



Denmark

National report

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Pictures : left: Young free-range chickens (MultiChick), Right: Dairy cows on the field (Jesper Overgaard Lehmann)

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EXECUTIVE SUMMARY

The purpose of this report is to investigate the policy requirements and market imperfections, and their implications for the resilience of Dairy production in the Region of Southern Denmark, as part of the EU-funded Horizon 2020 project, SUFISA (Sustainable finance for sustainable agriculture and fisheries). This executive summary has been derived from a much larger report, which is available from: [http://www.sufisa.eu/publications \(project reports\)](http://www.sufisa.eu/publications (project reports)).

The Danish case studies are carried out at a time when the Danish farming is undergoing significant structural development and in the midst of a financial crisis. In many ways the Danish farming can be considered as very successful, production is efficient, producing high yields with a low carbon footprint pr. product. However, currently Danish farming is in a significant financial crisis, which is evidenced by an unusually high rate of bankruptcies among farmers. Furthermore, a large share of farmers have a significant income problem as around 40 % of all dairy farms operate with both a high debt and a deficit on the annual accounts and therefore farmers cannot be considered economically sustainable. The crisis is partly caused by a huge debt of Danish farming amounted to 370 billion DDK (~€50 billion), which is the highest debt pr. farmer in the EU and it has particularly been generated by property investments. Prior to 2009 there was an overinvestment in farmland and the gradual build-up of a soil price bubble, which burst in 2009 and subsequently the soil price has decreased by more than 40 %. The low commodity prices, particularly for pork and dairy make it even harder for the farmers to exit this vicious cycle as investments have been carried out based on more favourable market expectations. The crisis in Danish agriculture is a huge problem for many small-scale rural banks that have provided loans for farmers, and a number of these have gone bankrupt and left the rural communities in despair, hence the farming crisis has an impact beyond farm level.

Data collection and methods

The key approach taken in the analysis has been to put the farmers at the centre of the research, in order to get their perspectives on the key issues that need to be considered. In the first instance, a media analysis was conducted (which covered national, regional and specialised media from 2005 to 2016), as well as a desk-based analysis of market conditions and regulations (sources reviewed included: academic publications; government and policy documents; market research and consultancy reports; industry reports and NGO documents), supplemented with 21 expert interviews. Following analysis of the resultant data, two focus groups (FGs) were held with dairy farmers at two locations in the region of Southern Denmark, in addition two individual interviews were conducted with organic producers who deliver their milk to German dairies. Subsequently, a survey among dairy producers in the Region of Southern Denmark and poultry producers in Denmark was carried out in the winter of 2017 and spring of 2018. The following contains first a general description of the case of dairy farming in the region of southern Denmark, including a section describing the policy and regulatory conditions, market conditions and financial conditions. Each section first contain a general description based on documents and expert interviews and secondly a description based on the farmers perspective based on the focus group interviews, workshop and surveys. Finally, the summary includes a description of farmers' strategies and the intuitional arrangement that are employed to manage these conditions.

Dairy production in the region of Southern Denmark

Region of Southern Denmark is characterized by extensive rural areas and a high proportion of agriculture (65 %). In the western part of the region there is a high prevalence of sandy soils that are mostly suitable for

grazing and the area therefore features a high share of organic dairy farmers, as organic dairy farming requires grazing. Furthermore, it is one of the areas in Denmark that has the highest concentration of organic farmland. Farming plays an important role in the regional economy, as agriculture, forestry and fisheries account directly for around 3.4 % of the employment in the region. The most common agricultural products of the region are industrial crops, such as corn, wheat, grass and barley for feedstuff as well as pigs, poultry, pelts and milk. In the region there is a large production of corn used for biogas production in Germany, which has increased the price of farmland. The Region of Southern Denmark borders with Germany and it is a region that traditionally has a high influx of ideas from the south, for instance, there is a high concentration of biodynamic farmers organised around the cooperative dairy "Naturmælk".

Historically dairy production is one of the most important sectors of Danish agriculture, and an important export commodity. Although Denmark only produces around 3 % of all dairy produced in the EU. The turnover of the Danish annual export of dairy products was around 13,5 billion DDK in 2015 (€1,8 billion), which is about 20% of the annual Danish export of agricultural commodities. Danish dairy products are primarily exported to Germany, China, United Kingdom and Sweden. 65 % of the exported dairy products is cheese, whereas powder, concentrate and butter account for 15 % and 11 % respectively. The Danish dairy production is highly concentrated in the western part of the country due to a high prevalence of sandy soils which provide relatively poor conditions for arable crops, but which are suitable for grazing (Kristensen, Aaes, & Weisbjerg, 2015). Furthermore, in particular in the Region of Southern Denmark there is a high concentration of organic dairy producers, which is in fact the highest in the country.

Danish dairy farming is undergoing a significant structural development that has resulted in a general increase in the number of cows per farm, from a national average in 1982 of 52 to 126 in 2014 on average, and this figure is even higher for the region of Southern Denmark. In general, Danish dairy farmers have higher capital investments in their production facilities, but also higher yields pr. cow and lower environmental impact compared with their competitors in the EU and the world market (SEGES).

The total Danish dairy production has been relatively stable since the 1930'ties at around 5000 Mkg, however, there has been huge changes to the dairy production system. In the 1930'ties the population of Dairy cows was at its largest of about 1,7 million, but today this has decreased to about 500.000 heads in 2015. The dairy productivity has doubled from 1900 to 1970 and more than doubled since the 1970'ties reaching an annual average of 9000 kg milk pr. cow in 2010. In the beginning of the 1990'ties a largescale conversion to organic dairy production was initiated and today around 10 % of the Danish dairy production is organic. The development has been driven by a number of different factors. Compared to other countries, Danish organic farming policy is unique because organic farming has been supported and developed as an industry, whereas many other European countries have supported organic farming as an agro-ecological measure (Daugbjerg & Halpin, 2010). It has always been a political ambition to develop organic farming on market terms, and several measures to enhance sales and the commercial potential of organic products have been implemented. Organic production was formally institutionalised with the organic law of 1987, enabling production audits by the state, research funding, marketing support, extension and conversion support (Daugbjerg & Halpin, 2010). Since 1996 more than 50 million DKK has been spent annually on research and development of organic food production. According to ICROFS, this research has contributed to the solution of some of the challenges faced by the industry because it has been jointly planned with the different market actors (Kledal & Halberg, 2012). Furthermore, organic farmers have aspired to be an alternative to the

existing food production, which has resulted in creativity and innovation to develop and implement novel sales networks and market niches (Kjeldsen & Ingemann, 2009). Examples include the successful e-commerce box-scheme “Årstiderne,” delivering organic produce to 45,000 families in Denmark and Sweden (Årstiderne, 2014), many small successful farm-shops, and more recently the Food Communities (fødevarefællesskaberne), a consumer initiated and organised box-scheme that has spread to more than 15 localities in Denmark (Thorsøe & Kjeldsen, 2015).

Historically the Danish dairy industry has been important in the development of the Danish agricultural sector and the organisation in cooperatives was first adopted by the dairy sector to enable foreign trade with dairy products, primarily for the German and British markets. Traditionally the Danish dairy sector has been composed of a large number of small scale dairies, around 1500 in 1900, but structural development has reconfigured the dairy sector significantly and today the sector is composed of 28 dairies (of which Arla is by far the largest) operate 54 production facilities (Mejeriforeningen, 2016).

Policy and regulatory conditions

Dairy production is conditioned by various types of policy and regulatory interventions that are both developed at national and at EU level.

Denmark along with Ireland and the United Kingdom both joined the EC in 1973. The Common Agricultural Policy (CAP) lays the foundation for the European agricultural policy, and it has been changed on several occasions. The late 1970's and early 1980's marked the beginning of a new area for the EC policies as food security no longer has the same focus. At European level the productivist policies are questioned due to their cost and the massive overproduction that have now become the result. As a result, a quota system was implemented in 1984 that for instance put a ceiling on the dairy production. The CAP was reformed initially in 1984, where milk quotas were introduced, in 1988 where an expenditure ceiling was imposed on the European Council, but most significantly with the MacSharry reform in 1992. In the MacSharry reform the CAP policy was fundamentally changed by abolishing price support in favour of income support in the form of direct payment. Today the CAP policy provides direct income support for Danish dairy producers, in its two pillar program, 1) the direct support package and 2) the rural development program. In Denmark the CAP program is managed by the AgriFish Agency.

As of April 1st 2015 the EU abolished its quota policy, thereby liberalizing the dairy production. The abolition of milk quotas has been one of the most significant policy changes for Danish milk producers in recent years, as producers are no longer limited in their production by a quota system, but rather by the capacity of their farms (Arla, 2016). The abolition of milk quotas has had a different impact on the organic and conventional milk market. The supply of organic milk was fairly stable the years preceding the abolition, but decreased suddenly by the end of 2014. This decrease is attributed to the fact that a number of organic producers converted their production to conventional to increase their production once the quotas were abolished. However, as prices for conventional milk decreased and prices for organic milk increased, the organic production has again increased to more than what it was before. Furthermore, a number of the conventional producers who converted to conventional production have once again applied for conversion to organic production and therefore this production is expected to increase further in the future.

For the past 200 years the agricultural production in Denmark has gradually been intensified and new areas have been included in the agricultural production (Bjørn, 1988). The intensive agricultural production has

resulted in a number of environmental issues, during the 1980ties the regulatory response was a series of action plans to limit nutrient leaching (NPO, 1985; AP-I, 1987; AP-SUS, 1991; AP-II, 1998; Ammonia-AP, 2001; AP-III, 2004). From the mid-1980s these action plans consisted of general regulatory instruments such as, standardizing the timing and limits of fertilizer application, introduction of mandatory catch crops and introducing general norms, for instance, harmony regulation that specifies a required acreage for a certain number of livestock. From around 2007 the WFD introduced a fundamental change to the development of policy targets. Previously targets were based on a politically approved goal of nutrient reduction, but in the WFD policy targets are based on an assessment of the ecological conditions and the objective is that the ecological conditions should have a “good ecological status” by 2027 at the latest. This policy objective implies a huge challenge for the agri-environmental management. The whole approach to the environmental planning has been restructured as the regulatory regime has previously been dominated by general policy instruments are now replaced with a regulatory regime characterized by policy instruments that spatially differentiate the effort depending on local conditions, such as ecological status of recipients and nutrient leaching at field scale.

Traditionally private ownership has been the dominant form of enterprise in Danish agriculture, which has also been protected by the agricultural law that details the legitimate owners of agricultural properties. The law was revised in 2012 and 2015 in order to attract investment capital into the field of agriculture. Hence, the new and updated version of the agricultural law enables new forms of ownership, such as ownership by non-farmers, liability companies or pension funds. Similarly, requirements for the farmer to take residence on the farm are abolished along with the restrictions on the maximum farm size. The changes in the agricultural law indicate a more fundamental shift in the regulatory perception of farmers, hitherto, it has been an important objective of the law to maintain “family farming” by limiting the structural development and the access to farmland by non-farmers. However, gradually this has changed so that today the major concern is to ensure that the conditions for farming resemble the conditions for any other industry. Hence, the understanding of agriculture as a particular form of rural culture with an inherent value that is worth protecting has gradually been replaced by an understanding of agriculture as an industry like any other.

The governance of the regulatory condition is also something that preoccupies farmers, as they find themselves in a sector, which is undergoing significant changes in these years. Regarding the contemporary market conditions farmers’ particularly note three aspects that are important in their decision-making:

1. **The agricultural law:** The changes in the agricultural law enabled the entrance of new norms of capital and ownership. Farmers appear as quite ambivalent about the new possibilities for the entrance of financial capital to the agricultural industry. On the one hand the new investors are seen as “destructors of the peasant culture”, on the other it is seen as completely indifferent, because it is just money and the financiers will always need a farmer to manage their properties and are in need of new capital, independent on its origin. Hence, the question is how farms should be organized in the future as the old image of a farm with a family, is not seen as the future, but it is difficult to see what should replace it.
2. **The image of farmers:** The image and status of farmers as a regulatory object is also a central point of concern. The whole debate revolves around the status farming vis-à-vis other types of activities in the countryside. The central question is whether Denmark is an agricultural “production country” or not. For some farmers who live in proximity to areas of high biological value this is a matter of farm

survival, as regulation of production may impose too many restrictions on the farming practice to still be viable. The comments reflect another concern for the farmers, they have to continue farming even though they observe that some of the activities they do are out of sync with the rest of society. At the same time, the farmers are also a bit apathetic towards the rest of society and its perceived lacking and simplistic understanding of the value and conduct of farming. The biggest concern is that the public image is embedded into regulation that is correspondingly simplistic.

3. **Representation of farmers in the regulatory process:** Farmers also express their distrust towards the agricultural regulation. Farmers direct this distrust towards the scientific basis of the environmental management and a sense that they are not recognized in the regulatory process. Farmers are concerned that the regulation changes overnight and that important regulatory decision will be taken by public officials. However, it is also argued that justice will prevail in the end if farmers stick together and argue based on facts.

Market conditions

In the past 5 years, conditions on the milk market have changed considerably. In the wake of the financial crisis the farm gate milk price has dropped to less than 200 DKK øre pr. kg, which is well below the costs of production for many producers. However, the prices increased again to record height in 2014 where the farm gate price for milk was 379 DKK øre pr. kg. and again dropped below 200 DKK øre pr. kg following the abolition of the milk quotas. Abolition of milk quotas and the emergence of a more volatile milk market, influenced by various world market events such as political crisis or natural disasters. Furthermore, the abolition of the milk quotas coincided with an import ban from Russia following the Ukraine crisis and a Chinese import stop of milk powder. Danish dairy farmers are highly dependent on the export markets as about 2/3 of the production is exported, and therefore the Danish dairy price was very influenced by these world market events. In addition, economists predict that the world market milk prices are expected to continuously decrease due to technological development, such as automation, breeding and increasing efficiency. Therefore, an important market condition for Danish dairy producers is a decreasing world market milk price and a more volatile market situation.

The Danish sector is composed of 28 dairies that operate 54 production facilities (Mejeriforeningen, 2016). Most of these are geographically located in the western part of the country. The multi-national Arla foods, which was established in 2000 in a merger between the Danish MD Foods and the Swedish Arla, is by far the largest dairy and one of the largest dairies in the world. Currently Arla operates in 7 countries and in 2015 the turnover was €10,3 billion (Arla, 2016). Most of the dairies are organized in the Dairy Association, and umbrella organization that manage standards and represent the dairy sector in policymaking.

Farmers in Denmark have been accustomed to fairly stable commodity prices due to the EU quota system and as a result they have invested in modern high-tech production systems. However, the quota abolition has also implied that Danish dairy producers are increasingly exposed to volatile world market prices. This is challenging because the producers have a high debt, which implies a high share of fixed costs that are difficult to meet when it is impossible to up and downscale production, hence producers must plan on a long timescale and depend on a high production and a steady cash flow. Therefore, it is no option for Danish producers to reduce production in times of poor prices, but the only option available is to increase efficiency, cancel reinvestments and increase production. For the single farmer this is entirely rational, but for the Danish and European dairy sector it is problematic, because it further increases production and thereby puts

a pressure on the prices. Volatile prices are not an issue if producers have sufficient liquid funds in times with low prices, however, overinvestments, poor loans and lack of savings has been a huge problem for many dairy producers. Hence, in the last couple of years Denmark has witnessed the highest rates of bankruptcies since the 1980'ties, and particularly dairy farmers have been among the ones that have been hit the hardest.

The growing difference between organic and conventional producers is another notable feature, which can be attributed to an expanding domestic and German organic market and therefore a higher demand for organic milk internationally. But also the fact that a number of organic dairy producers converted their production to conventional when the quotas were abolished in 2015 thereby creating a regional void (Vidø, Schou, & Zobbe, 2015). A notable feature of the internal Danish milk market is that consumers only purchase fresh milk, as UTH milk is largely unavailable in shops, an important condition as it has almost prevented competition from foreign dairies, which are unable to handle the logistics of delivering fresh milk to the Danish market. Furthermore, when the milk has to fresh in the supermarkets, the distance to the dairy increasingly imply a costly friction for the dairies.

In the past 10-20 years the Danish food system has been influenced by several new tendencies and it is becoming increasingly differentiated. The new and emerging food trends offers opportunities for adding value to the dairy production. First, it is worth noting that the Region of Southern Denmark is very near to the German market and there has been a long tradition for organic production within the region. The dedicated organic dairies in Denmark, including the company "Naturmælk" in the Region of Southern Denmark very diverse, producing a range of different products out of the milk including, fresh milk, butter and various types of cheese for different market segments. Second, there is an increasing focus on food as the material context of new experiences and communities. For instance, in a coordinated yearly event Danish organic dairy producers let out their dairy cows, attracting around 200.000 spectators on 70 different organic farms, during a day (Økodag, 2014). Third, there is an increasing focus on local food and origin has become an important factor in consumers' decisions to purchase particular products, reflecting a growing interest in 'food from somewhere'. Fourth, taste and gastronomy have become prominent new tendencies, following the onset of the new Nordic Food Cuisine in 2004, which is based on the virtues of "taste", as well as local, seasonal and traditional products of the highest quality (The Nordic Council of Ministers, 2012).

In effect, consumption of organics in Denmark has increased continuously for the past 30 years and today accounts for an 8 % market share, which has exceeded Danish production capacity for several food items, and has been accompanied by a growth in the import of foreign organic products (Thorsøe, 2015). In particular the demand for organic food is driven by a focus on health and animal welfare (Christensen, Olsen, Kærgård, & Dubgaard, 2014). Organic milk is the one of the most successful organic products in the Danish food market, where 25 % of the retailed fresh milk is organic and it is also a popular product in other European countries accounting for a market share of about 10 % in countries like Holland, Belgium, Finland and France (Willer & Lernoud, 2014).

Regarding the contemporary market conditions farmers' particularly note four aspects that are important in their decision-making:

- 1 . **Value-chain dynamics:** There is a general consensus that the structure of the retail sector and the asymmetric power relations between dairy farmers and downstream actors is problematic for the farmers. Hence, farmers feel that they are in a vulnerable position, particularly farmers who are

producing products with an added value like organic milk due to the mark-up added by the supermarkets. This mark-up is added as a percentage thereby magnifying the initial difference in price proportionately. Furthermore, among all focus group participants there is a concern that the dairy will not be able to pay the farmer a sufficient price for their produce. This is not just seen as a function of the organization of the retail sector, but it is also seen as a function of the world market.

2. **Production dynamics:** The recent market changes, where the dairy price has become much more volatile is also a great concern for the farmers. One of the major concerns is the unpredictability of the milk market, which makes it difficult to make proper budgets. The current crisis is not just seen as an issue due to the quota abolition, rather the current situation is a function of a longer series of deregulation on the dairy market. Hence, farmers do not explain the current situation as a problem with the dairy, but rather with general conditions at the dairy market. In fact, the farmers are generally quite happy with their dairy.
3. **Marketization:** The marketization has followed the gradual liberalization of the milk market and the globalization of the value-chains have had some important implications for Danish producers. Particularly, producers feel squeezed in the dairy market where they find themselves in a place where commodity prices have been declining, while other expenses have not and therefore they are in a constant battle to reduce the costs of production to stay afloat. Simultaneously, there is great frustration with the liberal market, as it tends to award other actors than dairy producers. The volatility in market price has some quite important implications for the producers, for instance the requirements for self-finance has increased as it is needed to manage the fluctuations. Particularly for dairy producers this is challenging, due to the huge investments and long settlement time.
4. **The paradox of farmers' market orientation:** All in all, the focus group participants are also a bit apathetic about trying to change the current situation. For instance, farmers generally observe the market developments from a liberal point of view and then interfering in the "natural market dynamics" is necessarily seen as a bad thing. On the other hand, the farmers are quite frustrated with their precarious position in the value-chain of the liberal market economy, exemplified by their discontent with the retailers, speculators and financial institutions. They are also quite protective of their colleagues who have gone bankrupt and argue that they have fallen victims of "unlucky timing of investments" or "banks that are not playing fair". Hence, there is a paradox in how the participants explain success, as a good management strategy and failure, which is either a distributed responsibility or poor financial decision-making on an individual basis. Hence, this liberal worldview of the farmers also produces a blind spot in terms of understanding the dynamics of the free market.

Financial conditions

The ability to obtain loans for investment in development of the production facilitates is an important framework condition for farmers. Historically, personal ownership has been institutionalized as the dominating form of ownership in Danish agriculture, although the proportion of private ownership has decreased a bit in recent years, still around 85 % of Danish farms that are privately owned. The conditions for refinance with this form of ownership is quite different from other forms of ownership (Olsen & Pedersen, 2014). Unlike shareholder companies where capital can be obtained by issuing new bonds, private companies are very sensitive to changes of the asset value and large investments (Olsen & Pedersen, 2016). Furthermore, when ownership changes, for instance during succession, the entire property value is usually refinanced by loans. Therefore, huge sums are extracted from the agricultural sector in each succession and the system has resulted in the build-up of a large debt. During the past 20 years this debt has increased,

following the build-up of the soil-price bubble, see above. This investment boom has only been possible because Danish farmers generally have a good access to investment capital at a low interest rate compared with other European countries due to a well-functioning financial industry. Historically, loans have not been provided based on a particular business model, but according to the equity of the loan taker. Hence, farmers with sufficient equity, for instance generated by increases of farmland value, have been able to obtain loans for whichever investment they saw fit.

Furthermore, 86% of the loans for agriculture are loans with variable mortgage rate and 61 % are without repayment. This means that many farmers are in vulnerable position, as they would experience financial difficulties if the interest rate increases. Although, many farmers are no longer reinvesting thereby producing new debt, the sector is still in a vulnerable position. The current loans are configured with a large share of short-term adaptable interest loans, as 172 billion DDK of the real-estate mortgage (total = 276) is interest free. This makes the entire agricultural sector very vulnerable to increasing interest rates.

The current financial crisis is in many respects a double crisis for Danish farming; loans have become more expensive, while the value of their property has decreased. Therefore, many farmers are stuck with production facilities and loans they cannot repay, but are also unable to sell. However, this general tendency also masks a huge variation among farmers, as the farmers that have the highest solidity still have very cheap access to capital, whereas credit access is much more expensive for the farmers who have low solidity. In general, the costs of obtaining loans has increased and for some farmers there are also increasing difficulties in getting access to loans, hence it is also difficult for the sector as a whole to invest in production facilities to the same extent that the production facilities are worn down. The high share of private ownership makes the agricultural sector particularly vulnerable to decreasing asset prices as the solidity cannot be improved with a capital emission (Vidø et al., 2015).

The ownership structure has huge implications for the price of finance in financial markets. Following the financial crisis, the interest level has generally been low for Danish farmers. The low interest meant that solvent farmers have very low finance costs. However, due to the decreasing soil prices and the consequent loss of equity, many farmers experience increasing costs of finance. According to bankers and finance experts, the reason for these increasing finance costs is the finance regulation that was implemented in the wake of the financial crisis, most notably the Third Basel Accord. The accord attempts to regulate how banks manage the risks of a running a bank, by imposing requirements for differing levels of reserves for different forms of bank deposits and other borrowings. Furthermore, the value of farm land has now been classified as an “uncertain asset”, and therefore it is not a type of asset that Danish banks prefer too much of in their portfolio because it increases their finance costs (Olsen & Pedersen, 2014). The implications of the Third Basel Accord are that banks have now become much more reluctant granting loans for the agricultural sector. Furthermore, the finance costs now vary much more between different groups of farmers, depending on their equity.

Structurally the Danish dairy sector, as any other commodity producing sector, is under pressure from a declining terms of trade, hence, commodity prices on the world market are in a long-term perspective expected to gradually decline, while prices for production factors are generally not declining to the same extend (Zobbe, 2014). Therefore, to remain in farming farmers must adapt their production, most often this

is ensured by increasing productivity to make up for the decreasing terms of trade. In the period between 1950-2000 Danish farmers increased their productivity with the same rate as the declining terms of trade, which meant that the farmer's income could be maintained. Furthermore, Danish farmers increased their productivity more than other comparable countries. However, from around 2000 the productivity gradually declined one of the reasons may be an easy access to finance until 2008, that did not discourage farmers from making unprofitable investments (Zobbe, 2014). Dairy farmers income has been relatively good in 2013-2014, which is attributed to the high world market prices at the time, however, in the aftermath of the financial crisis many farmers have had a difficult time finding finance for productivity improvements, due to the general difficult credit access (Olsen & Pedersen, 2014). Therefore, in the past 15 years Danish farmers have been on a roller-coaster ride, before the financial crisis most investments would be funded, but today it is much more difficult to make investments, and the number of these has decreased significantly.

In relation to agricultural markets agricultural economists have noted that "volatility is here to stay" (Vidø et al., 2015). Hence, contemporary farmers cannot shy away from the financial markets, but must modify their behaviour according to these markets. This has also gradually changed the focus of the farmers, being profitable is no longer just about managing the fields, but increasingly also about acting in financial markets.

In the past 10 years, benchmarking tools have become increasingly important in farmer's assessment and bankers assessment of the farm, and an important planning tool. Development of tools is based on a national database of farm accountancy data administered by SEGES. Benchmarking analysis enables the farmer to compare his production with the production on a number of parameters. In particular, the cost of production for one kg of milk has become a central single measure of the farmers' performance, which is used in their engagements with the banks. Arguably, there are a number of factors that influence the costs of production, that are unrelated to the farmers immediate performance and the banks make various attempts at distilling the good performers from the poor performers. Most banks have particular goals for the production costs that farmers must meet to become eligible for loans and financial support. Our analysis further indicates that apparently there is currently a mismatch between what bankers expect to be a sustainable production price and what many farmers are able to deliver and expects. Apart from this simple financial measure the bankers include various sources of information in their decision-making, for one thing a number of key performance indicators such as, LTV, rate of return, liquidity, solidity and positive momentum in the farm economy. As a rule of thumb, investment plans should yield an interest of about 10 % of the equity, which is a very high figure, when comparing to historic data where the equity has yielded an interest of about 3 % on average in the period 2000-2012. In the same period the average interest rate was about 4,5 %, hence the yield of investments in agriculture has been significantly lower than low risk stock bond investments (Kærgård, 2014).

Regarding the contemporary financial conditions farmers' particularly note three aspects, that are important in their decision-making:

1. **The financial gaze:** Generally, the farmers recognize that the financial conditions for Danish farmers are much better than for other European farmer. Furthermore, the Danish financial institutions have had an important role in shaping the course of Danish farming, but at the same time the financial sector has been an important factor for creating some of the equity problems that Danish farmer face today, but farmers do not feel the banks take on their share the responsibility for these issues. There is a widespread perception that the role of the financial institutions has changed quite a lot

following the financial crisis. Farmers feel that the financial sector has gone from one extreme to the other. At some point the banks could not lend enough money to farmers, but now they say it is completely the opposite. Hence, farmers feel that they are in a vulnerable position as they are at the mercy of financial actors whose rationales are somewhat opaque, this is a big source of uncertainty and frustration. Farmers feel that they are pawns in a game they do not quite understand, but they have realized that the banks do not act with their best interest in mind.

2. **Investment behaviour:** The apathy of the farmers in relation to the banks also sparks some reflexion on the investment behaviour of the farmers. The focus groups converged in the consensus that the farmers are generally quite optimistic in their investment behaviour, sometimes perhaps too optimistic. However, apart from justifying their investments on the grounds of a need for structural development and investments in new technology that emphasize growth, there are also a number of practical and pragmatic reasons for investment behaviour that are often overlooked.
3. **Succession:** The focus groups also reveal that farmers are quite conscious about the difficulty of selling their farms at a decent price or finding a successor due to the structural development. The previous investments by Danish dairy farmers have some significant implications for the ability of the farm to continue in operation in the future and there is a frustration that so much capital has left the agricultural sector. One of the key issues is the trouble of young people to enter farming due to the requirements posed by the financial sector.

Farmers strategies and institutional arrangements

Farmers understand their strategies in a number of meanings and there is a great variance between strategies, particularly in relation to the perspectives for succession. Hence, there are multiple in play and each individual farmer does not consider all these aspects and combine them in different ways.

1. **Production strategy:** The most dominant response of the farmers to meet the current market conditions is “diluting” the costs of production by increasing efficiency, increasing the scale of operation and cutting costs. However, farmers are well aware that diluting costs will not necessarily address the underlying causes of the challenged economy. Other farmer’s note that a number of successful cases have demonstrated that supermarkets have also realized that they may gain a profit by emphasizing products with unique qualities. There has been a change within the Danish farming sector when it comes to products with an added value, and the farmers that engaged in these kinds of activities are no longer perceived as “longhaired hippies”, but they are now more seen as an innovative vanguard. Direct sale and diversifying is another strategy that farmers often mention to ensure the farm economy. Although direct sale of milk is not an option for many, due to the required skills and technology there are a number of other approaches to direct trade. For instance, to exchange fodder crops like roughage and grain directly with neighbouring farmers in years of excess thereby circumventing the retailer and therefore save the charge redistribution. Diversifying, for instance via farm tourism or growing potatoes are other approaches. Farmers carry out these activities to distribute the risk between different activities and to ensure that there will be enough activities for the parents if they have a heir to take over the farm.
2. **Internal organization:** The farmers in the focus group talk about how they attempt to adapt the internal organization of the farm to manage the market volatility, as this for many is a major concern. Some of the organic farmers in one of the focus groups for instance mention that for them it is about creating something resilient by managing the fluctuations. Other farmers present similar arguments

when they talk about increasing self-sufficiency and avoiding contractors to do the work as a means to reduce expenses and thereby avoid the market risks. Hence, an effort is carried out to ensure reduced expenses, for the purchase of fodder and other external input on the farm and to ensure an alignment between the production facilities, acreage and other resources on the farm.

3. **Structural reorganization:** Structural reorganization is particularly a theme in relation to succession. The traditional generational change is by many not an option, due to the lack of a successor, and those who have a successor may be unable to find an investor. Only a few of the interviewed farmers planned for a traditional succession, but farmers also consider a number of other options. This is quite interesting, as farmers do not envision the coming generation of farmers to adhere to the same mode of production as the current generation. In fact, all the farmers we have talked with during our interviews expect that new models for succession and ownership have to be developed. Farmers observe a number of challenges. For instance, the structural development, which has created a landscape of very large production units, is another challenge for the succession. Furthermore, a particular challenge for Danish farmers is the recapitalization of the entire production facilities in each succession, which causes instability and difficulty finding a successor. Rather than a traditional succession, the farmers believe that the future will bring new forms of ownership sustaining farming. One of these strategies is lease holding rather than ownership, in that way a young farmer can get started without a huge capital investment. Many of the dairy farmers therefore consider the share milking model which is widespread in New Zealand as an option for future Danish farmers.

Key points

Within the Region of Southern Denmark dairy production has deep historical roots, is deeply embedded in the identity of the region. Furthermore, there are many specialized dairy farms in the region and a range of actors supplies the farmers with various inputs and knowledge networks.

Access to finance is currently an important issue for many Danish farmers, particularly dairy producers, as the number of loans has been reduced significantly. This is related to the current low commodity prices that make Danish dairy production economically challenging. However, interviews with bankers also indicate that some the problem is not related to lack of liquid funds in the finance sector, but uncertainty concerning the yield of agricultural investments. This again indicates that the problem for the Danish Dairy industry is twofold, first, a huge debt which is difficult which makes investments risky due to a high sensitivity to increasing interest rates, decreasing soil prices and 2) a business model that is unable to deliver sufficient yields that will compensate for the risk associated with the loans.

Although the Danish dairy farmers are in many ways quite different in terms of ideology and production systems, their understandings of the challenges of dairy farmers under the present market, financial and regulatory conditions are quite comparable. They all appear to be caught in a paradox that their immediate survival requires them to act in a way that prevents the reproduction of the farming system they are a part of. Furthermore, they are well aware that it is the consequence of the current development, but they are unable to find a proper solution for this. Hence, a largescale reconfiguration of the Danish agricultural sector is currently taking place, in particular, within the dairy industry. A large number of farmers exit farming due to bankruptcies, forced sales or voluntarily agreements. Hence, currently an accelerated structural development takes place and concentration of the farms, in which existing farmers purchase those who exit. Furthermore, due to the changes to the regulation concerning farm ownership a number of new actors are

now investing in agriculture, such as pension funds, investment funds and private persons. Furthermore, some of the larger farms experiment with different forms of ownership, for instance liability companies.

Interestingly the survey indicates that in spite of producing a commodity, which has become very volatile, the dairy farmers in the region of Southern Denmark are for the most part satisfied with their dairy. However, a large minority of the dairy farmers also consider new ways to strengthen the farm economy, for instance by diversifying, developing new partnerships and sales channels or adding value to their products as a strategy to strengthen the farm economy.

Poultry meat production in Central Denmark Region

In Denmark there are around 200 poultry meat producers, the vast majority of these rear chickens and the Central Denmark Region has one of the highest concentrations of poultry meat producers in Denmark. Furthermore, the only two major slaughterhouses managed by HKScan and Danpo are located within the region, which makes poultry production a regionally important industry.

The Danish poultry meat production is fairly stable, annually, the sector produce around 125.000.000 birds, which are slaughtered in Denmark at the two major slaughterhouses, in addition 10.000.000 birds are exported as live birds and slaughtered in Germany and Holland (DPMA, 2015). The poultry meat production has a total value of DKK 1.791 million (€240 million) (2015 figures) (Vidø et al., 2015). The production is organized as an industrial agricultural production, with fairly large-scale and modern production facilities in farms that house chicken flocks typically ranging between 20.000-40.000 birds, the average number of conventional birds produced annually pr. production facility is around 500.000 (Own calculations based on: DPMA, 2015).

A relatively high share of export characterizes Danish poultry meat production, as more than half the production is exported. However, concurrently about half of the Danish consumption of poultry meat and poultry products is imported - a proportion that has been increasing in recent years. A reason for this configuration of the value chain is that Danish slaughterhouses have specialized in the production of fresh poultry products, that are exported and frozen or processed chickens are imported. Furthermore, the Danish poultry industry is part of a globalized value chain, which implies that the cut-up chickens are retailed at the market where the value is highest, for instance, breast meat is sold locally and the chicken feet are exported to Asia.

The poultry value chain is composed of very few and specialized actors on both supply and processing side and they are primarily private companies, see Figure 17. For instance, the day-old chickens are nearly all produced by one company, DanHatch and there are two major and privately owned slaughterhouses. Furthermore, there are only a handful of companies that produce fodder for the chickens (according to specifications developed by DanHatch, which is adapted to the particular breeds of birds that are used). Hence, this organisation of the value chain also mean that there is virtually no competition between the actors, as there are no redundant actors in the value chain. Therefore, the actors in the value chain are also very well coordinated in their practice. Furthermore, when there are no cooperatively owned companies on the supply and demand side of the value chain the farmers have little influence on how the value chain is assembled and also few options for negotiating other prices or qualities than what is automatically given. This configuration of the value chain means that production standards and qualities are very strongly coordinated.

The two abattoirs, Danpo A/S, which is a subsidiary of the Nordic based Scandi Standard and HKScan, which is also a big North European player are the result of a series of mergers and acquisitions. However, the economy in the two slaughterhouses differs significantly. Danpo have a fairly stable economy, with an annual turnover of about 1.8 billion DKK and produce an annual result of a more than 60 million DKK. Furthermore, earlier in 2016 Danpo acquired the dedicated organic slaughterhouse Sødum that has developed a range of organic chicken and welfare chicken products. On the other side, HKScan has experienced a decline in their annual turnover of about 360 million DKK (2011-14) and has been struggling with a deficit in the past couple of years, primarily caused by the Russian food ban (Vidø et al., 2015).

Central Denmark Region is characterized by extensive rural areas and a high proportion of agriculture (65 %). The region is diverse, as the western part is rural with intensive agricultural production, while eastern part is quite populous, containing the second largest Danish city, Aarhus. This is also reflected in the agricultural structure, where a number of small farms around Aarhus supply the city, while the western part of the region is dominated by large farms. On average 3 % of the workforce in the region is occupied by agriculture, forestry and fisheries, which is higher than the national average of 2 %. The most important agricultural products of the region are industrial crops, such as corn, wheat, grass and barley for feedstuff as well as pigs, poultry, pelts and milk.

Market conditions

On a global level, poultry meat is one of the fastest growing meat types. Currently the farm-gate price for poultry hover around 6 DKK, but compared with the milk price recent years has not seen similar market volatility. Therefore, poultry producers have a much more stable economy. One of the reasons for this difference may be that poultry production varies more than dairy production, and it is possible for producers to adjust production if commodity prices are high or low, hence there is little response time for producers to adjust production. The share of poultry meat in the overall Danish meat consumption is currently rising and by the end of 2014 it is the second most consumed protein with a market share of 26.4% of the Danish population's annual meat consumption and the annual per capita consumption is 24 kg (DAFC, 2015). Compared with other product categories poultry meat is a fairly uniform category, almost the entire retail market is composed of fresh standard poultry meat products. Generally, poultry meat is perceived as a cheap and lean meat product that is easy to prepare, therefore it has become an important ingredient in quickly prepared everyday meals. Differentiations in the product category include various brands, various cuts and marinades, but there is little variation in the primary production.

The poultry value chain is composed of only very few and specialized actors on both supply and processing, and they are primarily private companies, obligated to make a profit for their investors. Furthermore, this organisation of the value chain also means that there is virtually no competition among the actors, as there are no redundant actors in the value chain. This leaves very little room to manoeuvre for the farmer, but also a pressure to fulfil his particular role in the chain. Furthermore, when there are no cooperatively owned actors on the supply and demand side of the value chain the farmers have little influence on how the value chain is assembled and only a few options for negotiating other prices than what is automatically given.

Although the Danish organic market is important with an average market share of 8 %, less than 1% of the chickens that are produced in Denmark are certified as organic. There are a number of reasons for this market lag. 1) One of the issues appears to be that the organic production and the food quality is not corresponding

with the industrial and hygienic standards inherent in the regulation for broiler production. 2) Technically, it is difficult to change a conventional into an organic, as organic birds require access to outdoor areas and the central location of the chicken houses on the farm tend to collide with the need for outdoor rearing. 3) The abattoirs are very industrial in their setup and they are adapted to the large volumes that are common in conventional poultry production. However, as the organic flocks are considerably smaller the slaughtering costs for organic chickens are significant. Furthermore, it is difficult to manage many of the qualities that are associated with organic poultry production in the mainstream marketing channels, such as uneven size of birds. Selling organic broilers as frozen food, to some extent, would alleviate the problem by allowing for larger quantities at a time rather than continuous small-scale supply, lowering the abattoir costs. However, the quality conventions in the Danish broiler market dictates fresh meat only as the retail sector prefer customers who purchase fresh produce, due to the added value of fresh produce and because customers who prefer fresh produce shop more frequently, thus purchasing more in total. Furthermore, customers who purchase frozen food are perceived as cheap, and thus unattractive customers for supermarkets. Therefore, the retail-sector has gradually removed frozen food from their product ranges in favour of fresh food (Thorsøe, Kjeldsen, & Noe, 2017). 4) The retail price for an organic chicken is considerably higher, at least double price, compared with a conventional bird. One of the issues is that organic broilers are in a deadlock, as prices are high because volumes are low and volumes are low because prices are high.

