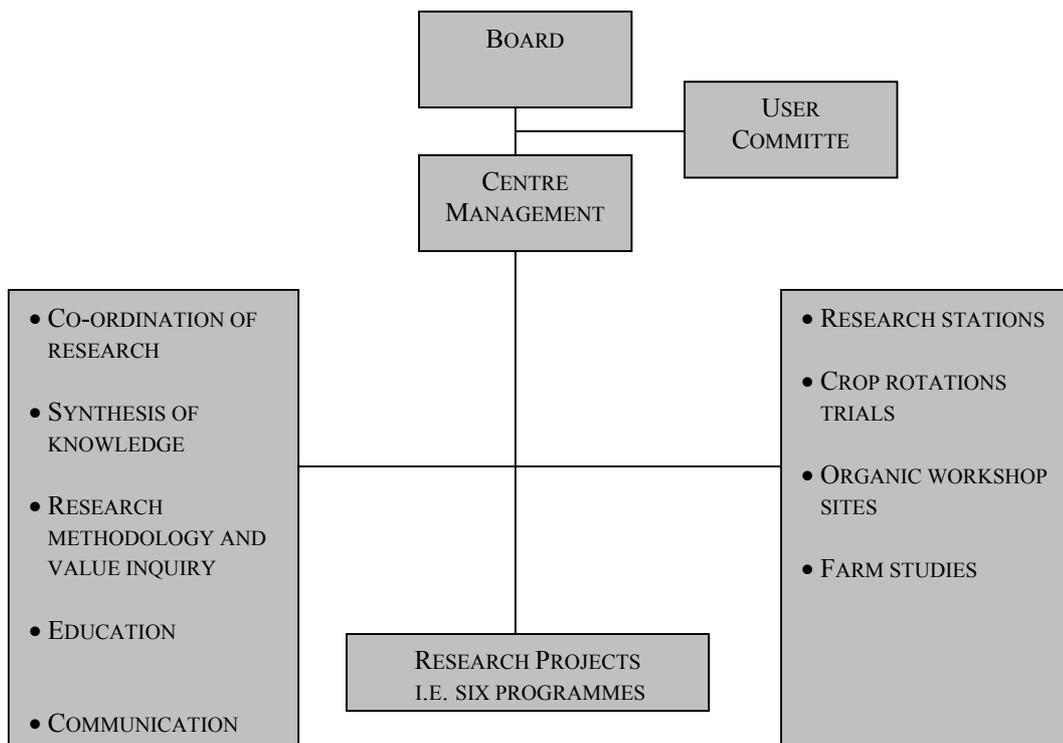
There are several non-governmental organisations in Denmark which function as grass root organisations and advisory services and some have separate organic product criteria.

There are primarily two non-governmental organisations of importance: The Biodynamic Association (FBJ) and The Danish Association of Organic Agriculture (LØJ). Both organisations have individual regulations and corresponding labels. The regulations of the former are inspired by biodynamic principles and deviate somewhat from the state regulations. Contrary, the regulations of the latter mainly deviates in the sense that it is stricter. Presently, the organisation rules are a supplement to the state legislation on organic farming because agricultural products labelled "bio-dynamic" or "organic" must be produced in accordance with the State regulations. Being represented in the Organic Food Council, which is an advisory body for the Minister of Food, Fisheries and Agriculture, The Danish Association of Organic Agriculture also wishes to play a role in influencing the political agenda. Among other things, the organisation has an impact on the development of the advisory services to organic farmers being a member of a working group under the Agricultural Advisory Centre. LØJ and FBJ are some of the organisations joined in the umbrella organisation Økologiens Hus [The Organic House], a service organ, which attempts to profile ecology on different areas. Økologiens Hus works with development of rules, policy, information consumer analyses and promotion of organic export.

1.2.3 Research Institutions

Organic research caught speed in the early 90s, but lacked conformity and unity and was marked by individual researchers from different functions (Ministry for Food Agriculture and Fisheries, 1999a) as a result The Danish Research Centre for Organic Farming (DARCOF) was established in 1996 by the Ministry of Food, Fisheries and Agriculture. DARCOF I ran from 1996 to 1999 and received about DKK 100 million from the Ministry for research and development and 33 projects were completed. DARCOF II is running from 2000 to 2005 and was initially allocated DKK 160 million (DKK 32 million/year) from the Budget, but additional funds have been allocated from the budget in 2001. DARCOF II consists of 26 planned projects(DARCOF, 2001). In connection with DARCOF I the Ministry established an organic research station, set up organic workshops, formalised collaboration with selected private, farms and established a research professorship in organic plant production at the Royal Veterinary and Agricultural University. Currently, DARCOF has approximately 100 research scientists in 15 participating institutions¹. DARCOF is called a “research centre without walls”, hence researchers remain in their own environment but collaborate across institutions. The main responsibility and objectives of DACROF is to initiate, co-ordinate, evaluate and manage ongoing research projects; to generate information relating to environmental, health and social implications; contribute to education of researchers, consultants and lectures in primary production; and communicate findings of R&D to the organic farming community.

Figure 1.1: Organisation of DARCOF



Although the main research activities are organised within the framework of DARCOF some institutions still carry out organic research independently.

Grass-root research maintains to be an important priority and is meant as a supplement for the established research on research institutions. Grass-root research is carried out by organic farmers and financed by the Budget. Projects that can be supported include development of organic farming, product quality in primary production and the relationship between organic farmers, consumers and the local society. In 2000 approximately 120 research projects were approved which correspond to DKK 19 million. The results from grass root research are published on the web by the National Advisory Centre.

1.2.4. Organic Agriculture & Education

This section treats the integration of ecology in the agricultural education system and implementation in the educational system as such.

Whereas it was virtually non-existent some years ago, organic agriculture is moderately gaining importance in the educational system due to the increased interest in organic farming. First of all, there has been established a dynamic contact between the agricultural schools and the agricultural advisory centres so that the schools receive information in line with the local agricultural advisors. Secondly, organic farming is now integrated into the conventional teaching at the agricultural schools. Thirdly, organic training is offered by the in-service schools or the local advisory centres (as in service training), which primarily have been focussing on basal knowledge concerning organic agriculture. However, the interest in organic farming, which is reflected in the increasing conversion rate does not show among the students at the agricultural schools, since courses in organic farming are often cancelled. Another drawback is the complete lacking of integration of organic farming (on the graduate level) in the super imposed courses, which are mandatory if one wishes to acquire a farm larger than 30 ha. (Section is based on (Ministry for Food Agriculture and Fisheries, 1999a)).

1.3 Support Mechanisms

In this section the area of support mechanisms will be covered. Firstly, the EU and national support schemes available to organic farmers is described and secondly, financial support given to market development and processors is described.

1.3.1 Support Scheme for Farmers

The ministerial order on financial support to organic agriculture is the base of this section (Ministry for Food Agriculture and Fisheries, 1998). This section focuses on the support incentives initiated by the Danish government and of supra national initiative only the hectare support is mentioned.

The Danish State offers a number of financial support possibilities for farmers and organic farmers in particular. The rationale behind the national support scheme is to be able to cover national demand for organic products by nationally produced products, which is thought to be in line with organic thinking (Ministry for Food Agriculture and Fisheries, 1999a). The Danish Directorate for Food, Fisheries and Agriculture administers the support for organic farmers. The support is based on the number of hectares and is divided into a conversion part and a permanent part. Presently, the following five systems (a-f) of subsidies are at the disposal of organic farmers:

Table 1.1: Support Rates for Organic Farms in DKK per ha/year, 2000

	Year 1	Year 2	Year 3	Year 4	Year 5	New obligation period
EU support incentives:						
HECTARE SUPPORT, NOT CONDITIONED BY ORGANIC FARMING	2,169	2,169	2,169	2,169	2,169	2,169
National support incentives:						
(a) Maintenance	850	850	850	850	850	850
(b) Conversion/transition	450	450	-	-	-	-
(c) Prolonged cultivation of grass, not conditioned by organic farming	600	600	600	600	600	600
(d) Sensitive agricultural areas, not conditioned by organic farming	500	500	500	500	500	500
(e) Farms with no milk quota	2,000	2,000	(1,200)*	(500)*	(500)*	-
(f) Reconvert to pig production **			2,000	2,000	2,000	-
Upper limit incl. EU support	5,000	5,000	4,000	3,500	3,500	3,500
Upper limit incl. EU support when pig production	5,000	5,000	5,000	5,000	5,000	3,500

*Not available when having organic pig production

**The hectares occupancy rate must be no higher than 0.5-0.7 animal unit/ha per year in order to receive the subsidies, animal unit is defined as 100 kg. N ab stock. (e) and (f) cannot be obtained simultaneously

1.3.1.1 Notes to table 1.1

(a) *Subsidies for Maintenance, §5*, is to be seen as a mean to retain converted farms organic.