In spite of the relatively low market share of organic poultry meat, the market is currently evolving quite rapidly and the chicken market is differentiated slowly. Furthermore, the product category is expected to grow even further in the future, because poultry is a cheap lean meat product and therefore is well aligned with some new food trend, such as protein based diets and convenience and because consumers increasingly request differentiated products (Thorsøe et al., 2017; Thorsøe, Laursen, & Noe, 2015).

The changing consumer preferences and a diversifying poultry market is not just an opportunity for the producers of poultry products, but they also constitute a threat for the producers who have invested in a particular production. These producers depend on an ability to produce at full capacity to repay their investments so once started production relies on stable or more favourable market conditions. Hence, many poultry producers have begun to worry about the stability of the market conditions since nearly all supermarkets in 2016 have stopped retailing eggs from battery chickens. The decision came as a big surprise to the production industry, as numerous producers have reinvested in an upgrade of their production system due to new animal welfare standards in 2014. However, these investments will not be viable when phasing out this branch of production, and leaving producers in a precarious position. Poultry meat producers and the producer association attempts to prevent a similar thing to happen for standard chicken products, via a continuous dialogue with the retail sector, concerning production development, but the situation is challenging.

Regarding the contemporary market conditions farmers' particularly note five aspects that are important in their decision-making:

1. **Vulnerable market position:** Producers are in a precarious position when it comes to the formation of the farm gate price for the chickens. On the one hand the structural development has been quite pronounced in the poultry sector and today there are only two abattoirs left, so there is very little competition on the chicken market. At the same time, there is full transparency in the value chain and the abattoirs are familiar with the average costs that producers have for fodder, chicks and other supplies. However, the abattoirs are liability companies and they are unable to disclose their accountancy data to the producers. Hence, the producers are in a difficult negotiating position vis-à-vis the producers as the quotation is more or less decided by the abattoirs. However, the abattoirs are also in a squeeze, as they also have to sell their products to retailers that are also putting a price pressure on the abattoirs. In addition, one of the abattoirs are financially challenged and therefore is not in a position to compete much on the market or invest in the development of new types of production. To ensure stable conditions the abattoirs are carefully managing the flow of products by not accepting more chickens than what they are able to sell.
2. **Fragile production with marginal gains and high risks:** Poultry producers are in a vulnerable position as the marginal gains of production is very small compared with the turnover in the production. Hence, the farmers continuously have to produce a product with little marginal gain, but at the same time his production relies on a number of other actors such as supply companies. Already weeks prior to the hatching of the chicks the production is planned in detail, including an exact date for the pickup of the grown chickens. Hence, very small issues or deviations will be problematic to the producer. Conventional chickens only live about 33 days. Hence, the production needs to be flawless and variations need to be at a minimum and even small deviations in composition of fodder or health conditions of the chicks is unfortunate for the producer.
3. **The future of poultry production in Denmark:** The producers are a bit ambivalent about the future of poultry production in Denmark. Producers note that poultry meat is well aligned with some of the other major trends in society, such as a climate friendly production as poultry production is one of the most favourable energy conversion rates. However, they are also concerned with the classification of poultry meat as a cheap product. The producers we have interviewed both recognize the need for a general transformation of the production, but also the excessive expectations of consumers towards modern poultry production. Many of the producers that we interviewed for this study have stopped believing in the long-term future of conventional poultry production in Denmark. Furthermore, some of the farmers fear that supermarkets will abandon poultry producers due to a better economy in products with an added value, with a reference to the recent out phasing of eggs from battery chickens. This change in the supermarket policy is something that worries many producers and has made them feel at risk and many recognize a clear need for transforming the production to bring it more in line with the expectations of the supermarkets.
4. **The organic poultry market:** The conditions on the organic poultry market are quite different from the ones on the conventional poultry market. Poultry is among the commodity product categories with the highest difference in requirements for production between conventional and organic production. Everything within organic farming differs; all the things that influence the commodity prices are different. For instance, currently the organic grain prices are high due to many new

converters, which have yielded an enormous pressure on the price of grain for fodder. Organic poultry production is a niche product that lives a life of its own, unaffected by the world market prices. At the same time, there is a concern that the favourable market conditions that prevail at the moment will be equaled out by new converters who are interested in becoming a part of this new production system.

5. **Commodity markets:** Poultry production is characterized by a very high turnover, primarily for fodder, which accounts for about 75 % of the total expenses of the farmers. However, the fodder price fluctuates quite a lot and therefore the fluctuating grain prices constitute an important risk for the poultry producers. This has some direct consequences for the daily life of the producers as they have to be extremely careful in timing the investments of grain, soy meal and transport. Hence, farmers have become pawns in a global value chain and they are increasingly influenced by events they cannot control, like frost in Argentina or a draught in Russia. The mechanisms that farmers utilize to make some long-term stability imply that it is increasingly difficult for farmers to change from one supplier to another and in practice it is difficult to get out of a delivery contract. This introduces a new risk as it is complicated to produce chicken fodder and the companies do not always deliver in the expected quality.

Financial conditions

Previously banks have classified poultry production as a specialty production, which is generally a hindrance to finance as the mortgage providers are reluctant to provide a full mortgage, hence producers must finance investments with their equity or borrow money from the banks, which is at a higher interest rate. Therefore, poultry producers have not had an easy access to investment capital prior to the financial crisis and therefore have not overinvested to the same extent as other production sectors. Furthermore, the financial crisis in the agricultural sector and the new banking regulation has resulted in a declining willingness from banks and mortgage providers to invest in agricultural production, due to a dwindling equity. However, poultry producers generally do not have a high share of investments in farmland and therefore they have not experienced the same equity loss as pig and dairy producers when the land prices have dropped 40 %.

Due to the difficulty of producers to access investment capital and in the fear of declining production supply, the abattoirs in the value-chain have taken on the task of providing bank guarantees and ensuring a fixed minimum contribution margin running for 7 years to enable new investments. For example, in 2012 Danpo introduced a “growth package” in which they offered a bank guarantee, subsidy for environmental approval, contribution margin guarantee and investment surety for 1,5 million DKK for each new production facility, in addition they provide a surplus for all chickens produced in the new houses in the first 7 years of operation. In addition, other policies also ensure the economy of the poultry producers, for instance, postponed payments to the supply industry, price guarantee and insurance funds for farmers whose animals are infected with salmonella (which is a significant decline in the stock value).

These types of collaborative investments in the value-chain are a rather new and interesting feature in the Danish foodscape, as they ensure the farmers economy via a form of partnership between the different actors in the value chain. It creates a bit more stability in the economic conditions for the producers and underscores the mutual dependence of the actors in the value chain; furthermore, they illustrate the strong coordination of production between the actors.

Generally, the poultry producers that we interviewed do not express many financial concerns at present, as the economy of poultry producers is doing fairly well. However, there are also aspects that are problematic in their decision-making. Regarding the contemporary financial conditions farmers' particularly note two aspects that are important in their decision-making:

1. **Financial status of poultry producers:** Compared with other sectors, poultry production is traditionally classified as a "specialty production" by the banks and the mortgage providers, because there are not so many poultry producers. Therefore, the financial institutions believe that it will be difficult to sell the properties if the current owner goes bankrupt or wants to quit production. One of the challenges is that the houses that are used for poultry production are not easily converted to other types of agricultural production or other uses. For the farmers, this implies that poultry producers do not have access to the same types of mortgages that other types of production. This financial status is a bit peculiar as poultry producers historically have a better farm economy compared with other pork and dairy farmers. The effect is that there are not constructed a whole lot of new buildings at present and some of the ones that are currently used for production keeps getting older and the average age of the production facilities is an estimated 26-28 years.
2. **Commodity chain finance:** In order to ensure reinvestments in the production facilities one of the abattoirs implemented a growth plan, in which they issue a bank guarantee and ensures a contribution margin. This has enabled some new investment in the poultry sector and it is an important tool for banks and mortgage providers, as it is more attractive to provide the additional capital, when producers have some security in the first 7 years of operation.

Poultry breeding as a condition for production

The poultry breeds serve as an important condition for the poultry producers. Poultry breeding is extremely complex, specialized and expensive, hence there is currently no breeding activities taking place in Denmark or the rest of Scandinavia for that matter. Therefore, the Danish bird suppliers import eggs from their partners abroad (most importantly the Ross 308 breed). The birds that eventually end up in the supermarkets are the fourth generation of the birds that are breed and the initial 11 chickens end up parenting 39,5 million birds with an almost identical genetic mark-up. This is a necessity in the industrial poultry production where standardisation and uniformity is a key quality criterion. The birds are bred based on a set of breeding goals, which code for a particular behaviour and a corresponding impact on environment, animal welfare and production system (Gamborg & Sandøe, 2005). The breeding companies are huge multinational companies and Danish farmers have very little influence on how they operate or which breeding goals they adopt. Therefore, these breeding goals code for a particular production system, and it is impossible to alter the production strategy (for instance emphasising animal welfare by slow growth or outdoor rearing), without also adjusting the genetic mark-up of the birds. Hence, it also implies that poultry production is highly locked in to a particular production pathway. Furthermore, any changes to the genetics of the birds will only appear in the stables after a time lag of five years.

Policy and regulatory conditions

In the late 1990'ties salmonella Denmark experienced several cases of salmonella outbreaks related to chickens. To secure the food security for Danish consumers the government in collaboration with the poultry sector developed a number of regulations. The legislation details the conditions for poultry production, such

as requirements for the stable system, education of workers, animal welfare requirements and hygienic standards, the law is particularly adapted to industrial scale chicken production.

In the 1980-90's food security became a growing concern and a number of action plans to combat infections in poultry meat was implemented first in 1989, later again in 1998, this was followed by a new action plan in 2008 focusing on campylobacter. The actions plans have had an effect and there has been a significant decline in the number of reported infections. Hence, in general, Danish broiler has a high level of food safety and the use of antibiotics is very low as the production system ensures minimal external exposure of the birds to guarantee a high degree of protection against infections and an efficient stable management(DAFC, 2015).

In the poultry industry, quality is assured by daily data reports to a common database KIK (The Quality System In Chicken Production) and ACQP (Assured Chicken Quality Programme). The quality assurance scheme guarantees full traceability throughout the broiler production chain and it is a requirement for all actors in the value chain and close to all birds that are slaughtered in Denmark are covered by a quality insurance scheme. The system is third party accredited and audited, which allows veterinarians, slaughterhouses and key customers to monitor the mass balance and general health of a batch of chicken. Furthermore, the system can be utilized as a benchmarking tool, enabling the comparison of the efficiency between different producers.

Avian flu is increasingly also a concern among poultry producers. Avian flu is a highly contagious viral disease that primarily infects birds, but exposed humans may also be infected. The disease originates from Asia and infection is caused if the broilers come into contact with migrating birds. Any species of bird can be infected by avian flu and with some species the mortality rate is as much as 100 %. Chickens and turkeys are the most vulnerable, while waterfowls generally are more resistant. In 2006 a particularly contagious and aggressive strand of bird flu quickly spread across the different continents (H5N1). Again, in the fall of 2016 a strain of H5N8 spread across Northern Europe and elsewhere. Particularly free ranging birds are in the risk of getting in contact with contaminated birds. It is considered highly unlikely that conventional poultry producers, who keep their birds indoors and put a great effort into reducing any contamination in the stables, are exposed to infections. This recent outbreak affected many of the European countries, but in Denmark only a number of wild birds were found and a few pastime farms with outdoor rearing were infected. However, when infected birds were discovered important Asian markets were closed (particularly South Korea). The disease has had a profound implication on the market conditions as export markets are automatically shut down for 3 months following OIE regulation, when infected birds are discovered, and therefore an outbreak of avian flu immediately affects the quotation that is given to farmers.

Regulatory conditions are quite a big thing in poultry production, particular regulation to manage disease in birds, particularly salmonella, but more recently also bird flu. These diseases are both highly contaminating, detrimental to the poultry market and generally, the poultry producers appear as content with the way that the regulation is managed, as regulation has been developed in close collaboration with the producers. Furthermore, apart from the mandatory regulation developed at national level a number of private initiatives have also been taken in the value chain on a voluntary basis. Regarding the contemporary regulatory conditions farmers' particularly note four aspects that are important in their decision-making:

1. **Disease management:** The most recent outbreak of bird flu in the fall of 2016 affected many of the European countries, and in Denmark a number of wild birds were found and a few pastime farms

with outdoor rearing were infected and caused the important markets in Asia to ban the import of Danish birds. Hence, even though the producers were not directly influenced by the avian flu they were indirectly influenced as the import ban quickly caused a drop in the quotation. Actually, just a small drop in the quotation price following an outbreak of avian flu is enough to cause the farmers to lose a significant part of their annual wage. The farmers tend to think of this more as a technical hindrance to trade rather than a reflection of a genuine concern for food safety. Furthermore, it is a problem for the farmers as they cannot do much to change their production, as they have paid for chicks and fodder and there is nothing much to do but wait for it to pass. However, although the abattoirs also lose money they are able to transfer some of their losses onto the farmers. Farmers are not in a position to transfer any of their costs onto other actors. They are bound by long-term and fixed contracts with some of their suppliers, and in addition, they have to continue producing to maintain their production facilities and to ensure that they can keep a cash flow for their mortgage. In addition, following outbreaks and market shutdowns large stockpiles of frozen products, usually whole chickens, or parts thereof have been built. Hence, market recovery is always slower than market shutdown. The big issue in this particular outbreak was that although no birds in the production system were actually infected it still caused a market to shut down as the birds of pastime producers and professional producers are registered in the same OIE-register. Attempts will be made to change this, which is in line with the practice in other countries, but nobody was aware of this prior to the present outbreak.

2. **Hindrances to foreign trade:** Although producers are generally content with the disease management and the sanitary requirements that have been implemented, some of the policies also hamper the market competition by restricting the producers' abilities to interact with companies abroad. For instance, due to the National Salmonella Action Plan, it is not possible for producers to purchase hatched chicks abroad. Hence, effectively this strategy, which safeguards producers from foreign contamination, also hampers the competition. Another strategy that is faced with similar issues is the delivery of birds to German abattoirs. Abattoirs in Germany practice a particular form of production in which the birds are gradually slaughtered at different ages. Hence, producers can initially have a higher number of birds in the stables, and then slaughter the birds at for instance day 30, 37 and 42, thereby increasing the production volume per square meter. Many producers in the southern part of Denmark thus deliver their birds to Germany. However, this form of production also implies a higher risk of contamination as the chicken harvester drives several times through the flock. Several producers have also decided against this form of production in the fear that there will be a market shutdown in the event of a disease outbreak. Then they will be stuck with a flock of chickens that they are unable to export and also unable to sell to a Danish abattoir as this form of production is not recognized by the Danish quality standards.
3. **Organic regulation:** The Danish organic regulation was initially moulded over the French Label Rouge system, which implies that the herd size should be below 4.800 birds and the birds should gain a maximum of 35 grams per day and be at least 57 days when slaughtered and 63 for the hens. Furthermore, the birds should have access to free range areas that are planted with vegetation. Although the regulation in many ways reflects the expectations that many consumers have towards an organic production, it also constitutes a significant barrier for conversion of some of the existing operations. The reason is that the specialized buildings for poultry production, are often much larger and sometimes built for 50.000-100.000 birds. Hence, producers have huge investments tied to the

buildings that they are unable to pay off if they are to decrease their stock density. Furthermore, often houses are placed in cluster of 4-5 houses, with marginal space between, which prevents outdoor access for the birds.

4. **Quality assurance in the poultry production:** The quality assurance schemes KIK and ACKP that ensures full traceability throughout the broiler production chain is an example of a voluntary regulatory regime that has been developed by the actors in the poultry chain. The producer interviews reveal that producer on the one hand find it a bit annoying that they have to make these registers, as it is a bit time consuming, on the other hand it also provides a good overview of the production and serves as a self-monitoring device that provides feedback on particular focus areas. Due to this system farmers are able to benchmark their own production to the production of other farmers. Furthermore, farmers are also able to monitor the performance of fodder from different companies. For the farmer, the quality assurance scheme function as a documentation of performance when attending bank meetings or making claims towards suppliers for failure to deliver products in an acceptable quality. For the abattoirs, the quality assurance scheme functions as a legitimization of their quality claim towards retailers and other costumers, but the system also causes frustration as sometimes requirements are seen as a little foolish. Although the producers do understand the need for a quality assurance scheme they do not always understand the particular requirements that they are faced with and then it is frustrating that it is “easy” to develop new requirements.

Understanding poultry producers’ strategies and institutional arrangements

Regarding the strategies and institutional arrangements there are a number of aspects that are brought up by the farmers as particularly important for them, which have been grouped into four categories:

1. **Managing world market volatility:** The costs of purchasing fodder is one of the most important costs for the producers and prices at the world market fluctuates significantly, therefore the producers need some strategies to manage this uncertainty and market risk. Hence, the decision to purchase fodder is very important for the overall farm economy and it is one of those ongoing decision-making situations that the farmers are spending a lot of resources to get right. However, there are different strategies at play depending on the temper of the farmer, some farmers have outsourced all their purchase of fodder to a purchasing club. Others conduct all the purchasing themselves, perhaps with the assistance of salesmen from the fodder companies, their colleagues and friends, or professional advisors. Furthermore, there are different time horizons in play, some farmers purchase fodder for a full year whereas other only purchase small amounts at one time or invest in futures on soy meal and transport, others just purchase when products are on the market. Hence, there are many different strategies in play to manage the world market volatility.
2. **Coordination in the commodity chain:** The Danish poultry meat chain is highly coordinated and all activities are carefully planned. This is quite important for the poultry producers as they always know that they have a market for their produce, so they never have to think about the sales process and are able to focus entirely on managing their flocks. On the other hand, they are also closely tied to the suppliers and the abattoirs and they do not have other options, but to quit farming (if that is even an option for them), if they are discontent with this network. The cooperation among the abattoirs and the farmers is framed in two different contracts, the first is between the individual farmers and their abattoir. This contract usually runs for two years and specifies how much produce the farmer

should produce. However, the quotation is variable and is defined by the abattoir depending on the particular market conditions that prevail at any given time. If prices are below the cost of production for three consecutive flocks, then the farmer is able to abandon the contract, but otherwise contracts are extremely stable. The second contract is between the abattoir and the supplier association consisting of all the suppliers to the abattoir. It specifies the general terms of collaboration between the suppliers and the abattoir. Furthermore, the supplier association is the main dialogue partner representing the suppliers in the debate with the abattoir, for instance concerning how the quotation and discounts are set, disease management and gives input in relation to the quality development in the value-chain.

3. **Succession:** Whereas dairy producers plan for a future where the farm is continued either by a new young farmer or a natural successor, poultry producers do not necessarily plan for succession. Poultry production is a niche form of production and farmers cannot be sure to sell the property on the market and it is difficult to obtain a mortgage. Hence, the interviews indicate that many poultry producers plan for their farms to be worn down prior to their retirement. This wearing down strategy imply that the new owner either reinvests in the production system or demolish buildings and start a new production. As poultry producers, like Danish farmers in general, have a rather high average age, this strategy implies that production facilities also have a relatively high average age, allegedly around 26-28 years.
4. **Optimization of field economy:** The poultry producers who own farmland are considering how to manage this farmland as arable farming, currently, is not a very good business. The farmers also employ different strategies, that are in a sense unrelated to the poultry commodity, but that are very important for the farm economy as a whole. Some of the farmers note that it is not so important for them what they earn from their fields, because when the grain prices are low so too are the fodder prices and that is much more important for their farm economy. Another farmer noted that he is working towards establishing a potato production as this is a high value arable crop that will reduce his reliance on the income from the poultry production. Furthermore, he needed to commence a new activity as he had just partnered up with his father and they needed new revenue streams to generate value for both of them. A farmer, with a larger acreage of leased land was pressed by his bank to give up these lease contracts because he was losing money on the arable farming. However, he was reluctant to give up these leaseholds as his environmental approval depended on an access to a particular spreading area for his manure. These examples tell an interesting story about the way that poultry famers think about their strategies. Farmers do not think about their strategies strictly in terms of particular commodities, but rather consider their strategies in holistic terms that include all the operation on the farm.

Key points

The poultry value chain is composed of only very few and specialized actors on both supply and processing, and they are primarily private companies, obligated to make a profit for their investors. Furthermore, this organisation of the value chain also means that there is little competition, but a high degree of coordination. For instance, the bird suppliers have coordinated their breed selection with the feedstuff producers and the abattoirs to fine tune product. This leaves very little room to manoeuvre for the producers and a pressure to fulfil their particular obligations. Furthermore, when there are no cooperatively owned actors on the supply and demand side of the value chain the farmers have little influence on how the value chain is assembled and also few options for negotiating other prices than what is automatically given.

In terms of finance poultry producers are also in a special situation. Previously, mortgage providers classified poultry production as a specialty production which is generally a hindrance to finance and particularly prior to the financial crisis the credit access was poor. Poultry producer, therefore have not made reckless investments to the same extent as other production sectors. In the fear of declining production supply many of the companies in the value-chain have taken the task of providing different kinds of loans and security for the producers to enable new investments. For instance, in 2012 Danpo introduced a “growth package” in which they offered a bank guarantee, subsidy for environmental approval, contribution margin guarantee and investment surety for 1,5 million DKK for each new production facility, in addition they provide a surplus for all chickens produced in the new houses in the first 7 years of operation.

The poultry breeds serve as an important condition for the poultry production. Poultry breeding is extremely complex, specialized and expensive, hence, there is currently no breeding activities taking place in Denmark or the rest of Scandinavia for that matter. This implies that poultry production is highly locked in to a particular production path and it is extremely difficult to change the production system as any changes to the genetics of the birds will appear in the stables after a time lag of five years. Furthermore, the breeding companies are huge multinational companies where Danish farmers have very little influence on how they operate and therefore it is extremely difficult to alter production conditions without also changing the breeds that are used in the production.

The decision to purchase fodder is increasingly important for the overall farm economy and it is one of the ongoing decision-making situations that the farmers are spending many resources to get right. This has some direct consequences for the daily life of the producers as they have to be extremely careful in timing the investments of grain, soy meal and transport. There are different strategies at play depending on the temper of the farmer, some farmers have outsourced all their fodder trade to a purchasing club. Others conduct all the purchasing themselves, perhaps with the assistance of salesmen from the fodder companies, their colleagues and friends, or professional advisors. Furthermore, there is a difference in the time horizon of the investment, some farmers purchase for a full year whereas other only purchase small amounts at a time or invest in futures on soy meal and transport, others just purchase when products are on the market.

The survey indicate that in spite of being in a precarious market position with fluctuating commodity prices, many of the poultry producers in Denmark are still satisfied with their sales channels. However, the survey also suggest that there are a large minority who are somewhat unsatisfied with the current state of affairs and they are on the lookout for alternatives in terms of sales channels, production strategies and ways to add value to their products as a strategy to strengthen the farm economy.

Key findings of the two case studies

In this section, we will briefly draw out the five key points that we have identified in the report.

Danish farming currently undergoes a fundamental restructuring

The overall conclusion from the two case studies, which has also been verified in the qualitative inquiry is that Danish agriculture is currently undergoing a fundamental restructuring. The restructuring is composed of a number of factors: 1) Danish agriculture is based on a business model, which is challenged in the world market economy. 2) Previous overinvestments, structural development and a soil price bubble has removed much of the equity in the sector and resulted in poor capacity to change. 3) A form of ownership,

which is unable to address some of the current challenges, such as ensuring succession and managing the volatile market situation. This produce yet new questions like which mode of production will rise out of the restructuration and how the development of a resilient agricultural sector can be ensured?

Similarities and differences between the case studies

In a number of ways, the two case studies are very similar, both commodity types are bulk commodities that are traded at the world market, where the individual farmer have no real influence on price and quality standards. Hence, they continuously need to improve efficiency to accommodate for the decreasing world market prices. Furthermore, both commodity types are produced in a value chain where specialized actors supply inputs and carry out sales activities. Hence, the farmers do not have to take care of these activities, but they can focus their attention on the operation of their farms, however, they also depend on these actors to deliver good prices and services. However, there are also important differences between the two commodities: 1) Within the dairy sector and to a lesser extend within the poultry sector there is a growing differentiation due to the emergence of an organic and specialty food market, which has provided new business opportunities and therefore also an alternative production strategy for some producers. 2) There are different responses to shocks and market volatility in the two value chains. Within dairy farming commodity prices have traditionally been fairly stable, therefore, it has been easy for the farmers to predict future prices and therefore also to plan investments. The actors in the poultry industry have adopted a number of mechanisms that stabilize farmers' production economy and ensures a proper level of investments, such as *"postponed payments"*, *"insurance schemes"* and *"contribution margin security"*. However, this is absent in the dairy sector where the market fluctuations are individualized and each producer must find a way to deal with the volatile market on their own. Poultry producers on the other hand have been more cautious with their investments in the past. This is partly due to a classification as *"specialty"* production, which restricts the access to finance and because poultry producers have less investments in farmland. 3) The increasingly volatile market situation poses a huge challenge to the Danish production system, particularly the dairy producers, where production takes place in modern high-tech production facilities. Ideally, this implies management of the environmental impact and animal welfare issues, but these facilities require a large investment to begin with and require production at full capacity until the farms can be decommissioned, otherwise investments are not viable. This is challenging when prices are fluctuating, as production require a large amount of buffer capital to ensure the financial resilience. In an average farm economy, this capital is absent and given the prevalence of private ownership it is difficult to rise.

The changing identity of the farmer

The current crisis has made the banks more cautious in their way of dealing with the farmers. Many farmers depend on overdraft and the banks are in a position where they must decide which farmers they will support and which farmers will have to leave farming either through a bankruptcy or by selling their property. Banks do not invest in agriculture as such, but provide capital for farmers who invest. This implies that banks have increasingly begun to observe the farmers as *"capital managers"* and they assess whether or not they are credible capital managers. Therefore, an important new condition for the farmers is the framing that banks and other credit and mortgage providers use to assess whether and under which conditions the farmers are credible loan takers. This leads to a number of changes: 1) Banks now take a number of factors into consideration when they make their decisions; including financial measures such as production costs pr. unit, but also a number of other measures such as management qualification, credibility ability to reflect on new

ideas and reflect on proposals from outsiders. This has implied a stronger focus on skills, which traditionally have not been considered important in the collaboration with the banks like *“strategic leadership skills”*, *“marital stability”* and *“management of employees”*. Increasingly, it becomes important for the farmer to fulfil the image of a *“good farmer”* in the view of the banks because the structural development is pronounced and banks tend to favour the *“top 25 %”*, and if a farmer is not within this category, banks are reluctant to give access to finance. 2) The businessman identity is quietly implanted in the farmers for instance using newly developed benchmarking tools. These tools are used to benchmark farmers against one another and provide the banks with a number of key figures for each farm that continuously benchmark the performance of each farmer against a national average. 3) Due to the capital intensity of the Danish farming sector, the banks are the engine of transformation in the sector and their decision to finance an investment or not is of crucial importance, not only to the individual farmer, but for the course of the entire Danish farming sector. The benchmarking tools are built over historic data and they are not a neutral representation of the farm but a particular view of the farms performance. This suggest that banks prefer a focus on the on the traditional strongholds of the Danish farming sector like standardized products for the world market, rather than an emphasis on a transformation to new modes of production. 4) Structural development implies an increasing focus on leadership and managing employees, therefore, there is no room for the farmers who are mainly interested in the practical aspects of farming, because the business aspect is increasingly important if farmers want to survive in farming. The volatile market conditions require a much more focused attention to the timing of investments, sales and purchasing behaviour as these aspects increasingly determine the profitability of the farmers. Furthermore, in the present situation farmers observe an equity loss and therefore it becomes increasingly pressing for the banks to manage their agricultural investments in a more active manner, because it is costly for the banks to keep farmers afloat.

Managing world market volatility

Both dairy and poultry producers are in a precarious market position, their own production have no influence on the general supply and demand on the world market. At the same time, they are very dependent on external input, but they have no influence on the price of these inputs either. This illustrates that have become pawns in a global value chain and they are increasingly influenced by events they cannot control, like frost in Argentina or a draught in Russia. For many livestock and dairy producers, the costs of purchasing fodder is one of the most important costs and prices at the world market fluctuates significantly, therefore the producers need some strategies to manage this uncertainty and market risk. The choice of fodder source is also one of the areas where dairy and poultry production differ, as poultry producers are very dependent on external fodder purchases. Generally, dairy farmers have better options for growing fodder for the animals on their own farm as dairy cows are able to eat grass, roughage and silage that can be produced by the farmer.

Opportunities and barriers for resilient production

The two cases illustrate different barriers and opportunities for a resilient transition of the Danish agro food system. The poultry case reflects a production system with low entrance barriers, it is fairly cheap to purchase a small production facility and poultry producers can quickly build a sustainable cash flow. However, the system is also dominated by a few major actors on the supply and processing side that are adapted to a particular mode of production (using specific breeds and producing a uniform product). The dairy case illustrates a production system that is fairly expensive to purchase and it takes a long time to establish a

sustainable cash flow. This also indicates an important material difference between but through processing milk may be the two commodity types that code for a different organization of the value chain. Poultry is a fairly uniform product, where processing does not add much value to the final product, as the final product usually is just the chicken meat. Milk is different as range of different products such as fresh milk, milk powder, butter and cheese are produced, and these products are produced in qualities for many different market segments. Hence, the organization of the dairy value chain is more diverse as there is a better opportunity for demonstrating skills and adding value to the final product.

1. Introduction

This report is the Danish National Report from the European research project SUFISA – “Sustainable Finance for Sustainable Agriculture and Fisheries” (2015-2019). The purpose of this report is to investigate policy requirements, market imperfections and their implications for commodity sectors and regions, thereby providing an empirically grounded regional and commodity-sensitive analysis of CSP for the resilience of primary producers. The ambition of the project is to move beyond generalized assessments of conditions, strategies and performances (CSP), hence, the purpose is analysed in two case studies, dairy production in the Region of Southern Denmark and poultry production in Central Denmark Region, respectively. The two case studies are presented in their own sections within the Danish National Report, but it will become clear that there are many overlapping issues, as there is a number of generic regulations and policies that influence all Danish agriculture.

Due to a parental leave with one of the Danish participants and an internal reorganization of the project group we have been unable to complete all sections of this report. Status is that we have collected all the data for the report and there are a number of interesting aspects that we have already included in the case-study, but there are also a number of aspects that are not completed for this first version. We have more less completed sections 1-3 & 6 and attempted to complete the analysis and discussing bits of the case-studies (sections, 4.4, 5.4, 6), as these will be used as input in other project activities, however, in particular section 5 is still a little incomplete. Omissions are heightened in yellow.

1.1 Methodology

The methodology adopted to write the report is threefold. First, in the media analysis the purpose has been to conduct an initial screening of the field to identify topics to explore further in the later stages of the SUFISA project based on a range of different written sources. Sources and text selection have been generally conducted following the guidelines that were developed for the SUFISA project and the covered material consists of: General newspapers, trade journal articles and agricultural press in the Infomedia database, whitepapers, research notes, reports, memos and academic literature. Suitable keywords have been used to restrict the field of enquiry and focus the search on relevant themes. Our previous experiences in this field guided the first keywords selection that was then progressively updated with the research findings.

Secondly, we conducted a desk-based analysis of market conditions and regulations for each case region/commodity, supplemented with expert interviews per case study. In more detail, the media analysis examined national, regional and specialised media from 2005 to 2016, with a focus on publications reporting on the economic and financial sustainability of primary producers. The desk-based review involved analysis of key policies, regulations and market issues that impact dairy producers in the Region of Southern Denmark and in the Central Denmark Region, respectively. Sources reviewed on this stage of the inquiry included academic publications, key regulations, policies, standards, market data, market research and consultancy reports.

Third, we conducted 25 stakeholder interviews as supplements to the desk-based review. The aim of the interviews was therefore to gain further insight into the nature and complexity of market and regulatory conditions and how they are experienced from the farmers perspective, as well as identify emergent CSP issues. Having conducted a desk-based review of the literature available on each commodity, the interviews

were used to make sure the report provides an accurate and up-to-date grasp of the issues by asking those stakeholders who are directly involved in the sector for their inputs. In other words, from their perspective what are the key issues, especially in relation to regulations and markets that need to be accounted for in order to develop resilient systems of production. A total of 25 interviews were completed for the Danish National Report, 13 for dairy and 12 for poultry.

1.2 Report structure

The report is structured in 6 sections; the next section of the report provides a summary of the findings in the media analysis. For a more detailed account, please consult the Media Analysis - National Report Denmark. The major part of the report consists of the two parallel commodity case studies, which review key regulatory and market conditions for Danish dairy farmers and poultry producers respectively. Initially we introduce the case studies and the contemporary situation in the Danish agricultural sector. Sections 4 and 5, then provide the case study context, then describe and analyse the main policy and regulatory conditions and market conditions providing evidence how these conditions specifically influence primary producers' situation, actions, strategies and performances in a given sector. Both case studies are summarized in a SWOT analysis and short discussion which draw out the key issues emerging in both sectors. These issues will be taken forward in the coming research activities, including focus groups and workshops with producers and other actors in both commodity chains. A comparison between the two sectors is not provided in detail in this report, but we will draw out some key points in section 6.

2. Media content analysis

2.1. Introduction

The initial section presents the summary of a media analysis carried out for the SUFISA project (subtask 1.1.3). The objective of this analysis is to cover the range of different positions and approaches that are debated in the media regarding the SUFISA objectives; sustainability of primary producers in a context of multi-dimensional policy requirements, market imperfections and globalization. The purpose of the analysis has been to conduct an initial screening of the field to identify topics to explore further in the later stages of the SUFISA project.

Sources and text selection have been generally conducted following the guidelines, which have been adopted based on the general guidelines that were developed for the SUFISA project and the covered material consists of: General newspapers, trade journal articles and agricultural press in the Infomedia, whitepapers, research notes, reports and memos and academic literature. Suitable keywords have been used to restrict the field of enquiry and focus the search on relevant themes. Some suggestions deriving from the previous experiences in this field guided the first keywords selection that was then progressively updated with the research findings. Keywords were used in combination, to restrict the focus and minimise possible non-pertinent selections. The starting combinations were the following (keywords translated in English for easier comprehension): "landmænd" (farmers) and "landbrug" (farms), used in combination with words like (translated in English) "market", "credit", "inputs", "risk management", "strategies", "finance", "sustainability". The research focused on the years 2012-2015. For some sources time range is less wide because of limits in archives availability; some texts produced in the previous years have been also selected when deemed particularly relevant or pertinent. For more information on the methodological aspects of the inquiry and the full media analysis, see Media Analysis – Danish Report.

2.2 Conditions

In the following sections the media coverage of the perceptions of farmers' conditions grouped according to the SUFISA Conceptual Framework. When external conditions are discussed in relation to farms' characters, and when references to farms' strategies developed in reaction to those conditions are made, the analysis considers these additional elements within the most pertinent sections.

2.2.1 Regulatory and policy conditions

The two major recent regulatory and policy initiatives in Danish agro-environmental regulation have been to deal with, first the financial crisis in the agricultural sector and secondly to manage the environmental impact of farming, in particular, the nutrient surplus.

The regulatory changes have not been debated much in the media, although some critics have pointed out that it is unfortunate that no one keeps track of which actors invest in Danish farms and therefore also their motivations for investing. Numerous articles in the material have dealt with the opportunities for enabling generational change or restructuring the farms that need a supply of new capital (however, these are dealt with under factor conditions).

Following an overproduction of milk in the late 1970ties and 1980'ties the EC implemented a milk quota system in 1984, which implied that a dairy production was restricted. The milk quota system was cancelled

on April 1st 2015. This cancellation has increased production, but also deflated the world market milk price and resulted in a financial crisis among Danish dairy producers.

2.2.2 Factor conditions

In the analysis two important issues emerge concerning factor conditions, first and most significant is the soil price bubble and secondly the opportunities for generational change and new forms of ownership.

The collapse of the soil price continuously has many implications for the agricultural economy and for the individual farmers. The collapse has left a number of farmers technically bankrupt (their loans exceed the value of their property) and furthermore, a large share of farmers are no longer able to repay some of their loans. A recent assessment from the University of Copenhagen reveals that almost 25 % of the Danish farmers currently struggle with a high debt and a low income or a deficit. Hence, today the financial industry is reluctant to approve loans for agriculture in general as they no longer consider agriculture as an attractive investment, furthermore, the equity of farmers has decreased dramatically, which influence their ability to obtain loans. Currently we see a historical low rate of investments into renewal of farming equipment, which mean that the current wear of the farming equipment is much greater than the current rate of investment.

The build-up and burst of the soil price bubble has been a significant event that has been widely debated in all the reviewed media. There appears to circulate a number of reasons for the inflation of the soil price. Prices had been rising for a long time, in both the domestic housing market and in the market for agricultural properties, and loans were given based on security in the inflated land value. In general, the financial industry provides relatively cheap mortgages at low interest rates, and prior to the financial crisis farmers had easy access to finances.

The inflation of the soil price and the current financial crisis is extensively covered and debated in the various media. However, there are notable differences concerning which aspects of the financial crisis the different sources we reviewed in this media analysis cover. General newspapers cover some of the individual bankruptcies and their implications for the rural economy. The agricultural newspapers also cover these individual accounts, but in particular also the aggressive marketing practices in the financial industry that enabled the risky investments.

Interestingly labour issues are not widely debated in the documents we reviewed for this analysis. However, in recent years there has been a change in the agricultural workforce so today it is estimated that about ¼ of the workforce is foreign labour. Interviews with farmers indicate that the one of the main rationale for hiring foreign labour is that they are “more motivated” for farm work. The share of foreign labour is not debated as such, but it is often mentioned in newspaper articles that are critical towards the agricultural industrialization and its implications for rural communities, as one of the symptoms of an unhealthy system.

2.2.3 Demand conditions

In the media analysis two important issues emerge concerning demand conditions, first is the gradual conversion to new quality conventions that the Danish market is undergoing and secondly the influence of the fluctuating commodity prices and particularly events and issues that influence these prices.

From the analysis, it appear that agricultural production in Denmark largely can be grouped in two different groups, conventional bulk production for the world market and specialty production, such as organic, gourmet and local production. For the past 10-20 years the Danish food system has gradually undergone a

transformation towards a range of new food qualities, including, increasing organic production and consumption, increasing interest in local food production, and an emphasis on experience, community, taste and gastronomy (Thorsøe, Kjeldsen, & Noe, 2016; Thorsøe & Noe, 2016). In general the low commodity prices that are currently dominating the world market, primarily impact the conventional produces as the prices for organic food have not to the same extent been influenced by the decreasing prices.

The evolution in demand conditions are covered by all the reviewed media, but in different ways. The agricultural newspapers, in particular, present stories of farmers who have adopted a new form of production technique in articles that explore the practicalities, challenges and economy of changing production. Hence, quite often it is mentioned in a headline how a particular change has influenced the turnover of the farm. The lacking emphasis on new quality conventions is also mentioned in many of the papers that deal with farmers that are in crisis. Some of these farmers note that there may be some more fundamental problems with the underlying strategy: *"we have been too self-satisfied in this business [red: pork production] by believing that we produce a commodity and consumers should just eat it. But they decide for themselves what they want to buy. We have to make some quality products to get a price premium."* The quote also reflects the fact that although the market for specialty food is growing in Denmark, Danish farming is primarily engaged with the production of standardized produce for the world market.

In the ordinary newspapers, the transition to new quality conventions is generally covered by focusing on consumer experiences with quality food, success stories of food entrepreneurs and how Danish products are received in foreign markets (mostly when positively received). Particular emphasis is given to certain product categories, where a lot of change has taken place in recent years, such as the craft beer sector, production of old grain varieties, food festivals and the emergence of the New Nordic Food Movement. The New Nordic Food Movement is claimed to have had a significant influence on contemporary Danish cuisine, by emphasizing the virtues of "taste", as well as local, seasonal and traditional products of the highest quality. Furthermore, there is an increasing focus on new experiences related to food production. For instance, in a coordinated yearly event Danish organic dairy producers let out their dairy cows, attracting around 250.000 spectators on 70 different organic farms, during a day and this event receives a lot of publicity.

Organic production receives quite a lot of media attention, in particular in the popular media, where it is presented as an ethical choice for the concerned consumer. In the popular media, stories about organic farmers tend to focus on the values, personal narratives and motivations of the producers or the particular qualities that are associated with a particular form of production. However, organics also has a prominent place in the agricultural media that communicate with both organic and conventional producers. The agricultural media tend to present organic production as a form of marketing strategy for the producers and not as an ethical decision, for instance a recent headline in an agricultural newspaper read that *"I earned half a million by converting to organics"*. Hence, these stores tend to focus more on the differences in production practice on a practical level.

Several papers deal with world commodity market and how individual producers should manage the risks at the world market. One of the trade journals that specialize in economy, notes that the world market trade is growing and so is the number of different options that famers can choose between to manage the uncertainties of increasingly fluctuating prices. Contemporary farmers cannot shy away from the financial markets, but must modify their behaviour according to these markets. In a different set of papers a range of

traders are interviewed concerning the opportunities for using financial instruments like “futures” or “options” to manage the financial risks at the commodity market.

Apart from these general aspects of the global commodity trade a number of specific issues have received quite a lot of media attention, in particular the food ban from Russia and the low milk prices. The food ban from Russia has had a huge impact on the commodity prices and it has received quite a lot of attention, both in the agricultural newspapers and in the general newspapers. Denmark, as a huge pork and dairy exporter, is highly influenced by the import ban and the resulting low commodity prices. Another contemporary commodity crisis is the low price on dairy products. This Dairy crisis is presented as a threefold crisis in terms of a coincidence of Russian food ban, lifting of the milk quota and little Chinese market activity. Generally, world market events, such as the Ukraine crisis, are presented as extraordinary events that are beyond the control of the individual farmer, who is just a pawn in a game of international politics. For instance in one of the trade journals it is written that: *“Danish farmers are among the victims in a game of international politics between the West and Russia”*. The low commodity prices seem to come as a shock at a time when farmers, banks and trade companies expect that the financial crisis had waned off and commodity prices should have been better.

2.2.4 Finance and risk management conditions

Danish agriculture is currently in a significant financial crisis, which has led to a number of changes in the financial conditions for farmers. In this media analysis three aspects appear as most important, first, the configuration of the Danish financial sector and the vulnerability of Danish farmers, secondly, how the financial industry perceives and assesses farmers and thirdly how the financial industry deals with agricultural clients. Furthermore, it varies quite a lot how farmers finance and risk management are presented in various media.

Interviews with bankers presented in trade journals reveal that a number of additional attributes are also very important, this is, for instance indicated by the remarks of a director of a rural bank: *“Management and leadership are important buzzwords for the modern farmer. When we, as the oldest rural bank, are keen to have more agricultural clients in our portfolio, the key question is whether we are sitting across from a farmer who can handle leadership and management”*. This assessment is also found in other articles for instance in an interview with a different bank director: *“The personal qualities with the managing director have a significant influence on our decision-making concerning the farm”*. These quotes illustrate that the decision-making in the banks concerning finance has been reconfigured in recent years and that banks do not just make a financial assessment when they evaluate a farmer, but personal qualities are also increasingly relevant. Apparently the change in perspective is something that is also found with the farmers and an article in a trade journal magazine notes that a change in the role of farmers has taken place: *“from agricultural school farmers to business school farmers (...) however, there is a long way until farmers are as focused on economy and leadership as what we observe with the best small and medium sized companies from other sectors”*.

The change of the agricultural law has enabled new forms of ownership, and for instance pension funds have started to place investments in Danish agriculture. In a recent article the manager of one of these funds explains the rationales of the fund: *“When we are interested in agriculture it is because we need an alternative to bonds that do not yield much in a low interest market”*. However, researchers note that they

do not expect pension funds will have a long-term interest in Danish agriculture as the interest yield on the investment historically has been around 3 % which is much lower than what other types of investments will yield. Furthermore, pension funds have been a bit reluctant to invest in the Danish agriculture as they still consider the prices to be so high that investments will not yield a significant interest. Therefore, some of the Danish pension funds have also begun to invest in agriculture in Eastern Europe, where the opportunities for an increase in the value of the investments is higher.

Several papers note, that the agricultural sector is the only sector where there has not been a *“proper restructuring”* following financial crisis, thereby suggesting that the financial sector have neglected some of the financial problems of the agricultural sector. For instance, several experts note that banks are reluctant to push for bankruptcies because this would increase the pressure on the soil prices and instead some farm become eligible for financial restructuring, in which a part of their debt is removed based on a set of agreed conditions concerning future investments, costs and income. In order to meet this challenge and ease the capital access for Danish farmers, the Danish government in collaboration with the agricultural association, and several private financial institutes in 2012 established a new public financial institute (Landbrugets FinansieringsBank), that offers loans for *“talented and efficient farmers who need access to necessary finance”*. It is the objective of the bank to emphasize growth and job creation in the rural areas by providing capital access to *“viable investments”*, *“financial restructuring”* and *“generational change”*. Capital for the financial institute is collected from several public institutions as well as from the financial industry.

The analysis reveal that there is a significant difference between how the crisis is covered in the media, in the agricultural media, the coverage mostly relates to how farmers were tricked into risky loans by aggressive marketing by the banks and financial industry. In the ordinary newspapers, the coverage more relates to the reckless behaviour of farmers and the consequences that this has for society at large and small rural banks in particular.

2.2.5 Socio-institutional conditions

In this media analysis two factors that emerge in relation to socio-institutional conditions, 1) internal disagreement within the agricultural associations concerning the organization and political strategy and 2) a growing divide between the agricultural sector and society at large.

This organizational disagreement between DAFC and BL has been a notable feature in the public debate concerning agricultural policies for the past couple of years and in particular the lawsuits that BL have filed against the government have generated a lot of media attention. Furthermore, as noted by a commentary in the general press, the hardline approach that has been adopted by BL has to some extent also influenced DAFC in a more confrontational direction, due to the fact that they are slowly losing members. The success of BL is explained in another newspaper analysis: *“They [BL] epitomize a zeitgeist, putting words on the frustration of the farmers’ deep frustrations about being indebted above the chimney top and experience that you work from morning until the evening subjected to strict environmental regulation and meanwhile also being disapproved by the population at large.”* Hence, it appears that the emergence of BL is the result of a feeling of misrepresentation by DAFC. In general DAFC need to adopt a wider perspective because it represents a more heterogeneous group of constituents. In particular in the aftermath of the agricultural agreement there was a widespread consensus, in both the general newspapers and in the agricultural newspapers that the: *“reputation of farmers lies in tatters”*. Internally the agricultural press also notes a widespread sense of victory that the agro-environmental policy may finally begin to change more in favour

of the farmers, due to the hardline approach. However, it is also noted that: *“BL are risking to put the agricultural sector in the doghouse, with the millions of Danes, who do not live on a tractor, and that is hardly in the best interest of the sector.”*

The debate concerning the representation of farmers is indicative of another wider societal debate concerning the balance between rural and urban areas, which is essential in relation to agro-environmental policymaking. An important member of the party that is currently in power and the politician who would eventually become minister for environment and food remarked, towards the former minister for the environment that: *“Yet another Auken [locally famous former minister for the environment and an outspoken environmentalist] has been side-lined by the voters and therefore no longer can make a fool of herself with her selfish and politically correct opinions at the expense of the thousands of Danes who live in “ProductionDenmark”, where you want a balance between the environment and food production.”* Furthermore, another important member of the same party recently noted to several media following the approval of the agricultural agreement that: *“For a long time agriculture has been the whipping boy of the urban elite.”* During the past 20 years a number of new parties have become established on the liberal side of the parliament and in the latest election the Danish liberal party (Venstre), which have traditionally represented farmers, experienced a significant decline, in particular, in the rural areas. Hence, a number of commentators have noted that the agricultural agreement also has to be seen as the liberal party trying to win back some of the rural voters that they have lost to the new liberal parties.

Others have noted that currently we observe a growing polarization between the rural and the urban. Recently one of the online newspapers did an opinion poll which showed, that only a minority of the general population are in favour of: *“easing the environmental regulation to improve the competitiveness of Danish agriculture.”* and according to a social scientist this: *“Is undoubtedly due to the fact that farming has long been in bad standing, 30-40 years ago voters almost exempted agriculture as the big environmental sinner and pointed fingers at the industry.”* Hence, today the perception agriculture in the general public apparently has changed from being a culture-bearing sector into a big-time polluter and this change in perspective legitimizes completely different agro-environmental regulation. In their own words BL, in particular, thrive on the feeling of powerlessness that is widespread in the agricultural community, their chairman for instance notes: *“Farmers have been trampled on and humiliated by governments’ officers, sitting in distant offices without any connection to reality. If farmers need to reclaim their self-respect it is necessary that somebody stand their ground (...). We stand, and we keep standing.”*

2.2.6 Socio-demographic conditions

In this media analysis socio-demographic does not appear to be debated significantly, except for possibilities for generational change.

The structural development and the current capital intensity of farming have resulted in fairly large and expensive farms and the difficult access to finance for young farmers is problematized in many articles that cover the problems of becoming established as farmers on their own farm. Ideally this is a great time for young farmers to get established because it is relatively cheap to purchase a farm as prices have decreased substantially, furthermore, there are a number of farmers who are ready for retirement that have postponed the generational change due to the current prices. Hence, the current situation: *“enables young farmers to enter farming at an affordable price that may be the basis of a healthy business.”* However, young farmers continuously experience problems when obtaining loans and a commentator with one of the trade journals

noted that: *"the banks demands a very high liquidity and the sector therefore push forward a huge problem of generational change.(...) this makes the young people give up their dream of private ownership and instead they become payed labour."*

Furthermore, the opportunity for new forms of ownership enabled by the revised agricultural law has generated quite a bit of media attention. In particular the agricultural newspapers and trade journals have a number of articles focusing on cases that pursue different modes of finance as a vehicle for generational change, possibilities for financial restructuring of highly indebted farmers and the possibilities for developing alternative modes of production via access to alternative forms of capital.

2.2.7 Ecological conditions

The ecological conditions, in particular, how farming should relate to the ecological conditions is a hugely contested political area and it is something that has received a lot of media attention in Denmark, both in the, scientific literature, policies, agricultural media and general newspapers. Hence, there has been a number of important debates concerning the ecological conditions and how farming should relate to the ecological conditions. However, in particular three related issues emerge, as important aspects of the debate 1) status of the ecological conditions 2) a disagreement concerning the ontological status of the ecological conditions 3) a disagreement concerning how to manage the ecological conditions.

The new understanding of regulation as something that need to be based on environmental conditions and intercalibrated across Europe rather than politically agreed emission targets has been opposed by the agricultural sector, the Director of DAFC for instance remarked: *"Our members compete with farmers in other countries and we need to play on the same field."* Hence, farmers primarily observe differences in framework conditions, when they compare different geographical areas, whereas the WFD is based on differences in ecological status. In effect, the new agricultural agreement contains a section about the need to: *"prevent unnecessary over implementation of EU regulation (...) therefore a neighbour-check will be carried out in the future when implementing new EU regulation."*

In this analysis, there are a number of different positions in the debate about agro-environmental management and there are a range of very different positions in the debate. The chairman for the DAFC for instance noted: *"Farmers they like the nature, but it should not be a millstone around our neck, that prevents development of a competitive agricultural production. In many ways, it is like that today. (...) society must focus our efforts in those areas, where we have the greatest natural values and endangered species that need protection."* Furthermore, the leaders of the parties in the liberal block in a joint article noted that: *"Our eagerness to ensure the environment and sustainable production has pushed considerations for growth in the agricultural sector aside. It is time to change that balance and these priorities (...) which originate in a misunderstood consideration for environment and nature rather than green realism."* The new term *"environmental realism"* is criticized for indicating a downscaling of the ambitions in the agro-environmental management. On the other hand, there are also a number of critical voices in the public debate, for instance this comment from a newspaper concerning the recent agricultural agreement article: *"It is ridiculous, that farmers are allowed to pollute even more, when we have such many problems as it is. And normal families come to pay for pollution which is not their fault. The polluter pays principle apparently does not apply to agriculture."*

Although there have been disagreements concerning the objectives, the scientific basis and policy instruments, there has largely been consensus concerning the application of a scientific approach as the knowledgebase for the regulation. With the establishment of BL this consensus has been challenged in a number of ways. The chairman of BL for instance notes: *“You have to remember that universities are also a business. They have an interest in noting some problems to get funding (...) this environmental thing is a lot about emotions. And when emotions are at stake they take precedence over facts.”* Hence, BL both dispute the knowledge base which has been applied previously in the regulation of agriculture and the biased position of scientists as a whole. In particular, the widespread use of environmental models is challenged, as there is often documented a discrepancy between results predicted in modelling and in on-site measurements. One of the scientific advisors for BL note in a newsfeed: *“It is our claim that Denmark already has met the targets [concerning nutrients] – and gone beyond. There are several sites where it has been documented that model calculations do not correspond with reality. Measurements of drainwater from fields show that the actual leaching is much lower than predicted in calculations.”* Furthermore, BL has introduced a number of alternative theories concerning nutrients, such as the balance principle (explained as: *“a healthy plant eats what is being served”*), hence there is no additional leaching by increasing the fertilizer allowance) as well as claims about: *“lacking evidence that nutrient leaching constitute a problem for the environment”* and that: *“the leached nutrients does not come from agriculture”*. These claims have all been rejected by scientists as *“complete nonsense”*. However, in a number of lawsuits BL have challenged the legitimacy of the agro-environmental regulation. Usually the scientific practice distinguishes between good and bad science, but when the matters are transferred to the courtroom a completely different logic applies, as lawsuits dislocates the whole regulatory process from a focus on truth, which is the code in science to a focus on legality, which is the code in law. This ontological controversy is also evident in the political process that followed in relation to the political approval of the agricultural package and a number of scientists pointed out that: *“The legislative process takes place on a false and misleading basis”* and that: *“In the scientific community we would be killed for doing this”*. For more info on this aspect of this knowledge controversy, see Thorsøe, Graversgaard, and Noe (2016).

Interestingly there is not a huge difference in the coverage in conventional media concerning the framing of the problems within the agricultural sector. This is noteworthy because most the conventional media are associated with particular political parties, and traditionally the newspapers that are associated with the liberal parties tend to be more concerned about the conditions for the farm businesses, whereas the more leftist newspapers tend to be more concerned about environmental protection. Furthermore, the environmental policy also indicates various understandings of nature with various roles for agriculture. In a recent debate the Minister for Food and Environment noted that: *“It is a bit arrogant, to claim that a cornfield is not considered as nature “*. On the other hand a representative for the parliamentary opposition replied that: *“It is absurd to claim that a cornfield is nature. Biologically it is a desert, the nature in Denmark gets poorer and poorer every year, we have less and less birds, we have less and less different animals and we have less and less plants.* Hence, politically the view of nature is quite different across the political field, in particular concerning the relationship between agriculture and nature. This difference is important as it leads to very different policies towards agriculture.

2.2.8 Technological conditions

Historically technology has been extremely important in improving the efficiency of production in Danish farming. In relation to technology the Danish farm worker wages, which are relatively high, appear as an

important factor in the discussion about technological development, hence technology investments are seen as the solution to the chronic income problem in Danish farming. Hence, the application of technology is seen as the way to increase efficiency to secure the Danish farming economy and there are numerous articles in the media analysis that explore various forms of technology interventions from a farmer perspective. Most of these articles concerns technologies that increase efficiency, in particular in relation to securing a higher yield or lowering the input of manual labour such as driverless tractors, application of robotic and information technologies. Interviews with farmers applying the new technologies and insights into their rationales are often important components of these articles, for instance concerning, driverless tractors: *"We are part of a world in which we must produce for decreasing prices and so we must consider opportunities for streamlining the production, one option is self-guided vehicles"*.

However, the financial crisis has also initiated reflections concerning the strategy for the application of technologies. For instance, the traditional focus on efficiency via technology investments has been criticized, for instance, by the Department of Resource Economics that in a recent assessment note that: *"Danish farmers are world champions when it comes to efficiency, but they are unable to make money."* But also from one of heads of a regional extension service: *"The agricultural sector often claim that you have to produce more to ensure the supply of produce and jobs in the abattoirs and dairies, but it cannot be the duty of farmers to keep others occupied, they must first and foremost ensure a good economy for themselves."* Furthermore, the financial crisis in Danish farming has made the newspapers direct their attention towards the conduct of farming in other countries. In particular, emphasizing what may be done to locally increase income and which sectors of Danish farming that are actually making money. In a visit to a successful German farmer, the reporter for instance notes that stables are: *"Used until they are worn down"*, apparently this is a novelty.

Technology also codes for a particular production system and in particular the agricultural newspapers present a range of articles concerning how the technological configuration of the processing industry codes for a particular form of production. For instance, this is evident when it comes to the processing industry. Recently the Danish market for free range and organic meat have yielded high prices, hence, in 2015 a number of new abattoirs began or upscaled their production of poultry, pork and beef to meet the increasing demands with a particular emphasis on strengthening these production types. However, due to the large-scale investments in technology and their sunk costs, the Department of Agriculture and Resource Economics note that farmers that are currently in a financial crisis are unable to downscale their production or adapt it to the evolving market. Therefore, Danish agriculture is caught in a deadlock as it is difficult to break away from the path dependency inherent in the adopted strategy.

The Danish farming technology is often used as an important argument in the debates concerning agricultural policies: *"Denmark is in the lead when it comes to producing food effectively and sustainably. This provides a comparative advantage in the export markets, both on the products and the technologies that are used in the production"*. Interestingly technology is used as an argument for both proponents of increasing environmental protection and as a justification for the intensive Danish agricultural production. A number of liberal debaters for instance noted in a newspaper article: *"Production would just be relocated to other, more polluting countries, if it is restricted in Denmark."* This argument stresses a moral obligation to produce in Denmark based on a global balance account of environmental pollution. However, technological development is also used as an argument for increasing the environmental protection, as increasing environmental protection would give Danish farmers and the supply industry *"an important comparative*

advantage” in the future food market where sustainable production technologies will be critical success factors. Within science-based agricultural research the notion of “*sustainable intensification*” has been adopted as an important guiding principle and it is inscribed in research support programs and department policies as a critical task for science.

Several articles note it as a problem that Danish farmers: “*do not have capital available to make the necessary investments in new and efficient technologies*”. This is a problem on several levels, for instance, researchers from the Department of Resource Economics, note that farmers are unable to replace new investments in the same rate, as the production system is derelict. Furthermore, lacking local technology investments is allegedly a problem for the supply industry as: “*The development of technologies in collaboration with customers is crucial for the industry*”.

2.4. Frame analysis

A second purpose of the analysis is to identify the frames that are predominant in the public debate concerning the conditions for farming and the strategies that are adopted by farmers.

A frame can be considered as an application of concepts, ideas and devices comprising a certain worldview. Furthermore, the frame shapes the perception of agriculture by interpreting events and conditions in a particular way that order possible outcomes and give preference to certain actions over other. Each frame is organized around a particular logic, concerning good farming practice and development strategies, hence, frames are highly normative, however, they are rarely explicit, but operate most effectively when the tacit normativity inherent in the frame is concealed as common sense. The frame concept implies a certain amount of overflow concerning aspects that cannot be described by the frame and therefore each frame differs in terms of which aspects that are included and excluded.

In the analysis, we have identified three different frames 1) productivist frame, 2) an organic frame and 3) an environmentalist frame, see table 1. However, within each frame there is also a certain tension among some of the key actors, hence the frames cannot be considered as fixed entities, but they gradually evolve.

2.4.1 The productivist frame

This frame is by far the most dominant in the Danish agricultural debate where it has been adopted by a number of important actors such as DAFC, processing industry, the current government and most political parties as well as the new agrarian orientation, headlined by BL. The key operating logic is that Danish agriculture should adapt to the world market by producing bulk commodities, in the Danish context with high wages, this require framework conditions that are comparable to those of competitors and investments in the newest technology. The strategy, is also embedded into the publicly funded Agricultural Financialization Bank, whose main purpose is to ensure that: “*the most efficient farmers, in economic terms, should produce*”. It is emphasized that agriculture is an important industry that it makes good sense to protect. Therefore, it is necessary to reduce the “burdens” of the agri-environmental regulation to accommodate the Danish production.

Table 1: Overview of the frames

Frame	Operating logic	Key concepts	Key advocates
Productivist	Require adaptation to the world market by producing bulk commodities, in the Danish context with high wages this require good framework conditions for the farmers and investments in the newest technology	ProductionDenmark Production, Framework conditions, efficiency	DAFC, the current government and most political parties, processing industry
Organic	Agriculture need to emphasize sustainable production and added value.	Sustainability, Animal welfare, Social relations, Terroir, Gourmet production	Some political parties (center/left), the organic association
Environmentalist	Agriculture need to be restricted and the agricultural area need to be reduced to release spaces for the environment. Furthermore, the food system needs to increasingly initiate learning processes that enable consumers to make more informed choices.	Biodiversity, Social learning Downscaling	Certain EU directives (WFD, Habitat directive, Nitrate directive). Some biologists

The framing imply that the Danish agri-environmental regulation is seen as important factors that disables competition with foreign farmers, because farming is compared with the world market conditions, and in that sense the Danish regulations appear as more restrictive compared with competing markets. Furthermore, within this frame a conflict is building up between the agricultural sector and the surrounding society, illustrated with the introduction of concepts like ‘ProductionDenmark’, and “environmental realism”. Furthermore, a strategy emphasizing improvements in efficiency and increasing production to better the financial crisis is adopted. The interpretation of the termination of the milk quotas, by the mainstream agricultural community, is one of the places where the logic of the frame is quite well exposed. For instance, an extensionist note: *“The termination of the milk quotas fantastically positive for Danish milk producers. Each farmer for the first time in 32 years has the ability to exploit the maximal capacity in his production, this is what improves the economy”*, although this has resulted in a “brief period” with low prices. The business economic executive of the agriculture and food council acknowledge the current financial crisis, but also emphasize that: *“we expect improvements in the operating economy within 2016 and even more next year (..) during the financial crisis in the last couple of years the efficiency has been improved significantly in all production sectors. The improved efficiency means that farmers are well adapted to realize a better income, when the state of the market improves.”* Both of these quotes are from the spring of 2016 and therefore given at a time when the crisis had been ongoing for a while. Hence, reducing costs and increasing production is interpreted entirely as a good thing although it has also recognized as having resulted in extremely low prices and significant financial problems for many farmers.

2.4.2 The organic farming frame

Organic production in Denmark was conceived in the 1980’ties in a centre/left political context. In 1987 the government began to publicly support the conversion to organic farming via the introduction of a publicly

managed labelling and control scheme. Formally the organic movement is organized in the dedicated producer and consumer organization “the organic association”, but also as a subsection of the DAFC, furthermore, organics is included as subsections of the large cooperatives Danish Crown and Arla, but with dedicated organic companies and organics are sold alongside conventional products in supermarkets.

This organizational setup also implies that organic farming today is not seen as a radically different food system, but it is included in the mainstream food system. Furthermore, organic farmers generally do not consider themselves in opposition to conventional farmers, but rather emphasize a “creative conflict” between organic and conventional producers, which enables the two production systems to exist alongside each other. Nevertheless, the organic frame is organized around a different logic that emphasizes sustainable production and added value. Hence, a number of organic producers and the organic association work in close collaboration with chefs and other representatives from the gourmet sector of the Danish restaurant and processing industry to develop and introduce new products and new product qualities, see above. This has resulted in a huge emphasis on the development of a range of new food qualities and social relations between producers and consumers (Thorsøe & Kjeldsen, 2015; Thorsøe, Kjeldsen, et al., 2016). Furthermore, consumers are supportive towards organics, for instance, in a recent survey 70 % of consumers note that organic production is based on better values.

Organic production is defined by a set of principles and translated into regulation the chairman for the organic association details the organic “holistic” approach to sustainability: *“For us sustainability is about less animals and meat on the plate, higher biodiversity, protection of societal resources like nature and drinking water and limited application of antibiotics and other medicines for animals. We apply significantly less fertilizer on our fields and use carbon sequestering crop rotations and catch crops (...) sustainability is about giving the next generation just as good conditions as our generation – preferably better.”*

In recent years and with the growing organic market the organic production frame has become much more diversified in terms of its strategic implications. Hence, there are a number of tensions within the organic frame, one stream is approaching the productivity frame, emphasizing that organic farming should be “market based” and in order to achieve that, it is necessary to adopt a large-scale industrial organic production. This is based on an understanding of organic farming as the organic regulation. Hence, producing organics only imply meeting the organic regulation stressing the importance of labelling and standardization to enhance the opportunities for production. Other streams of the organic movement emphasize the new and emerging food qualities and a more radical approach to sustainable development, hence an emphasis on expanding the diversity of production.

2.4.3 Environmentalist and social transition

The intensive Danish production system is met with criticism, in particular from various nature conservation groups and consumer associations. Their framing of agriculture involves a more radical interpretation of sustainability emphasizing the importance of environmental aspects. The operating logic of the frame concerns a need to adapt agricultural production to the environmental conditions, rather than the other way around, hence the perspective stress that agricultural areas should be restricted thereby releasing spaces for environmental protection emphasizing the value of biodiversity. Furthermore, the frame stresses the importance of perceiving agriculture and food as something which is not entirely material, but also a social phenomenon. One of the ways to meet this objective is to emphasize social learning that reconnects producers and consumers and therefore reembed aspects that are not otherwise transferred at the market

into the products. The frame implies a strategy emphasizing the importance of bettering the financial crisis of Danish farmers by a complete transformation of the food system.

The framing, for instance, is exposed in recent political negotiations concerning a “*nature agreement*”, where it has been proposed to: “*Relocate, natural areas with little value that are movable. It is necessary to enable more flexibility. We wish to create (...) coherent nature and at the same time make sure that nature does not curb urban and industrial development in rural areas.*” The chairwoman for the nature conservation association on the other hand strongly opposes the proposal: “*I don’t know what they are thinking. The proposal comes from people who do not know how long it takes for nature to evolve. It is not something that you can establish from one day to the next (...) when we have so little nature left in Denmark, KL should head for the other direction and emphasize that the remaining nature should be protected.*”

Whereas the first two frames are mainly found with different actors from the agricultural community, the last frame is mainly found with actors who are outside of the agricultural community, but still have a stake in relation to the agricultural activity, such as nature conservation, recreational activities or consumer associations. This frame also has an inherent internal conflict as there are generally speaking two different approaches to environmentalism, either by greening the farming activity, for instance via extensification and another which stress the need for a strong zonation between natural areas which need to be expanded and farmland, which need to be reduced in size, but not otherwise restricted.

2.5 Key points

In sum, the media analysis indicates a number of emerging issues that need further exploration in the later stages of the project. In particular, four aspects appear recurrently and influence several of the 7 conditions that are mentioned in the analysis. First the current financial crisis in Danish farming, second the emergence of new food qualities and farmers ability to deliver on the emerging quality expectations, third the contested state and regulation of agriculture and environment and fourth the growing gap between society and agriculture.

The current financial crisis of Danish farming receives a lot of media attention from all Danish media, as it is currently such an important and pressing issue for all Danish farmers. The debate concerns various topics, such as the causes of the financial crisis, the events that are responsible for the crisis and how the current situation can be bettered. There are a number of new initiatives that experiment with new ways of reconfiguring the integration of farming and finance, to enable a different mode of production. Furthermore, the analysis indicates that there is currently a debate about what kind of finance should characterize Danish farming in the future. Hence, there are a number of different initiatives concerning alternative modes of finance for agricultural initiatives. Some of these initiatives concern the opportunities for managing the farming sector in the financial crisis, while other explores future models for financing alternative modes of production. Furthermore, the financial crisis has underscored the problems associated with attracting new investment capital to the agricultural sector. In particular, in relation to generational change it is problematic that the required investments have exceeded the possibilities for obtaining loans in the contemporary financial industry.

The rapidly evolving Danish food market has also received a lot of media attention and from an agricultural perspective emphasis is particularly given to farmers opportunities for meeting these new quality demands in the primary production. Furthermore, in many articles it is noted that specialty production is one of the

only aspects of farming that currently make a profit. From a consumer perspective, some of the general newspaper articles explores how new food qualities embed new meaning to food consumption, but also the relationship between new food qualities and other general societal tendencies, such as emphasis on sustainable production, health and taste.

The environmental management and its impact on farmers is another issue which is widely debated and much contested, in particular, in the current financial crisis, where all regulation which incurs a cost on the farmers is met with opposition in the agricultural community. The environmental management may incur some costs or inconvenience on farmers and a large part of the debate concerns the fairness of such a regulation and whether the objectives are sensible and implementation at farm-scale is possible. Furthermore, the lawsuits that are against the state filed by BL have received quite a lot of attention in both the agricultural and the general press. The environmental debate illustrates that one of the important points of contention is how farming should be regulated, based on “environmental targets” as emphasized by for instance the EU directives and their implementation in Danish regulation or based on “comparable framework conditions”. In general, the debate also reflects a Danish perception of the agro-environmental regulation as much stricter than the regulation in other countries. Therefore, the debate often outlines a trade-off between environmental regulation and the competitiveness of the agricultural sector.

The media analysis further indicates a growing gap between the agricultural sector and society at large in terms of diverging visions of how the landscape should be used. Commentators note that on the one hand the growing gap is due to changes within the agricultural sector because of structural development and increasing specialization, but also by a high degree of functional specialization within society, which imply that it is increasingly difficult for city-dwellers to understand and accept the conditions for the rural areas. However, the growing divide also reflects a break with the idea of agriculture as a particular rural culture, which is very important for the national and rural identity. Furthermore, it is emphasized that this growing gap is problematic because society via regulation frames the conditions under which farming may take place.

3. Common introduction to the case studies

Historically farming has been a prominent sector in Denmark. In the 19th century, Danish farming was established as a significant industry and virtually the only export commodities were agricultural products, primarily grains. However, from around 1860 onwards Danish farming underwent an important transition, as the grain producers converted to pork and dairy production for export, in particular for the markets in England and Germany. The transition was enabled by self-ownership, cooperative organization and the development of common industry standards, which enabled small-scale farmers to be economically sustainable at the export markets.

The Danish case studies takes place at a time when the Danish farming is undergoing significant structural development. On the surface Danish farming is very successful, production is efficient, producing high yields with a low carbon footprint pr. product. However, currently Danish farming is in a significant financial crisis, which is constituted by a number of different components:

- 1 First, there is an unusually high rate of bankruptcies among Danish farmers (35 in March 2016, the highest rate for 35 years). Simultaneously, the number of traded agricultural properties is lower than it has been for years and agricultural economists expect that the number of bankruptcies would be even higher if banks and financial institutions were less hesitant to push for bankruptcies, due to a fear of further decreasing real estate prices. Last year the Department of Food and Resource Economics, Copenhagen University assessed the number of farms “on the brink of bankruptcy”. The results indicate that 2.205 farms out of a total number of 11.178 are on the brink of bankruptcy, see Table 2, furthermore, 615 farms are also exposed if prices continuously remain low, corresponding to around 25 % of the farms, most of which are either pork or dairy producers (Olsen, 2015).
- 2 Second, a large share of Danish farmers have a significant income problem; around 30 % of all farms operate with both a high debt and a deficit. The financial situation on Danish farms is the result of a strategy which has been dominated by high investments, high debt and high reliance on world market production. Olsen (2015) assessed the need for new capital and the table shows that a total of about 3000 farmers are in a critical need for capital, because they have a high depth, their liquid funds are low and because they operate at a deficit. Of these producers around 1500 are pork producers and 1200 are dairy producers. Although the report is fairly recent the problem has worsened in 2016, due to the continuously low commodity prices.
- 3 Third, the total debt of Danish farmers amounted to 370 billion DDK (~€50 billion), which is the highest debt pr. farmer in EU and in a recent report the debt was highlighted as the main cause of the income problem of Danish farmers compared with their European colleagues. This income problem is also amplified by the current low world market prices on key commodities for Danish farmers such as pork and dairy products. In addition, the prolonged financial crisis has emptied many of the resources that were saved prior to the crisis.
- 4 Fourth, the debt, in particular, has been generated by property investments and the gradual build-up of a soil price bubble, which burst in 2009 and subsequently the soil price has decreased by more than 40 %. The high soil price increased the rate of generational change, as a number of older farmers were bought out and new farmers entered farming and existing farms expanded their production, but it also accelerated the general debt of the farming sector. Loans were provided by banks and financial institutions based on collateral in the inflated soil price and a number of the loans were “risky”, as they were provided as interest swap loans, based on Swiss franc, loans exempt from repayment or adjustable

rate mortgage, which are all very sensitive to increasing interest rates or decreasing soil prices (Olsen & Pedersen, 2016). Furthermore, a number of farmers took out loans, based on their equity to invest in other businesses, such as windfarms.

- 5 Fifth, high debt and the income problem in agriculture has been a huge problem for many small-scale rural banks that have provided a high number of loans for agriculture, and a number of these have gone bankrupt and left the rural communities in despair. In addition, it is currently difficult for farmers to take up loans to finance investments, as many banks are not able to or interested in expanding their portfolio of loans for agriculture.

Table 2: The number of farms “on the brink of bankruptcy”. The table indicate that 2.205 farms out of a total number of 11.178 are on the brink of bankruptcy, highlighted in red, furthermore, 615 farms are also exposed if prices continuously remain low, highlighted in yellow, corresponding to a total of around 25 % of all Danish farms, most of which are either pork or dairy producers (Olsen, 2016).

Adjusted debt percentage (%)	Strongly negative	Negative	Positive	Robust positive	Total
Above 100	676	408	56	125	2.164
85-100	438	502	207	169	1.316
70-85	408	639	320	705	2.072
55-70	468	637	239	1.065	2.409
< 55	755	916	480	1.965	4.116
Total	2.745	3.102	1.301	4.030	11.178

Due to structural development, financial crisis, functional specialization and mechanization the agricultural industry has lost some of its historic significance. The last 40 years the number of farms has decreased from around 120.000 to currently 30.000 part time and around 10.000 full time farmers and the average farm size has decreased from around 30 ha to 80 ha today - although full time farms are considerably larger. The number of employment in farming has followed a similar tendency, as around 420.000 occupied in 1960, which has decreased to around 80.000 today. In addition, the agricultural industry has a decreasing share of the BNP (3.4 %) and employment (3.6 %). Although, farming has lost some of its position in the national economy, it continuously has an important impact on the rural economy in some areas and the industry continuously takes place in around 60 % of the total Danish area.

The interviews conducted as a part of the analysis for this report also reveals that a number of the key actors in and around Danish agriculture believe that we are currently undergoing a fundamental change in the agricultural production. One of the interviewees for instance notes: *“In 30 years we will look back at these times and realize that some fundamental changes took place. I think that the most fundamental change is that a significant part of the animal and dairy production will be transformed from private ownership into*

other forms of ownership.” Generally, we are presented with three different visions for Danish agriculture: 1) Specialized animal or dairy production for the world market, a significant structural development is expected within this category as farms could be with 2.000-4.000 cows each, professional management, multiple localities and not privately owned. 2) With 150-250 cows and a couple of employees, private ownership, who are resilient because they do not have any significant debt, but they are slowly wearing down their production facilities and they are not developing their farm because that would imply a debt that cannot be repaid. 3) Perhaps the same size as 2, but operates with a different logic because they to different extent produce niche products, like organics or specialty products. They have to add value to the product because they have to make up for the loss of scale economies.

Furthermore, in addition to this financial crisis, which is pushing for a fundamental restructuring of Danish agriculture, currently Danish agriculture is also undergoing a structural reorganisation in the representation of farmer’s political interests. Denmark has a strong tradition for cooperation among farmers going back to the cooperative movement in the late 1880’s when farmers organized themselves in various associations striving for consensus to influence policy making (Ingemann, 2006). Farmers and food related businesses have been organized in the Danish Agriculture and Food Council (although with periods of exceptions for some of the farmers organizations). DAFC is an umbrella that was initially established 1919 as a forum for internal discussion and consensus-making to influence public policies and it has had a prominent place in the Danish organizational landscape. The internal coherency was broken in 2010 when a group of farmers formed a new organization called Bæredygtigt Landbrug (BL – Sustainable Farming). Whereas DAFC have attempted to influence public policies by negotiation and knowledge production, BL is represented as a protest movement against the framework conditions of Danish farmers, vocal discontent with the public administration and their scientific advisors, but also against the idea that the agricultural sector gain influence via negotiations with the political system. Hence, BL has gained momentum with several notable lawsuits filed against voices in the public debate for defamation, and against the government for several instances of “*unconstitutional regulation*”, including implementation of the WFD, the Buffer zone act and the nutrient regulation in general. BL mainly represent farmers and it is estimated that BL accounts for farmers representing half the acreage of Danish farmland. The DAFC is constituted much wider and in addition to farmers also represent a range of private and cooperative actors of the commodity chain. For more information on this reorganisation see (Thorsøe, Graversgaard, et al., 2016).