(b) *General subsidies for conversion of land, §5*, can be seen as a compensation device as the purpose is to compensate for the decline in revenue, which organic farmers will have in the two-year conversion period in which the products cannot yet be sold as organic, i.e. at a higher price.

(c) *Areas with prolonged cultivation of grass* are equally secured state support and the SLF-support (see d) can also be given to these areas.

(d) *Sensitive agricultural areas (SLF-Support), §5*, are subsidies as well. The purpose is to establish equal competition between conventional farmers and organic farmers in these areas, but several demands are posed to the farmer if he/she wishes to receive this type of subsidy.

(e) *Supplementary subsidies for farms without milk quota, §6*. Here the purpose is to encourage farmers, who exclusively cultivate plants, to produce organic feed grain and the promoting production of organic pigs, poultry and eggs. This subsidy requires that at least 50% of the farm be grown with crops entitled to EU hectare subsidies.

(f) *Supplementary subsidies for established pig production when this is reconverted to organic production no milk quota, § 7*. The purpose is to promote the conversion of pig production over from conventional to organic. This subsidy also requires that a minimum of 50% of the farm is grown with crops entitled to EU hectare subsidies.

If the total support exceeds the upper limits adjustments are made in the support given by the Danish State. Land which lie fallow, non-food production, Christmas trees and forest are not allocated any financial support. The above-mentioned support rates are all taxable and are reported automatically to the taxation authorities.

The period in which support is given is minimum five years hence it ends five years after the beginning of the conversion of the last piece of land, §1. This period can be extended to another five years if the farmer re-applies and so forth. Year one and two are conversion years, meaning the products produced cannot be sold as organic during this period. This can only be done in year three. All animals and land must be fully converted within four years, this means that a more gradual conversion is possible. The farm has to be authorised to organic farming to be entitled to receive area support and normally, the farm has to be fully organic including all rented land etc.

Other support mechanisms includes:

- *Support for Environmental Farming Methods*
- *Support for Product Development*
- *Support for Demonstration Projects*
- *Support for Organic Development Projects (incl. Grass-root research & conversion of catering centres)*

In the early years of organic farming almost two thirds of the national funding went towards information for consumers and farmers, education and exhibitions, advisory/extension services to farmers, demonstration farms and product development.

Farmers are supported indirectly through the promotion of 'organic kitchens' in public institutions etc. The state initiated a three-year system of subsidies for establishing organic catering centres (1997-2000). This system provided the possibility of getting 40-50 per cent of the expenditures state-subsidised if municipal or other public institutions converts to ecological kitchens. (Ministry for Food Agriculture and Fisheries, 1999a)

1.4 Certifying Bodies and Inspecting Systems

In the following section the procedures concerning authorisation and control will be elucidated, the section is chiefly based on The Governmental Order concerning Financial Contributions to organic farming (Ministry for Food Agriculture and Fisheries, 1998) which authorities and control systems are regulated by.

There are two departments of relevance when considering the certifying bodies and inspecting systems The Plant Directorate and The Danish Directorate for Development in Agriculture and Fisheries.

Agricultural produce can only be sold as organic in Denmark if the farm is authorised by The Plant Directorate, which is an organisation within the Ministry of Food, Agriculture and Fisheries. If applicants meet the requirements set by the Plant Directorate, authorisation will be granted and the application will be forwarded to the Danish Directorate for Development in Agriculture and fisheries, which administrates the application of support.

Both directorates have full access to authorised farms, the accounts, the balance sheets etc, §27. The Plant Directorate inspects all farms at least once a year during the summer. Additionally, 15 per cent of the farms are controlled unannounced and the stables and feeding in all larger farms with animal husbandry are controlled during the winter (Wier and Calverley, 1999). The Danish Directorate for Development in Agriculture and Fisheries uses the information gathered by the Plant Directorate when granting the subsidies.

A breach of the regulations can result in public prosecution, fine, scrapping of produce or deprivation of the authorisation all depending on the character of the violation. In 1999 six farmers had their authorisation deprived (Ministry for Food Agriculture and Fisheries, 1999b).

The Veterinary Services, the Municipal Food Control Units and the National Food Agency of Denmark approve and control enterprises producing and manufacturing organic foods.

The relevant associations, which have specific organic procedures and an independent eco-label, additionally control the farms that adhere to them.

1.5 Advisory Service

The organic advisory system originates from 1985, and in 1996 it became an integrated part of the national advisory system.

The Danish Agricultural Advisory centre is one out of the two levels in the advisory system of which the farmers are both the owners and the users. The Danish Agricultural Advisory centre is owned by the national farmers' organisation (two thirds) and the Danish Family Farmers' Association (one third). The primary task of the Advisory Centre is to provide technical knowledge, know-how and service to the approximately 75 local advisory centres. Hence, the Advisory Centre functions as an "advisor to the advisors". On the Advisory centre a specific group is concerned with organic agriculture. The local centres give the farmers advice on educational, finance, IT, social and technical issues within all types of farming. Some types of organic farming are still relatively rare e.g. sheep and poultry production and in these cases direct advice to the farmers is provided by the central Advisory centre.

The Advisory Centre initiated a national information campaign from 1990 to 1994, which also promoted the organic national label to the population. The Advisory Centre has a "travelling advisory service" which assists farmers who wish to seek finance for product development within organic farming.

2. AGRICULTURAL PRODUCTION

In the following section the evolution and status quo of organic agriculture will be elucidated. Firstly, characteristics of the Danish organic agricultural sector such as area, size of population, types and geographical location, are described. Secondly, the Danish import and export of organic products are examined.

2.1 Number & Area

The division of hectares and number of farms between organic and conventional farming appear from table 2.1. In 1999, 5.4 per cent of the total number of farms in Denmark was organic and the average production area belonging to organic farms exceeded that of conventional farms.

Table 2.1: Number & Area of Organic Farms' relative to All farms, 1999

	All farms	Organic farms	
		Total	Share of all farms
Number of farms	57,831	3,099	5.4%
Total production area in ha s	2,644,048	146,685	5.5%
Converted organic land	-	60,232	2.3%
Average production area per farm in ha	45.7	47.5	-

Source: (Statistics Denmark, 2000)

State authorised organic farming was introduced in 1987, but the acceleration in conversion did not catch speed until 1995 where there was a net increase of more than 50% in the number of organic farms. The evolution of the number of organic farms the past 7 years is illustrated in the table below.

Table 2.2: Development in Organic Farming 1994-2000

	1995	1996	1997	1998	1999	2000
Authorised, beginning of the year	677	1,050	1,166	1,617	2,228	3,099
+ Applicants	417	161	499	670	950	450
- Expired authorisations	44	45	48	59	79	83
Net influx	373	116	451	611	871	367
Authorised, end of the year	1,050	1,166	1,617	2,228	3,099	3,466
Conversion percentage (net influx/primio)	55.1%	11.0%	38.7%	37.8%	39.1%	11,8%

Source: (Ministry for Food Agriculture and Fisheries, 2001)

Since 1996, the net conversion percentage has more or less increased and in 2000 there were 3,466 authorised organic farms in Denmark.

In table 2.3 authorised organic farms are distributed by size of land in 1999. The distribution of size of land for organic farms deviates most obviously from the one of all farms in the case of very small and large farms. Hence, nearly 13 per cent of organic farms occupy less than 5 ha, whereas only 3.2 per cent of all farms had this size. The relative share of farms exceeding 100 ha was 14.1 per cent in organic farms but only 9.9 per cent of all farms possessed more than 100 ha.

Table 2.3: Authorised Organic Farms by Size of Land

	1999			
	Organic farms	Organic land in per cent	In per cent of all farms	All farms in per cent ^a
< 5 ha	393	12.7	-	3.2
5-9,9 ha	450	14.5	4.8	16.1
10-19 ha	540	17.4	4.7	20.6
20-29.9 ha	316	10.2	4.2	13.0
30-49.9 ha	340	11.0	3.5	17.2
50-99.9 ha	624	20.1	5.4	20.0
100 and more	436	14.1	7.1	9.9
Total	3,099	100.0	5.4	100.0

Source: (Statistics Denmark, 2000); A: 1998 numbers

In the below table the development of and the distribution in both in-conversion land in year one and year two and fully converted land is depicted.