Although there is a general crisis among Danish farmers, the effect of this crisis vary quite a lot among the different commodity types, as there is a different commodity price developments, investment histories, policies etc., however, there is also a great variation within the commodity types. Hence, due to the crisis and its expression among Danish farmers the financial aspect of farming has been the absolute most important condition for Danish farmers in recent years and the focus of policies that influence farmers behaviour and production strategies. Therefore, providing a better understanding the different responses to the financial crisis and improving the understanding of the relationship between bankers and farmers, is crucial for understanding the relationship conditions, strategies and performances in the Danish context and the mode of farming that will be the result of the current crisis. Hence, in this report we will emphasize these aspects.

4. Case study A: Dairy production in Southern Denmark

4.2 Case study introduction and context

Milk is an important source of protein and micronutrients such as calcium. The annual world milk production is about 746 million; however, very few countries are self-sufficient with regard to milk. The main milk-surplus countries are Argentina, Australia, New Zealand, USA, Uruguay and countries of the EU (FAOSTAT). On a global level milk consumption is increasing (around 8% 2007-13) and it is expected to increase further in the future, as it is added to the diet in many developing countries. The EU produces annually 157 million tons, which accounts for about 21 % of the world production.

4.2.1 Dairy farming in DK

Although Denmark only produces around 3 % of all dairy produced in the EU, but historically dairy production is one of the most important sectors of Danish agriculture, and an important export commodity. The turnover of the Danish annual export of dairy products was around 13,5 billion DDK in 2015 (€1,8 billion), which is about 20% of the annual Danish export of agricultural commodities (Hansen, 2012). Danish dairy products are primarily exported to Germany, China, United Kingdom and Sweden. 65 % of the exported dairy products is cheese, whereas powder and concentrate and butter account for 15 % and 11 % respectively, see Figure 1.

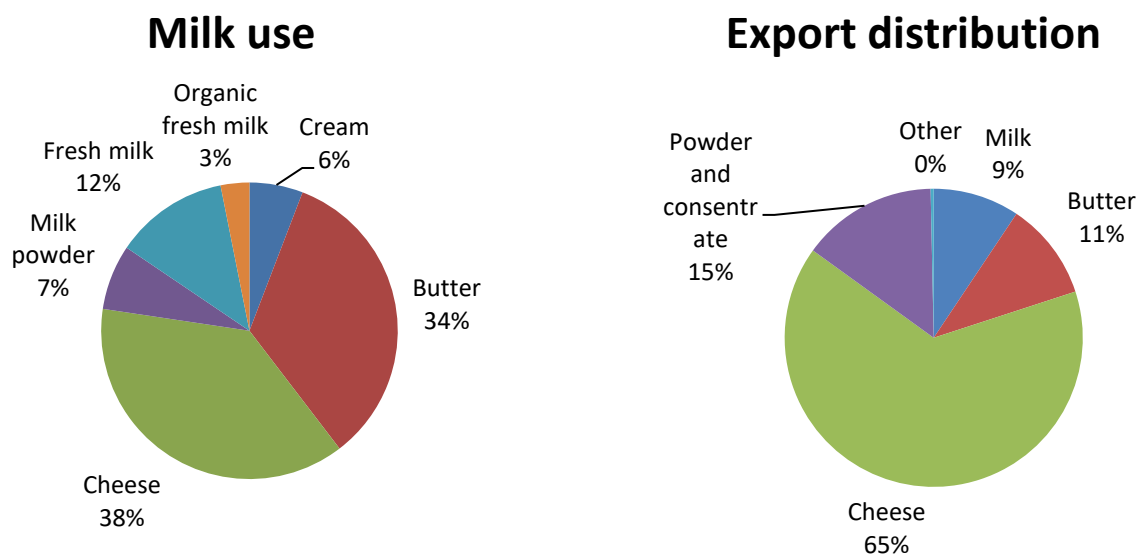


Figure 1: Left: Use of the Danish dairy production, 2014 data (DST, 2016c). Right: Composition of the total Danish dairy export of 13,5 billion DDK, 2015 data. Own calculations based on (DST, 2016d).

The Danish dairy production is highly concentrated in the western part of the country, see Figure 2. The high share of dairy producers in the western part of the country is particularly due to a high prevalence of sandy soils which provide relatively poor conditions for arable crops, but which are suitable for grazing (Kristensen et al., 2015). Furthermore, in particular in the Region of Southern Denmark there is a high concentration of organic dairy producers, which is in fact the highest in the country.

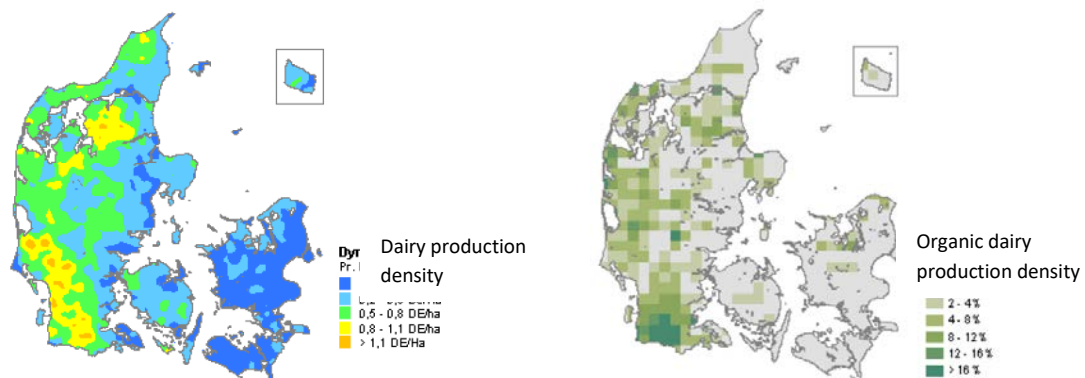


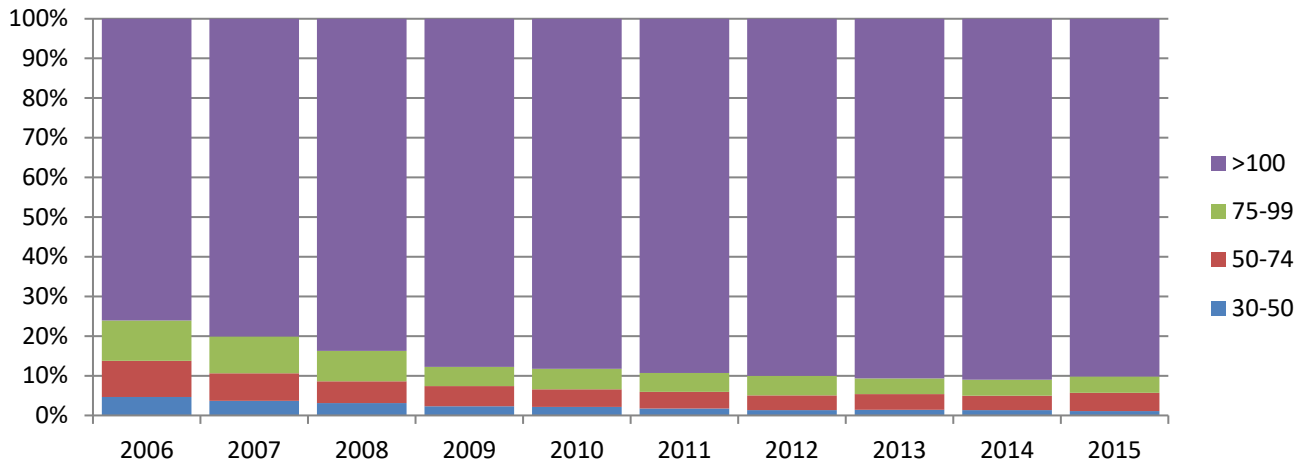
Figure 2: The distribution total dairy production and organic dairy production, respectively (Dalgaard, 2008).

Danish dairy farming is undergoing a significant structural development that has taken place since the end of WWII, hence, today dairy production is concentrated on fewer, but larger and more intensively managed farms, see Figure 3. The structural development in Denmark has resulted in a general increase in the number of cows per farm, from a national average in 1982 of 52 to 126 in 2014 on average, but this figure is even higher for the region of Southern Denmark. Furthermore, the region and Denmark as a whole has seen a concentration in the number of cows on each farm, in 2006 around 75 % of the farms had more than 100 dairy cows, however, this figure had risen to more than 90 % in 2015, see Figure 3. In general Danish dairy farmers have higher capital investments in their production facilities, but also higher yields pr. cow and lower environmental impact compared with their competitors in the EU and the world market (SEGES).

The Danish dairy production has been relatively stable since the 1930'ties at around 5000 Mkg, see Figure 4, however, there has been huge changes to the dairy production system. In the 1930'ties the population of Dairy cows were at its largest of about 1,7 million, but today this has decreased to about 500.000 in 2015. The dairy Productivity per animal has increased from an annual milk yield was doubled from 1900 to 1970 and more than doubled since the 1970'ties reaching an average of 9000 kg in 2010. This development was facilitated by the introduction of new breeds, and a change in the feeding and management practice.

In the beginning of the 1990'ties a largescale conversion to organic dairy production was initiated and today around 10 % of the Danish dairy is organic.

Distribution of dairy cows on farms Region of Southern Denmark



Number of farms and average herd size Region of southern Denmark

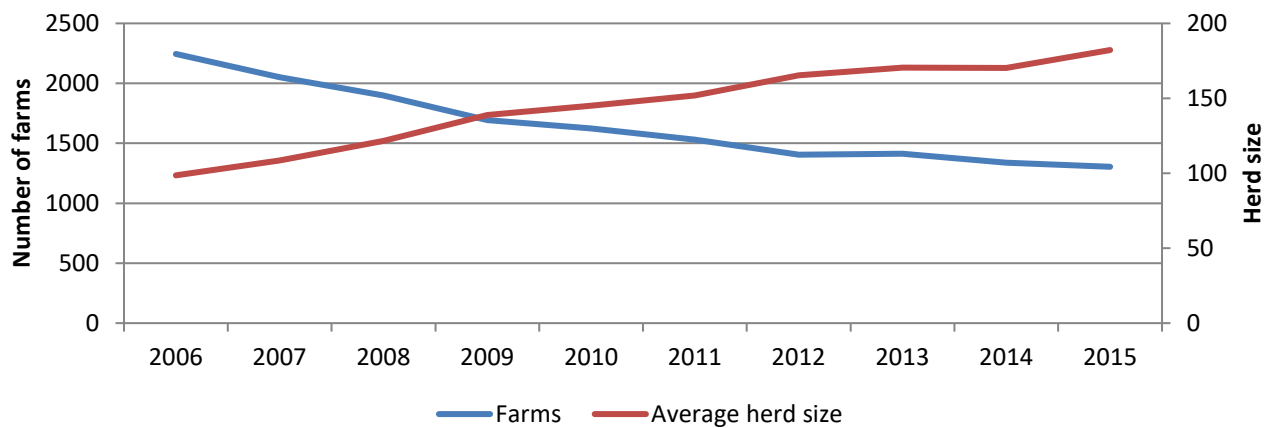


Figure 3: Distribution of dairy cows on farms and number of farms and average herd size on farms in the Region of Southern Denmark, own calculations based on (DST, 2016c).

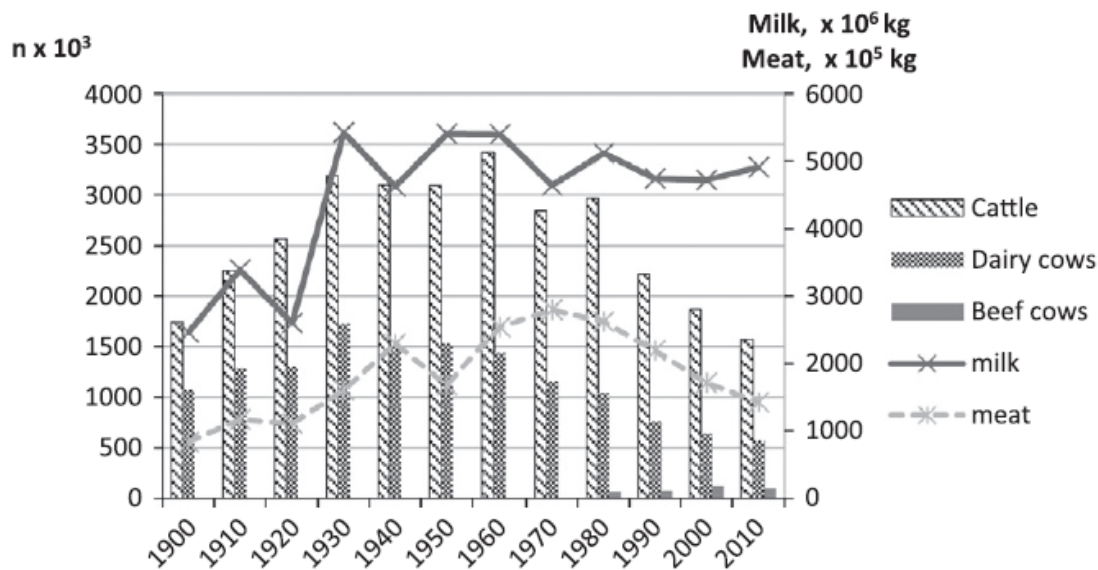


Figure 4: Development in number of cattle (dairy and beef cows) in relation to the annual production of milk and meat 1900-2010 (Kristensen et al., 2015).

In Denmark milk is handled by several cooperative dairies, of which the multinational Arla is by far the largest, see Table 3. Historically the Danish dairy industry has been important in the development of the Danish agricultural sector and the organisation in cooperatives was first adopted by the dairy sector to enable foreign trade with dairy products, primarily for the German and British markets. Traditionally the Danish dairy sector has been composed of a large number of small scale dairies, in 1900 around 1500, but structural development has reconfigured the dairy sector significantly and today the sector is composed of 28 dairies, operate 54 production facilities (Mejeriforeningen, 2016). Most of these are geographically located in the western part of the country, as this is also where the milk product takes place. However, the multinational Arla foods, which was established in 2000 in a merger between the Danish MD foods and the Swedish Arla, is by far the largest dairy and one of the largest dairies in the world and currently operate in 7 countries, in 2015 the turnover was €10,3 billion (Arla, 2016). Most of the dairies are organized in the Dairy Association, and umbrella organization that manage standards and represent the dairy sector in policymaking.

Table 3: Annual turnover in the most important Danish dairies (Vidø, Schou & Zobbe, 2015).

	2007	2008	2009	2010	2011	2012	2013	2014
Omsætning								
Arla Foods	47.742	49.469	46.230	49.030	54.893	63.114	73.600	79.125
Thise Mejeri	359	504	496	500	541	580	725	864
Nørager Mejeri A/S	242	257	204	213	243	230	267	347
Naturmælk		206	209	227	216	217	242	249

4.2.2 The DK case study area: Region of Southern Denmark

Region of Southern Denmark is characterized by extensive rural areas and a high proportion of agriculture 65 %. In the western part of the region there is a high prevalence of sandy soils that are mostly suitable for grazing and the area therefore a high share of organic dairy farmers, as organic dairy farming requires grazing, see Figure 5. Furthermore, it is one of the areas in Denmark that has the highest concentration of organic farmland.

Farming plays an important role in the regional economy, as agriculture, forestry and fisheries account directly for around 3.4 % of the employment in the region. The most common agricultural products of the region are industrial crops, such as corn, wheat, grass and barley for feedstuff as well as pigs, poultry, pelts and milk. In the region, there is a large production of corn used for biogas production in Germany, which has increased the price of farmland. The Region of Southern Denmark borders with Germany and it is a region that traditionally has a high influx of ideas from the south, for instance, there is a high concentration of biodynamic farmers organised around the cooperative dairy “Naturmælk”.

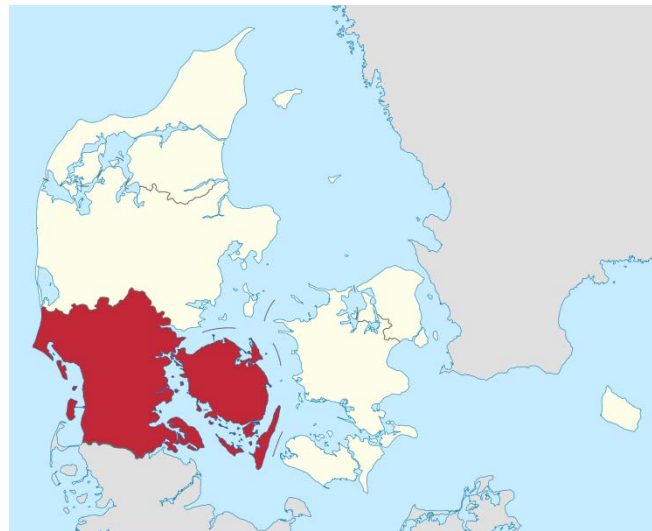


Figure 5: Region of Southern Denmark (Wikipedia, 2016)

Land use types Region of Southern Denmark

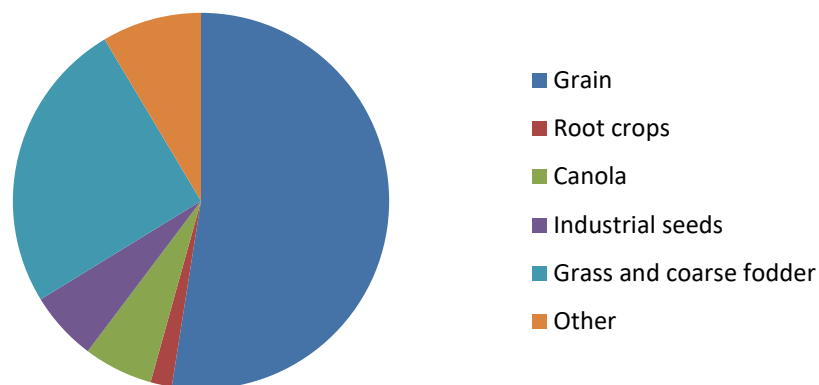


Figure 6: Land use types in the Region of Southern Denmark (DST, 2016a).

4.3 Policy and regulatory conditions

Dairy production is conditioned by various types of regulation, such as “the dairy act” LBK number. 470 of 15/05/2014), the “animal protection act” (LBK number 1150 of 12/09/2015) and “the foodstuff act” (LBK number 43 of 12/01/2016). Furthermore, organic dairy products are among the most important organic

product categories with a market share of about 25%. The organic production is regulated under “the organic act” (LBK number 1657 of 14/12/2015). The regulation for conventional and organic dairy production is administered and controlled by the Danish Veterinary and Food Administration.

4.3.1 CAP and abolition of the milk quotas

The EU sets out the overarching policy and regulatory conditions for farmers within the union. The policy that applies to the member states is laid out in the Common Agricultural Policy (CAP), which has been in effect since 1962, although the policy focus has been changed several times to cut spending and to include new policy areas such as rural development and environmental protection.

Denmark along with and England both joined the EC in 1973. At the time it seemed like a happy marriage, the EC and in particular southern Europe was undersupplied with agricultural commodities and Danish farmers gained access to a significant amount of subsidies (about one third of its total Gross Factor Income in 1973) (Bjørn & Pedersen, 1988). The objectives of the agricultural policy of the EC subsidies are stipulated in article 39 of the treaty of Rome, to: *“(a) increase agricultural productivity, by ensuring the rational development of agricultural production and the optimum utilization of the factors of production, particularly labour, (b) to ensure thereby a fair standard of living for the agricultural population (...) (c) to stabilise markets; (d) to guarantee regular supplies; and (e) to ensure reasonable prices in supplies to consumers”* (EC, 1957). Hence, the treaty of Rome stresses the interdependence between agriculture and society, but it also institutionalizes productivity improvements as the means for agriculture to fulfil its social contract.

The late 1970's and early 1980's marks the beginning of a new area for the EC policies as food security no longer has the same focus. At the time Denmark has a trade balance deficit, public overspending and at a European level the productivist policies are questioned due to their cost and the massive overproduction that have now become the result. As a result, a quota system was implemented in 1984 that for instance put a ceiling on the dairy production. The CAP was reformed initially in 1984, where milk quotas were introduced, in 1988 where an expenditure sealing was imposed on the European Council, but most significantly with the MacSharry reform in 1992. In the MacSharry reform that the CAP policy was fundamentally changed by abolishing price support in favour of income support in the form of direct payment. This lowered the price support by 29% for cereals and 15% for beef and compensated by introducing direct payments, based on the size of the farmed area (Otte Hansen, 2001).

When agricultural trade was finally taken up in 1995 it reflect not only the fact that the EU's foreign trade partners were discontent with EU's support of its own agricultural sector, but also the more substantial change in the perception of agriculture from an important cultural foundation to an industry that should be regulated like any other industry (Otte Hansen, 2001). Hence, the cap regime has moved away from a production oriented policy underpinned by price support to a 'multifunctional' policy in which numerous aspects of farming are emphasized. The reforms were politically necessary, but also had the effect that the mechanisms that stabilize the prices for agricultural commodities fluctuate much more. Today the CAP policy provides direct income support for Danish dairy producers, in its two-pillar program, 1) the direct support package and 2) the rural development program. In Denmark, the CAP program is managed by the AgriFish Agency.

Abolition of the milk quota

In April 1st 2015 the EU suspended its quota policy, thereby cancelling its limits on production. The abolition of the milk quotas has been one of the most significant change of conditions for Danish milk producers in recent years, as producers are no longer limited in their production by a quota system, but rather by the capacity of their farms (Arla, 2016).

However, the abolition of milk quotas has not influenced organic and conventional producers similarly, see Figure 7. Prior to the quota abolition Denmark saw a gradual increase in the conventional milk production for several years. The conventional production had been rising in a couple of years prior to the abolition of the quotas due to a slow phasing in of the quota system and because Danish dairy producers had produced above the limits specified by the quotas, for which they were fined. On the other hand, the organic milk production was fairly stable the years preceding the abolition, but decreased suddenly by the end of 2014. This decrease is attributed to the fact that a number of organic producers converted their production to conventional to expand their production once the quotas were abolished. However, as prices for conventional milk decreased and prices for organic milk increased, the organic production has again increased to more than what it was before. Furthermore, a number of the conventional producers who converted to conventional production have once again applied for conversion to organic production and therefore this production is expected to increase further in the future.

This market situation has direct implications for the farm economy. In 2014 a conventional dairy producer would yield a surplus of 893.000 DKK (€120.000), before subtracting his own wage in 2014, however, by 2015 this figure has decreased to -198.000 DKK (-€26.000) in 2015, on average, however, there is a huge variation among the farmers (Vidø et al., 2015). Furthermore, this result is produced at a time when dairy farmers on average have produced a significant deficit in the period 2010-2012. The organic farmers are doing much better, their economy has been good in the period 2010-2012, and on average they yielded a surplus of 853.000 (€114.000) in 2014, 599.000 (€80.000) in 2015, but unlike their conventional colleagues, organic dairy producers are also expected to gain a significant income in 2016 (Vidø et al., 2015).

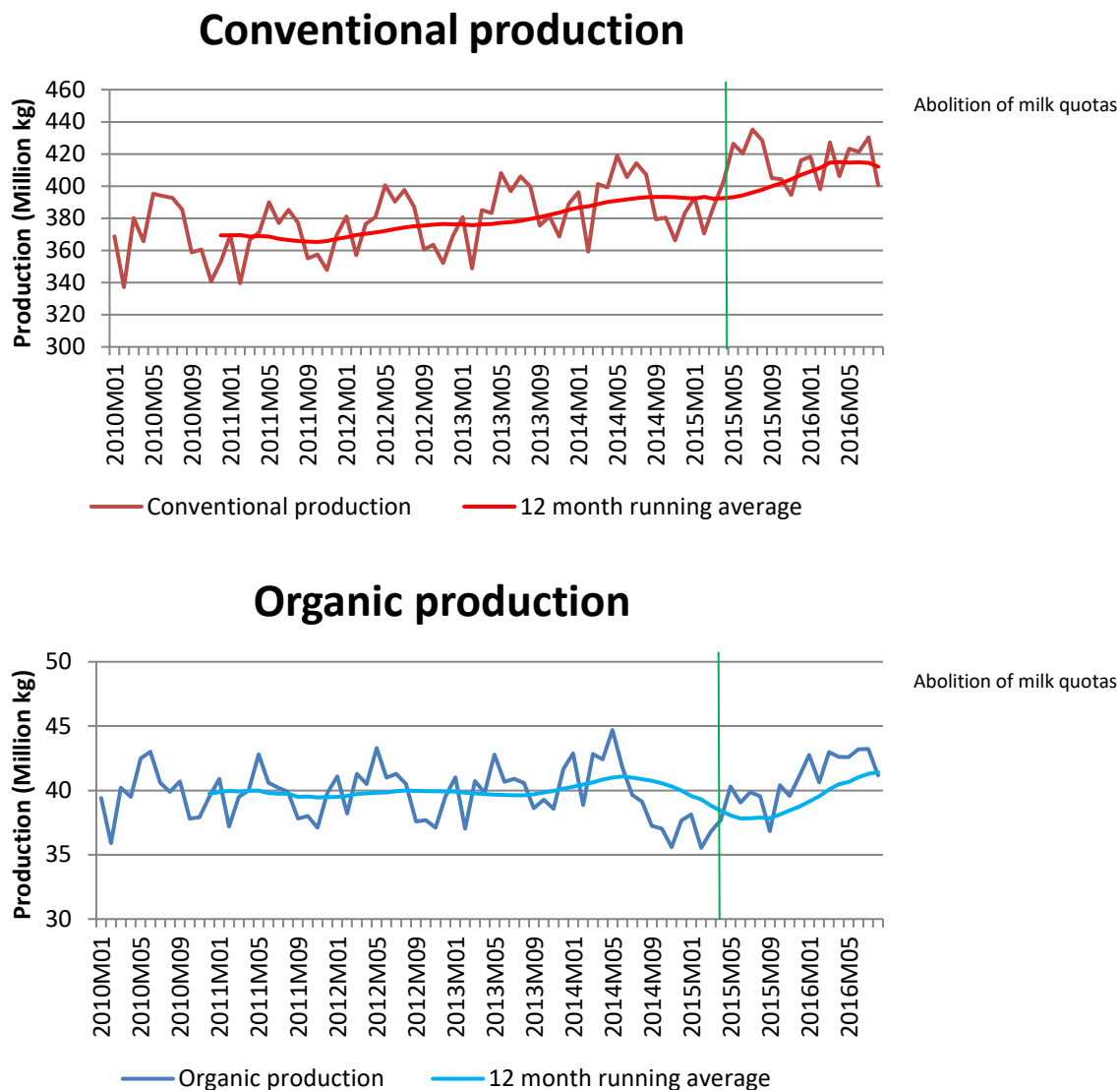


Figure 7: Development of the conventional and organic milk production in Denmark. Own calculations based on (DST, 2016b).

4.3.2 Agro-environmental policy and differentiated regulation

For the past 200 years the agricultural production in Denmark has gradually been intensified and new areas have been included in the agricultural production (Bjørn, 1988). This has modified the landscape both physically, in terms of drainage of wet areas, modification of streams, deforestation and chemically in terms of nutrient and pesticides leaching to the ground and surface water. Today, roughly 60 % of the Danish landscape is used for intensive agricultural production.

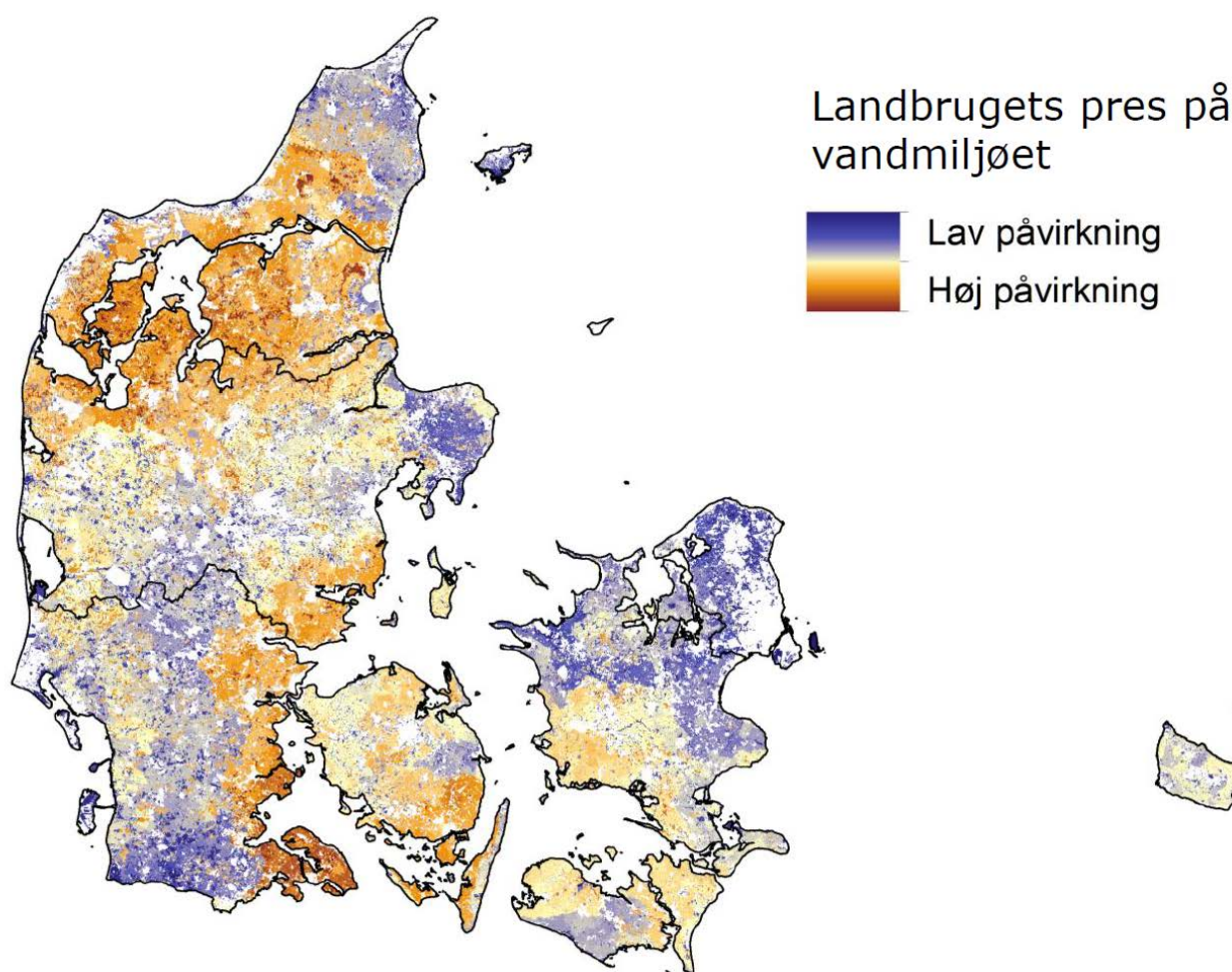


Figure 8: The impact of agriculture on the aquatic environment, the illustration indicate that in particular in the eastern part of the Region of Southern Denmark the impact is high, but also that it is somewhat smaller in the areas that are dominated by a high concentration of dairy production in the western part of the region (J. E. Hermansen et al., 2015).

The intensive agricultural production has resulted in a number of environmental issues that need to be managed in the agro-environmental management, see Figure 8. Agriculture was originally exempted from the environmental act of 1972. However, during the 1970ties and early 1980ties the general awareness of the environmental impact of agriculture gradually arose, and the regulatory response was a series of action plans to limit nutrient leaching (NPo, 1985; AP-I, 1987; AP-SUS, 1991; AP-II, 1998; Ammonia-AP, 2001; AP-III, 2004). From the mid-1980s these action plans consisted of general regulatory instruments such as, standardizing the timing and limits of fertilizer application, introduction of mandatory catch crops and introducing general norms, for instance, harmony regulation. The effort in many ways has been successful and for instance it has reduced the nitrate leaching by 50 %, since the introduction of AP-I. From around 2007 the WFD introduced a fundamental change to the development of policy targets. Previously targets were based on a politically approved goal of nutrient reduction, but in the WFD policy targets are based on an assessment of the ecological conditions and the objective is that the ecological conditions should have a “good ecological status” by 2027 at the latest.

This policy objective implies a huge challenge for the agri-environmental management, for instance, the nutrient leaching need to be lowered from around 60.000 tons N per year to 48.000 tons per year. In effect, all of Denmark has been designated as nitrate sensitive, which has enabled a policy of lowering the norms for fertilizer application below what is economically viable. Furthermore, there are a number of physical barriers and modifications that need to be removed. Implementing the WFD is seen as a huge challenge for Danish agri-environmental regulation for a number of reasons. Despite more than 30 years of efforts to reduce the environmental impact of agriculture, the impact is still perceived as significant, a large share of streams are physically modified and the nutrient load is still too high (requires reduction from 60.000 ton N to about 48.000 tons N). Improvements using general policy instruments will be extremely costly, as the cheapest policies have already been implemented. Furthermore, the implementation of the WFD needs to be integrated with a number of related policies, such as, reducing biodiversity loss, groundwater protection and mitigating climate change.

The EU directives, including the Water Framework Directive, the Habitat Directive and the Nitrate Directive have encouraged a new approach to measuring the ecological status of the natural areas and a new balance between agricultural production and environmental protection. Hence, the whole approach to the environmental planning has been restructured as the regulatory regime has previously been dominated by general policy instruments that are now replaced with a regulatory regime characterized by policy instruments that spatially differentiate the effort depending on local conditions, such as ecological status of recipients and nutrient leaching at field scale. This change in regulatory practice was decided in December 2015 when the Danish government in a political agreement among the governing parties agreed to *“the agricultural agreement”* (Aftale om Fødevarer- og landbrugspakke). The agreement relieved the agricultural industry of some of the restrictions on the use of fertilizer, but also introduced differentiated regulation as a new policy regime that begins in 2019. The agreement states that: *“It is the vision of the government and the agreement partners to conduct a paradigm shift in the agro-environmental regulation. For more than 25 years Danish farmers have been met with similar requirements, in spite of the proximity of their fields to a vulnerable fiord with a risk of oxygen depletion”* (MFVM, 2015). Hence, in differentiated regulation, policy measures are implemented in the areas where they are most effective in reducing the environmental impact, see also section 2.2.5. However, the agreement was highly controversial, most notably because restrictions are lifted prior to the implementation of differentiated measures and because the minister for agriculture and food was accused of *“creative bookkeeping”* to hide the environmental impact of the agreement. It is expected that the agricultural sector will gain an economic surplus ranging from 1.3-1.8 billion DKK (Jacobsen, 2016), however, this will not be evenly distributed on all production sectors, but it is expected to be most beneficial to plant and pork producers.

The contested agro-environmental regulation is not just about which values that need to be included in the agro-environmental management, it is also a more fundamental debate about the ontological status of the environmental impact of agricultural production. In the 1970'ties and in the 1980'ties there was a widespread debate concerning the impact of farming on the environment in Denmark, the disagreement in particular, concerned the leaching of nutrients regarding its origin, the extent of the leaching and its impact on the environment. However, the disagreement continued until it was settled in 1991 when representatives of farmers and policymakers engaged in a consensus conference to agree on a common playing field, based on a scientific analysis of the available data.

4.3.3 Ownership of agricultural properties

An important regulatory change that encouraged this practice was a change in accounting practice for loans, from the public value (which is used for taxation) to market value that is usually higher. In addition, prior to 2007, banks were desperately trying to win agricultural customers; hence, they were reluctant to reject proposals for expansions, in spite of a poor business plan, as long as there was security in the real estate value. Banks and bank owners had an own interest in selling risky bank products, such as interest swap loans, as they were related to huge bonuses, and these loan types were aggressively marketed towards farmers. Furthermore, continuously farmers were making huge profits based on speculation they were presented as “elite” farmers in the agricultural media. One of the farmers who went bankrupt with a debt of €7.5 million, for instance, noted that *“Greed ruled over sanity”*, during the build-up of the bubble. There was a high demand for land, because the acquisition of land was a prerequisite for expansions of the farm due to “harmony regulation” (requirement for a certain amount of land for each farm animal). In sum, all these effects combined indicate a powerful discourse that has justified taking extreme financial risks.

Traditionally private ownership has been the dominant enterprise form in Danish agriculture, which has also been protected by the agricultural law that details the legitimate owners of agricultural properties. The law was revised in 2012 and 2015 and attracting investment capital, is a major concern in the revision of the law, for instance the primary objective of the revision was to: *“Modernize the agricultural act by improving the opportunities for investments in the agricultural industry and thereby enable farmers to attract capital for purchase and further development of farms.”* Hence, the new and updated version of the agricultural law enables new forms of ownership, such as ownership by non-farmers, liability companies or pension funds. Similarly, requirements for the farmer to take residence on the farm are reduced and the limitations on the farm size. The changes in the agricultural law indicate a more fundamental shift in the regulatory perception of farmers, hitherto, it has been an important objective of the law to maintain “family farming” by limiting the structural development and the access to farmland by non-farmers. However, gradually this has changed so that today the major concern is to ensure that the conditions for farming resemble the conditions for any other industry. Hence, the understanding of agriculture as a particular form of rural culture with an inherent value that is worth protecting has gradually been replaced by an understanding of agriculture as an industry like any other.

4.4 Market conditions

In the past 5 years conditions on the milk market has changed considerably. The wake of the financial crisis the farm gate milk price dropped to less than 200 DK øre pr. kg, which is well below the costs of production. However, the prices increased again to record high in 2014 where the farm gate price for milk was 379 DK øre pr. kg. Due to the abolition of milk, which again dropped below 200 øre pr. kg following the abolition of the milk quotas. Abolition of milk quotas and the emergence of a more volatile milk market, influenced by various world market events such as political crisis or natural disasters. Economists predict that the world market milk prices are expected to continuously decrease gradually due to technological development, such as automation, breeding and increasing efficiency, and therefore an important market condition for Danish dairy producers is a decreasing world market milk price and a more volatile market situation.

The milk quotas have been successful in stabilizing production and in recent years therefore also the prices that dairy producers receive for the milk, in fact for the past year it has been lower than the costs of production and about 90 % of the dairy producers currently operate with a deficit. Farmers in Denmark have

been accustomed to stable prices and they have invested in modern high-tech production systems. However, the quota abolition has also meant that Danish milk producers are increasingly exposed to volatile world market prices which is challenging because the producers have a high debt, implying a high share of fixed costs and furthermore, dairy production is difficult to up and downscale and producers must plan on a long timescale and depends on a high production and cash flow. Therefore, it is no option for Danish producers to reduce production in times of poor prices, but the only option available is to increase efficiency, cancel reinvestments and increase production. For the single farmer this is entirely rational, but for the Danish and European dairy sector it is problematic, because it further increases production and thereby put a pressure on the prices.

The interviews indicate that the dairy producers were fairly optimistic prior to the quota abolition and looked forward for the abolition as if it was the “*Christmas evening*”, but many were caught surprised and unprepared when the prices decreased so dramatically as they did. Volatile prices is not a problem if producers have sufficient liquid funds to take them through times when the prices are poor, however, the overinvestments, poor loans and lack of savings has been a huge problem for many dairy producers, in the last couple of years Denmark has witnessed the highest rates of bankruptcies since the 1980’ties.

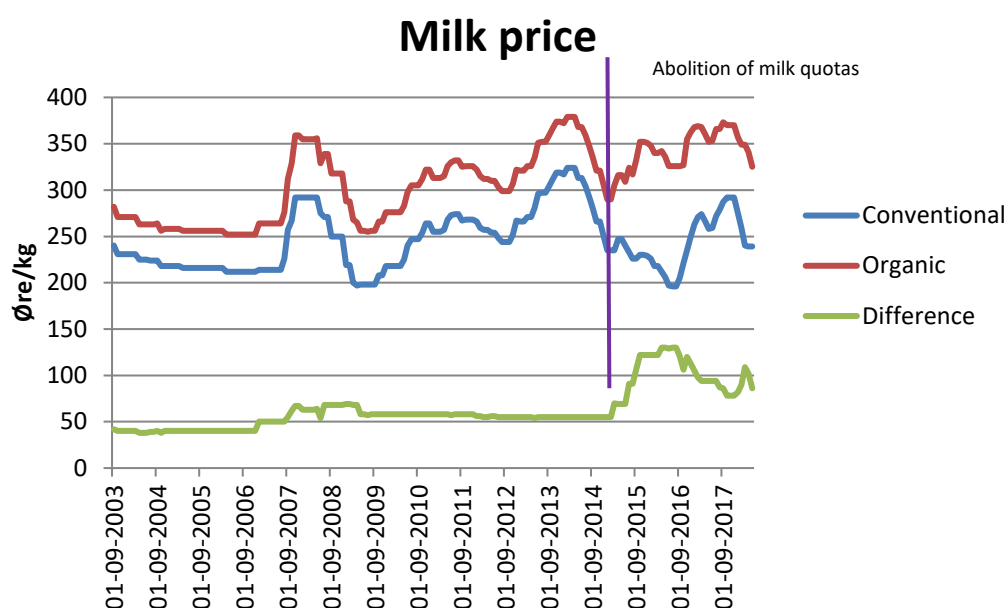


Figure 9: Development of the conventional and organic milk price, respectively. Own calculations based on (FarmtalOnline, 2016).

The growing difference between organic and conventional producers is another notable feature, which can be attributed to an expanding domestic and German organic market and therefore a higher demand for organic milk, but also the fact that a number of organic dairy producers converted their production to conventional when the quotas were abolished in 2015 (Vidø et al., 2015).

A notable feature of the internal Danish milk market is that consumers only purchase fresh milk, as UTH milk is largely unavailable in shops, an important condition as it has almost prevented competition from foreign dairies, which are unable to handle the logistics of producing fresh milk to the Danish market.

4.4.1 Financial market conditions

The ability to obtain loans for investment in development of the production facilitates is an important framework condition for farmers. Historically, personal ownership has been institutionalized as the dominating form of ownership in Danish agriculture, although the proportion of private ownership has decreased a bit in recent years it is still around 85 % of farms that are privately owned, see Figure 10. The conditions for refinance with this form of ownership is quite different from other forms of ownership (Olsen & Pedersen, 2014). Unlike shareholder companies where capital can be obtained by issuing new bonds, private companies are very sensitive to changes of the asset value and huge investments (Olsen & Pedersen, 2016). Furthermore, when ownership changes the entire property value is usually refinanced by loans. Therefore, huge sums are extracted from the agricultural sector for each generational change and the system has resulted in the build-up of a large debt, see Figure 11. During the past 20 years this debt has increased, following the build-up of the soil-price bubble, see section 3.

Furthermore, 86% of the loans for agriculture is loans with variable mortgage rate and 61 % are without repayment, see Figure 12. This means that the many farmers are in vulnerable position, as they would experience financial difficulties if the interest rate increases. Although, many farmers are no longer pursuing various types of risky investments, as they did 10 years ago, the sector is still in a vulnerable position. The current loans are configured with a large share of short-term adaptable interest loans, as 172 billion DDK of the real-estate mortgage (total = 276) is interest free. This makes the entire agricultural sector very vulnerable to increasing interest rates.

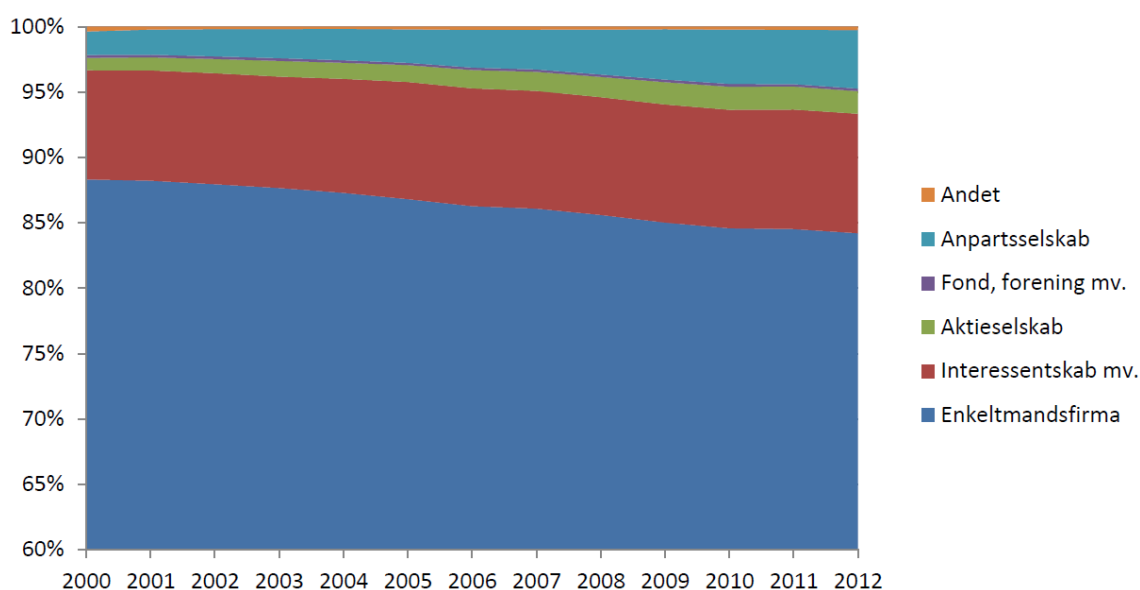


Figure 10: Ownership structure in the Danish Agricultural sector (Olsen & Pedersen, 2014).

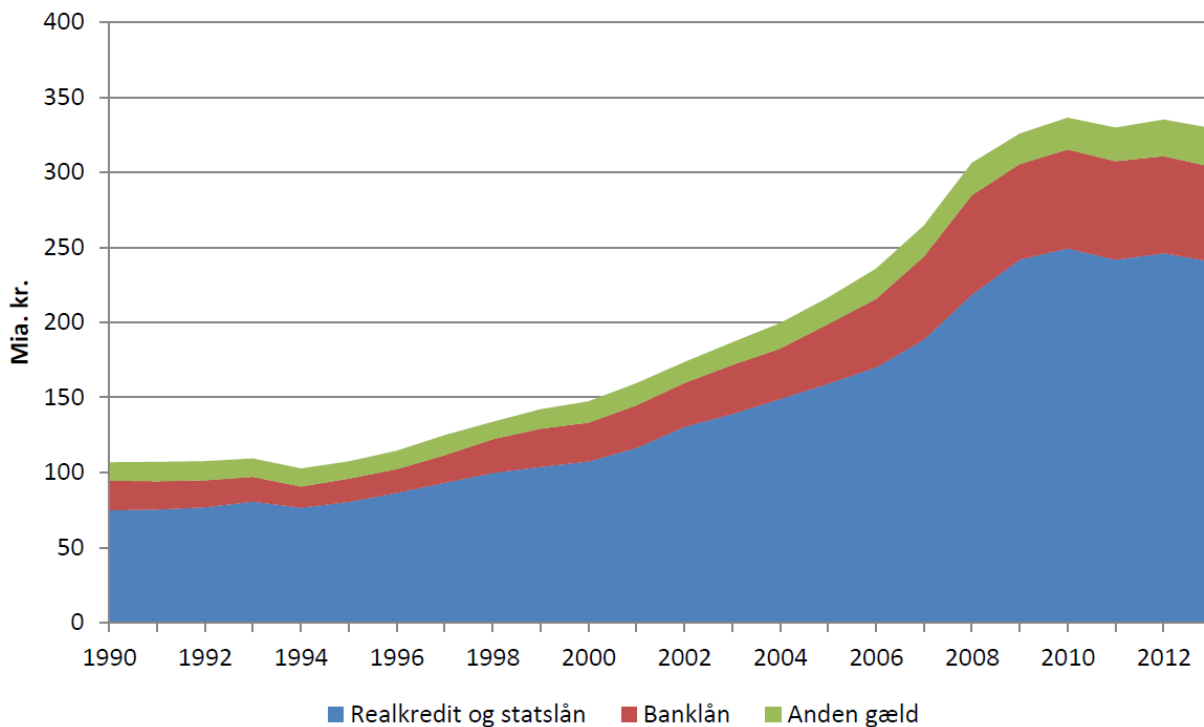


Figure 11: Development in the debt in the agricultural sector (DST 2016).

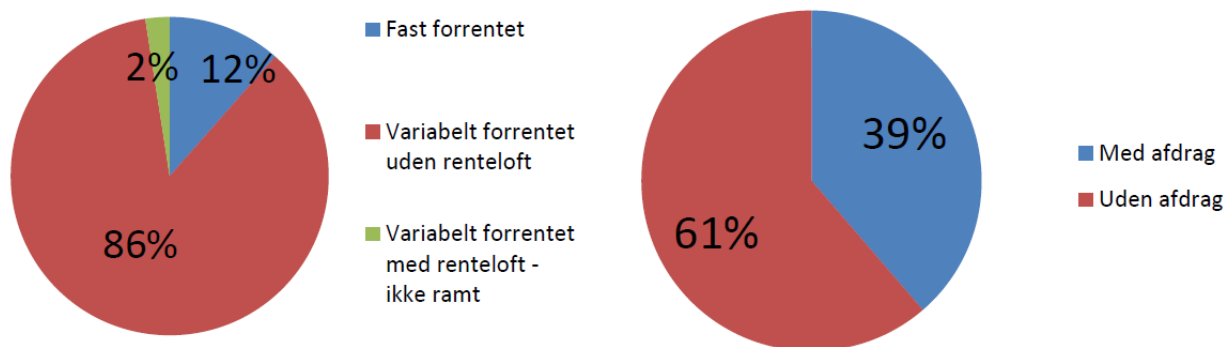


Figure 12: Left: Composition of the loans in the Danish agricultural sector. Right: Distribution of loans with and without repayment, respectively (Olsen & Pedersen, 2014).

The current financial crisis is in many respects a double crisis for Danish farming, loans have become more expensive, but the value of their property has decreased. Therefore, many farmers are stuck a production facility and loans they cannot repay, but are also unable to sell. However, the general tendency also masks a huge variation among farmers, as the farmers that have the highest solidity still have very cheap access to capital, whereas it is very expensive for the farmers who have low solidity. In general, the costs of obtaining loans has increased and for some farmers there are also increasing difficulty in access to loans, hence it is also difficult for the sector as a whole to invest in production facilities to the same extent that the production facilities are worn down. The high share of private ownership makes the agricultural sector particularly

vulnerable to decreasing asset prices as the solidity cannot be improved with a capital emission (Vidø et al., 2015).

The ownership structure has huge implications for the price of finance in financial markets. Following the financial crisis, the interest level has generally been low for Danish farmers. The low interest meant that solvent farmers have very low finance costs. However, due to the decreasing soil prices and the consequent loss of equity, many farmers experience increasing costs of finance. According to bankers and finance experts, the reason for these increasing finance costs is the finance regulation that was implemented in the wake of the financial crisis, most notably the Third Basel Accord. The accord attempts to regulate how banks manage the risks of a running a bank, by imposing requirements for differing levels of reserves for different forms of bank deposits and other borrowings. Furthermore, the value of soil has now been classified as an “uncertain asset”, and therefore it is not a type of asset that Danish banks prefer too much of in their portfolio because it increases their finance costs (Olsen & Pedersen, 2014). The implications of the Third Basel Accord are that banks have now become much more reluctant granting loans for the agricultural sector. Furthermore, the finance costs now vary much more between different groups of farmers, depending on their equity.

Table 4: Development in terms of trade for the Danish agricultural sector (Zobbe, 2014).

	Sektorbytteforhold		Totalfaktorproduktivitet		Økonomisk produktivitet	
	2000-09*	2003-12*	2000-09*	2003-12*	2000-09*	2003-12*
EU-25	-1,8	-0,7	1,2	0,9	-0,6	0,2
EU-15	-1,5	-0,5	1,0	0,8	-0,6	0,3
Danmark	-2,2	-0,5	1,0	1,3	-1,2	0,8

Structurally the Danish dairy sector, as any other commodity producing sector, is under pressure from a declining terms of trade, hence, commodity prices on the world market are in a long-term perspective expected to gradually decline, while prices for production factors are generally not declining to the same extend (Zobbe, 2014). Therefore, to remain in farming farmers must gradually increase their productivity to make up for the declining terms of trade. In the period between 1950-2000 Danish farmers increased their productivity with the same rate as the declining terms of trade, which meant that the farmer’s income could be maintained, furthermore, apparently Danish farmers increased their productivity more than other comparable countries, see Table 1. However, from around 2000 the productivity gradually declined one of the reasons may be an easy access to finance until 2008, that did not discourage farmers from making unprofitable investments (Zobbe, 2014). Dairy farmers income has been relatively good in 2013-2014, which is attributed to the high world market prices at the time, however, in the aftermath of the financial crisis many farmers have had a difficult time finding finance for productivity improvements, due to the general difficult credit access (Olsen & Pedersen, 2014). Therefore, in the past 15 years Danish farmers have been on a roller-coaster ride from before the financial crisis, when most investments would be funded, to a situation today where it is much more difficult to make investments, and the number of these has decreased significantly, see Figure 13.

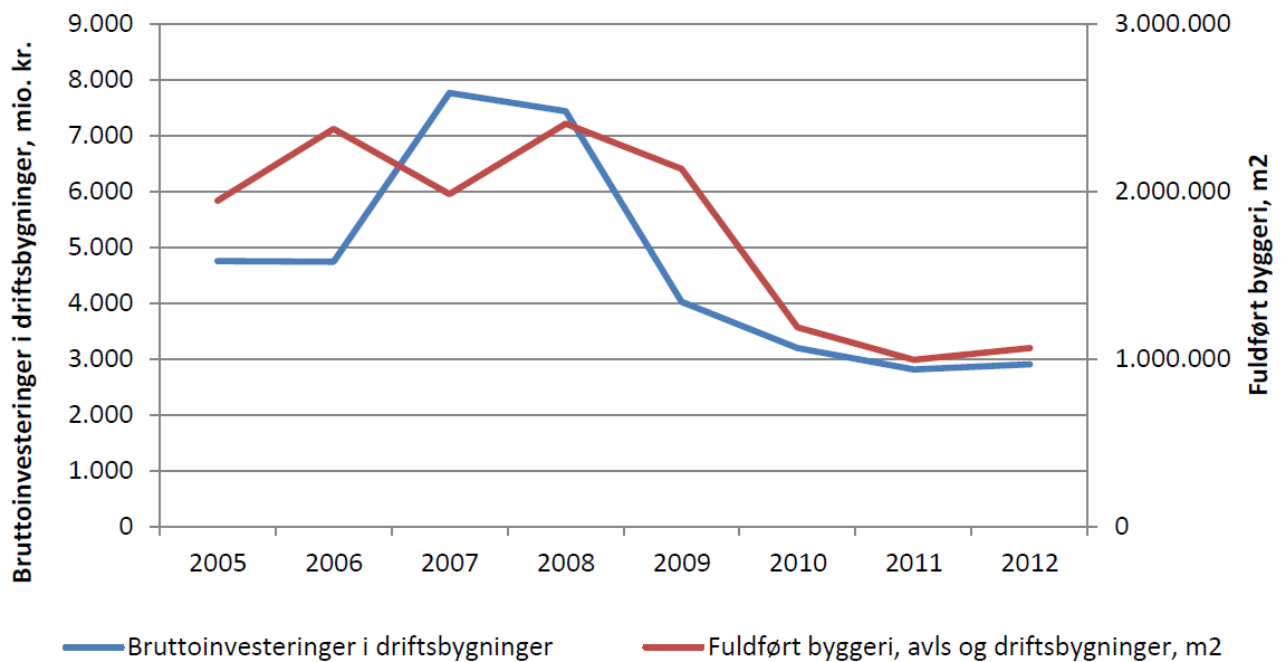


Figure 13: Investments in buildings and completed new constructions (Olsen & Pedersen, 2014).

However, beneath this general picture there is a variation among different financial institutions. Traditionally the Danish banking sector is split into many small banks with different geographical areas of operation and a small number of national and multinational banks. Furthermore, the Danish real estate mortgage system has traditionally been among the cheapest in Europe and Danish farmers generally have access to cheap finance. However, the cheap and easy access has changed quite a lot in recent years. A number of the small rural banks have a very high proportion of their portfolio of their loans to the agricultural sector, some as much as 35 % of their loans. Therefore, there is also a huge variance in terms of how the agricultural crisis has influenced the banking sector and in particular the farmers that who have engagement in some of the banks that are in trouble, have difficult access to investment capital because it is difficult to obtain loans where they are and it is difficult to change bank. A recent assessment from the Department of Food and Resource Economics University of Copenhagen indicates that banks have had to down write the value of their portfolio. In 2013 by about €200 million, but the prospective future losses are expected to be much higher, for instance in 2016 the DAFC expects that about 2/3 of the total bank debt of €12 billion will be difficult to collect.

In relation to agricultural markets agricultural economists have noted that “volatility is here to stay” (Vidø et al., 2015). Hence, contemporary farmers cannot shy away from the financial markets, but must modify their behaviour according to these markets. This has also gradually changed the focus of the farmers, being profitable is no longer just about managing the fields, but increasingly also about acting in financial markets. Furthermore, it is noted as a problem that Danish farmers are not good enough at using these many new options: “prices are extremely fluctuating and many Danish farmers do not guard themselves well enough against these fluctuations. Danish farmers are very good at growing the corn, but it is also very important to buy and sell well.” Thorsøe and Noe (2016) for instance, find that plant producers have placed large investments in grain storage facilities to act as grain speculators and sell their produce at the optimal time, as noted by one of their interviewees: “I think that it is just as important to follow the [world] market as it is

to be a good plant producer", indicating a shift in identity of the farmer from a producer of goods to a financial speculator.

In the past 10 years benchmarking tools have become increasingly important in farmers assessment and bankers' assessment of the farm, and an important planning tool. The tools are developed based on a national database of farm accountancy data administered by SEGES. Benchmarking analysis enables the farmer to compare his production with the production on a number of parameters. In particular the cost of production for one kg of milk has become a central single measure of the farmers performance, which is used in their engagements with the banks. As many dairy producers are also low on liquid funds they depend on the banks to carry them through the crisis and the figure is central in farmers communication with the banks. Arguably, there are a number of factors that influence the costs of production, that are unrelated to the farmers immediate performance and the banks make various attempts at distinguishing good performers from poor performers. Hence, for many of the bankers we have interviewed for this report the measure has become a central tool for the bankers in their management of their farmers and is considered as an indicator of good farm management and it forms the basis of agreements among bankers and farmers, enables comparison among different farmers. Most banks have particular goals for the production costs that farmers must meet to become eligible for loans and financial support. Our analysis further indicates that apparently there is currently a mismatch between what bankers expect to be a sustainable production price and what many farmers are able to deliver and expects. Apart from this simple financial measure bankers in their decision-making the bankers include various sources of information, for one thing a number of key performance indicators such as, LTV, rate of return, liquidity, solidity and positive momentum in the farm economy. As a rule of thumb investment plans should yield an interest of about 10 % of the equity, which is a very high figure, when comparing to historic data where the equity has yielded an interest of about 3 % on average in the period 2000-2012. In the same period the average interest rate was about 4,5 %, hence the yield of investments in agriculture has been significantly lower than low risk stock bond investments. Apart from these financial measures the decision-making in the banks concerning finance has been reconfigured in recent years and that banks do not just make a financial assessment when they evaluate a farmer, but personal qualities, such as management capacity, is also increasingly relevant.

The current financial crisis has also led to some policy changes which reconfigure the financial decision-making of the banks, and therefore indirectly also of the farmers. For one thing, the decision to finance in many banks are no longer made by the financial advisor, but in the smaller banks it now has to be approved by the executive and some of the larger banks have actually established "agricultural centres" where economists are responsible for the decision to fund a particular project. Furthermore, the financial crisis has introduced new demands on the banks, in particular, concerning liquidity and the how properties are valuated and devaluated. Banks are now more closely monitored by the financial council (Finansrådet), a public institution that assesses the accounts of the banks. Hence, the practice of the financial council has great implications for the financial conditions of farmers.

4.4.2 New and emerging food trends as a condition for dairy production

In the past 10-20 years the Danish food system has been influenced by several new tendencies and it is becoming increasingly differentiated, including, increasing organic production and consumption, increasing interest in local food production, and an emphasis on experience, community, taste and gastronomy. These different tendencies have been adopted and interpreted in different ways by Danish dairy producers.

As noted above, there is a high market demand for organic milk, reflected in a historical gap between the organic and conventional milk price. Consumption of organics in Denmark has increased continuously for the past 30 years and today accounts for an 8 % market share, which has exceeded Danish production capacity for several food items, and has been accompanied by a growth in the import of foreign organic products (Thorsøe, 2015). In particular the demand for organic food is driven by a focus on health and animal welfare (Christensen et al., 2014). Organic milk is the one of the most successful organic products in the Danish food market, where 25 % of the retailed fresh milk is organic and it is also a popular product in other European countries accounting for a market share of about 10 % in countries like Holland, Belgium, Finland and France (Willer & Lernoud, 2014).

It is worth noting that the Region of Southern Denmark is very near to the German market and there has been a long tradition for organic production within the region. One of the major organic dairies is located in the region and has been open to the influx of ideas from Germany concerning agricultural production, hence there is also a number of biodynamic dairy producers in the region. The dedicated organic dairies in Denmark, including the company “Naturmælk” in the Region of Southern Denmark very diverse, producing a range of different products out of the milk including, fresh milk, butter and various types of cheese for different market segments.

Second, there is an increasing focus on food as the material context of new experiences and communities. For instance, in a coordinated yearly event Danish organic dairy producers let out their dairy cows, attracting around 200.000 spectators on 70 different organic farms, during a day (Økodag, 2014). Furthermore, several large food festivals have emerged attracting up to 30.000 participants during the weekend to interact with food producers, NGO's and learn about food production and cuisine.

Third, there is an increasing focus on local food and origin has become an important factor in consumers' decisions to purchase particular products, reflecting a growing interest in 'food from somewhere'. Recently, there has been an increase in direct sale of meat, dairy, flour and vegetables, for instance, reflected in an increase in the number of farm shops from (1.200 in 2007 to 2.300 in 2013) (Meldgaard et al., 2015). Furthermore, one of the two large supermarket chains COOP has given direct market access to selected producers in their local supermarket.

Fourth, taste and gastronomy has become a prominent new tendencies, following the onset of the new Nordic Food Cuisine in 2004, which is based on the virtues of “taste”, as well as local, seasonal and traditional products of the highest quality (The Nordic Council of Ministers, 2012). According to M. E. T. Hermansen (2012) NNF is closely related to sense making and a way to express identity in the Nordic countries, an 'exercise in nostalgia'. However, NNF is as much a construct as it is a rediscovery of a historically rooted food culture and the 'tastemakers' in the NNF are a group of chefs and food critics, who have discerned the taste of the Nordic for the general public (Byrkjeflot, Pedersen, & Svejenova, 2013). A number of very small dairies (but also a subsidiary of Arla) that produce specialty raw milk cheese for the gourmet market, have adopted these new tendencies.

These new tendencies offer new opportunities for Danish dairy producers, but it is also important to emphasize that there is a growing divide among Danish consumers, there is both a group of consumers who have embraced these new trends, but around half of the population also claim to be indifferent to organic production (Lund, Andersen, & O'Doherty Jensen, 2013). The change which has taken place in the Danish

food system is parallel to the development in other Scandinavian countries and in the northern part of Europe.

Table 5: SWOT analysis of the Danish dairy sector in the region of Southern Denmark.

Strengths <ul style="list-style-type: none"> • Good agro-ecological conditions (high quality grass/grazing) • Well established dairy tradition and expertise/knowledge in the county • Well renowned advisory service owned and operated by the farmers • Knowledge networks that accommodate the exchange of experience among farmers (ERFA-groups) • Key dairy co-operatives, processors and many other farmers in close proximity • Dairy farming is part of the county's identity • High-tech and modern production facilities. 	Weaknesses <ul style="list-style-type: none"> • High costs of production • Need for full capacity utilization all the time due to high fixed costs • Poor milk price (for most) does not currently match cost of production • Unsustainable business case, hence it is difficult to obtain loans for business development • Farm succession & ageing farmer profile (increasing one year, each year) • Very sensitive to price fluctuations • Entry to the industry is difficult due to high costs and large farm size • High debt percentage
Opportunities <ul style="list-style-type: none"> • Decreasing soil prices • Low interest rate • Increasing organic and specialty food market • Greater flexibility with abolition of milk quota • Access to new forms of finance, including private investments and pension fund ownership • Increasing focus on sustainable forms of production 	Threats <ul style="list-style-type: none"> • Price volatility, due to political factors and speculation • Increasing exposure to the world market • Lacking opportunities for obtaining finance • Continued oversupply of liquid milk • Competition for land access with German energy crop producers • Price volatility and exposure to global milk price markets • Falling world market prices • Increasing focus on CO₂ footprint and new environmental regulation

4.5 SWOT summary

Based on the analysis of regulatory, policy and market conditions in the case study of the Danish dairy industry in the Region of Southern Denmark, in this section we will provide a list of key points and issues that

are raised in the case study. The key issues are identified in a SWOT analysis, which enables us to identify opportunities and barriers for a resilient development of the regional dairy industry, see Table 5.

In general, within the Region of Southern Denmark dairy production has deep historical roots, is deeply embedded in the identity of the region. Furthermore, there are many specialized dairy farms in the region and a range of actors that are adapted to supply the farmers with various inputs and knowledge networks.

4.5.1 Regulatory and policy conditions

The abolition of milk quotas in combination with various international political crisis and a changing world market demand means that the milk price has dropped significantly in the last couple of years. Furthermore, the increasing exposure to the global market imply that Danish dairy farmers increasingly have experienced volatile prices, as policies are no longer interventionist and the milk price is stronger correlated with the world market price. However, the abolition of the milk quotas will also imply a greater flexibility for each farmer, as he no longer has to take quota limits into account but is able to produce at full volume, if it is feasible.

Furthermore, three other regulatory and policy conditions influence dairy producers. The financial crisis has had a very hard impact on Danish dairy producers and the finance sector compared with other European countries. Due to a the build-up of a soil price bubble in the years preceding the financial crisis has increased the total debt burden of Danish farmers and new legislation implemented to fulfil the Third Basel Accord has made a high debt/asset ratio problematic. The issue is that it restricts farmers access to capital for reinvestment and development, as the cost of finance has increased and banks have become more reluctant in their borrowing practice. One of the consequences is that succession is now problematic because young farmers have an increasingly difficult access to investment capital and because structural development has created an agricultural sector that consists of large specialized production facilities.

Traditionally personal ownership has been the dominating ownership in Danish farming, but the ownership regulation was changed in 2010, allowing other forms of ownerships, such as liability companies and foreign owners. This has created a fear of landgrabbing from foreign companies or investment funds, but it has also enabled local farmers to experiment with new forms of ownerships and ways of organizing the farm economy. Whether these new forms of ownership will dominate change the underlying dynamics of Danish farming remains to be seen, but currently there is much experimentation taking place.

Not only Danish policies that influence the producers in the Region of Southern Denmark in particular the German market and policies also have an impact on farmers. An example is the German energy policies that offer good subsidies for bioenergy production. This has increased the demand for local biomass production which has helped to increase the land and leasing prices in the region.

4.5.2 Market conditions

In the past 5 years conditions on the milk market has changed considerably. Economists predict that the world market milk prices are expected to continuously decrease gradually due to technological development, such as automation, breeding and increasing efficiency, and therefore an important market condition for Danish dairy producers is a decreasing world market milk price and a more volatile market situation. The growing difference between organic and conventional producers is another notable feature, which can be attributed to an expanding domestic and German organic market and therefore a higher demand for organic

milk, but also the fact that a number of organic dairy producers converted their production to conventional when the quotas were abolished in 2015 (Vidø et al., 2015).

Currently the interest rate is historically low, which is very important for the dairy farmers as they have a high proportion of loans in relation to assets. However, for most dairy producers, the current financial crisis is in many respects a double crisis for Danish farming, loans have become more expensive, but the value of their property has decreased. It is difficult for many to obtain new loans as banks increasingly have begun to assess the business cases of their clients, which marks a clear break with an earlier practice, where finance was given entirely based on the farmers' equity.

Danish dairy production largely takes place in high-tech modern production facilities, which means that farmers also have high fixed and operating costs, hence, they are unable to reduce production when dairy prices are unfavourable. Therefore, the crisis response that has been adopted by Danish dairy farmers has been to reduce costs, by cancelling reinvestments, optimizing labour use and to maximize production by including additional cows, thereby reducing the production costs for one kg of milk.

In the past 10-20 years the Danish food system has been influenced by several new tendencies and it is becoming increasingly differentiated, including, increasing organic production and consumption, increasing interest in local food production, and an emphasis on experience, community, taste and gastronomy. In Denmark, organic production has a prominent place in the food scape with a market share of 8 %, which is growing and organics is also retailed in supermarkets alongside conventional products. Organic milk is one of the most popular organic products with a market share of more than 30 %. The Region of Southern Denmark is very near to the German market and there have been a long tradition for organic production within the region. Furthermore, one of the major organic dairies is located in the region and has been open to the influx of ideas from Germany concerning agricultural production, hence there is also a number of biodynamic dairy producers in the region. The dedicated organic dairies in Denmark, including the company "Naturmælk" in the Region of Southern Denmark are very diverse, producing a range of different products out of the milk including, fresh milk, butter and various types of cheese for different market segments.

4.5.3 Key points

Access to finance is currently an important issue for many Danish farmers, particularly dairy producers, as the number of loans has been reduced significantly. This is related to the current low commodity prices that make Danish dairy production economically challenging. However, interviews with bankers also indicate that the problem is not related to lack of liquid funds in the finance sector, but due to uncertainty concerning the yield of agricultural investments. This again indicate that the problem for the Danish Dairy industry is twofold, first, a huge debt which makes investments risky due to a high sensitivity to increasing interest rates, decreasing soil prices and 2) a business model that is unable to deliver sufficient yields that will compensate for the risk associated with the loans.

Currently a largescale reconfiguration of the Danish agricultural sector takes place, in particular, within the dairy industry. A large number of farmers exit farming due to bankruptcies, forced sales or voluntarily agreements. Hence, an accelerated structural development takes place and a concentration of the farms, in which existing farmers purchase those who exit. Furthermore, due to the changes to the regulation concerning farm ownership (landbrugsloven) a number of new actors are experimenting with agriculture,

such as pension funds, investment funds and private persons. Furthermore, some of the larger farms experiment with different forms of ownership, for instance liability companies.

4.6 Dairy production in Southern Denmark - focus groups and workshop

To explore how farmers experience their market conditions, regulatory conditions and financial conditions, in the Region of Southern Denmark we summoned the farmers to two focus group sessions. In this chapter, we explore how farmers themselves think of the conditions under which they operate and the strategic response to the challenges they observe.

The interviews were organized around a poster developed for the interview based on the main question: “In your perspective, which challenges can you identify in the current market conditions, regulatory conditions and financial conditions and which strategies do you employ in response?” This main question were operationalized into, 4 sub questions: 1) What do you consider as the main challenges for your farm in relation to price and markets under the current market conditions? 2) What do you consider as the main challenges for your farm in relation to development and succession under the current financial conditions? 3) What do you consider as the main regulatory challenges for your farm under the current regulatory conditions? And 4) which strategies do you employ to meet these challenges, see figure 14. The posters were used as a tool to facilitate the discussion and each farmer was as to write one or two statements on a post it labels for each of the four questions, and asked to stick it at the poster and explain its meaning to the others, one question at the time. In figure 14 these statements are translated and organized in thematic groups as a grounded outcome of the analysis.

The first focus group consisted of farmers who deliver their milk to a small-scale organic dairy and the second consisted of farmers who deliver their milk to Arla. In addition, we conducted 2 individual interviews with farmers who recently have cancelled their contracts with Arla to deliver their organic milk to German dairies. These two interviews provide some interesting insight into how farmers build and change their strategies. The focus groups and interviews were recorded, transcribed verbatim and open coded according to a grounded research methodology. Subsequently the codes from the different interviews have been compared and the list of codes have then been condensed in a process of constant comparison to produce unequivocal categories of the statements (Corbin, 1998; Silverman, 2011). Figure 14, depicts the statements that were given in the different discussions and the colour reflects the arena in which it was given. The presentation in this analysis is organized according to these themes and quotes have been selected and translated to illustrate recurring themes in the data material.

Challenges for a financially sustainable production

In your perspective, which challenges can you identify in the current market conditions, regulatory conditions and financial conditions, and which strategies do you employ in response?

What do consider as the main challenges for your farm in relation to price and markets under the current market conditions?

Marketization

Hot-shots on the commodity markets
Low returns on investments
Decreasing turn of trade
Growing uncertainty

Value-chain dynamics

Markup in the value-
Retail sector too large and expensive
Biodynamic marketing (soft
No price premium for added
Can the dairy purchase at acceptable price

The financial gaze

Location, location, locati-
Requirement for 20% self-
finance of investments
Too many administration
costs, taxes and charges

Debtburden, financiali-
zation and the equity of
young farmers
The Danish Financial Supervi-

Perhaps good financial

What do consider as the main challenges for your farm in relation to development and succession under the current financial conditions?

Investment behaviour

SWAPs
Difficult to loan money
Dangerous debt vs. No
buyers of properties
Thinking more on deve-
lopment than phasing-out

Production dynamics

Increasing supply
Decreasing prices
Profitability

Which strategies do you apply
to meet these challenges?

Production strategy

Organic production
Alternative / additional production
Be among the top 10%

Internal organization

Gradual succession

Structural reorganization

Being large
Need for increasing tenacy

Succession

Property value will be divided in
three for succession

Image of farming

Farmers have a right to be
None
Production country vs. Not a
production country

What do consider as the main regula-
tory challenges for your farm under
the current regulatory conditions?

Number of animal units depends

Simplification, no more strange rules
80 % catch crops, no undersown
grass
Incoherent environmental regulation

Representation of far-
mers

Agricultural law

The agricultural law (the wealthy can
purchase all the land)
No longterm regulation

Figure 14: Outcome from the focus group sessions and individual interviews (not yet incorporated) red text represent statements in focus group 1 and green text represent statements from focus group 2. The text is a translations of the interviewees statements and it has been grouped based on the method of constant comparison.

4.6.1 Challenges of the contemporary market conditions

Regarding the contemporary market conditions there are a number of aspects that are brought up by the farmers as particularly important for them, which have been grouped into three aspects, value-chain dynamics, production dynamics, and marketization.

Value-chain dynamics

There is a general consensus that the structure of the retail sector and the asymmetric power relations between dairy farmers and downstream actors is problematic for the farmers. For instance, in one of the focus groups it is noted that the capacity of the retail sector is way too big and it is argued that it can only be so big because the profit is too excessive. Hence, farmers feel that they are in a vulnerable position, particularly farmers who are producing products with an added value like organic milk, as the markup added by the supermarkets implies that the difference in retail price between organic and conventional products is amplified, as the mark-up is added as a percentage. The comments from one of the focus group participants reflect this concern: *"The supermarkets find it difficult to understand that they make more money selling out product (red: organic) rather than others, even if the percentage is lowered. Either you sell this milk or you sell the other, it occupies the same volume on the shelves"*.

Hence, among all focus group participants there is great concern that the dairy will not be able to pay the farmer a sufficient price for their produce. This is not just seen as a function of the organization of the retail sector, but it is also seen as a function of the world market and the precarious position of Danish farmers, who live in a high cost society. The remarks of one of the interviewees illustrate this development: *"It may be that my dairy cannot pay me a decent price, but perhaps it is not the fault of the dairy, maybe there are other places where it is more profitable to produce milk. There is no law dictating that we (red: the group) should be able to take care of cows, if they can do it better in other places of the world (...) It doesn't matter which kind of milk you produce the production costs have to be lower than the market price. No matter when you look the top 30% always makes more money than the prime minister"*. In spite of the low prices and market volatility, farmers are quite content that after all they have well-functioning cooperatives that are able to purchase all the milk that is produced, but they are worried of the competitive situation of Danish dairy produces vis a vis other European dairy producers. Another comment in the same focus group reflect this situation: *"With the dairy I can sell my milk at a high and stable price, and that is what it is all about that I can make money. But my concern is that many others can see a perspective in producing milk in the EU, and I see dairy production as a regional perspective more than a national."*

Production dynamics

The recent market changes, where the dairy price has become much more volatile is also a great concern with the farmers. One of the major concerns is the unpredictability of the milk market, which makes it difficult to make proper budgets. This is illustrated by a comment in one of the focus groups: *"The volatility and the unpredictability, it is difficult that you can barely make a budget, the January price may be completely different from the August price and the other way around. It has probably become worse after the quota abolition, but we have to get used to this, but it probably takes some time."* Another farmer supplements arguing that the current crisis is not just a situation following the quota abolition. Rather the current situation is a function of a longer series of deregulation on the dairy market: *"It has never been worse and that everything is deregulated means that you have larger variation, but it is not only due to the quota abolition,*

but it has gradually become like that since McSharry." Hence, the current situation is not explained by a problem with the dairy, but rather with general conditions at the dairy market, in fact the participants are quite happy with their dairy. This is reflected in a comment from the focus group with Arla farmers: *"We have a structure around us as farmers that is more effective and efficient than the others (read: other European farmers) that enable diversity, some wants to be big, some want to be small, some want to do specialty products, but we are all farmers. We don't have to worry about security of sales, the cooperatives take care of this, it is one of our strong hands."* However, here there is a contrast between the focus group participants and the individual interviewees as these left Arla in favour of a more lucrative German contract. This primarily had to do with a lacking transparency in the internal accounts of Arla, where German suppliers were paid a substantially higher price than their Danish colleagues. Furthermore, the Danish farmers were already exporting their milk to the same dairy as their North German Arla colleagues and that appeared as unfair. However, the challenges they face in their daily operation are remarkably similar.