Table 2.4 Development in the Number of Organic and In-conversion Farms and Area

	Number of Farms	Organic area in ha	2. year in-conversion ^a	1. year in conversion ^b	Non-converted land	Total Production area in ha
1994	677	16,387	1,031	3,269	457	21,145
1995	1,050	17,032	3,668	17,634	2,550	40,884
1996	1,166	20,193	17,826	6,970	1,180	46,171
1997	1,617	37,033	7,109	15,822	4,366	64,329
1998	2,228	44,102	18,203	30,894	5,962	99,163
1999	3,099	60,232	36,924	39,473	10,056	146,685
2000	3,466	93,354	43,561	20,745	7,597	165,258

a) Area is in-conversion, yield can be sold as in-conversion crops; b) Area is in-conversion. Depending on the time of the harvest relative to the time of conversion the product either be sold as conventional or in-conversion crops. Source: (Ministry for Food Agriculture and Fisheries, 2001)

2.2 Types of Organic Farms

Types of farming employed in organic farms are illustrated in table 2.5.

Table 2.5: Authorised Organic Farms Distributed by Type of Farming, 1999

	Organic farms	Organic farms in per cent	All farms	All farms in per cent	Organic farms in per cent of all farms
Crop production, incl. horticulture	1,635	0.53	31,360	0.54	5.2
Cattle etc.	932	0.30	11,381	0.20	8.2
Other livestock farms	97	0.03	5,474	0.09	1.8
Mixed farms	434	0.14	9,616	0.17	4.5
Total	3,099	100	57,831	100	5.4

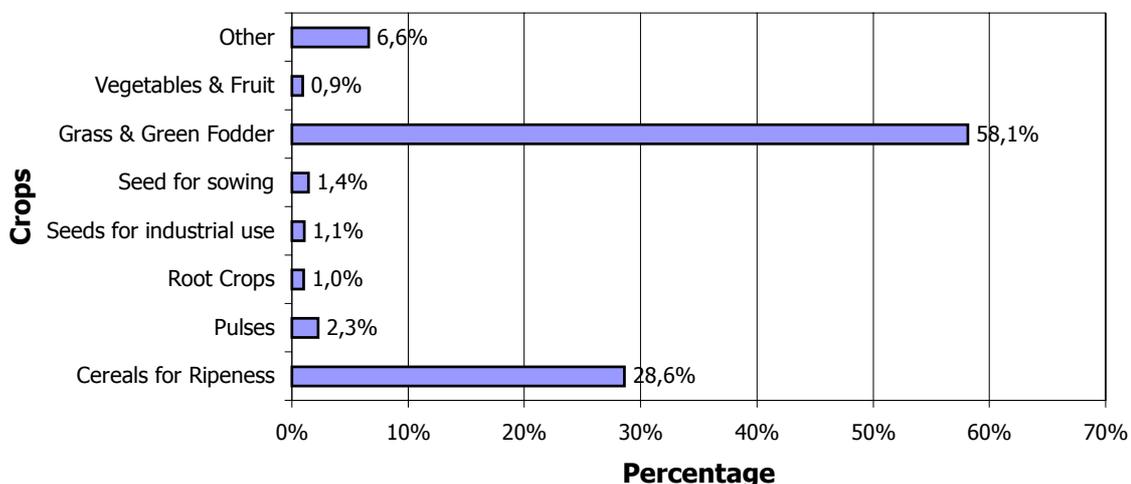
Source: (Statistics Denmark, 2000)

As can be seen from the table the distribution of type of farming in organic farms more or less corresponds with the over all distribution in the agricultural sector.

Crop production constitutes the largest share in both cases. The difference between the distribution of organic and conventional farms is pronounced with respect to farms with cattle, where the organic share is the larger. This supports the fact that dairy products are the most important organic products in terms of market share, see also (Michelsen et al., 1999).

The application of organic land is characterised by the fact that farmers to a large extent depend on their own production of feed, hence the production of grass and green fodder accounts for more than 50 per cent of the total vegetable production in organic agriculture. Besides production of grass, green fodder and cereals for ripeness, the production of organic crops is limited. Production of vegetables and fruit also seems limited; however, it does exceed that of the conventional production (Ministry for Food Agriculture and Fisheries, 1999a, Thøgersen, 1998, Ministry for Food Agriculture and Fisheries, 1999b). The employment of organic land can be seen in the figure below, which takes into consideration all land belonging to organic farms. Meaning, both land which has not yet been converted; land, which is in the 1st and 2nd year of conversion as well as fully, converted land.

Figure 2.1: Land Use at Authorised organic Farms, 1999



Source: (Ministry for Food Agriculture and Fisheries, 1999b)

The relative share of organic farms with animal husbandry is higher than the one of converted farms and at the same time there are more often several types of livestock on organic farms than on conventional farms.

In the table below farms will occur in several categories if there is more than one type of animal husbandry on the farm.

Table 2.6: Animal Husbandry

	Organic farms end of 2000		All farms in per cent
	Number	in per cent	
Diary cattle	856	24.7	18.9
Suckle cattle	861	24.7	21.2
Pigs	483	13.9	24.2
Sheep	660	19.0	6.0
Fowls	542	15.6	10.4

Source: (Ministry for Food Agriculture and Fisheries, 2001, Statistics Denmark, 2000)

The relative shares for the organic farms generally deviate slightly from the ones for all farms. Somewhat obvious is the larger share of organic farms that have dairy cattle as well as the inferior share of organic farms with pigs.

2.3 Production Tonnage

In the following section the size of organic production for relevant areas will be presented. Production statistics on in-conversion products are not available. Organic meat production of deer, harts and goats is rather limited statistics concerning these are not comprised in the report.

The majority of organic vegetables is sold as fresh vegetables, and only a small percentage as frozen. The production of frozen organic vegetables began in 1995 and presently it only comprises a few sorts because the sale of frozen vegetables is based on import (Borgen, 1999).

In table 2.7, the different types of vegetables, which have been produced both conventionally and organic, are depicted. It can be noted that organic vegetables rarely account for more than 10 per cent of the total yield.

Table 2.7: Quantity and Yield of Vegetables, 1996

	Total production in tons	Organic Production in tons	Relative organic share
Spring & white cabbage	17,543	770	0.04
Red cabbage	7,142	327	0.05
Kale	681	78	0.11
Brussels sprouts	1,574	30	0.02
Celeriac	2,470	394	0.16
Beetroots	8,742	1,418	0.16
Carrots	95,727	15,275	0.16
Onions	54,807	2,422	0.04
Iceberg lettuce	5,319	327	0.06
Lettuce, other	1,594	67	0.04
Chinese cabbage	8,391	146	0.02
Cauliflower	7,058	5	-
Leeks	7,216	625	0.09
Broccoli	825	9	0.01
Celery	327	78	0.24
Peas (fresh consumption)	647	8	0.01
Sweet corn	776	7	0.01
Asparagus	54	2	0.04
Potatoes	1,545,000 ^a	723 ^b	-

Source: Adapted from (Statistics Denmark, 1998)

The table only comprises the categories where there has been organic production. The figures for the production do not illustrate the commercial production but rather the total production inclusive waste.

a: 1997/98; b:1998

The demand for organic products was initially concentrated on milk, and dairy products are still the most important. In the past few years the production of organic milk has accelerated and the authorised organic milk producers accounted for 7.5 per cent of the total Danish milk quota in 1999 (Borgen, 1999).

Table 2.8: Natural Milk Production per year

	Natural milk delivered to dairies, million kg	Of which organic, million kg
1995	4,476.2	n.a.
1996	4,495.2	n.a.
1997	4,431.8	137.3
1998	4,467.6	168.8
1999	4,455.2	291.8

Source: (Statistics Denmark, 1996, Statistics Denmark, 1997, Statistics Denmark, 1999, Statistics Denmark, 2000)

The production of cattle, pigs, muttons and poultry is illustrated in table 2.9, which gives a picture of the scope of the animal production. The figures express the total number of

animals that have been slaughtered and the approximate number of organic animals that have been slaughtered.