Marketization

For both focus groups the marketization following the gradual liberalization of the milk market and the globalization of the value-chains have had some important implications for Danish producers. Particularly, producers feel squeezed in the dairy market where they find themselves in a place where commodity prices steadily have been declining, while others state *we depend on access to grazing land and such, we depend more on other factors. Concurrently with the decline in our economy, wages and other costs increase, so we have to reduce our costs, but* expenses have not and therefore they are in a constant battle to reduce the costs of production to stay afloat. At the same time there is great frustration with the liberal market, as it tends to award other actors than dairy producers. A discussion in the focus group with organic producers reflects this concern, however, the diagnosis was similar in both the focus groups: *"The turns of trade is gradually becoming worse. Organic farming is not a rational form of production, you increase your productivity to counteract this trend, that is a general mechanism in a liberal economy, but in addition we have other challenges as organic producers, because cannot do that like in other sectors."* Another farmer supplements: *"Everybody says growth and that is based on our costs, so we also have to have more incomes (...) you can do the math, in 1989 the milk was sold at 2,89 (DKK) today it is 2,5 it is declining, other costs are not."* In spite of this the organic producers feel less squeezed than their conventional colleagues, as it is noted by one of the participants: *"In practice we have a market system, where 97% of the milk is sold locally and the remaining 3 % determines the price of all of it. And then we have some hot-shots at the commodity market who controls the market and buys and sells when it goes up and down and creates these big fluctuations that are so detrimental to the primary producers, but they make a profit on it. But the fluctuations are hard to manage for us, but we have to say that we as organic producers are not so affected by it as the conventional producers."*

The volatility in market prices has some quite important implications for how the production needs to be organized, as detailed in one of the focus groups: *"10 years ago we did not see these fluctuations in the milk price, they have become much higher."* And another farmer supplements: *"It have also had some implications for the requirements for self-finance, they mirror each other. When you are in a sector with these fluctuations you need equity as a buffer to manage it."* Particularly for dairy producers there are certain aspects that are problematic, due to the huge investments and long settlement time, hence, farmers cannot stop producing

for 3 months even though they are running with a deficit, and when they are running low on equity it is problematic for them.

The paradox of farmers' market orientation

All in all, the focus group participants are also a bit apathetic about trying to change the current situation. For instance, one of the focus group participants note that the present challenge is not unique: *"It is the way it has always been (...) you should be able to produce what the people want, and keep your costs below the market price, alternatively you should find something else to do."* Hence, the focus group participants generally observe the market developments from a liberal point of view and then interfering in the *"natural market dynamics"* is necessarily seen as a bad thing. On the other hand, the farmers are quite frustrated with their precarious position in the value-chain of the liberal market economy, exemplified by their discontent with the retailers, speculators and financial institutions. Another farmer also noted that: *"I am not a communist, but perhaps it would have been easier in the present situation"*. Hence, interfering in the market dynamics apparently is equated with *"communism"*, which is strongly negative and in this perspective the farmers who are unable to keep costs below the market price should find something else to do. At the same time the participants are quite protective of their colleagues who have gone bankrupt and mentions factors like *"unlucky timing of investments"*, *"banks that are not playing fair"* and the Danish Financial Assessment Agency encouraging an aggressive investment strategy. Hence, there is a paradox in how the participants explain success, as a good management strategy and failure, which is either a distributed responsibility or poor financial decision-making on an individual basis. Hence, this liberal worldview of the farmers also produces a blind spot in terms of understanding the dynamics of the free market.

4.6.2 Challenges of the contemporary financial conditions

At present the financial situation among Danish dairy farmers is extremely challenging as about 40% of the dairy farmers are declared *"close to bankruptcy"* and this of course has some significant implications for how the dairy farmers perceives their current challenges and opportunities.

The financial gaze

The focus groups indicate that generally the farmers recognize that the financial conditions for Danish farmers are much better than for other European farmers. Furthermore, the Danish financial institutions have had an important role in shaping the course of Danish farming, but at the same time the financial sector have been an important factor for creating some of the equity problems that Danish farmer face today, but farmers do not feel the banks take on their share the responsibility for these issues.

An important role is the shift in how Danish farmers are perceived by the financial institutions, which has changed quite a lot following the financial crisis. A debate between two of the farmers in one of the focus groups reflects this changing perspective: *"there is no doubt that if you want to invest you check out what you invest in and a sector which is exposed to weather and politics has a poor rating. (...) We have to recognize that we are an uncertain sector (...) if one thing, the financial crisis has learnt us that risk comes at a price, rarely it has been more expensive and the difference between having finance and not had never been wider. If you have money you have to pay a fee for the Bank of Denmark and if you don't, you have to pay an interest rate of 15%."* The debates continue and another supplements: *"Then we have seen a financial sector that has gone from one extreme to the other. At some point the could not lend enough money to farmers, as next year*

the land price will increase and then you can... you could loan all the money you liked and right now they it is completely opposite.” Hence, farmers have observed a change in the way they are treated by their financial partners, and one of the changes is a much higher focus on the yield of the investments. A focus that also resonates with the farmers in the focus groups, as one of them notes: “Historically it is a challenge that the yield is lower than the market rate, it is a sign of disease. We can whimper about that nobody wants to finance (red: farming), but there is a reason for this, who wants to finance anything that is unable to yield a market rate?” This financial situation not only makes it difficult for the farmers to get access to credit, it has also changed how the banks assess farmers and provide credit access. This is illustrated in one of the focus group debates:

Farmer 1: We increasingly see that the financial sector interferes with the daily management, the individual farmer has become paralyzed, every decision that involves a bit of money has to go past a bank, if you don't have any equity. It has changed completely, in addition, their willingness to take a risk is gone.

Moderator: Who makes the decisions to finance?

Farmer 2: We cannot talk with them

Farmer 1: No I think that it comes from above. The financial advisor are told who to keep an eye on, they put us into different categories, and if you are in the red, if there is any uncertainty...

Farmer 3: In my opinion the financial advisor does not make decisions any more.

Farmer 1: No it probably varies from bank to bank.

Farmer 3: The financial assessment agency has forced a division between providing credit and giving advice, there has to be a Chinese wall between those functions

Farmer 1: You shouldn't be blind that the regulation suits the banks just fine, they can always excuse themselves with whatever... they just push it unto us.

And so the debate converged in a consensus that reflects a feeling of being in a vulnerable position and at the mercy of financial actors whose rationales are somewhat opaque. This is a big source of uncertainty and frustration. This point is also illustrated at another place in the same focus group, when the Danish Financial Assessment Agency is discussed:

Farmer 1: It ought to be the task for some good journalists to explore the role of the Financial Assessment Agency, it is really thought provoking that in 2010 they dictate that farm buildings older than 10 years should be registered without value, what is the sense of that? That only push to a sector in trouble and all the banks just fall in line, because otherwise the agency would just come and punch them in their faces. That is really an interesting subject.(...)

Farmer 2: The next thing is when they have to show a better account then they butcher a couple of farmers (red: file for bankruptcy), because they have written it off in their accounts, that is the argument for doing it, but it is not necessarily for the good of the farmers. Sometimes you

sit and wonder why they do what they do this, but it is necessary to know what goes on in their system to really understand.

Farmer 3: *The next thing is that they also interfere in the trading of farms, where they have a neighbour for a property on sale and...*

The discussion reflects a huge feeling of apathy and frustration. Farmers feel they are pawns in a game they do not quite understand, but they have realized that the banks do not act with the best interest of the farmers in mind. However, making money is not just about running a business, it is linked to the identity of being a “good farmer”, as a later remark in the same focus group indicate: *“we must feel esteemed, and money is a condition for that, therefore we have to earn money.”*

Investment behaviour

The apathy of the farmers in relation to the banks also sparks some reflection on the investment behaviour of the farmers, as one of the participants in the other focus group notes: *“I talked to a mason about it and as soon as a farmer earns 1 DKK he is ready to reinvest 4. It is deeply embedded in the nature of farmers to just develop, develop and develop, there are many who have this gene, they just keep on going even though they do not make any money.”* This consensus that the farmers are quite optimistic in their investment behaviour prompts the farmers to discuss whether they were happier before they began investing to become bigger, a path that all the farmers in the focus group had taken. One of the farmer reflects: *“We had 65 cows, before we expanded. When I look back I think that I was happier when I just had 65 cows, but that is of course difficult to know when you are 35 and you have your entrepreneur gene, but we did not have the debt that we have now and work wise it was also much easier. So I look back with some regret.”* The comment reflects that expansions and structural development also follows a logic of its own, which is somewhat beyond the individual farmer, however, the farmer acknowledge that he himself had made the decisions independent on external factors. Although a production logic has circulated among the farmers that has been promoted by processors, financial institutions and other important actors, the decisions are still considered as individual decisions by the farmers. Therefore, the decisions are also entirely the responsibility of the individual farmer when investments fail or are regretted. The comments also reflect that once certain choices have been made they are difficult to undo as they code for a particular organizational form. Other of the focus group participants, however, note that there were other considerations in play when they decided to invest in their facilities: *“We constructed a stable with two robots, it is adapted to our needs, I have much more body friendly work in my new stable, but I have also decided that I have to wear it down. Many people say to us that we need more cows (...) the thing is that I do not want to lock in the next generation, he either continues or he can demolish the stable and lease the farmland, so my life improved with the new stable. Another farmer notes that: “I am more happy now than when I had 100 cows, because I do not like to do the work. I would much rather take care of people than cows, I am much better with that (...) it takes some size also to gives some freedom, now with the 65 cows you have to tend the farm every day.”* These statements indicate that apart from justifying their investments on the grounds of a need for structural development and investments in new technology that emphasize growth, there are also a number of practical and pragmatic reasons for investment behaviour that are often overlooked.

Succession

The focus groups also reveal that farmers are quite conscious about the difficulty of selling their farms at a decent price or finding a successor due to the structural development. A discussion in one of the focus groups illustrate this issue: *"I have not regretted a single decision I have made, I like the life I have got, except for the SWAP that almost killed us, my dream is that when I stop, I have known for a decade that nobody will be succeed. I have had a better life than a mason, we are born equal and we leave equal, why should I be better off when I am retired, I have still had a better life."* One of the farmers decided not to expand so much as some of the others. He notes that: *"I want to be able to sell my property before it is completely worn down, I can see my colleagues, their biggest concern is how to get rid of all this property and what to do with the money once they do, I don't want to end there."*

The resulting structural development and the previous investments by Danish dairy farmers have some significant implications for the ability of the farm to continue in operation in the future. One of the issues that is mentioned in both focus groups is the traditional Danish succession scheme, where the farm is sold at market value, either to a natural successor or to a new buyer. Then, the property value is divided among the heirs. One of the discussions in a focus group illustrate the issue: *"I am really pissed about all the money that have left the sector, we have been really good at that, the milk quota had to be tradable before it was abolished so we could make some money. We like to build houses to the parents that are three times the size of their parents, we have been really good in taking money out, that is the bubble I know, but I don't know what to do about it?"* The issue is also reflected in the other focus group where the participants also discuss about the possibility for young people to enter the sector due to the requirements posed by the financial industry. A comment in one of the focus groups reflects this point: *"The young people have an extremely difficult time finding the 20 % finance and so do we, when we have to invest."* Another farmer supplements: *"There are a tremendous amounts of costs in the financial sector for administration. One of our colleagues were about to begin and they had a saving of 1 million DKK, then they purchase a plot of land, build a new stable and farmhouse and when they were done they had paid 980.000 DKK in stamp duties and what not, that is absolutely crazy. We need young people to commence farming, but then they have to pay all of this in taxes, because that is all it is, taxes."*

4.6.3 Challenges of the contemporary regulatory conditions

The governance of the regulatory condition is also something that engages the farmers, as they find themselves in a sector, which is undergoing significant changes in these years.

The agricultural law

Recently the agricultural law was changed in 2010 and 2014, which enabled the entrance of new norms of capital and ownership. This change is naturally of great importance in the focus group sessions. Interestingly, in both the focus groups farmers appear as quite ambivalent about the new possibilities for the entrance of financial capital to the agricultural industry. On the one hand the new investors are seen as *"destructors of the peasant culture"*, on the other it is seen as completely indifferent, because it is just money and the financiers will always need a farmer to manage their properties. Two comments reflect this ambivalence: *"We see a lot of well-capitalized buyers from the Netherlands or Sweden who come to the area where I live and purchase properties. And that is a big problem for us because we really become a fringe area, because they don't live there and the buildings decay if they cannot rent them out, they come by every year to check on the property, perhaps just every 3rd. They let out the farm land and leave the buildings (...) it is just speculation and we have seen that since the change of the agricultural law."* Another farmer from the

different focus groups is in accordance: *“In relation to the agricultural law I think that we have failed, by almost backing the politicians to deregulate the agricultural law. It is the biggest challenge we face (...) it is a shame, because we destroy the farm culture, and you can only kill it once and that is what we are doing with the current agricultural law (...) and it is a shame because the society will lose value the day the plant forest or grains rather than animal production.”* Hence, the activities of the investors are also transforming the logic of the entire farming culture; this for instance is reflected in a comment by one of the farmers who notes that: *“The culture we have had hitherto, it is disintegrating and in 20 years we will see something completely different, but is that what we want?”* In spite of this recognition that the entrance of new forms of capital is transforming the traditional farming culture, the farmers also find themselves in a precarious position. They are in need of investors, for instance one of the farmers notes that: *“It doesn’t matter who owns the land, it is the access to farming that matters.”* Furthermore, another farmer note in relation to the plans for his farm and his succession: *“we have to move away from private ownership. We want to attract external investors and in the future we plan to collaborate with external finance, we cannot make it on our own as individual farmers.”* Another farmer also argues for the need to discuss new modes of farming, due to the expectations of the present generation, when he notes: *“The young people want to be much more flexible. They do not want to commit, in other sectors you enter in the expectation that you have to be re-educated underway (...) I think we need to prepare for the entrance of managers who do not want to be tied to a particular place. The question is how we organize such a farm? The old image of a farm with a family, it is not the future, and what replace it? I don’t know.”*

The image of farmers

During the discussion about the regulatory conditions the image and status of farmers as a regulatory object is a central point of concern. The whole debate revolves around what status farming should have in relation to other types of land uses, as reflected in a comment in one of the focus groups: *“the question is whether Denmark is a “production country” or if it is not. Out at my farm it is about whether we are allowed to deepen the ditches so that we can still drain out lands and it is one of the conditions that influence us much more than market conditions or other cooperatives, do I have the right to be here? (...) should we be allowed to produce or do we need nature and knowledge society, what is most important geese or me?”* This uncertain status of the farmer is also of concern in the other focus group, this is for instance reflected in the story one of the farmers tells of his son who have just got back from a high school reunion. He notes that: *“When he told them that he had chosen to become a farmer they pity him, and they think: oh, but what went wrong? His old teacher dropped his jaw, he thought it was one of the students who would make something of himself, it is mindboggling.”* But when he adds that he considers something about direct trade or organic farming they are much more accepting. Hence, towards society at large there is a big difference between “just being a farmer” one the one side and “actively engaging in a value-based development of production” on the other hand.

The comments reflect another concern for the farmers, they have to continue farming even though they observe that some of the activities they do is out of sync with the rest of society. At the same time the last comment, also reflect an apathy towards the rest of society and a perceived lacking and simplistic understanding of the value and conduct of farming. The biggest concern is that the public image is translated into regulation that is correspondingly simplistic. One of the farmers expresses this concern: *“The big fear is that there is always some factors from the outside who think they should govern how I farm”.*

Representation of farmers in the regulatory process

In the focus groups the farmers also expressed their distrust towards how farming is regulated, for instance expressed in a comment by one of the participants in relation to the regulatory conditions: *“I think that it is a big problem with these water plans and all the uncertainty. I think that it is a shame that somebody makes these statements and decisions on a false basis, that is really annoying, I can see that we have to do something if it is 100 % correct, but if somebody manipulates... I have an issue with that.”* The comment reflects a distrust towards the scientific basis of the environmental management, which is one aspect of the distrust. Another is the feeling of not being recognized in the regulation that is passed. This is expressed later in the same focus group: *“Even though almost all our fields are green continuously, normally it is best to plant grass in the fall to have a good grass field for the next growing season. We almost cannot do that anymore, we do not have the acreage to do it, we have to go back to the time when we grew grains or sew grass fields in the spring.”* Another farmer makes the conclusion: *“And he will plant his grass field, but is it technically optimal to do it like that, sometimes it short-circuits my brain.”*

The concern towards particular aspects of the regulation is shared by all the farmers, but in spite of this there are differences when it comes to if and how the concerns of farmers will be met by the authorities. One of the participants for instance reflects this in a comment: *“I am convinced that justice will prevail in the end... We have to emphasize a focus on competency and stick to our professional knowledge and meet the receiver where he is (...) if we cannot stick together as farmers and keep our path clean, then we are our own worst enemy. We will fail if we start yelling and believe that people will lay down flat and say yes sir.”* Another farmer also expresses a concern concerning the weight of farmers in the regulatory process: *“I am afraid that if we look at how many heads we are, then we are represented as much as we can expect, because in fact we are not all that many. We just use a lot of the landscape.”*

The concern for farmers is that they are afraid that the regulation will be changed overnight and that important regulatory decisions are based too much at the discretion of public officials. One of the participants for instance notes: *“The regulatory process is very variable, nobody knows the basis of the future regulation. The need for an environmental permit is arbitrarily decided, it's a challenge with all that randomness.”*

4.6.4 Understanding dairy farmers' strategies and institutional arrangements

The focus group discussions show that farmers talk about strategies in a number of meanings and there is a great variance in the responses, particular in relation to the perspectives for succession.

Production strategy

The most dominant response for the farmers to meet the current market conditions is *“diluting”* the costs of production by increasing efficiency, increasing the scale of operation and cutting costs. However, the participants are well aware that diluting costs will not necessarily address the underlying causes of the challenged economy. This is reflected quite well in this commentary: *“all the time we have been thinking about diluting, diluting and diluting, it is also what I do at home at the moment. And what came out of the financial crisis – dilution, but it does not address the root of the problem.”*

Recently, a number of successful cases have demonstrated that supermarkets have also realized that they may gain a profit by emphasizing products with unique qualities. One of the farmers in one of the focus groups for instance is working to develop a specialty product for a particular supermarket chain and he argues

that: *"I have reached a size where I can no longer expand, hence, if I cannot sell more of my produce, I have to sell the amount I can produce at a higher price. I can offer my dairy something unique so I hope to gain a higher price our location is in many ways restricting, but it also offers a lot of opportunities. The dairy helped me to see this, the modern consumer are interested in organics"* and another farmer supplements: *"The time is ripe for this, consumers are ready to pay a bit more, the retailers are ready and we are ready (red: farmers in general) and that is also quite important. The time was not ripe 10 years ago, the story did not matter so much then"*. The discussion also reflects a change within the Danish farming sector when it comes to products with an added value, and the farmers that engaged in these kind of activities are no longer perceived as *"longhaired hippies"*, but they are now more seen as the innovative vanguard. This indicate that among farmers there is also an issue of acceptability of strategies, which is important for how farmers are making decisions and that this perception also evolves in time. The comments of one of the interviewee reflect this changing perception: *"farmers today have much more respect for those who are not just emphasizing growth, among farmers like what he is doing (red: farmers mentioned above). Earlier it was just getting as large as possible that mattered, but it has come quietly with the organic movement, today we respect the farmers we laughed at 20 years ago"*.

Direct sale and diversifying is another strategy that is often mentioned by the focus group participants to ensure the farm economy. Although direct sale of milk is not an option for any of the participants in our focus groups, due to the required skills and technology. However, there are a number of other approaches to direct trade that are also used. One is to exchange fodder crops like roughage and grain directly with neighbouring farmers in years of excess. The rationale for these kinds of arrangements is to circumvent the retailer and therefore save the charge of redistribution. Diversifying is another area where dairy farmers are trying to address to build their farm economy. However, these activities are not primarily related to the dairy farming, but to initializing other activities such as new farming products or new revenue streams, for instance some have begun farm tourism or growing potatoes. Some of the farmers mentions that they initiate these activities to be able to distribute the risk between different activities or to expand activities to be able to include the next generation in the business.

Internal organization

The farmers in the focus group talk about how they attempt to adapt the internal organization of the farm to manage the market volatility, as this for many is a major concern. Some organic farmers in one of the focus groups for instance mentions that for them it is about creating something resilient: *"to manage the fluctuations, it has been a long and hard battle, but it has been intentional, we have wanted to build a harmonious farm."* Other farmers present similar arguments and talk about increasing self-sufficiency and avoiding contractors to do the work as a means to reduce expenses and thereby avoid the market risks.

Structural reorganization

The theme about structural reorganization particularly emerge as a theme in relation to the debates about succession. The traditional generational change is by many not an option, due to the lack of a successor, and those who have a successor may be unable to find an investor. Hence, as final question we asked all farmers about their plans for succession and only a few planned for a traditional inheritance from father to son, but a number of other options are also discussed. This in itself is quite interesting as not a lot of the current farmers envision the coming generation of farmers to follow the same mode of production. In fact, all the

farmers we have talked with during our interviews expect that new models for succession and ownership have to be developed.

The structural development, which has created a landscape of very large production units, is another challenge for the succession. A farmer outlines his vision for the future of his farm like this: *"We also have to take a look at ourselves, in which other sector can you own a 15 million euro business as a 22 year old? Management has never played as big a role as it currently does and we have to do better and find somebody who wants to take part with some "patient money", because one of the problems is that they want results before we can generate them."* A particular challenge for Danish farmers is that for each succession the entire farm is recapitalized, one of the farmers reflects on this issue: *"There is a need for stability in relation to succession, so that it is not capitalized in every succession. Another option is to find external investors who share the value that dominates the farm as it will not be possible to endure as a private enterprise in the future. Today if you have no equity, then the mortgage provider decides what to do on the farm and that is not attractive. It is important to find someone who can guarantee the 20% of the property value."* Instead of a traditional succession, the farmers believe that the future will bring new forms of ownership sustaining farming. One of these strategies is lease holding rather than ownership, in that way a young farmer can get started without a huge capital investment. Many of the dairy farmers therefore considers the *"share milking"* model which is widespread in New Zealand as an option for future Danish farmers and a few attempts to implementing it in Denmark has been made. Other farmers are considering various forms of trust ownership, as detailed by one of the farmers: *"I would like to make something completely alternative and transfer the ownership of this farm to a foundation, I think that the soil-price will increase and I feel bad about a pension fund will harvest that value."*

4.6.5 Key findings

In sum, although the farmers in the two focus groups are quite different in terms of ideology and production systems, their understandings of the challenges of dairy farmers under the present market, financial and regulatory conditions are quite comparable. This indicates that the choice of production mode is more a question of ideology than a strategy adopted to react to the challenges of economy, resilience or sustainability. Furthermore, they all seem to be caught in a paradox that their immediate survival requires them to act in a way that prevents the reproduction of the farming system they are a part of in the long run. Furthermore, they are well aware that it is the consequence of the current development, but they are unable to find a solution for this.

4.7 Dairy production in Southern Denmark - survey

The purpose of the survey was to quantify the distribution of the institutional arrangements that characterize the dairy producers in the region of Southern Denmark, to explore respondents' engagement towards sustainability goals and their strategies for the future of their farms. The questionnaire has been common for all the SUFISA case studies.

4.7.1 Introduction

The survey was carried out among dairy farmers in the region of Southern Denmark in the winter 2017 and spring 2018 by SDU. For the survey we had retrieved the phone numbers of all dairy farmers in the region. All information should refer to the business's latest completed financial year.

A total of 82 respondents participated in the phone survey, of which the vast majority was conventional dairy respondents (95 %), see Table 6, this is slightly higher than the regional average. We had aimed for a higher number of respondents (150), but the phone numbers we had retrieved proved to be land line numbers and we were only able to get hold of respondents afterhours and then also only with difficulty, so we had to reduce the ambitions. However, the lower number of respondents is not considered to be a problem as the general characteristics of sales and marketing arrangements only vary very little.

For the most part we have interviewed the owner of the place and the farms vary considerably in size and animal density with the smallest unit consisting of 47 ha and 24 dairy cows, while the largest consists of 680 ha and 1150 dairy cows, see Table 6. Farms are primarily privately owned (82 %), while a smaller number are also family owned (9 %) or organized as companies (9 %). Furthermore, there is also a variance in the respondents in terms of age and a vast majority of the farmers are older than 50 years old. These general characteristics are quite representative for Dairy farmers in the region and Danish dairy farmers at large

Table 6: General characteristics of respondents

Number of respondents	Conventional	Organic	Smallest	Largest	Mean
82	78	4	Acreage	47	680
					203,7
			Number of animals	24	1150
					256,7

Table 7: Legal status of the farm, respondents' status on the farm and respondents age cohort

Legal status of the farm		Respondents' status on the farm		Age cohort	
Privately owned	65	Owner	80	<40	17
Family owned	8	Tenant	1	41-50	22
Private company	8	Other	1	51-65	39
Other	1			>65	4
Total	82	Total	82	Total	82

4.7.2 Sales channels

All respondents have a contract with a processor that collects the milk and is responsible for the further processing of the dairy products. The vast majority of the respondents are members of a cooperative, most prominently Arla, but a smaller number also delivers their milk to the dedicated organic dairy Naturmælk, a private dairy or export to a private dairy in Germany, see Figure 15.

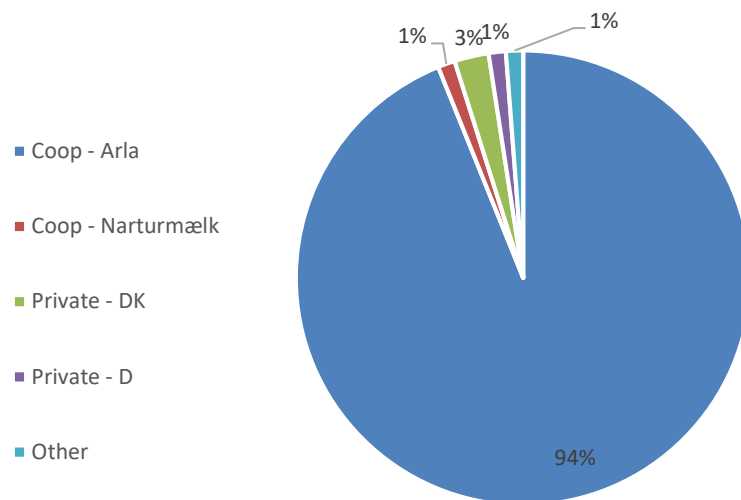


Figure 15: Sales channels

4.7.3 Characteristics of sale agreements

This basic organization of the sales channels implies very little variation in terms of the structure of the sales contract as each member of a cooperative are members on equal terms, hence private contracts have a duration of 7-12 month, while membership of a cooperative has a duration of 13-24 month. Furthermore, generally:

- Respondents are selling all their produce to the one buyer
- There are no penalties if respondents fail to deliver the agreed quantities,
- There are price premiums for delivering higher quality products
- There are safeguards if the buyer fails to fulfil the agreement
- Respondents receive no interest in case of delayed payments from the buyer
- Respondents receive services like collection, storage, transport, handling, etc.
- Respondents receive managerial support or technical assistance
- Respondents receive no credit assistance (information on credit products, bank loan guarantee, etc.)
- Respondents receive no special assets, technology and/or machinery
- There is no automatic extension mechanism in the agreement (e.g. evergreen contracts)

Although, conditions are similar in contractual terms respondents have a slightly different experience of the conditions. However, the vast majority are either “completely” or “somewhat” satisfied about the conditions (70 %), whereas only about 10 % of the producers indicate that they are “somewhat unsatisfied”. Furthermore, respondents generally agree on many aspects of the contract and it appears that most are quite content with the organization of their sales arrangements, see Figure 16 and Figure 17.

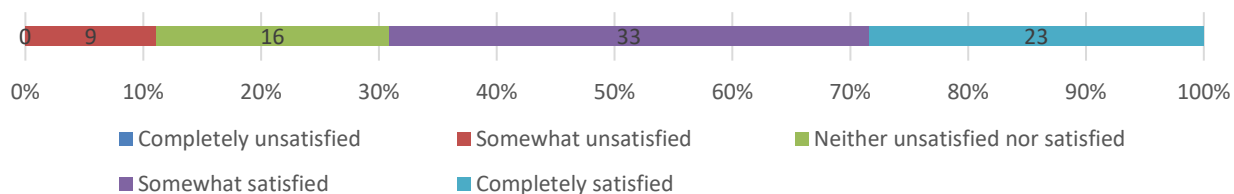


Figure 16: Replies to the question: “On a scale from 1 to 5, how satisfied are you with this sale agreement?”

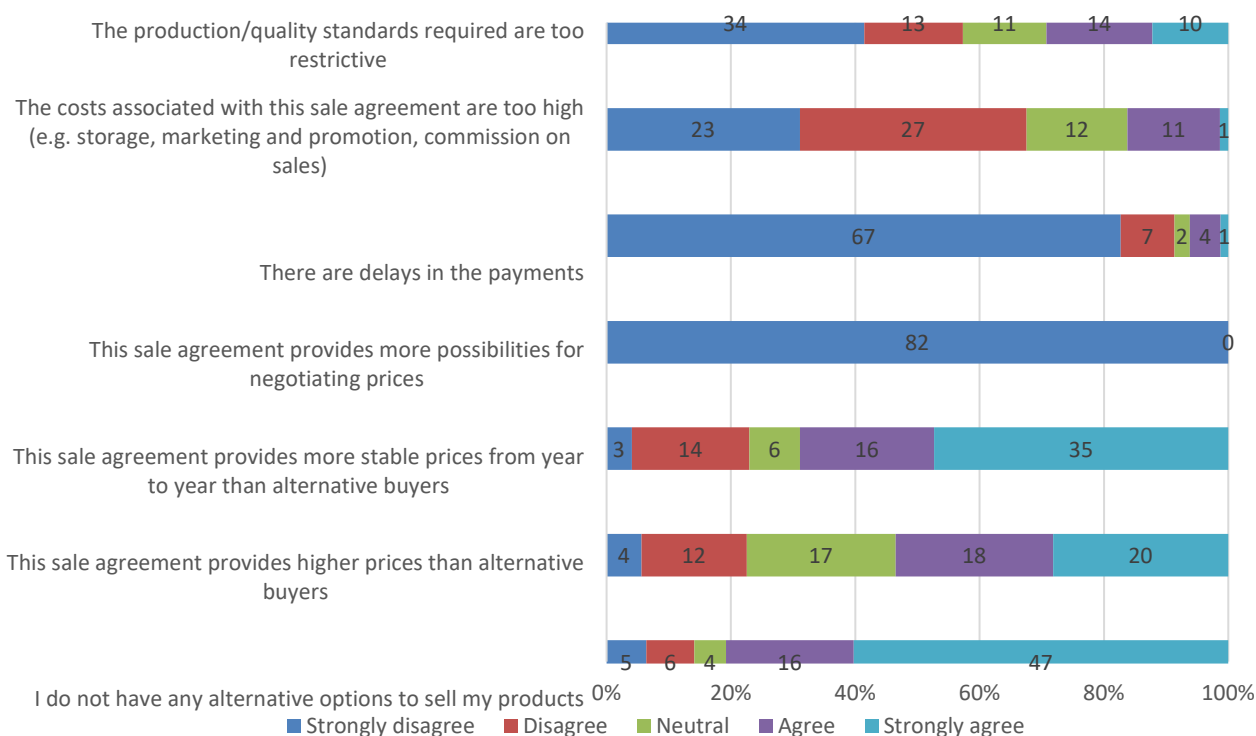


Figure 17: Replies to the question: “On a scale from 1 (strongly disagree) to 5 (strongly agree) how much do you agree with the following statements regarding your satisfaction with respect to this sale agreement?”

4.7.4 Sustainability

Regarding the sustainability effects of the sales agreement, there are also quite diverging views of the effects, see Figure 19. Concerning the economic aspects of sustainability more than half of the respondents agree that their sales agreement has had a positive impact on their abilities to “cope with changing market conditions” and “maintaining profitability”. However, the two elements “Invest in the farm business” and “Selling the products in periods of greater difficulty where prices were low” mobilize a strong opposition as 50-60 % of the respondents indicate that they “disagree” or “strongly disagree” to these effects. Concerning the societal effects the picture is less mixed as more than 60 % “agree” or “strongly agree” that the contract allows them to “connect with other farmers”, “create a good connection with buyers and input

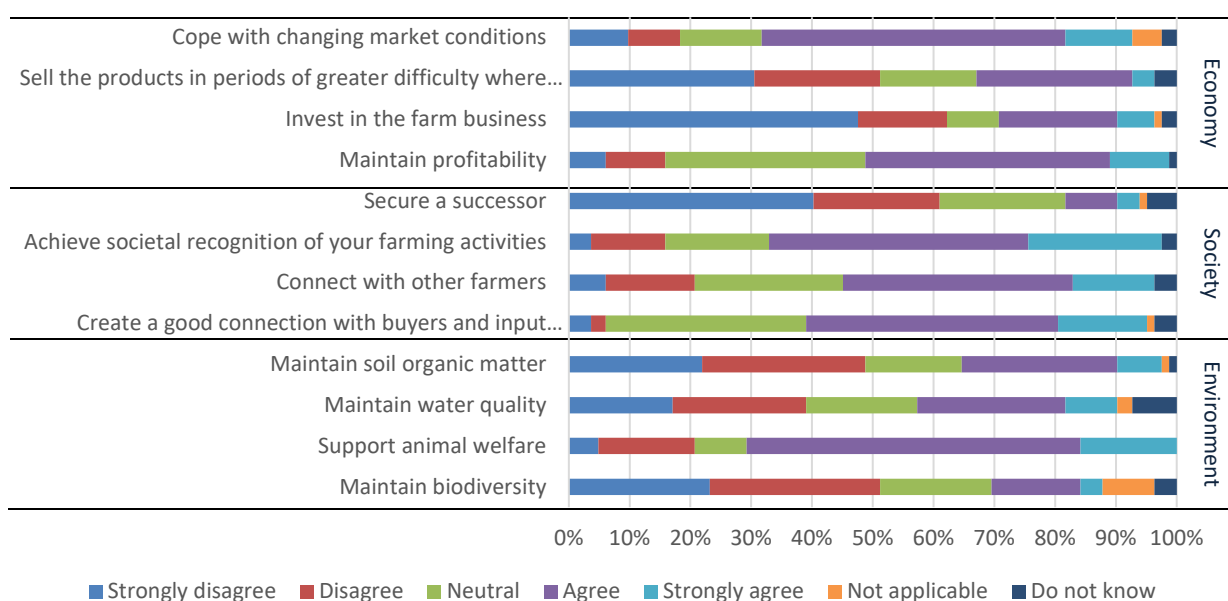


Figure 18: Replies to the question: "Please assign a score from 1 (strongly disagree) to 5 (strongly agree) regarding the potential impact of sustainability of the sale agreement/membership rules to the collective organization." (N=82)

providers" and "achieve societal recognition of their farming activities". For the last aspect "securing a successor" respondents are almost equally divided between agreeing and disagreeing. Regarding the environmental effects there is considerable agreement that the sales agreements is able to "Support animal welfare" (70%). However, for the remaining three indicators respondents indicate a very mixed picture, as respondents are almost equally divided between the categories.

4.7.5 Strategies and drivers of farming

There is considerable variation in terms of the strategies for the future development of the farm. The majority of respondents indicate that they plan to maintain the existing scale of operations (60%), whereas about 20 % indicate an interest in expanding the existing scale of operations and an equal share plan to either "abandon farming" or to "downscale the existing scale of operations", see Table 8. This strategy appears to be well aligned with the strategy promoted by the cooperative dairies and adopted by Danish farmers at large.

This general focus on expansion of existing production facilities is also expressed in that the production related changes that the respondents plan to adopt. Almost half plan to invest more in production facilities (44%). Generally, farmers do not plan to externalize particular aspects of their operations (11 %) or specialize production (17 %), which may also be due to the fact that these options for many farmers is not an option due to an already highly specialised sector, see Table 9. Interestingly, 43% of the farmers plan to insure against crop or production losses.

In terms of the market related changes, the respondents also expect a number of changes that are quite remarkable, see Table 10. About a third plan to diversify, by introducing new products (33%), a large majority plan to add value to the dairy that they produce, for instance by converting to conversion to organic (62 %). Furthermore, a bit less than half plan to develop new partnerships, for instance with other

farmers, retailers, processors (38 %). This indicates that the dairy farmers are in a situation where they consider alternatives to their current marketing outlets.

Regarding the future of the farm there is also a divergence among the respondents, see Table 11. About a third currently have no plans for the future of their farms (33%), this is highly correlated with the age of the farmers and in particular the young farmers have not yet made any plans as to the future of their farm. About one fourth plan for a family member to take over the farm (23 %) and about one fifth plan to sell their farm on the market (17 %).

Table 8: Replies to the question: " What are your strategies for the development of dairy farming within the context of your farm business in the coming 5 years? (N=82)

	Count	%
I plan to maintain the existing scale of operations	48	58,5
I plan to expand the existing scale of operations	18	22
I plan to downscale the existing scale of operations	4	4,8
I plan to abandon farming	11	13,4
I do not know	1	1,2
Total	82	100

Table 9: Production related changes (N=82)

	Yes	No	I do not Know	Not relevant
I plan to invest more in production facilities	44 %	39 %	2 %	15 %
I plan to externalize particular aspects of my operations	11 %	72 %	2 %	15 %
I plan to specialize my production	17 %	63 %	5 %	15 %
I plan to insure against crop/livestock losses	43 %	38 %	1 %	18 %
I do not have specific plans	16 %	29 %	13 %	41 %

Table 10: Market related plans (N=82)

	Yes	No	I do not Know	Not relevant
I plan to diversify into new products	33 %	45 %	7 %	15 %
I plan to insure against volatile prices and costs to avoid loss of income	40 %	41 %	1 %	17 %
I plan to develop new partnerships (for instance with other farmers, retailers, processors)	38 %	45 %	2 %	15 %
I plan to develop new sale channels for my dairy products	20 %	55 %	7 %	18 %
I plan to add value to the dairy that I produce (e.g. conversion to organic)	62 %	20 %	15 %	4 %
I do not have specific plans	4 %	40 %	15 %	41 %

Table 11: Replies to the question: “What is your current expectation for the succession of your farm?”