Table 2.9: Slaughtered Animals & Export of Live Animals for Slaughter and Breeding^A

	1995	1996	1997	1998
Total cattle	289,000	800,000	799,000	742,000
Organic cattle	3,420	3,500	6,000	10,500
Total pigs	20,341,000	20,427,000	21,065,000	22,741,000
Organic pigs	3,750	4,250	13,000	22,500
Total muttons and lambs	86,000	90,000	80,000	72,000
Organic muttons and lambs	1,300	1,300	1,500	3,200
Total poultry	132,467,000	130,295,000	130,618,000	136,764,000
Organic poultry	-	-	38,000	166,000

Source: Adapted from (Borgen, 1999), (Statistics Denmark, 2000)

a: The numbers indicate an estimate of the number of organic animals which have been slaughtered at authorised organic slaughterhouses, and therefore can be sold as organic meat. The figures for cattle comprise both calves and oxen.

The production and sale of cattle has been dominated by the fact that farmers, in general, have focused on production and sale of milk. In 1998, the slaughtering of organic cattle accounted for 1.5 per cent of the total number of cattle slaughtered. Only meat from animals, which have been slaughtered at authorised organic slaughterhouses, can be sold as organic. Considering the number of cattle, it is clear that not all are attempted sold as organic (Borgen, 1999).

The number of slaughtered organic pigs accounts for approximately 1 per cent of the total pigs slaughtered. An organised production of organic chickens was fully established in 1998, and hereafter organic chickens have been distributed through the retail system as fresh and frozen products (Borgen, 1999).

The total available meat quantities are presented in the table below. Organic quantities are, however, estimated based on the number of animals slaughtered.

Table 2.10: Available Meat Quantities in Million Kilograms

	1995	1996	1997	1998
Total beef and veal	200.3	197.6	195.3	179.0
Organic beef and veal	0.855	0.875	1.500	2.625
Total pig meat	1,581.8	1,596.6	1,638.5	1,769.9
Organic pig meat	0.28125	0.31875	0.975	1.6875
Total mutton and lamb meat	1.8	1.9	1.7	1.6
Organic mutton and lamb meat	.0325	0.0325	0.0375	0.080
Total poultry	184.0	181.7	185.0	193.4
Organic poultry	-	-	n.a	n.a

Source: The figures for total production: (Statistics Denmark, 1998); The estimates of the organic quantities: (Borgen, 1999)

The figures indicate the meat quantities which have been available to the Danish production. The organic quantities have been found by multiplying the number of animals that have been slaughtered at authorised organic slaughterhouses with an appropriate average weight. Average weights: Cattle 250 kg, pigs 75 kg and lamb 25 kg.

2.4 Regional Distribution of Organic Farms

Approximately one fifth of the organic holdings are situated on the Islands, and in terms of area and livestock they are less than half the size of holdings in Jutland. Thus, the distribution of organic holdings is geographically unequal. Holdings on the Islands have relatively more horticultural crops and potatoes, while many holdings in Jutland are cattle holdings with large fodder areas.

Table 2.11: Regional distribution of Organic Farms in Denmark, 1999

	Jutland	Funen	Zealand	Total
Authorised farms	2,321	160	618	3,099
Production area	128,559	3,131	14,995	146,685
Average area per farm	55.4	19.6	24.3	47.3

Source: (Ministry for Food Agriculture and Fisheries, 1999b)

2.5 Import and Export

In this section Danish import and export will be described. Organic products do not appear individually in trade balances; hence the sparse statistics on export are collected by Økologiens Hus (Nielsen and Geer, 2000), and are based on interviews with approximately the whole population of exporters. The information is judged as rather reliable and the following section is based on this material.

Denmark has a notable import of organic fodder grain and bread grain from especially Germany and Sweden (Wier and Calverley, 1999) on other areas the import is curtailed, see below.

Table 2.12: Overview of Imports

Dairy products	Pig meat	Lamb & deer	Grain and fodder	Vegetables
Import is limited. It includes special cheeses & milk for cheese production	1995 : 35 tons 1996 : 41 tons 1997 : 0 tons 1998 : 0 tons	Limited import of lamb	Increasing importance for both consumption grain (32,737 tons in 1998) & fodder grain (10,469 tons in 1996)	Has been important for some years due to high demand for organic vegetables & fresh vegetables all year around.

Source:(Borgen, 1999)

The value of organic export is estimated to a good DKK 237 million representing a good 10 per cent of home market sale, which is estimated to DKK 2.5 billion. The organic export is still rather small and compared to total agricultural exports it amounts to approximately 2.5 per cent. Generally, agricultural export is an important area for Denmark, but organic producers might have concentrated on covering domestic demand and export of organic products is a somewhat new phenomenon. (Ministry for Food Agriculture and Fisheries, 1999a).

In 2000 export was initiated by a total of 45 companies and additionally 15 companies are expecting to start exporting and several await responses from certifying organs in the expecting export markets. To obtain organic certification in foreign countries might also pose a restrain on export. Exports go to near markets, namely (in decreasing importance) Great Britain, Germany, Sweden, Other Nordic countries, United States and France. Future markets of interest are countries like Japan and Italy.

Table 2.13: Exporting Companies on Type of Exports

	Dairy	Fruit & vegetables	Cereals	Meat & products	Egg & products	Other grocery	Total
Number of exporting companies	11	8	8	4	1	13	45
Size of export in DKK mill.*	122	24	40	20	n.a.	n.a.	237

Source: (Nielsen and Geer, 2000)

* Uncertainty factor +/-10%

Dairy products are well represented and half of the Danish milk producers are represented as exporters. Surprisingly the second largest export group is cereal because Denmark also imports organic cereal both primary produce and manufactured in order to cover demand.

Potential exporters of organic products point to the fact that the Danish market for organic products is better developed than abroad, which means that they first need to build up export markets in order to be able to export (Ministry for Food Agriculture and Fisheries, 1999a). In a smaller survey other barriers to export has be identified as: the non-transparency of private control organisations; insecurity about the base for co-operation and the retail business' lacking ability to implement organic products into their product programme (Ministry for Food Agriculture and Fisheries, 1999a).

3. CONVERSION

3.1 Economics of Production

This section is based on the accounts statistics of organic farming 1999 (Statens Jordbrugs- og Fiskeriøkonomiske Institut, 2001).

In 1999 aggregate gross output on organic farms fell about 3 per cent compared to 1998, whereas the cost rose by almost 4 per cent. Subsequently, this led to a decrease in gross profits after three years with increases. Interest payments were almost unchanged, so the current income went down as well. Taxes and private consumption increased slightly, and savings went down (DKK 67,000 to DKK –3,000).

In 1999, investments in steady state holdings were larger than in conventional holdings. On average, investments in organic holdings were DKK 488,000, which represent an increase of 17 per cent compared to the preceding year. On conventional holdings, investments rose as well, but only to a good DKK 300,000. The investments in agricultural assets were DKK 299,000 and 187,000 respectively.

Organic production is heavily influenced by many large dairy holdings. Out of the total organic gross output, 54 per cent came from cattle, while pigs and poultry contributed with 12 per cent. Contrary pigs were dominant on conventional farms.

The structural differences in holdings, mentioned in section 2.4, are reflected in the economics. The gross output per holding in Jutland of DKK 980,000 in 1999 was almost twice the output on the Islands. In Jutland, more than half of the output was milk. On the Islands, one third of the gross output came from milk and almost one third from horticultural crops and potatoes. The gross profit from the holdings were DKK 273,000 in Jutland and DKK 80,000 on the Islands, but since wage income from outside the holding was much higher on the Islands, current income was slightly higher on the Islands than in Jutland.

3.1.1 Part-time and Full-time Holdings

57 per cent of organic holdings are part-time holdings. Their economic importance, however, is insignificant since their output only was 3 per cent of total organic output exclusive subsidies (12% if subsidies are included) and 1 per cent of the total gross profit. Like conventional holdings, organic holdings are subject to considerable economics of size. Holdings with 1-2, 2-3 and >3 annual work units had rates of return of 0.9, 2.7 and 4.6% respectively. The same trend is shown for labour income. Rate of return and labour income were negative for part-time holdings.

3.1.2 Arable Holdings

72 per cent of the arable farms are part-time holdings and they account for 28 per cent of total gross output in 1999. On organic arable holdings, gross profit was DKK 121,000 in

1999 or twice the amount on corresponding conventional holdings. Thus, as in previous years organic farming was able to compete with conventional farming.

3.1.3 Dairy Production

Most all organic dairy production takes place on full-time holdings. Gross output rose by DKK 120,000 in 1999 to a good 2 million DKK, but cost rose almost twice as much, to DKK 1.4 million, and the gross profit was DKK 643,000 which is DKK 91,000 lower than in the preceding year. This fall and the increase in capital input caused labour income to fall from DKK 154 to 112 per hour in 1999. The lower profit was primarily due to lower prices on organic milk. The fall in gross profits along with slightly higher interest payments and personal taxes and almost unchanged private consumption led to negative savings after two years of positive savings.

3.2 Farmer Motivation

The motivators for farmers to convert to organic agriculture which have been presented in the literature can on an overall level be divided into three areas, namely: environmental motivators, financial motivators and normative motivators.

(Tress, 2000) found that *considerations for the environment* was the most important motive for conversion followed by *improved animal welfare* and *the prospect of a better income*. *Considerations for the environment* was the most frequently named motive and it is suggested that this goes back to the awareness of ecological threats and is reinforced by the fact that agriculture has a particular high national and cultural standing in Denmark. The belief that organic agriculture is the future in Denmark is of particular importance for conventional farmers who **plan** to convert. Whereas the prospect of a better income was found to be of particular importance to managers who **might** convert their farms (Tress, 2000). Kledal (Kledal, 2000) also found that potential organic farmers had rational, financial reasons for converting and has already such conditions in the productions and the sale that conversion would be possible without great and unpredictable risks. Those who consider changing to organic farming can clearly be placed in a “younger group” (younger than 44 years). But seen from a strictly economic point of view age must be seen in relation with the farmer’s investment profile. Hence, major investments are made while the farmer is relatively young, and after the age of 45 they tend to slow down investment wise (Kledal, 2000).

3.3 Barriers to Conversion

Several barriers for conversion have been pinpointed in the literature and in the data collected from the key informants used². In the following general barriers will be presented first, followed by barriers unique to the individual agricultural systems.

Kledal (Kledal, 2000) sound that there is a large need for information about organic production, thus many farmers are unsure about e.g. reduction in yield size, insufficient nutrients and how to handle weeds and pests if converting. Therefore lack of knowledge might be seen as a barrier. This is supported by **Tom Krogh Nielsen (Økologiens Hus)**: who emphasise the need of organic farmers having a high degree of agricultural knowledge to perform well and the farmers willingness to use more time.

Further, it is suggested that the new EU regulations, which were introduced in the year 2000 can function as a “rest” were potential organic farmers will await reactions from organic farmers to see how these cope with new regulations (Kledal, 2000).

Both mentioned in the literature (Kledal, 2000) and by key informants (Tom Krogh Nielsen, Økologiens Hus; Erik Fog, The Danish Agricultural Advisory Centre; Karsten Deibjerg, Friland Food) is the importance of stability of demand. “Farmers can see that there is a market NOW but fear that when they convert there will not be sufficient market possibilities” (Erik Fog, The Danish Agricultural Advisory Centre)

Demand needs to be stable over several years, earnings need to be competitive with conventional produce on a longer term and there is a need for increased sales possibilities, which could be done through increased export possibilities (Kledal, 2000). “Farmers need to be very brave when converting....we have never been able to predict the future, not even on short term” (Karsten Deibjerg, Friland Food) and the fact that the market for organic products has by and large been in stagnation the last years does not provide farmers with prospect of a lucrative market.

Organic farmers have a more universal rotation of crops and therefore a relatively larger area with prolonged cultivation of grass and thereby a relatively smaller area with cereals and other crops supported by the EU. As a consequence, organic farmers receive less hectare support than conventional farmers do, meaning that the hectare support would decrease if converting (Ministry for Food Agriculture and Fisheries, 1999a). Ideally, however, support during the conversion period should cover such losses.

In connection with this it can be mentioned that generally the conversion period is not seen as a barrier in it-self because of the in-conversion support given or due to shortage prices are high (crops). Additionally, complication of legislation is mentioned as a barrier, which have not been overcome despite courses provided for farmers and help from advisors (Gert Rahbek, KFK). Furthermore, an overall negative attitude towards organic principles is also a barrier although there seem to be consensus that the attitude towards organic farming has improved greatly as organic farmers are doing better and are supported by politicians, major retail chains, academics and scientists (Erik Fog, The Danish Agricultural Centre).

3.3.1 Animal Husbandry

It can be troublesome to purchase organic fodder (grain) and since organic livestock farms have to be somewhat self-sufficient the relationship between number of ha and size of the

livestock is essential. A rule of thumb is that one need 1 ha fodder per animal unit (100 kg N AB stock) for cattle and 0.5 animal unit for pigs in order to be self-sufficient (Ministry for Food Agriculture and Fisheries, 1999a). The number of animal units per hectare is perceived as a barrier, hence in a survey 42% of the potential milk producers answered that the need for land is a considerable barrier for change (Kledal, 2000). Key-informants point to the fact that this phenomenon is somewhat unique to countries like Denmark, whose agriculture is one of the most intensively driven in the world (Erik Fog, The Danish Agricultural Advisory Centre). This phenomenon means that risk of crops failure own as well as in general is very serious.

When converting the farm also needs permission to have animals on the farm as well as it is needed to establish storage possibilities for the dung/farmyard manure.

For farms with cattle it is inexpedient if the farmer has large areas of rented land (short term), if the land is situated badly with respect to the buildings or if the rounding of is poor. Poor or worn down buildings (cowshed/stable) is also considered a reasonable constraint if the present farmer is short sighted because the farmer will be obliged to invest in new buildings (Ministry for Food Agriculture and Fisheries, 1999a).

For farms with pigs the quality of soil is important, hence in order to be appropriate the soil must be well drained and sandy (Ministry for Food Agriculture and Fisheries, 1999a). It is also important whether the production is based on piglets or slaughter hogs/porkers.

3.3.2 Vegetable Production

Besides the above-mentioned aspects, other issues of importance in relation to the cultivation of plants is the number of hectares, the method of working (extensive or intensive) and the income.

Primarily, the conversion is facilitated if the farm neither produces sucker beets or intensive crops, while the farm then depends less on employment of pesticides and fertilisers. Secondly, the less the farmer depends on income from the farm the easier it will be to convert, therefore part-time farms with less than 30 hectares are seen as more immediately converters because the motives for conversion are not necessarily financial. Moreover, the soil quality can be perceived as a barrier because the organic subsidies will have more weight in relation to the value of the products on farms with sandy soil. (Ministry for Food Agriculture and Fisheries, 1999a)

3.4 In-conversion products

This section brings some key informants' thoughts on in-conversion products and these helping eliminating barriers to conversion. A modest number of informants has been used and this section is not in any way representative.

Firstly, general resistance towards in-conversion from farmers, processors and retail chains is feared from all informants. "Farmers have resisted it earlier (milk) and ... from talking

with farmers we know that the conversion period is not perceived as the real problem if the farmer has prospect of profits in the future” (Erik Fog, The Danish Advisory Centre). The relatively positive credit system and confidence in organic farming are factor of importance in this connection. As is the in-conversion support which is exactly meant as a compensation for the lower price in the conversion period. Retail chains it seems want to avoid ‘half-way’ solutions, and the key informants fear that in-conversion products will create confusion about the organic status: “The market is well-developed and I fear that we might destroy something that has already been established...consumers should not be confused...” (Karsten Deibjerg, Friland Food).

Secondly the fact that a very high percentage of the Danish consumers are accustomed to the organic label could mean that the fact that marketing of in-conversion products will demand a new label will “make forces will resist this in Denmark” (Erik Fog, The Danish Advisory Centre). Marketing in-conversion products could create problems for organic products/farmers: it creates confusion and in-conversion products approach organic products but is more readily available to the consumer because it is cheaper” (Tom Krog Nielsen, Økologiens Hus).

Thirdly, informants mention that in-conversion quantities are rather small and periodical and probably there is not meaningful quantities, which means that enterprises will not be willing to process these products.

3.5 Potential and Future Prospects

A prognosis based on an enquiry made with 36 local organic advisors has been developed and predicts that the total converted land area will increase from 100,000 ha to almost 300,000 ha in 2002. This means that organic land will account for 10-11 per cent of the total agricultural land in Denmark, all things being equal (Ministry for Food Agriculture and Fisheries, 1999a).

The ability for farms with animal husbandry to convert to organic agriculture seems to depend primarily on the livestock density and the soil quality (see above). Being placed in the proper “category” facilitates the conversion because neither herd nor land need adjustment, which can be perceived as a large benefit. The table below seeks to illustrate the extent of potential converters based on livestock density and soil quality.