	Count	%
I have no expectations at present	25	30,5
I expect a family member to take over the farm (e.g. son, daughter, brother)	19	23,2
I expect to sell the property	14	17,1
I expect to give up the tenancy	3	3,7
Other, please specify	12	14,6
Total	73	89,0

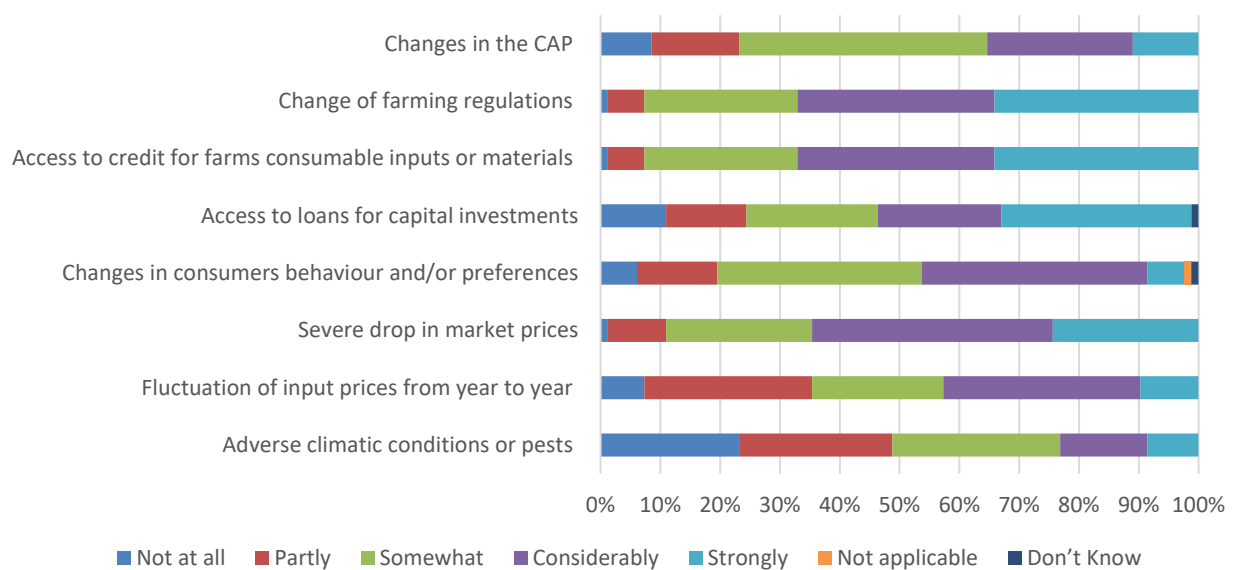


Figure 19: Replies to the question: “To what extent might the following factors influence your decisions regarding your production and farming strategies for poultry production? Please assign a score from 1 (not at all) to 5 (strongly influenced)” (N= 82)

In relation to understanding the drivers of farming there is generally agreement that “change of farming regulations (e.g. nitrate, water and pesticides regulations)”, “access to credit for farms consumable inputs or materials” and “Severe drop in market prices” are considered to be important drivers of farmers decision making, see Figure 19. More than 60% of respondents indicate that this is a “considerable” or “strong” driver, furthermore, the opposition to these is less than 10 %. In addition, there is also widespread agreement that “adverse climatic conditions or pests (e.g. hail, drought, floods, animal disease)” is not a considerable driver of farmers strategies. A bit less than 50 % indicate the effect to be “not at all” and “partly”, however, there is also a minority of 20-25% who indicate that this has a “strong” or “considerable” effect. In addition to these 5 factors that producers largely share the views about there is an interesting variation concerning “changes in consumers behaviour and/or preferences”, “fluctuation of input prices from year to year (seeds, fertilizers, pesticides, fuel, energy, feed, etc...)”. Here respondents are almost equally divided among the different response categories. This suggests that the configuration of the individual farm economy has a profound impact on how these factors are experienced by the individual farmer.

4.7.6 Key findings

In sum, like the vast majority of Danish dairy farmers, respondents in this survey are members of a cooperative. The survey indicates that in spite of producing a commodity, which has become very volatile, the dairy farmers in the region of Southern Denmark are for the most part satisfied with their dairy. However, a large minority of the farmers also consider new ways to strengthen the farm economy, for instance by diversifying, developing new partnerships and sales channels or adding value to their products as a strategy to strengthen the farm economy.

5. Case study B: Poultry meat production in Central Denmark Region

5.2 Case study introduction and context

Poultry meat is an important source of protein and micronutrients. In 2014 the annual world poultry production was about 110 million metric tonnes of which 0.1% is produced in Denmark. However, on a global level poultry meat consumption is one of the fastest growing meat products with annual growth rates of about 5 % and consumption is expected to rise (OECD-FAO, 2016). The EU produces annually 13.1 million tons, which accounts for about 12 % of the world production. Within the European union the main producers are: Poland (13.7 %), France (12.7 %), UK (12.4 %), Germany (11.4 %) and Spain (11.1 %) (EC, 2016).

5.2.1 Poultry meat production in Denmark

In Denmark there are around 400 poultry meat producers, the vast majority of these rear chickens, see Table 6 and the Central Denmark Region has one of the highest concentrations of poultry meat producers in Denmark, see Figure 20. Furthermore, the only two major slaughterhouses managed by HKScan and Danpo are located within the region, which makes it a regionally important industry.

Table 12: Number of registered Danish poultry meat producers (DPMA, 2015).

	2012	2013	2014	2015
Conventional poultry meat producers	227	239	216	217
Organic poultry meat producers	16	23	19	19
Central rearing of poultry meat production	15	15	19	21
Multiplication plants	45	46	40	41
Turkeys	40	27	29	32
Ducks	25	30	29	30
Geese	20	14	13	16
Ostridge's	12	13	12	12
Total	400	407	377	388

The Danish poultry meat production is fairly stable, annually, the sector produce around 125.000.000 birds, which are slaughtered in Denmark at the two major slaughterhouses, in addition 10.000.000 birds are exported as live birds and slaughtered in Germany and Holland, see Figure 15 (DPMA, 2015). The poultry meat production has a total value of DKK 1.791 million (€240 million) (2015 figures) (Vidø et al., 2015). The production is organized as an industrial agricultural production, with fairly large-scale and modern

production facilities in farms that house chicken flocks typically ranging between 20.000-40.000 birds, the average number of conventional birds produced annually pr. production facility is around 500.000 (Own calculations based on: DPMA, 2015).

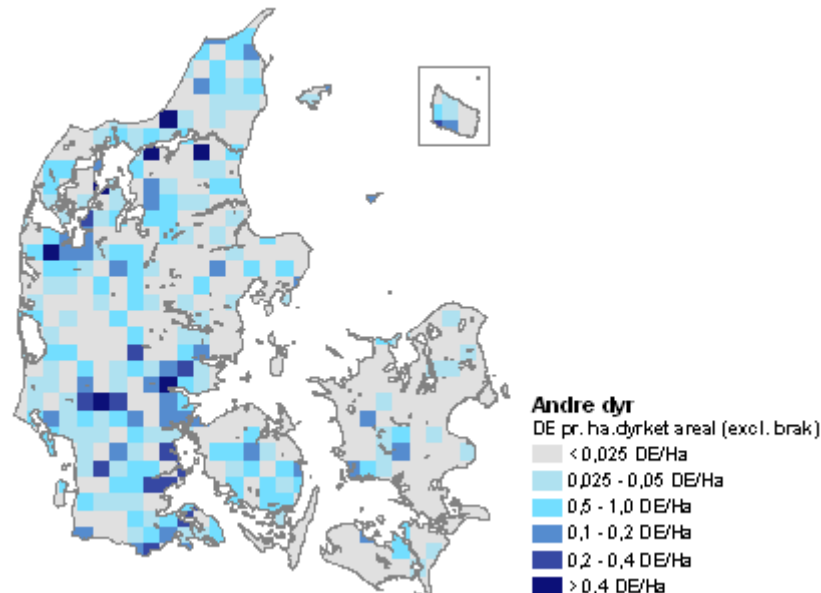


Figure 20: The density of the poultry and pelt production in Denmark. No particular analysis has been made of the location of Danish poultry production, but the map gives a good indication of the density, as poultry makes up the majority of the animals that are depicted (Daugaard, 2008).

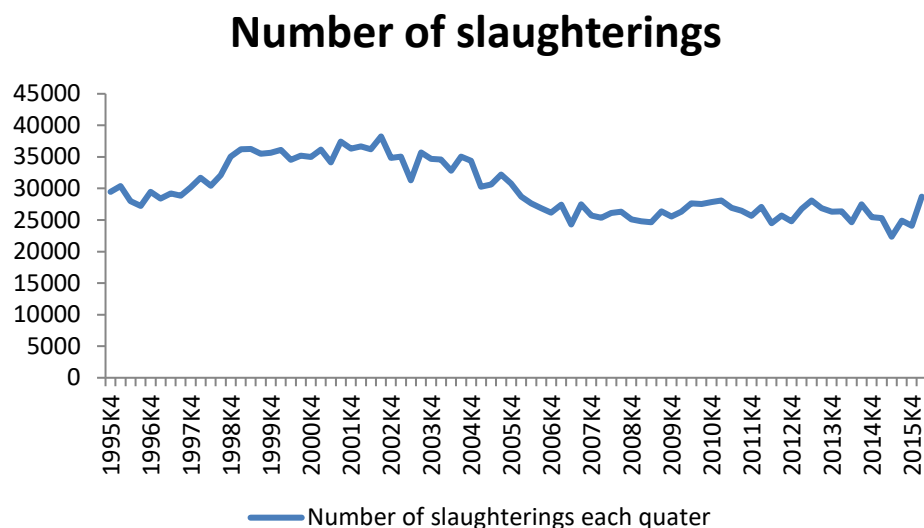


Figure 21: The number of slaughterings at the (currently) two Danish slaughterhouses (DST, 2016).

Danish poultry meat production is characterized by a relatively high share of export, as more than half the production is exported. However, about half of the Danish consumption of poultry meat and poultry products is imported - a proportion that has been increasing in recent years, Figure 16. A reason for this configuration of the value chain is that Danish slaughterhouses have specialized in the production of fresh poultry products,

that are exported and frozen or processed chickens are imported. Furthermore, the Danish poultry industry is part of a globalized value chain, which implies that the cut-up chickens are retailed at the market where the value is highest, for instance breasts are sold locally and the chicken feet are exported to Asia.

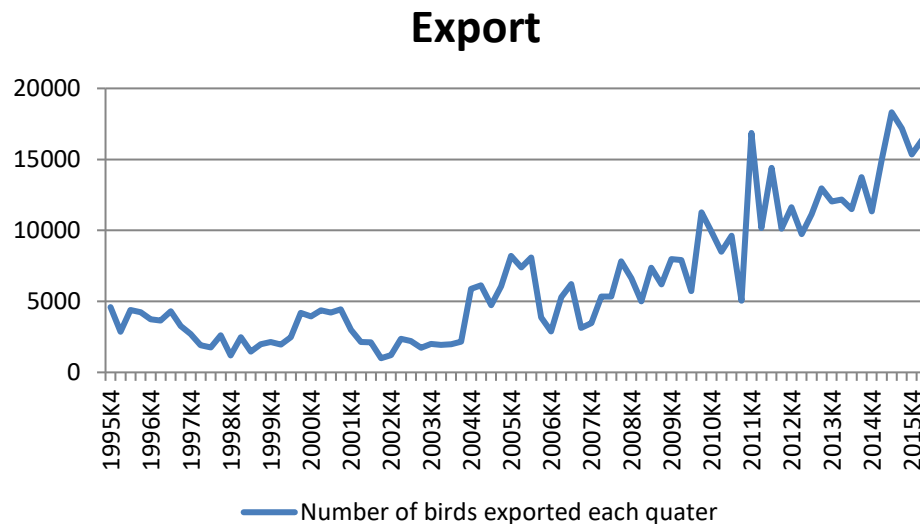


Figure 22: Number of birds exported each year (DST, 2016).

The poultry value chain is composed of very few and specialized actors on both supply and processing side and they are primarily private companies, see Figure 17. For instance the day-old chickens are nearly all produced by one company, DanHatch and there are two major and privately owned slaughterhouses. Furthermore, there are only a handful of companies that produce fodder for the chickens (according to specifications developed by DanHatch, which is adapted to the particular breeds of birds that are used). Hence, this organisation of the value chain also means that there is virtually no competition between the actors, as there are no redundant actors in the value chain. Therefore, the actors in the value chain are also very well coordinated in their practice. Furthermore, when there are no cooperatively owned companies on the supply and demand side of the value chain the farmers have little influence on how the value chain is assembled and also few options for negotiating other prices or qualities than what is automatically given. This configuration of the value chain means that production standards and qualities are very strongly coordinated.

The two slaughterhouses, Danpo A/S, which is a subsidiary of the Nordic based Scandi Standard and HKScan, which is also a big North European player are the result of a series of mergers and acquisitions. However, the economy in the two slaughterhouses differs significantly. Danpo has a fairly stable economy, with an annual turnover of about 1.8 billion DKK, and produces a result of a more than 60 million DKK, see Figure 18. Furthermore, earlier in 2016 Danpo acquired the dedicated organic slaughterhouse Sødram that has developed a range of organic chicken and welfare chicken products. On the other side, HKScan has experienced a decline in their annual turnover of about 360 million DKK (2011-14) and has been struggling with a deficit in the past couple of years, primarily caused by the Russian food ban (Vidø et al., 2015).

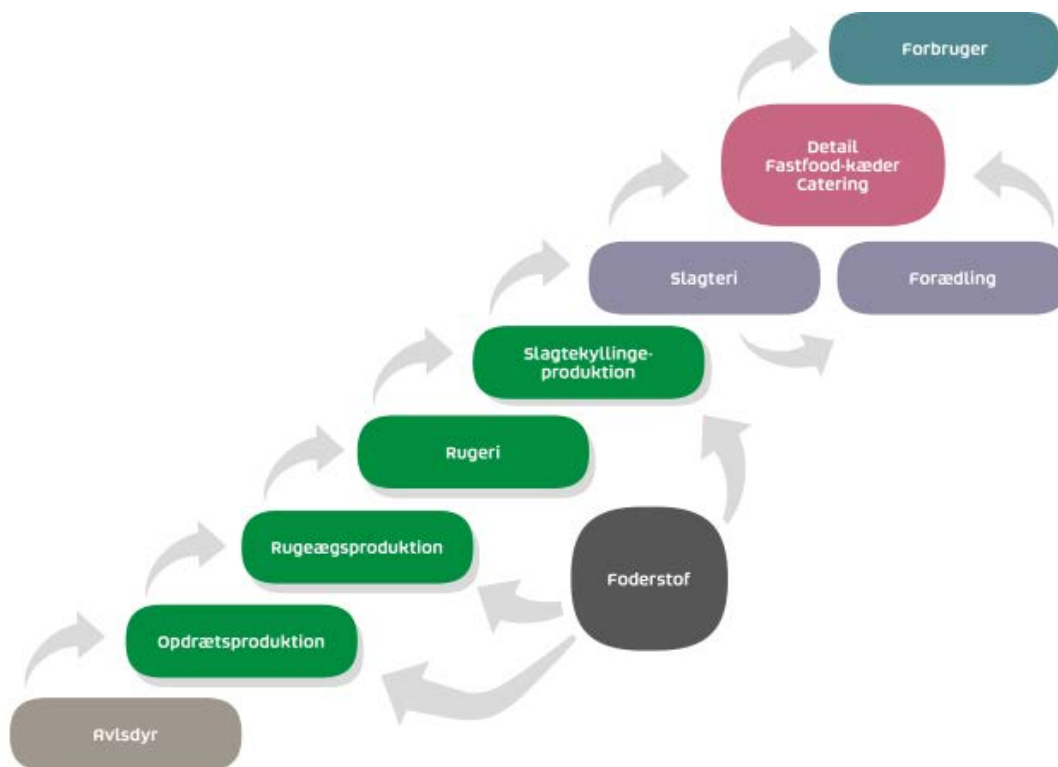


Figure 23: Depiction of the Danish poultry meat value chain (DanHatch, 2016).

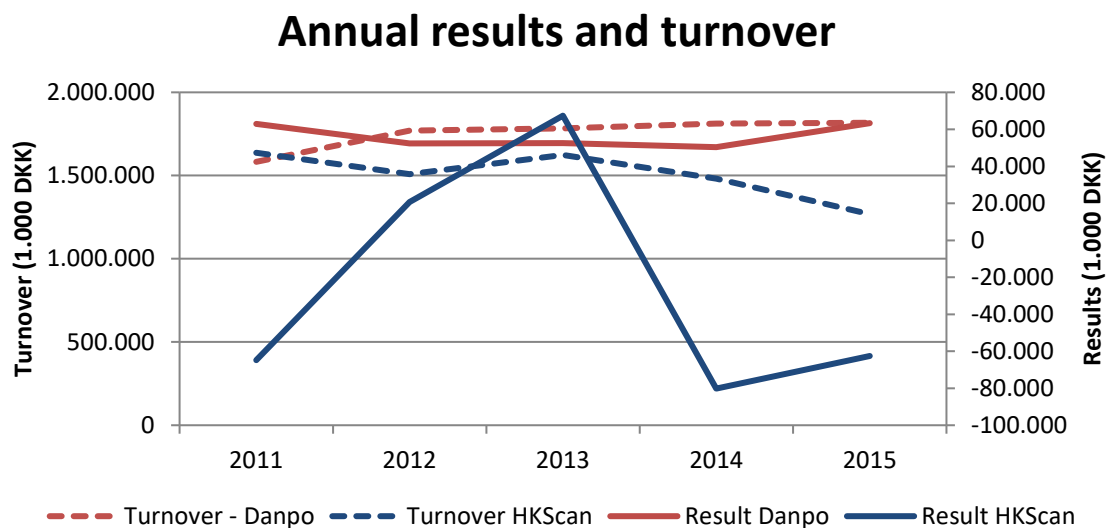


Figure 24: Annual results and turnover for the two major Danish slaughtering houses HKScan and Danpo (own illustration based on annual reports).

5.2.2 The case study area: Central Denmark Region

Central Denmark Region is characterized by extensive rural areas and a high proportion of agriculture (65 %), see Figure 19 and Figure 20. The region is diverse, as the western part is rural with intensive agricultural production, while eastern part is quite populous, containing the second largest Danish city, Aarhus. This is



Figure 25: Map depicting the Central Denmark Region (Wikipedia, 2016a)

Land use types Central Denmark Region

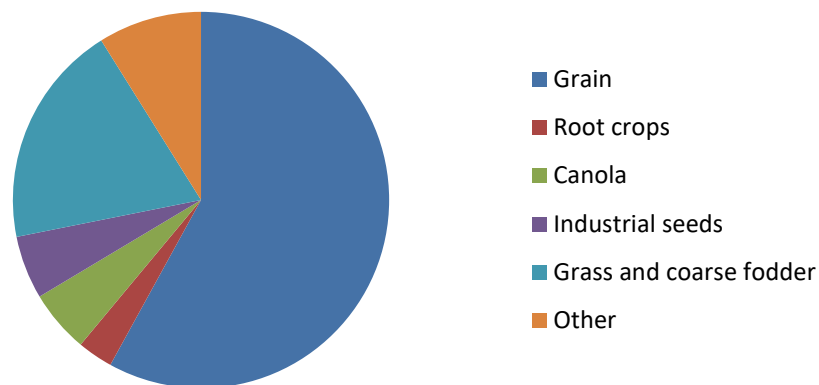


Figure 26: Land use types in the Region of Southern Denmark (DST, 2016a).

also reflected in the agricultural structure, where there are a number of small farms around Aarhus supplying the city, while the western part of the region is dominated by large farms. On average 3 % of the workforce in the region is occupied by agriculture, forestry and fisheries, which is higher than the national average of 2 %. The most important agricultural products of the region are industrial crops, such as corn, wheat, grass and barley for feedstuff as well as pigs, poultry, pelts and milk.

5.3 Policy and regulatory conditions

In the late 1990'ties salmonella Denmark experienced several cases of salmonella outbreaks relating to chickens. Hence, a number of regulations were put in place so secure the food security for Danish consumers,

such as “the broiler act” (LBK number 468 of 15/05/2014), the “animal protection act” (LBK number 1150 of 12/09/2015) and “the foodstuff act” (LBK number 43 of 12/01/2016). The legislation details the conditions for poultry production, such as requirements for the stabling system, education of workers, animal welfare requirements and hygienic standards, the law is particularly adapted to industrial scale chicken production. Furthermore, organic chickens are produced, regulated under “the organic act” (LBK number 1657 of 14/12/2015). Control is in place for all the above mentioned acts are administered by the Danish Veterinary and Food Administration.

5.3.1 Hygienic standards and policies

Infections of campylobacter and salmonella are the most common and feared causes of infections from poultry meat. The EU legislation contain a number of specific minimal requirements concerning how poultry meat is produced and handled by the processing industry, including the frequency of tests for salmonella and campylobacter. In addition to this general regulation the Denmark has implemented a number of additional requirements and in general Danish broiler has a high level of food safety and the use of antibiotics is very low. This is ensured by a production system, which guarantees that birds are only exposed to minimal external contact that ensures a high degree of protection against infection and an efficient stable management. In consequence the Danish chicken flocks rarely catch diseases that require treatment with antibiotics and the use of antibiotics in the treatment of sick animals is among the lowest in the world (DAFC, 2015).

In the 1980-90’s food safety became a growing concern and a number of action plans to combat infections in poultry meat was implemented first in 1989, later again in 1998, this was followed by a new action plan in 2008 focusing on campylobacter. The actions plans have had an effect and there has been a significant decline in the number of reported infections, see Figure 21.

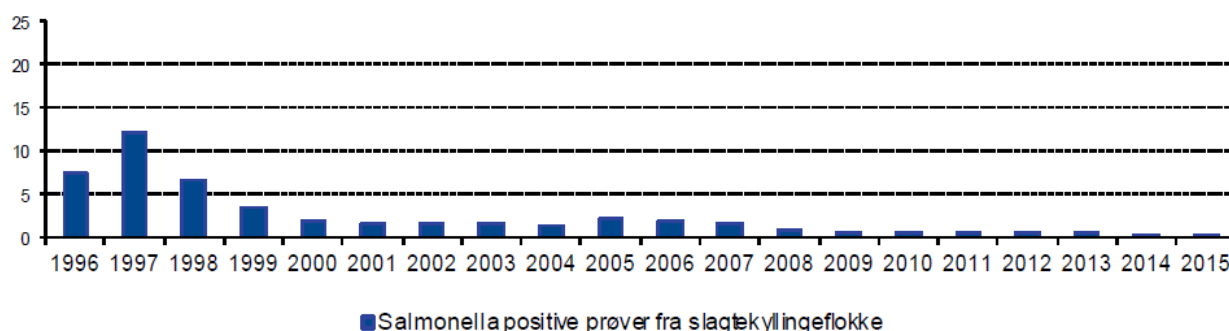


Figure 27: Number of positive samples from poultry flocks (DPMA, 2015).

In the poultry industry, quality is assured by daily data reports to a common database, the system is called “The Quality System In Chicken Production” (KIK), which is developed and managed by the trade association Danish Poultry Meat Association (DPMA, 2016a). The quality assurance scheme guarantees full traceability throughout the broiler production chain and it is a requirement for all actors in the value chain and close to all birds that are slaughtered in Denmark are covered by the KIK quality insurance scheme. The KIK system is organized as a database, into which all actors must fill in a number of recordings, enabling full transparency in the value chain and the identification of contamination pathways. The system is accredited, allowing veterinarians, slaughterhouses and key customers to monitor the mass balance and general health of a batch of chicken. Furthermore, it can be used as a benchmarking tool, enabling the comparison of producers.

Since 2008, Denmark has had zero tolerance towards Salmonella in poultry meat. Therefore, a section of each flock is tested for salmonella and infected flocks are destroyed or they are heat treated. In case of campylobacter infected flocks producers are discounted. Foreign broiler meat producers (except other Nordic countries) apply less rigorous implementation of the EU requirements for the testing of salmonella. A recent benchmark analysis developed by the Danish Agriculture and Food Council argue that the comprehensive and transparent food quality system that delivers a high level of food security is a comparative advantage of Danish poultry meat producers (DAFC, 2015).

Avian flu is increasingly also a concern among poultry producers. Avian flu is a highly contagious viral disease that primarily infects birds, but exposed humans may also be infected. The disease originates from Asia and infection is caused if the broilers come into contact with migrating birds. Any species of bird can be infected by avian flu and with some species the mortality rate is as much as 100 %. Chickens and turkeys are the most vulnerable, while waterfowls generally are more resistant. In 2006 a particularly contagious and aggressive strand of bird flu quickly spread across the different continents (H5N1). Again, in the fall of 2016 a strain of H5N8 spread across Northern Europe and elsewhere. Particularly free ranging birds are in the risk of getting in contact with contaminated birds. Hence, as a precautionary mechanism, The Danish Veterinary and Food Administration (DVFA) ordered all free-ranging birds to be kept under roof to prevent disease spreading. However, it is considered highly unlikely that conventional poultry producers, who keep their birds indoors and put a great effort into reducing any contamination in the stables, are exposed to infections. This outbreak affected many of the European countries, but in Denmark only a number of wild birds were found and a few pastime farms with outdoor rearing were infected. However, when infected birds were discovered important Asian markets were closed (particularly South Korea). The disease have had a profound implication on the market conditions as export markets are automatically shutdown for 3 months following OIE regulation, when infected birds are discovered, and therefore an outbreak of avian flu immediately affects the quotation that is given to farmers.

If an outbreak of HPAI (High Pathogenic Avian Influenza) is detected in a poultry herd, measures according to Council Directive 92/40/EC are imposed. This implies that all poultry on the infected farm are killed and disposed by rendering, subsequently the farm is cleaned and disinfected. In Denmark, the animals on the infected farms shall be killed within 24 hours after diagnosis, and the preliminary cleaning and disinfection shall be approved within two – eight days.

5.3.2 Stabilizing policies in the value-chain

Previously mortgage providers have classified poultry production as a specialty production, which is generally a hindrance to finance. Therefore, poultry producers have not had an easy access to investment capital prior to the financial crisis and therefore have not made reckless investments to the same extent as other production sectors. Furthermore, financial crisis in the agricultural sector and new banking regulation has resulted in a declining willingness from banks and mortgage providers to invest in agricultural production. In the fear of declining production supply many of the companies in the value-chain have taken the task of providing different kinds of loans and security for the producers to enable new investments. For instance in 2012 Danpo introduced a “growth package” in which they offered a bank guarantee, subsidy for environmental approval, contribution margin guarantee and investment surety for 1,5 million DKK for each new production facility, in addition they provide a surplus for all chickens produced in the new houses in the

first 7 years of operation. The director for the slaughterhouse notes that: *"It is exceedingly difficult for farmers to finance the construction of new production facilities. We have introduced these new measures to ensure our product supply (...) it is basically a sign of poor health that we have to do this. The financial sector ought to solve these problems."* There are other policies that ensure the economy of the poultry producers, for instance, postponed payments to supply industry, price guarantee and insurance funds for farmers whose animals are infected with salmonella (which is a significant decline in the stock value).

These types of collaborative investments in the value-chain are a rather new and interesting feature in the Danish foodscape, as they ensure the farmers economy via a form of partnership between the different actors in the value chain, which creates a bit more stability in the economic conditions for agricultural production. Furthermore, they illustrate the mutual dependence and strong coordination of production between the actors.

5.3.3 Poultry breeding as a condition for production

The poultry breeds serve as an important condition for the poultry producers. Poultry breeding is extremely complex, specialized and expensive, hence there is currently no breeding activities taking place in Denmark or the rest of Scandinavia for that matter. Therefore, the Danish bird suppliers import eggs from their partners abroad and the birds that eventually end up in the supermarkets are the fourth generation of the birds that are breed and the initial 11 chickens end up parenting 39,5 million birds with an almost identical genetic mark-up, see Figure 22. This is a necessity in the industrial poultry production where standardisation and uniformity is a key quality criterion.

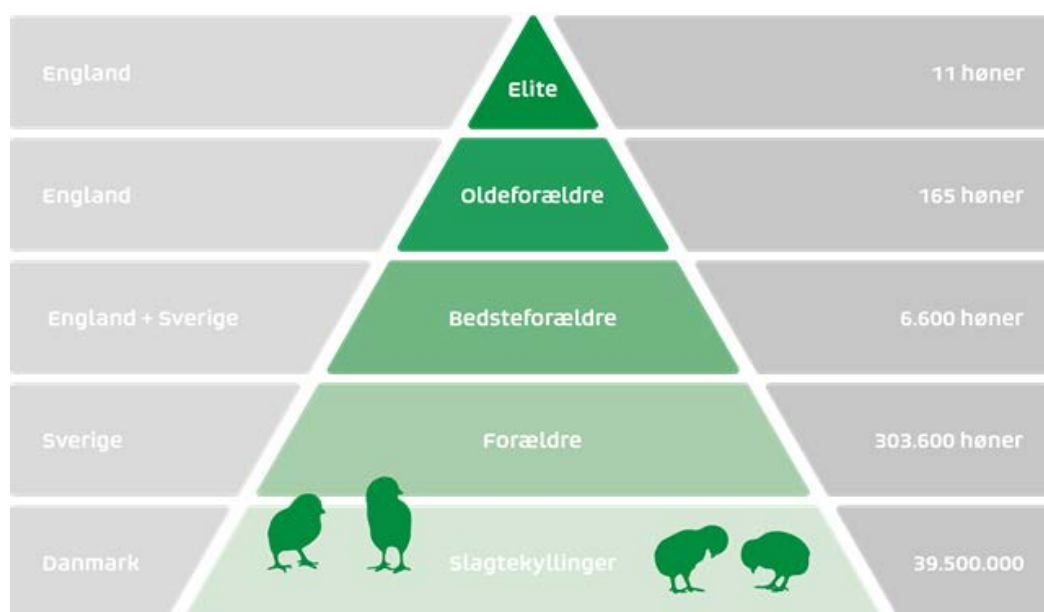


Figure 28: The Breeding pyramid of the Danish poultry meat sector (DanHatch, 2016).

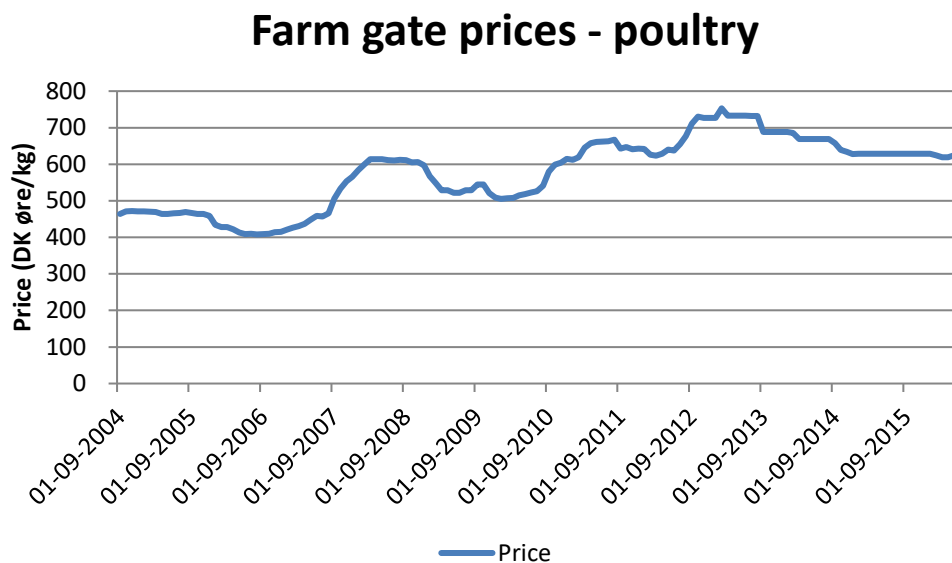


Figure 29: Development in the farmgate poultry meat price (FarmtalOnline, 2016).

The birds are bred based on a set of breeding goals, which code for a particular behaviour and a corresponding impact on environment, animal welfare and production system (Gamborg & Sandøe, 2005). Therefore these breeding goals code for a particular production system, and it is impossible to alter the production strategy (for instance emphasising animal welfare by slow growth or outdoor rearing), without also adjusting the genetic mark-up of the birds. Hence, it also implies that poultry production is highly locked in to a particular production pathway. Furthermore, any changes to the genetics of the birds will only appear in the stables after a time lag of five years. Furthermore, the breeding companies are huge multinational companies and Danish farmers have very little influence on how they operate or which breeding goals they adopt.

5.4 Market conditions

On a global level, poultry meat is one of the fastest growing meat types. Currently the farm-gate price for poultry hovers around 6 DKK, but compared with the milk price recent years has not seen similar market volatility, see Figure 23. Therefore poultry producers have a much more stable economy. One of the reasons for this difference may be that poultry production varies more than dairy production, and it is possible for producers to adjust production if commodity prices are high or low, hence there is little response time for producers to adjust production.

The share of poultry meat in the overall Danish meat consumption is currently rising and by the end of 2014 it is the second most consumed protein with a market share of 26.4% of the Danish population's annual meat consumption and the annual per capita consumption is 24 kg (DAFC, 2015). Compared with other product categories poultry meat is a fairly uniform category, almost the entire retail market is composed of fresh standard poultry meat products. Generally poultry meat is perceived as a cheap and lean meat product that is easy to prepare, therefore it has become an important ingredient in quickly prepared everyday meals. Differentiations in the product category include various brands, various cuts and marinades, but there is little variation in the primary production.

5.4.1 New and emerging food trends as a condition for poultry production

Although the Danish organic market is important with an average market share of 8 %, less than 1% of the chickens that are produced in Denmark are certified as organic. There are a number of reasons why the market for organic poultry meat is lacking behind the general organic market. 1) One of the issues appears to be that the organic production and the food quality is not corresponding well with the industrial and hygienic standards inherent in the regulation for broiler production. 2) Technically it is difficult to change a conventional into an organic, as organic birds require access to outdoor areas and the central location of the chicken houses on the farm tend to collide with the need for outdoor rearing. 3) The slaughterhouses are a very industrial in their setup and they are adapted to the large volumes that are common in conventional poultry production. However, as the organic flocks are considerably smaller the slaughtering costs for organic chickens are significant. Furthermore, it is difficult to manage many of the qualities that are associated with organic poultry production in the mainstream marketing channel, such as uneven size distribution. Selling organic broilers as frozen food, to some extent, would alleviate the problem by allowing for larger quantities at a time rather than continuous small-scale supply, lowering the abattoir costs. However, the quality conventions in the Danish broiler market dictate fresh meat only as the retail sector prefer customers who purchase fresh produce, as fresh produce is higher priced and customers who prefer fresh produce frequent shops more often, thus purchasing more in total. Furthermore, customers who purchase frozen food are perceived as cheap, and thus unattractive customers for supermarkets. Therefore the retail-sector has gradually removed frozen food from their product range in favour of fresh food. 4) The retail price for an organic chicken is considerably higher, at least double price, compared with a conventional bird. One of the issues is that organic broilers are caught in a deadlock as prices are high because volumes are low and volumes are low because prices are high.

Until recently the organic poultry meat production has not been financially viable for the slaughterhouses, however, it has remained in production due to strategic considerations. The interview respondents emphasized that marginal cost differences determine profitability. In consequence, the abattoirs cut up the broilers and sell each part in different markets where the prices are highest and it is not possible to obtain an organic price premium for broiler feet (a highly value product for the abattoir) because they are consumed in Asia, where there is currently no organic market. According to the manager of one of the larger abattoirs this has been problematic for their business model.

In spite of the relatively low market share of organic poultry meat, the market is evolving quite rapidly at the moment and the chicken market is slowly being differentiated. Furthermore, the product category is expected to grow even further in the future, because poultry is a cheap lean meat product and therefore is well aligned with some new food trend, such as protein based diets and convenience and because consumers increasingly request differentiated products (Thorsøe et al., 2015). It is possible to differentiate the poultry production in a number of ways, different age, feeding, weight, sex and breed. This would disassociate the specialty meat from cheap everyday food, but so far no producer has adopted a differentiation strategy. New and incrementally innovative chicken products are currently introduced and developed, in a collaboration between retailers, producers and slaughterhouses. For instance, in the spring of 2015, when the largest discount supermarket chain, Netto, introduced the French Label Rouge broiler to Danish consumers, which is appraised for high animal welfare and superior taste. Furthermore, the small-scale abattoir Sødram began producing “welfare broilers” for another retailer COOP, which is similar to the organic broiler apart from the feed. These products are successful and recently the French label rouge broilers have become the preferred

choice among the costumers in Netto, in spite a priced which is three times higher (Haar, 2016). Furthermore, to protect their Danish producers the Danish Poultry Meat Association have initiated a coordinated effort to develop a new national label for “Danish poultry products”, as many consumers find it difficult to know the origin of the meat that are available on the market and generally Danish consumers prefer the Danish producers, see Figure 24. The brand has been developed in collaboration between retailers, slaughterhouses and the producer association (DPMA, 2016b).

According to the manager of one of the broiler processing companies, animal welfare is the most important criteria for consumers: *“The reason that consumers chose organic chickens is not alone because of the label, it is primarily because they care about animal welfare (...) but we hope that it [introduction of Label Rouge and welfare broilers] can also boost our organic sales.”*



Figure 30: Label for the "Danish chicken" label developed by the trade association (DPMA, 2016b).

The changing consumer preferences and a diversifying poultry market is not just an opportunity for the producers of poultry products, but they also constitute a threat for the producers who have invested in a particular production. These producers depend on an ability to produce at full capacity to repay their investments so once started production relies on stable market conditions. In the poultry many producers have begun to worry about the stability of the market conditions since nearly all supermarkets in 2016 have stopped retailing eggs from battery chickens. The decision came as a big surprise to the production industry, in particularly as numerous producers have reinvested in an upgrade of their production system due to new animal welfare standards in 2014. However, when this branch of production is phased out, the investment will not be viable and the producers are left in a precarious position. Producers of poultry meat and the producer association attempts to prevent a similar thing to happen for standard chicken products, via a continuous dialogue with the retail sector, concerning production development, but the situation is challenging.