Table 3.1: Pig Farms Distributed by Animal Unit/ha & Type of Soil, 1997

Soil Quality	Pigs	Cattle
	< 0.8 animal unit/ha	< 1.0 animal unit/ha
Loam soil	716	316
Sandy soil	1,116	1,417
Total	3,565	1,733

Source: (Ministry for Food Agriculture and Fisheries, 1999a)

As can be seen in the table 3,565 livestock farms are characterised by a harmonious relationship between the size of the livestock and the land, which is why these farms are considered as the potential converters. There are 5,081 farms with cattle that have an animal density between 1,0 and 1,6 animal units/ha and if these have a high yield and the soil is loam or watery these can also be self-sufficient (Ministry for Food Agriculture and Fisheries, 1999a).

The immediate potential organic pig farms are only to a smaller extent pig farms with less than 0.8 animal units per farm, hence converting a pig farm will normally only be interesting if the farm has already outdoor sows (Ministry for Food Agriculture and Fisheries, 1999a). Other potential organic pig farms are the vegetable farms. According to (Kledal, 2000) future growth potential is in the plant sector and surprisingly the pig sector and at the same time he predicts a drastic slow down of the previous high-growth production of cattle/milk production. Key informant from the industry (Gert Rahbek, KFK) supports the idea that organic pig production will be much more important in the future.

Although sales of organic products have stagnated for some years key informants believe that there are still some possibilities that the market can grow. Several suggest that market development is dependent on product development as well as the development of prices on organic products (e.g. Carsten Deibjerg, Friland Food).

3.6 Marketing Constraints

Section 3.6 is based on (Sall&Sall, 2000) and relies on interviews with producers and persons in the retail trade.

Organic producers are in general only prepared to market and sell a particular product in its current form. This makes competition on shelf-space hard because competitors often have extensive plans and long-term strategies concerning how to improve sales. Organic producers in general lack initiative concerning sales effort and product placement in the retail trade, and it seems that they restrain themselves from increasing sales because they concentrate on the production instead of initiating a holistic approach. Another problem is lack of product development³, hence the organic products are merely analogue to already existing conventional products. This means that the assortment only experiences a deepening and not a widening.

Organic producers do not approach smaller retailers although they have proved positive towards having an organic assortment. Many organic producers feel the marketing has to be done with a certain “dignity”, which according to the retail trade can be perceived as a drawback.

4. AGRICULTURAL MARKETING AND SUPPLY CHAIN

Section 4 is an overview of the supply side of the market for organic food products. It includes producer price premiums, distribution channels, niche-markets, and further market development.

4.1 Producer Price Premiums by Product Sector

From table 4.1 the settlements of accounts and premiums paid by processors of organic food products can be seen. The premiums on cattle have a rather wide range, which is due to the fact that a proper differentiation of prices on organic beef began in 1995. Hereafter cattle, which had formerly been used as dairy cattle was sold cheaper and high-quality beef more expensively (Borgen, 1999).

Table 4.1: Settlements of Accounts and Premiums for Animal Produce

	1994	1995	1996	1997	1998
Organic pig meat	13.63	16.90	19.02	18.26	13.33
Conventional pig meat	10.15	9.64	10.66	10.92	7.67
Premium on pig meat	34%	75%	78%	67%	74%
Premium on beef	10-13%	7-22%	5-22%	6-37%	9-37%
Premium on sheep & lamb	n.a.	n.a.	n.a.	n.a.	n.a.

Source: (Borgen, 1999). The settlements of accounts are the prices paid by the slaughterhouses to the farmer expressed in DKK per kg.

Due to fierce competition on the market for organic milk, the settlements of accounts for whole milk are often kept confidential. In 1999 the domineering dairy work paid roughly 20 per cent in premium and the farmer received a bonus corresponding to the quantity of milk, which is actually sold as organic on the consumer market (Borgen, 1999).

4.2 Distribution Channel

The retail trade can be divided into two strings indirect sale and direct sale. The indirect sale consists of super markets, health stores and catering/wholesaler whereas direct sale is sale made from the farm.

The market for organic food products and the distribution conditions in Denmark are marked by the fact that Co-op Denmark, an assertive retail distribution concern, has played a domineering role in the development of both the marketing and the production of organic food products. This means that organic products have reached a wide range of consumers from an early point. It is also of importance that Co-op Denmark has chosen to work closely with the producers/farmers and hereby on a large scale, avoiding intermediate links (Michelsen, 1993).

Table 4.2 illustrates consumers' first and second choice as to where they prefer to buy their organic products.

Table 4.2: Where do Consumers prefer to shop for Organic Products

	Primary choice	Secondary choice
Supermarkets	76%	7,5%
Organic farmers	0,5%	8,1%
Grocers	0,5%	6,4%
Markets	5%	13,3%
Special stores/health stores	3%	21,4%
Do not know	15%	56,7%

Source: (Ministry for Food Agriculture and Fisheries, 1999a)

The pattern illustrated is similar to the general development in shopping habits, where convenience is central in the consumers' choice of where to shop and reflected in the fact that the majority of consumers prefer supermarkets. As a consequence of the wider distribution of organic food products the health stores have lost some of their *raison d'être* (Sall&Sall, 2000). As seen in table 4.3, Co-op Denmark is the most successful retail chain in selling organic food products.

Table 4.3: Market Shares in the Retail Distribution

Retail chain	Market share, all convenience goods in per cent	Market share, organic products in per cent
Co-op Denmark (FDB)	32.1	40.9
Danish Supermarket	24.6	26.2
Other	8.0	8.2

Source: (Ministry for Food Agriculture and Fisheries, 1999a)

Although there is no doubt that the retail sale is the most important distribution channel volume wise, sales made from smaller, closed organic systems are important as well. Parallel to Co-op Denmark's activities smaller and often purely organic wholesalers and manufacturing businesses secure the farmers' direct involvement. This system has several advantages. In closed systems the distance between the producer and the consumer is minimised which is thought to increase the organic farmers' credibility and the positive perception of organic foods (Ministry for Food Agriculture and Fisheries, 1999a)). Contrary, the supermarkets provide the possibility for a larger sale offering the products to a much large audience.

“Stable door sale“, sales directly at the farm, is a small part of the closed systems. In 1999, 218 organic farmers have voluntarily chosen to register as stable door salesmen, and information concerning their supply, prices and location is available to the public through a catalogue (Økologisk Landscenter, 1999). Since the registration is done voluntarily the registered number can be considered as a minimum, which means that at least 7 per cent of all organic farmers carry out direct sale. The direct sale can be implemented in various ways. Firstly, and most common is an actual shop placed at the farm. Secondly, the sale can occur at a more random level, e.g. subscription where products, which the consumer have not chosen himself, are delivered at the door with predetermined intervals; direct

ordering and delivery and sale at a marketplace (Økologisk Landscenter, 1999). Use of different levels of e-commerce is initiated by an increasing number of farms.

Farms also trade with each other and this sale also includes in-conversion, which can be used in production up to a certain percentage.

4.3 Manufacturing

This section describes the manufacturing trade in relation to organic milk and meat products. Since both the milk and the meat trade are dominated by one large manufacture the elucidation concentrates on these enterprises.

There are about 30 organic dairy works and osterias of which approximately half have independent acceptance of milk (Sall&Sall, 2000). Of these, however, one, ArlaFoods, is rather domineering, hence in 1999-2000 a total of 4,455,000 tonnes of milk were delivered at the Danish dairies of these 385,000 tonnes were organic and 320,700 tonnes were delivered to ArlaFoods (Arla Foods, 2001). ArlaFoods have an extensive organic product programme and most of the organic products belong to a separate product line with individual label. ArlaFoods is on the forefront with legislation e.g. in 2000 it made contractual agreements with farmers that dairy cattle which supply organic milk must be fed with 100 per cent organic fodder.

Danish Dairies and milk producing enterprises can adhere to the Danish Dairy board which purpose is to attend to the common trade interests including trade-promoting interests. Approximately 95 per cent of the organic milk is delivered to dairies that adhere to the Danish Dairy Board. The Danish Dairy Board also has developed some additional rules concerning the processing of organic milk – in some cases to meet requirements from importers. The Plant Directorate controls these rules. The Danish Dairy Board contributed to a nation-wide campaign for organic milk in 2000 and a campaign for organic dairy products is planned for 2001.

There are approximately 60 companies in Denmark that are allowed to work with processing of organic meat, plus a range of butchers. Of the 60 some 2/3 are registered as official slaughterhouses. The meat industry is also dominated by one company, Friland Food A/S (Borgen, 1999), which supply about 80 per cent of the domestic market. Friland Food A/S was established in 1992 and is owned by farmers and by a large-scale conventional slaughter co-operation, Danish Crown, which is the majority shareholder. Friland Food A/S has two product lines one with organic products and one labelled with a guarantee-label from the largest, oldest society for the prevention of cruelty to animals. This label secures among other thing that the animals do not get preventive medicine and that the fodder does not include unnatural additives (Friland Food, 2001). These rules are much in accordance with the rules for organic agriculture and one reason for the products

not carrying both labels is fears that they could undermine one another (Karsten Deibjerg, Friland Food).

5. ORGANIC MARKET

5.1 Market Shares

Organic products account for approximately 3 per cent of the total sale of provisions. If only categories, where organic products are available, are considered organic sale accounts for 4 per cent (Ministry for Food Agriculture and Fisheries, 1999a). As illustrated below there is a large difference in the market shares of different product categories. In this respect milk products are most important, and milk has in several years been the locomotive for organic products going from a market share of 4 per cent in 1995 to exceeding 20 per cent in 1999. As depicted in Michelsen et al. (Michelsen et al., 1999) the market shares in table 5.1 illustrate the five most important product groups: milk products, vegetables (incl. potatoes), cereals, egg and beef (incl. veal).

Table 5.1: Market Shares, Organic Products

	<i>Market share end of 1999</i>
<i>Dairy products:</i>	
Milk (consumption)	21%
Curdled milk	8%
Cheese	2%
Butter	6%
<i>Vegetables:</i>	
Carrots	13-14%
Potatoes	7%
Onions	4%
<i>Meat:</i>	
Beef	1,5-2%
Pork	1%
<i>Other:</i>	
Eggs	14%
Oatmeal	19%
Rye flour	22-23%

Source: Økologisk Landscenter, here from (Munch and Saietz, 2000)

Apart from the products mentioned in the table, niche products such as nuts, wine and pasta are sold, but with limited success. A wide range of vegetables is sold as well, but the production of these is limited. Several types of processed foods have been launched but also with limited success. Research has shown that consumers in general do not find organic processed food to be in accordance with organic principals or values. Exceptions were situations where the product was processed using traditional-like production methods, approximating the product to traditional or old-fashion products (Ministry for Food Agriculture and Fisheries, 1999a). Another point, which is central to the understanding of

the limited successes of processed organic food products, is the fact that technical production constraints make it difficult to produce products, which can compete with conventional products on parameters as consistency and durability (Ministry for Food Agriculture and Fisheries, 1999a).

5.2 Premiums Paid

In this section premium prices for organic products are highlighted, as is the relative share of organic products actually sold as organic and hereby releasing the premium price. There is no information available on the dynamics of the prices and premiums. The description is based on Michelsen, Hamm et al. (1999) pp. 60-73.

In table 5.2 consumer premiums paid (in percentage differences between conventional and organic products at the retail level) and the premiums to farmers (percentage above price of conventional producers) are depicted.

Table 5.2: Price Premiums, Percentage above Prices of Conventional Produce

	Vegetables & potatoes	Fruit	Cereals	Milk products	Beef	Pork	Poultry	Eggs
Farmer Premium	25-50	>100	60-70	20-25	10-30	60-100	n.a.	10-95
Consumer premium	20-50	50-100	0-20	20-30	20-50	30-60	50-100	7-50

Source: (Michelsen et al., 1999)

The figures are based on pure estimates by Danish experts based on experience and are therefore attached with uncertainty. The figures do not refer to a standardised period, but were reported in the first half of 1998.

In general, there is no direct connection between premium paid to the farmer and the premium paid by the consumers (Michelsen and Hamm, 2000).

When organic produced products are sold as conventional they are not realising the organic premium. Furthermore they might not realise the same price as paid for conventionally grown products which might be due to the appearance (Michelsen et al., 1999).

Table 5.3: Percentage of Organic Produce Sold as Organic

	Vegetables & potatoes	Fruit	Cereals	Milk products	Beef	Pork	Poultry	Eggs
% sold as organic	95	95	100	80	75	95	n.a.	90

Generally, the percentage of organic products sold as organic is high. As is the case in many European countries, there seem to be most problems connected with selling all organic milk and beef as organic. Michelsen, Hamm et al. (1999) give several reasons for this. These products are easily burdens with extra costs. First, because they need some processing, which means additional steps in the certification process. Second, because

plants, which are licensed to handle organic products may be fewer and further apart, so transportation incurs extra costs. Third, milk and meat require facilities in the shop to be kept fresh and therefore distribution through supermarkets is the only relevant distribution channel, however, this should not have a negative effect on sales in Denmark, since the main distribution channel is supermarkets.

In Denmark beef is an expensive food and therefore consumers demand quality, and "low sales figures on the organic market may therefore indicate that a high percentage of the meat is offered for sale is not of the general quality for which consumers are willing to pay a premium....this is the case of Denmark"(Michelsen et al., 1999). Contrary, the 80 per cent marketing of organic milk is not considered a problem as it is the result of a strategy developed by ArlaFoods in order to be able to satisfy a long-term demand for organic milk and secure future supply⁴.

5.3 Consumer Studies

Firstly, the consumer awareness of primarily the national eco-label is analysed. Secondly, a general schematic outline of some relevant consumer studies is presented, followed by a consumer analysis including description of consumer perceptions, attitudes towards organic food and farming, reason for purchase/non-purchase, health, safety, environment, welfare, ethics, source of purchase. Finally, consumer characteristics/segmentation is presented. Section 5.3 will primarily refer to the surveys presented in section 5.3.2.

5.3.1 Awareness of Organic Labels

As a rather unique situation the majority of Danish organic products (93-95%) carry the same label (Michelsen et al., 1999). The Official eco-label was introduced in 1990 by the government as a national public certification, which indicates that the products are controlled and authorised by the State, and produced according to well-defined organic principals. The introduction of the label was followed by campaigns to increase consumer awareness. Although few, other less widespread labels correspond to the standards of the different organic organisation. Organic private and commercial labels also exist but are usually labelled with the official eco-label as well. Labels from organic agriculture movements/farmers' associations are also relatively insignificant (Michelsen et al., 1999).

Usually, consumers are able to identify and verify product characteristics, but have no possibility of checking if a presumed organic product actually is organic which makes the communication aspects important when marketing organic products.

In general, studies show that consumer awareness of the official eco-label is high and stable but knowledge of the criteria underlying the allocation of the label is low (among others: (Ministry for Food Agriculture and Fisheries, 1999a)). Knowledge of different environmental labels was examined (Ministry for Food Agriculture and Fisheries, 1999a),

and knowledge of the eco-label was by far the most widespread. Hence, 40 per cent of the respondents mentioned the label when they were asked which organic labels they knew, and another 51 per cent verified that they knew it when asked directly. Respondents had more problems defining the criteria that underlie the allocation of the label as seen in table 5.4.

Table 5.4: Consumers' Knowledge: Criteria Mentioned by Respondents

Criterion	No spraying	Animal welfare	No fertilisers	Other
Per cent of the respondents	24	24	14	12

Source: MAPP, 1998, n= 200, here from (Ministry for Food Agriculture and Fisheries, 1999a)

In general, consumers have high confidence in the national eco-label (e.g. (Infood, 1998)), when, however, the label is used on imported organic products consumer confidence is low, illustrating a fear of foreign control and observance of rules to be low.

This means that by and large Danish consumers are aware of the national eco-label and there is a high confidence in the label and what it stands for. However, consumers are not aware of which criteria lie behind the allocation of the label and thereby how these products differentiate from other products. This might put the organic products in a vulnerable position because the positive attitude is not based on knowledge and therefore it might easily be influenced and changed.

5.3.2 Consumer Attitudinal Surveys and Purchasing Behaviour Surveys

The schematic outline includes some relevant consumer studies of newer date.

Reference	English title	Data Source
(Bjerke, 1992)	Consumer Interest In Organic Products	(n=1,450; answers valid 910)
(Grunert and Kristensen, 1995)	The Danish Consumer and Organic Foods	Telephone interviews (n=1,476)
(Bredahl et al., 1995)	Food related lifestyle in Denmark	Telephone interviews (n=1,200)
(Infood, 1998)	Qualitative analysis of the consumers' attitude towards organic food products	Focus groups interviews
(Thøgersen, 1998)	Understanding Behaviours with mixed Motives. An Application of a Modified Theory of Reasoned Action on Consumer Purchase of Organic Food Products	2 x telephone interviews (n=144)

The extensive survey: The Danish Consumer and Organic Foods (Grunert and Kristensen, 1995) speculated that consumers' environmental orientation has an influence on the consumers' buying behaviour and based on this five segments were developed. The Colourless (3.9%): totally uninterested in environmental issues. The Greenish Attitudes (23.8%): have a more positive attitude towards the environment but do not act accordingly nor do they have knowledge in the area. The Greenish Behaviour (12%): an unexpected

group in which the individuals themselves act environmentally but of other reasons than responsibility toward nature. The Greenish (49%): a green group that lacks knowledge about environmental issues. The Green (11%): consistency is a key word because individuals score high on knowledge, attitudes and behaviour.

In general, the more environmentally concerned consumers are, the more they perceive organic products as being more natural than conventional products, and the higher is their scepticism towards the food industry. Consumers concerned with the environment are willing to pay a premium price for organic products and also buy more organic products. The younger, the higher level of education and the higher the income, the higher is the motivation for paying a premium price (Grunert and Kristensen, 1995).

Another survey (Bredahl et al., 1995) investigating food-related life style in general identifies six consumer segments. Of interest is the third largest group The Ecological Moderates (20%) who prefer organic products to conventional ones. The Ecological Moderates do not shop in health-stores and is in general not very aware of or interested in food. This group of consumers is postulated to be a Danish phenomenon.

Focus group interviews (Infood, 1998) have shown that consumer purchasing motives were found to vary between consumers and product categories, however, consumers generally tended to have several motives attached to each purchase and product specific motives were discovered in connection with two categories. Firstly, consumers who buy organic meat do it for the sake of the animals and secondly, because the meat is free of growth promotant and medical residues and because the taste is perceived as superior to the one of conventional meat. Organic fruit and vegetables are mainly purchased to avoid remains of pesticides. Moreover, some consumers prefer the products because the fruit has not been ripened prematurely. Consumers, who have children, more often buy organic products especially if their children are suffering from either asthma and/or allergy. Generally, purchasing motives were found to be in accordance with actual product characteristics: considerations for the environment, animal welfare and the derivative effect of the reduction of the overall health risk, to which consumers attached great importance. Additionally, it has been suggested that consumers act out of prudence postulating that organic food has a smaller health risk.

5.3.3 Usage Rate

Approximately 80 per cent of the Danish consumers have purchased organic food products primarily milk and vegetables, however, only 1-2 per cent attempt to only buy organic (Borgen, 1999, Grunert and Kristensen, 1995, Infood, 1998). User rates can be seen in table 5.5:

Table 5.5: Usage Rates, Danish Consumers

Usage Rate/percentage of household budget spend on organic products	Percentage of the Danish households January-May 1997	Percentage of the Danish household July-November 1998
Non users	25	21
Light users / < 2.49 per cent	41	36
Medium users / 2.5 - 9.9 per cent	24	22
Heavy users / > 10 per cent	10	20

Source: GfK, Dansk husstandspanel (1997) & GfK, ConsumerScan (1998), here form (Borgen, 1999)

Heavy users normally account for a small percentage of the population and it is therefore remarkable that this group in 1998 accounted for 20 per cent having increased 100 per cent from the preceding year. It is mainly light users and medium users who have increased their usage rate, but the group of non-users have also decreased from 25 to 21 per cent (Borgen, 1999).

5.3.4 Consumer Characteristics

Behavioural, geographical, demographic and psychographic variables are significant when describing the Danish “organic” consumer, and age, gender, family size, income and values are some of the relevant factors, which will be described in the following section.

There are relatively more “organic” consumers in the capital and larger cities than in more rural area and 90 per cent of consumers in Copenhagen bought organic food products in the period July-November 1998. One aspect which can explain this is the fact that organic products have been marketed more aggressively in this area. It seems as the share of consumers who buy organic products has stagnated in the capital, which is not the case in other parts of the country (Borgen, 1999).

Consumer surveys reveal different, though not directly conflicting, information on the relationship between age and willingness to buy organic food products. The tendency is that age correlates negatively with willingness to use organic products (among others: (Grunert and Kristensen, 1995)). An actual “age-pattern” is most obvious in the group of consumers characterised as heavy users, which is dominated by young to middle aged consumers (Borgen, 1999): 1999: 30-39-year-old; (Bjerke, 1992):20-44-year-old) and consumers older than 60 are underrepresented (Bjerke, 1992, Borgen, 1999).

Women seem more concerned about environmental issues and thereby also more frequently buy organic products (Grunert and Kristensen, 1995, Borgen, 1999). This might be due to the fact that women, despite the more equal distribution of the domestic work, shop more frequently than men, which makes women more conscious about their attitude towards environmental issues and may therefor given more thought to buying organic products (Bjerke, 1992).

Surveys have shown different conclusions regarding the effect of consumers having children. One survey (Infod, 1998) organic consumers more often have children, hence approximately 80 per cent of households consist of one or two grown-ups and at least one child was found to buy organic products sometimes. Opposite, (Grunert and Kristensen, 1995) conclude that the number of persons in the household does not seem to have a significant impact on the consumption of organic foods.

There is a tendency that the higher the education, the higher the inclination to buy organic food products but surveys have pointed to the fact that this pattern is withdrawing (Bogen, 1999).

There is not an obvious pattern when considering the income, but a large part of the heavy users has high household incomes (more than DKK 400.000/year) and households with lower incomes are losing weight in the group of heavy users (Bogen, 1999).

Generally, organic consumers tend to be more worried about food security than consumers who do not frequently purchase organic products. The worry especially concerns medical residues, remains of pesticides, growth promotant and bacteria (Ministry for Food Agriculture and Fisheries, 1999a). Non-users do not worry in the same degree; moreover, they worry most about bacteria in the products.

Attributes

(Grunert and Kristensen, 1995) developed five product beliefs using laddering technique and in-depth interviews and the following attributes were identified: (ranked according to importance):

Organic food products

...are more expensive than conventional food products; are produced without fertilisers or chemical pesticides; ..are more natural because they are less manufactured than conventional food products; ..taste better than conventional food products and are more appetising than conventional food products.

5.4 Constraints on Consumption

According to (Grunert and Kristensen, 1995) 73 per cent of the consumers buy their organic food products in a supermarket and 21 per cent bought their organic products directly from the farmer or at a local marketplace. Respondents who did not buy organic products emphasised that they considered old habits as the largest constraint; the availability of organic products as the second most important and the higher prices as the third constraint. It was also seen as a constraint that respondents did not feel that they knew enough about organic products. This is supported by other surveys which reveal that many consumers do not know the principals which lie behind organic production. As mentioned earlier, consumers generally have confidence in the state authorised eco-label, and therefore lack of confidence cannot be considered as a constraint.

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¹ Danish Forest and Landscape Research Institute, Danish Institute for Agriculture and Fisheries Economics, Danish pest Infestation Laboratory, Danish Veterinary Laboratory, Institute of Local Government Studies, National Environmental Research Institute, Natural history Museum, Risø National Laboratory, Royal Veterinary and Agricultural University, Technical University of Denmark, The national committee for Pig Breeding, Health and production, University of Copenhagen, University of Aalborg and university of Aarhus.

² Key informants and organisation:

A) Senior Agricultural Advisor and manager of section of organic farming at The Danish Agricultural Advisory Centre, *Mr. Erik Fog*. Erik Fog has worked with organic farming since 1977. Was manager of the first information campaign for organic farming introducing the national eco-label from 1990-1994. The Danish Agricultural Center coordinates the advisory service for farmers.

B) *Mr. Karsten Deibjerg Kristensen* managing director for Friland Food and has been occupied in here since 1990. Friland Food A/S is a sales company and has 80 per cent of organic meat sales in Denmark. Danish Crown a large scale is the share stockholder in Friland Food A/S.

C) *Mr. Gert Rahbek* works with cereals and fodder for pigs and cattle in KFK. KFK is a large scale corn and fodder company which introduced organic products in 1996.

D) Market consultant Tom Krog Nielsen has worked with Økologiens Hus approximately 3 years.

³ Product development has recently proved a success in Denmark. In 2001 ArlaFoods launched the first new milk since 1973 (very low fat taste of a light milk & organic) four weeks after the launch it was one in four milks sold with no change in total milk sales (www.ArlaFoods.dk)

⁴ Conventional dairy co-operatives introduced economic incentives (long term delivery contracts and a guaranteed price premium) for dairy farmers to convert from 1994. Since 1997 milk prices at the farm have been related to the level of organic milk sold as organic, were the maximum premium paid when the quantity sold reached 80 per cent or more. Thereby farms shared the marketing risk with the dairy factories.