5.5 SWOT summary

Based on the analysis of regulatory, policy and market conditions in the case study of the Danish poultry industry in the Central Denmark Region, in this section we will provide a list of key points and issues that are

raised in the case study. The key issues are identified in a SWOT analysis, which enables us to identify opportunities and barriers for a resilient development of the regional poultry industry, see Table 7.

Table 13: SWOT analysis of the Danish poultry sector in the Central Denmark Region.

Strengths <ul style="list-style-type: none"> • High-tech and modern production facilities • Low debt percentage and capacity costs • Little internal competition and a strongly coordinated value chain • No overinvestments in this sector due to status as “specialty production” • High and well-coordinated hygienic standards • Institutionalization of the mutual dependence among the actors in the value chain, such as development of insurance schemes 	Weaknesses <ul style="list-style-type: none"> • Highly industrialized production that is not easy to adjust to changing conditions • Long time binds of investments • Bulk production, hence little income pr. unit and low added value in the value chain • High wages • Dependence on foreign labour
Opportunities <ul style="list-style-type: none"> • Few start-up costs • Increasing organic and specialty food market • Environmentally and climate friendly production • Increasing focus on food security 	Threats <ul style="list-style-type: none"> • Falling world market prices • Changing consumer preferences (such as the cancelation of caged eggs by the supermarkets) • Low value product for the retailers • Increasing focus on animal welfare • Monopoly like conditions in the value chain and reliance on a few key actors • Strong path dependency

The poultry breeds serve as an important condition for the poultry producers. Poultry breeding is extremely complex, specialized and expensive, hence there is currently no breeding activities taking place in Denmark or the rest of Scandinavia for that matter. Therefore, the bird suppliers import their birds or eggs from partners abroad, and the birds that eventually end up in the supermarkets are the fifth generation of the birds that are breed. This implies that poultry production is highly locked in to a particular production path and it is extremely difficult to change the production system as any changes to the genetics of the birds will appear in the stables after a time lag of five years. Furthermore, the breeding companies are huge multinational companies where Danish farmers have very little influence on how they operate and therefore it is extremely difficult to alter production conditions without also changing the breeds that are used in the production.

The poultry value chain is composed of only very few and specialized actors on both supply and processing, and they are primarily private companies, obligated to make a profit for their investors. Furthermore, this organisation of the value chain also means that there is virtually no competition among the actors, as there are no redundant actors in the value chain. Therefore, the actors in the value chain are also very well coordinated in their practice. For instance, the bird suppliers have coordinated their breed selection with the feedstuff producers and the abattoirs to fine tune the product. This leaves very little room to manoeuvre for the farmer, but also a pressure to fulfil his particular obligations. Furthermore, when there are no cooperatively owned actors on the supply and demand side of the value chain the farmers have little influence on how the value chain is assembled and also few options for negotiating other prices than what is automatically given. Furthermore, the Danish poultry meat producers have a well-coordinated quality management system, “The Quality System In Chicken Production (KIK)” that guarantees full transparency and disease monitoring.

Historically, poultry production has been considered as a “specialty production” by the banks, which has meant that access to credit has been slightly more expensive than other types of production. However, as there are so few actors in the supply and demand side they also rely on farmers to keep producing on financially acceptable terms. Therefore, a number of schemes have emerged to ensure that farms are developed according to the needs of abattoirs and supply industry, such as insurance schemes, loans on favourable conditions and extended repayment. This has given farmers stable economic conditions and an ability to develop the production facilities that are well coordinated with the needs of the other actors.

5.6 Poultry production in Central Denmark Region - focus groups and workshop

To explore how farmers experience their market conditions, regulatory conditions and financial conditions, in the Central Denmark we tried to summon farmers for two focus group sessions. However, poultry producers live rather scattered, so we were unable to find a suitable location where everybody could attend, so the two focus groups were replaced with 5 individual interviews. In this chapter, we explore how the poultry producers themselves think of the conditions under which they operate and the strategic response to the challenges they observe.

The interviews were organized around a poster developed for the interview based on the main question: “In your perspective, which challenges can you identify in the current market conditions, regulatory conditions and financial conditions and which strategies do you employ in response?” This main question were operationalized into, 4 sub questions: 1) What do consider as the main challenges for your farm in relation to price and markets under the current market conditions? 2) What do consider as the main challenges for your farm in relation to development and succession under the current financial conditions? 3) What do consider as the main regulatory challenges for your farm under the current regulatory conditions? And 4) which strategies to you employ to meet these challenges, see figure 26. The posters were used as a tool to facilitate the discussion and each farmers was as to wright one or two statement on a post it labels for each of the four questions, and asked to stick it at the poster and explain its meaning, one question at the time. In figure 26 these statements are translated and organized in thematic groups as a grounded outcome of the analysis.

The individual interviews consisted of 3 conventional poultry producers, one organic producers and one who produced both organic and conventional poultry. Furthermore, the interviewees were selected to cover

producers from both of the two major abattoirs. The interviews all took place in the home of the farmers. The interviews were recorded, transcribed verbatim and open coded according to a grounded research methodology. Subsequently the codes from the different interviews have been compared and the list of codes have then been condensed in a process of constant comparison to produce unequivocal categories of the statements (Corbin, 1998; Silverman, 2011). Figure 26 depicts the statements that were given in the different discussions and the colour reflects the arena in which it was given. The presentation in this analysis is organized according to these themes and quotes have been selected and translated to illustrate recurring themes in the data material.

5.6.1 Challenges of the contemporary market conditions

Regarding the contemporary market conditions there are a number of aspects that are brought up by the farmers as particularly important for them, which have been grouped into five categories; vulnerable market position, fragile production with marginal gains and high risks, the future of poultry production in Denmark, the organic poultry market and the commodity markets.

Vulnerable market position

Producers are in a precarious position when it comes to the formation of the farm gate price for the chickens. On the one hand the structural development has been quite pronounced in the poultry sector and today there are only two abattoirs left, so there is very little competition on the chicken market. At the same time, there is full transparency in the value chain and the abattoirs are familiar with the average costs of the produces have for fodder, chicks and other supplies. However, as the abattoirs are organized as liability companies they are unable to disclose their accountancy data to the producers. Hence the producers are in a squeeze vis a vis the producers as the quotation is more or less decided by the abattoirs. One of the producers reflect on this precarious market position: *"In relation to the poultry quotation we are both fortunate and unfortunate. The abattoir knows the costs of production at the blink of an eye, because they also have a production on their own, but also because they know the price of fodder and all that. But we have also been fortunate because if the fodder increases we have also been able to get something more, and the quotation almost follows the price on fodder."* In addition, one of the abattoirs is financially challenged and therefore is not in a position to compete much on the market. One of the producers reflect on this vulnerable position: *"If they only think of themselves they should pay as little as possible for the chickens. It is a problem that there has been no surplus in one of the abattoirs, there has been no competition on the quotations, the other abattoirs have not been in the lead, it would have been interesting for us."* Producers are organized in a producer association that should be consulted, but in practice, they do not feel that they have much to say in relation to the actual price setting. However, they have access to the quotations around in Europe and they use that for comparison, but the farmers feel they are in a difficult negotiating position vis a vis the abattoirs. One of the producers for instance mentions: *"when you are up against a listed company, then you know who becomes the little player in that game – and that is us producers."* The result is quite a stable commodity price for the producers, as detailed by one of the interviewees: *"Historically we have never had the big fluctuations that they have had in the cooperatively managed sectors, because it is a private abattoir so they cannot in the same way lower the price. Historically, the poultry abattoirs have taken some of the losses there has been otherwise they know that we will just stop and then they will not get any chickens. (...)"*

Challenges for a financially sustainable production

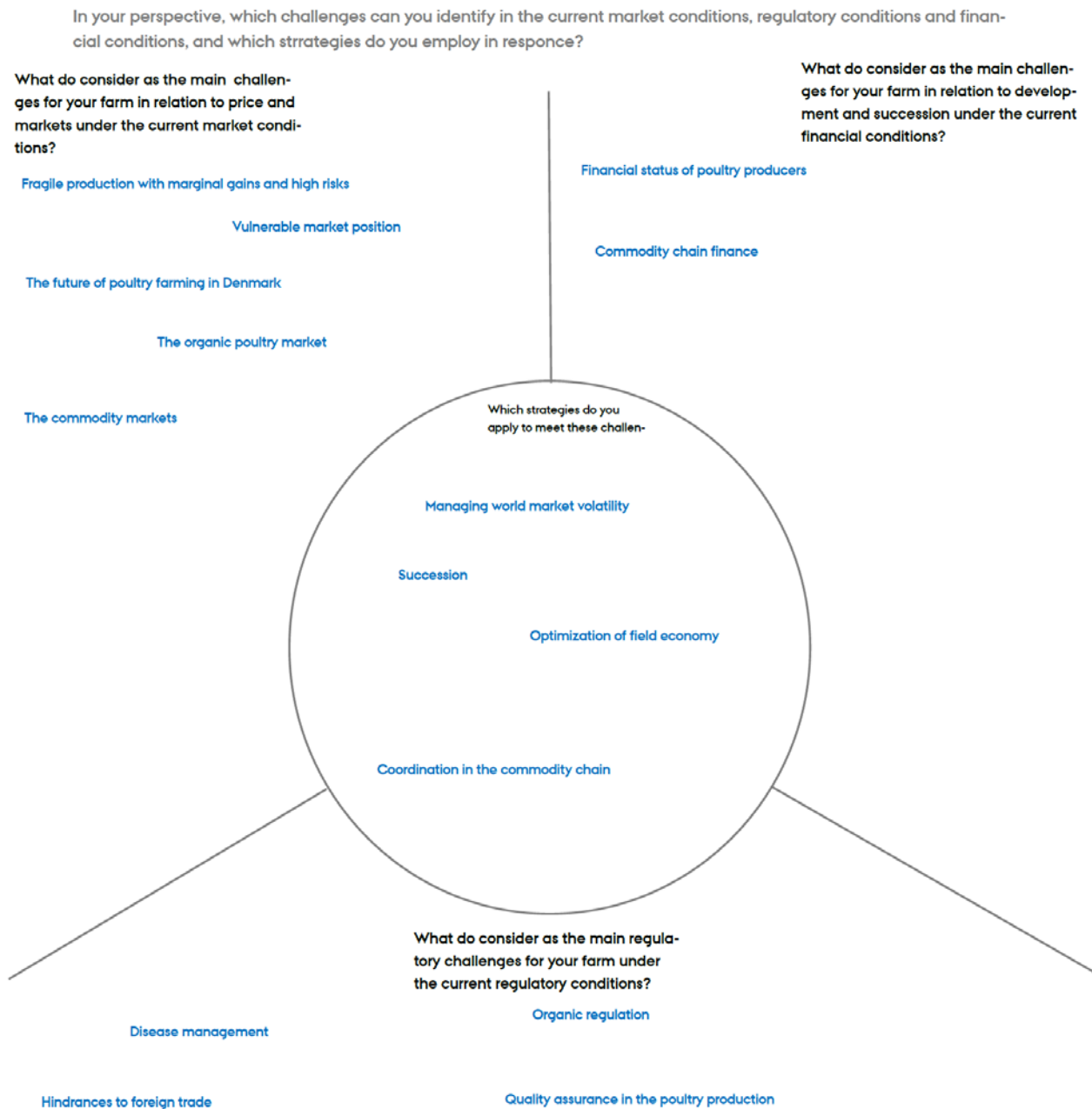


Figure 31: Outcome from the Individual interviews. The text is a translations of the interviewees statements and it has been grouped based on the method of constant comparison.

We never see a really high quotation, we will never see that with poultry, it is always fast to decrease and slow to recover, but it also has to do with their sales contracts that are 3 or 6 months.” One of the ways that the abattoirs have tried to ensure a stable market conditions is by carefully managing the flow of products by not accepting more chickens than what they are able to sell. A comment from one of the producers illustrates this point: *“Danpo and HKScan have managed how much they wanted, at least in terms of the houses that have been constructed to be in control, it has been managed according to what they were able to sell.”* Hence, there is an intricate relation between the farmers and the abattoirs, in terms of ensuring a “proper” supply of chickens to ensure stable conditions for producers.

Another way that manage the production and the quality standards is via a complicated system of discounts to the quotation price for a number of issues with the birds. If for instance the birds are unequal in size, above or below the weight target, wounded, or have footpad dermatitis, hock burn and a number of other criterions, they are discounted from the quotation price. Hence, the farmers need to manage their flocks carefully to ensure a high quotation price.

Not only the producers but also the abattoirs are in a squeeze, on the one hand they know that if the quotation is too low they risk that produces will stop and thereby leaving them without a commodity supply, which will prevent them from running at full capacity. Furthermore, the abattoirs are also themselves in a squeeze, as they also have to sell their products to Danish retailers, and that is also a tough market to compete on. One of the producers told us how this works: *“Once they showed us how the salesmen of Danish supermarkets organizes the competition among producers by setting up small tenders on the internet, then we can submit the offers until Thursday at noon on 50 ton of chicken breast, at a specified water content and such. It is not quality that counts, it is only price and they have 600 employees down there and then they loose to some stupid firm from abroad because they were a cent or two too high, it is fucking cold. There is no long-term cooperation. (...) much depends on the seasons, in the grill season, then there are others that have something else, they are doing tenders all the time, it is a tough market, it is horrible, but chickens are a hooker product, that draws people to the shops and it is hard to change.”*

Fragile production with marginal gains and high risks

Poultry producers generally find themselves in a vulnerable position as the marginal gains of production is very small compared with the turnover in the production, furthermore, already weeks prior to the hatching of the chicks the production is planned in detail, including an exact date for the pickup of the grown chickens. Hence, very small issues or deviations will be problematic to the producer and as conventional chickens only live on average 33 days the production need to be extremely well coordinated and variations need to be at a minimum. One of the producers compares the fragile state of the chickens to a bicycle rider in the tour de France: *“It is like a bike rider in the tour de France, you wonder why is he getting a stomach infection, he is a top trained athlete, but he is balancing on a knives edge when he is racing like crazy. And so it is with the chickens, if the fodder is bad, the litter goes bad, so the chicken’s growth is momentarily halted. I know that I have chickens delivered to me at a particular date, to be picked up later at a specified date. So there is nothing to do, it is not like rearing pigs where you can just postpone for a few days, if the curve breaks and the growth is halted for a period of time, they have to grow continuously.”* Hence, the farmer continuously has to produce a product with little marginal gain, but at the same time his production relies on a number of other actors such as supply companies. Furthermore, as the chicken production is optimized down to minute details and even small deviations in composition of fodder or health conditions of the chicks is unfortunate for the

producer. Another producer supplements: *"It is difficult to have a good economy in the poultry production, there is always something that goes bad, but there is not time for that."*

The future of poultry production in Denmark

The producers are a bit ambivalent about the future of poultry production in Denmark. On the one hand they note that poultry meat is well aligned with some of the other major trends in society, such as a climate friendly production as poultry production is one of the most favourable energy conversion rates. On the other hand, the producers are concerned with the classification of poultry meat as a cheap product. One of the producers elaborates: *"when it is classified as a cheap product, then it has an impact in the entire value chain. Generally, the production economy is deteriorating in poultry production, the settlement price keeps decreasing and we have come to a point where we cannot increase the efficiency much more, so there is not much to be gained, year after year the price keeps decreasing and the cake is smaller and smaller."* Another producer is in accordance, and sees this as the main barrier for transforming the production: *"if the price of a chicken cannot be higher than 35 DKK then it cannot be reared in anything but a huge stable, where they walk on top of each other. Everybody wants to decrease production to 20 kg/m², because it is much better to work with. You can clearly see that they are doing better than at 40 kg/m², the last week it is not nice to enter, they virtually have no room, not that they suffer, they have good access to water and fodder and a good ventilation. (...) Hence, there is no problem with the animal welfare, but that doesn't equate with that I think it is OK."* Hence, the producers are also in a difficult position caught between a value chain that demands cheap products and their own personal preferences for production. Some of the producers that we interviewed have also been in contact with retailers concerning how to develop the production systems to meet the expectations of the consumers. One of the comments from a producer reflects this issue: *"I think there will have to be some changes. When I am in contact with retailers they tell me that welfare to the consumers mean that the chickens are allowed to go outdoors, it is not that we just give them a bit of extra straws, or something like that, it is that they can go out. Because up in our little heads it is good to come outside, but actually it's not like that for a bird, because it is an animal from the jungle, it is almost cruelty to the animals to chase them outside. They feel uncertain, but a veranda with light and air, they do like that."* Hence, the comment both reflect the need for a general transformation of the production, but also the inappropriateness of the consumers' expectations towards the modern poultry production.

Many of the producers that we interviewed for this study have therefore stopped believing in the long-term future of conventional poultry production in Denmark. This is illustrated by one of the interviewees: *"In the future I don't think that we should produce these turbo chickens. If we look to the Netherlands then there is a huge number of farmers who have transformed their production to slow growing breeds, with veranda, I think that is the way it will go."* Another producer also notes that: *"I'd like to produce a different kind of chicken, because that is the direction it is heading, people today are a bit more concerned about what they purchase."*

A particular concern is the animal friendly organizations that are campaigning against these industrialized production systems. A producer elaborates: *"You can always find something that looks bad and then serve it for the afternoon coffee so that everybody chokes on it (...) I don't want to be framed as a tormentor of animals, or anything like that, I keep my animals like I must, but I adhere to the law. They also fear them at the abattoir. They do talk about getting our products endorsed by the animal protection organizations, without really changing the quality. (...) the animal protection organizations don't care much about the animal"*

density, but rather about improved access to food and water, but that doesn't matter, they eat whenever they want anyway."

Furthermore, many of the farmers fear that supermarkets will abandon poultry producers due to a better economy in products with an added value, with a reference to the recent out phasing of eggs from caged chickens. One of the producers reflects: *"let's pretend that I am the owner of COOP and we sell x million eggs and the ones we sell most frequently we earn 1 DKK, however, if we could sell them all as organic then it was 3 DKK. We risk that they will say that to us, now we don't want to sell these hooker products, we want to elevate chickens to a new level. We can endorse that, but we cannot do it overnight."* Hence, this change in the supermarket policy is something that has really caught the attention of many producers and made them feel at risk and they recognize a clear need for transforming the production to bring it more in line with the expectations of the supermarkets.

The organic poultry market

One of the alternatives to the conventional poultry production is to convert to organic production. The conditions on the organic poultry market are quite different from the ones on the conventional poultry market as reflected by this comment by one of the producers: *"Everything within organic farming differ, all the things that influence the commodity price are different. Currently the organic grain prices are really high due to many new converters, which has given an enormous pressure on the grain for fodder, which is difficult to get a hold of and that is bad for those of us who produce meat, but good for the arable farmers. (...) the retail prices for organic produce is much higher, and you would assume that we should just produce some more then, but we shouldn't do that, we agree on that the abattoir and us producers."* The commentary reflects a product, which in all aspect is a niche product that is living its own life unaffected by the world market prices. At the same time there is a concern that the favourable market conditions that prevail at the moment will be equalled out by new converters who are interested in becoming a part of this new production system. Another organic producer notes that: *"It gives me a good feeling, and therefore I also want to increase that branch of the production, and also because it is better financially. I believe more in that way for the future but I also believe that HKScan is financially challenged and therefore they are always one step behind in their strategy, those of us who are supplies the chickens do not always understand this."* Hence, the emerging organic market is not just driven by ideological motivation, but also by economic motivation.

Commodity markets

Poultry production is characterized by a very high turnover, primarily for fodder, which accounts for about 75 % of the total expenses of the farmers. However, the prices of fodder fluctuate quite a lot and therefore the fluctuating grain prices constitute an important risk for the poultry producers. This has some direct consequences for the daily life of the producers as elaborated by one of the interviewed producers: *"After the financial crisis the grain market is increasingly important, then prices goes up, and then they go down all the time. Previously we spend a week in autumn compiling a fodder contract around harvest and then we had a contract that was valid for a year. Now we purchase soy meal whenever it is profitable."* This dependence on the fluctuations on the grain market also introduces some new sensibilities to the farmers. One of the interviewees elaborates: *"I remember talking to my wife about the time when Clinton got a blowjob and the influence it had that he had an affair. That it should influence ordinary people so much, that everything loses value and stock markets decrease, it is bloody scary that it can have those consequences."*

On the one hand farmers have become pawns in a global value chain and they feel increasingly influenced by events that they cannot control. On the other hand, the mechanisms that farmers have to make some long-term stability imply that it is increasingly difficult for farmers to change from one supplier to another and in practice it is difficult to get out of a delivery contract. This introduces a new risk as it is complicated to produce chicken fodder and the companies do not always deliver in the expected quality. One of the interviewees elaborates this concern: *"Poultry fodder is a bit special because it has to be top-tuned all the way through. (...) it is like buying a car and then it only has three wheels when you come to collect, that is the feeling I have right now, I don't get what I pay for, I think I will change supplier in the future, stability in the growth curve is of utmost importance."* Furthermore, when there are problems with a particular supplier then producers need to struggle with the suppliers for damages, which is often complicated and resource demanding. One of the interviewees elaborates: *"We received some compensation, but it is never what it should have been, if the contract runs for a year, then it is difficult to get out of, that is the disadvantage of purchasing on a long-term."*

5.6.2 Challenges of the contemporary financial conditions

Regarding the contemporary market conditions there are a number of aspects that are brought up by the farmers as particularly important for them, which have been grouped into two categories; financial status of poultry producers and commodity chain finance

Generally, the poultry producers do not express many financial concerns at present, as the economy of poultry producers is doing fairly well, but some of the interviewees have previously been challenged financially position. There is, however, a frustration in terms of how the farmers are perceived by the financial institutions one of the interviewees for instance note: *"Now we are rated according to our debt. The more debt you have the more expensive it is to borrow money."* Another farmer shares this concern: *"the more your yield is challenged, the more you will have to pay in interests, the ones with the worst economy is paying the highest interest rate."* The comments reflect a concern that has gained in strength following the financial crisis where one of the changes was a higher charge for the perceived risk, which has put many farmers, particular those with a poor economy in a vulnerable position. At the same time going to the bank is not necessarily pleasant for the farmers, as one of the interviewees reflect: *"There is no feelings when you sit across from a bank advisor, he just looks at his papers and then that's it."*

Financial status of poultry producers

Compared with other branches, poultry production has traditionally had a different status in the banks and with the mortgage providers. The reason is that poultry production has been classified as a *"specialty production"*, because there are not so many poultry producers and therefore the financial institutions believes that it will be difficult to sell the properties if the current owner goes bankrupt or wants to quit production. One of the challenges is that the houses that are used for poultry production are rather special, in the sense that they are not easily converted to other types of agricultural production or other uses. One of the producers elaborates this point: *"If they cannot be resold after so and so long, then the value of the buildings is classified as "worthless", it is how they are thinking, but it is absolutely crazy."* For the farmers this implies that poultry producers do not have access to the same kind of mortgages than other types of production, and investing in production development becomes difficult for them. This financial status in many ways is peculiar as poultry producers actually have quite a good farm economy compared with other farmers, particularly if you look a few years back.

The effect is that there are not constructed a whole lot of new buildings at present and some of the ones that are currently used for production keeps getting older. One of the producers elaborates this issue: *"I think that the average age of the houses, even though new ones have been constructed, is still around 26-28 years, but they are still in working order if they have a decent size."* Another farmer also comments on this issue: *"the worst thing is that there is virtually no development, nothing new is constructed. The abattoirs must also be concerned, in 10 years' time our houses are 10 years older and we are 10 years older, there are more farmers above 80 than below 30 and nobody enters. You shouldn't think too much about that... but on the other hand you also have to think about it. (...) The people who should manage chickens they don't exist, it is like Martin Merild says (Red: jokingly), everything that is lower than knee height is not considered an animal. It is so difficult to finance pelt and poultry production, those who have cows and pigs have had a much easier credit access. They have never looked at the accounts, income wise we have been doing good, in spite of that we have not been able to loan money."* The comment reflects a number of concerns, one the one hand there is a growing concern about the future of the poultry sector because succession is halted and because poultry production has a lower status than other branches of production. At the same time there is a frustration towards the financial institutions are reluctant in their lending practice towards poultry producers in spite of the financial performance of the poultry producers.

Commodity chain finance

For the farmers the problem is that they do not construct many new buildings or attract new producers if they are unable to obtain an attractive mortgage. One of the interviewed producers reflect on this issue: *"If you cannot borrow more than 40 % or 50 % (Red: mortgage, rest will be financed in banks) then it simply becomes too costly to construct new buildings."* In order to ensure reinvestments in the production facilities one of the abattoirs implemented a growth plan, in which they issue a bank guarantee, ensures a contribution margin of 450 DKK annually for 7 years (earlier 5). Hence, effectively the abattoirs partly share the financial risk of reinvestments with the farmers, due to a need for ensuring a continuous supply of birds for their production facilities. This has enabled some new investments in the poultry sector and function as a solution to some of the investment challenges of the producers. One producer for instance notes: *"10, 12 or 15 new houses have been constructed in the past 3 years, since they made the growth plan, it was also needed. (...) however, still on average production facilities are probably around 26-28 years old, if we include the new houses."* Another producer is in accordance: *"It is something that the banks and mortgage providers are happy about. It is not necessarily something that we need, but I do think that banks and mortgage providers are quite content, then they have that to hold on to, at least they know that there is a contribution margin of 450 DKK, we know what we earn. But 7 years that is quite a long time."*

5.6.3 Challenges of the contemporary regulatory conditions

Regarding the contemporary market conditions there are a number of aspects that are brought up by the farmers as particularly important for them, which have been grouped into four categories; disease management, hindrances to foreign trade, organic regulation and quality assurance in the poultry production.

Regulatory conditions are quite a big thing in poultry production, particular regulation to manage disease in birds, particularly salmonella, but more recently also bird flu. These diseases are both highly contaminating, detrimental to the poultry market and generally, the poultry producers appear as content with the way that

the regulation is managed, as regulation has been developed in close collaboration with the producers. Furthermore, apart from the mandatory regulation developed at national level a number of private initiatives have also been taken in the value chain on a voluntary basis.

Disease management

The interviews for this report were conducted in the spring of 2017 at a time when there was an outbreak of bird flu and naturally this outbreak and its implication for poultry producers was an important focus point in the interviews. The outbreak affected many of the European countries, but in Denmark a number of wild birds were found and a few pastime farms with outdoor rearing were infected. It is considered highly unlikely that conventional poultry producers, who keep their birds indoors and put a great effort into reducing any contamination in the stables are exposed to infections. Nevertheless, the bird flu outbreak caused some of the important markets in Asia to ban import of Danish birds. Hence, even though the producers were not directly influenced by the bird flu they were indirectly influenced as this market shot down quickly caused a drop in the quotation: *“Immediately following the outbreak the quotation was lowered by 25 øre, and after it has gone it has only bettered by 10 øre. It isn’t really a problem because there is so great traceability in our value-chain, it’s just a technical hindrance to trade. It is one of the worst crises price wise, this and the Mohammed crisis in 2007, where there was a boycott in the middle east. (...) the abattoir... they can just lower the prices when they cannot sell the produce, then it is stockpiled, there is not much we can do about that. (...) they pretty much decide the prices, they receive the same product, only they cannot sell it at the same price, we cannot do anything about that, we have to pay for the chicken we have ordered, we have a contract for fodder for the bird. All we can do is to lean back and hope that it doesn’t take too long.”* Another producer noted that: *“The bird flu already cost me much of what I earn in a year, it’s just gone”*. Hence, the bird flu outbreak also illustrates the challenges of adjusting poultry production if there are sudden disruptions in the market. The example illustrates that although the abattoirs also lose money they are able transfer some of their losses onto the farmers, however, farmers are not in a position to transfer any of their costs onto other actors. They are bound by long-term and fixed contracts with some of their suppliers, and in addition, they have to continue producing to maintain their production facilities and to ensure that they can keep a cash-flow for their mortgage.

Following outbreaks and market shut downs large stockpiles of frozen products, usually whole chickens, or parts hereof have been build. Hence, market recovery is always slower than market shutdown. The big issue in this particular outbreak was that although no birds in the production system were actually infected it still caused a market shot down as the birds of pastime producers and professional producers are registered in the same OIE-register. Attempts will be made to change this, which is in line with the practice in other countries, but nobody were aware of this prior to the present outbreak.

Hindrances to foreign trade

Although producers are generally content with the disease management and the sanitary requirements that have been implemented, some of the policies also hampers the market competition by restricting the producers’ abilities to interact with companies abroad. For instance, due to the National Salmonella Action Plan, it is not possible for producers to purchase hatched chicks abroad. Hence, effectively this strategy, which safeguards producers from foreign contamination also hampers the competition.

Another strategy that is faced with similar concerns is the delivery of birds to German abattoirs. Abattoirs in Germany practice a particular form of production in which the birds are gradually slaughtered at different ages. Hence, producers can initially have a higher number of birds in the stables, and then slaughter the birds at for instance day 30, 37 and 42, thereby increasing the production volume pr. square meter. Many producers in the southern part of Denmark thus deliver their birds to Germany. However, this form of production also implies a higher risk of contamination as the chicken harvester drives several times through the flock. Several producers have also decided against this form of production in the fear that there will be a market shutdown in the event of a disease outbreak. Then they will be stuck with a flock of chickens that they are unable to export and also unable to sell to a Danish abattoir as this form of production is not recognized by the Danish quality standard. Other producers reflect that they would rather produce Danish products for the Danish market.

Organic regulation

The Danish organic regulation was initially moulded over the French Label Rouge system, which implies that the herd size should be below 4.800 birds and the birds should gain a maximum of 35 grams pr. day and be at least 57 days when slaughtered and 63 for the hens. Furthermore, the birds should have access to free range areas that are planted with vegetation. Although the regulation in many ways reflect the expectations that many consumers have towards an organic production, it also constitutes a significant barrier for conversion of some of the existing operations. The reason is that the specialized buildings for chicken production, are often much larger and sometimes build for 50.000-100.000 birds. Hence, producers have huge investments tied to the buildings that they are unable to pay off if they are to decrease their stock density. Furthermore, often houses are placed in cluster of 4-5 houses, with marginal space between, which prevents outdoor access for the birds.

Quality assurance in the poultry production

The quality assurance schemes KIK and ACKP that ensures full traceability throughout the broiler production chain is an example of a voluntary regulatory regime that has been developed by the actors in the poultry chain. A number of production related factors are mandatory to report, and failure results in an enforcement notice. The producer interviews reveal that producer on the one hand find it a bit annoying that they have to make these registers, as it is a bit time consuming, on the other hand it also provide a good overview of the production and serves as a self-monitoring device that provides feedback on particular focus areas. The comment from one of the interviewees reflects this position: *"It is a bit annoying to register all that data, we are not crazy about that, but we do like all the data that is gathered in the monitoring system, we have data to benchmark ourselves towards other producers, compare suppliers and all the other actors, many are envious of all the data that we have."* Due to this system farmers are able to benchmark their own production to the production of other farmers. Furthermore, farmers are also able to monitor the performance of fodder from different companies. One of the interviewed farmers explains: *"It totally reveals the performance of one company in relation to the 100 rotations of birds who have eaten a particular batch, their weight, death rate and all, it is very revealing. It is a quick way to perform self-monitoration, we can see exactly how each flock have been doing, it is great to keep track."* Furthermore, for the farmer, the quality assurance scheme monitoring system functions as a documentation of performance when attending bank meetings or making claims towards suppliers for failure to deliver products in an acceptable quality.

For the abattoirs the quality assurance scheme functions as a legitimization of their quality claim towards retailers and other costumers, but the system also causes frustration. The comment from one of the interviewed producers illustrates this function: *"It is a necessary for the supermarkets, but one of the aspects they emphasize is that there should be no grass in the gutters; although it is one of the aspects we as producers say, hey stop this nonsense. There are a lot of those things, but it is important for the abattoir to be able to say that we make all these requirements towards our producers, to themselves, to the suppliers and all the way through, they are all audited. (...) sometimes its hanging out our throats, it never ends there are always new requirements. At our abattoir there is a steering committee that decides how to progress, sometimes we as producers pull in one direction and the abattoir in the other direction, but it is good to have the debate. Somethings can be a little stupid, it seems foolish to have a rule just to please a procurement officer, but the minute it is written down it can imply that you fail at your next audit. Grass in the gutter, I still think it is foolish. We have one big client and they attend with all kind of people to make new requirements and stuff, sometimes they are quite foolish."* Hence, although the producers do understand the need for a quality assurance scheme they do not always understand the particular requirements that they are faced with and then it is frustrating that it is "easy" to develop new requirements. Another dimension that is mentioned by some of the interviewees is a perceived lacking practical skill on behalf of the people who are developing the regulations. One of the interviewees explains: *"They (red: an important customer) want the birds to have toys, they have pushed for it a few times, but it has to be disinfected and washed every time, it makes no sense. Windows are another thing, they want big windows for the birds to see the sun, we don't like that much either, then it is difficult to control their rhythm, when they eat and sleep. If too much extra light enters they go crazy when they are caught."* Another producer complaints about requirements that auditors sometimes have to accompany the farmers in the stables when they make mandatory swaps for salmonella control, on the grounds of contamination risk as the auditor visits a number of farms consecutively.

5.6.4 Understanding dairy farmers strategies and institutional arrangements

Regarding the strategies and institutional arrangements there are a number of aspects that are brought up by the farmers as particularly important for them, which have been grouped into four categories; managing world market volatility, coordination in the commodity chain, succession and optimization of field economy.

Managing world market volatility

The costs of purchasing fodder is one of the most important costs for the producers and prices at the world market fluctuate a lot, therefore the producers need some strategies to manage this uncertainty and market risk. However, there are different strategies at play depending on the temper of the farmer, some farmers have outsourced all their purchase of fodder to a purchasing club. Others conduct all the purchasing themselves, perhaps with the assistance of salesmen from the fodder companies, their colleagues and friends, or professional advisors. Furthermore, there is a difference in the time horizon of the investment, some farmers purchase for a full year whereas other only purchase small amounts at a time or invest in futures on soy meal and transport, others just purchase when products are on the market. All in all, there are many different configurations of this strategy in play, one of the producers explains: *"I use 4500 ton of fodder each year. It is not unimportant if it costs 5 DKK more or less for 100 kg, actually this account for a substantial part of my annual income, and therefore my risk management matters a lot, but it is never easy. I have this particular salesman that I trust who sometimes calls me and says that now we have these reports*

from around the world, then I might check his claims by calling my fodder advisor to hear what they say, about it, and then I make my decision. It is a difficult task to outsource, that is, if I am about to lose a lot of money I would like to be a part of it. I would find it hard to place in the hands of an advisor. (...) I purchase both products and freight (red: South America-Denmark) in advance, if the rates are low at some point, then you have bought the freight and you know that you will have to buy the soy at some point. Another producer supplies: we try to purchase when prices are reasonable (...). Mostly I use the advice from the salesmen and their reflections. We have previously used consultants, they may ask for 1000 DKK an hour, but they can be as much off as the rest of us. We note what the salesmen says and then we take it with a grain of salt, what we think, and what our colleagues think, it is difficult and then there is the USA report. We purchase a year in advance, then we don't have to wonder about it all the time, but it matters a lot for us, we spend 7-8 million DKK annually on fodder." Hence, the decision to purchase fodder is very important for the overall farm economy and it is one of those ongoing decision-making situations that the farmers are spending a lot of resources to get right. We asked several of the interviewees whether what they were doing could be considered as speculation, but they all noted that it should not be considered as "speculation", rather they preferred the more neutral term "risk management". This choice of preference indicates quite well the situation that farmers are faced with, acting on the world market is not an option but a condition, and how they chose to act have a profound impact on the farm economy.

Coordination in the commodity chain

The Danish poultry meat chain is highly coordinated and all activities are planned well ahead. This is quite important for the poultry producers as they always know that they have a market for their produce, so they never have to think about the sales process and are able to focus entirely on managing their flocks. On the other hand, they are also closely tied to the suppliers and the abattoirs and they do not have other options, but to quit farming (if that is even an option for them), if they are discontent with this network. The cooperation among the abattoirs and the farmers is framed in two different contracts, the first is between the individual farmers and their abattoir. This contract usually runs for two years and specifies how much produce the farmer should produce. However, the quotation is variable and is defined by the abattoir depending on the particular market conditions that prevail at any given time. If prices are below the cost of production for three consecutive flocks, then the farmer is able to abandon the contract, but otherwise contracts are extremely stable. One of the interviewees for instance notes: "*Normally, we say, jokingly, that you have to die to get out of it.*" The second contract is between the abattoir and the supplier association consisting of all the suppliers to the abattoir. It specifies the general terms of collaboration between the suppliers and the abattoir. Furthermore, the supplier association is the main dialogue partner representing the suppliers in the debate with the abattoir, for instance concerning how the quotation and discounts are set, disease management and gives input in relation to the quality development in the value-chain.

Succession

Whereas dairy producers plan for a future where the farm is continued either by a new young farmer or a natural successor, poultry producers do not necessarily plan for succession. Poultry production is a niche form of production and farmers cannot be sure to sell the property on the market and it is difficult to obtain a mortgage, hence, the interviews indicate that many poultry producers plan for their farms to be worn down prior to their retirement. One of the interviewees elaborates: "*Many poultry producers own very little farmland, hence they have very little capital invested, but it also implies that when you want to sell you cannot*

have a debt, many of the old farmers they do not have any debt at all.” This wearing down strategy allows the new owner to either reinvest in the production system or demolish buildings and start a new production. As poultry producers, like Danish farmers in general, have a rather high average age, close to retirement age, this strategy implies that poultry farms at present have a relatively high average age, allegedly around 26-28 years. In spite of this, the current situation is also something that worry some farmers: “I don’t think about it, I am a born optimist so I do believe in the best, but it is an issue. I think that there are a lot of things that I can do something about and there are a lot of things I cannot influence, I don’t want to be bothered with those.”

Optimization of field economy

The poultry producers who own farmland are currently considering how to manage this farmland as arable farming at the moment is not a very good business. Hence, the farmers also employ different strategies, that are in a sense unrelated to the poultry commodity, but that are very important for the farm as a whole. Some of the farmers note that it is not so important for them what they earn from their fields, because when the grain prices are low so too are the fodder prices and that is much more important for their farm economy. Another farmer furthermore, noted that he is working towards establishing a potato production as this is a high value arable crop that will reduce his reliance on the income from the poultry production. Furthermore, he needed to commence a new activity as he had just become a partner with his father and they needed some additional tasks to generate value for both of them. A farmer, with a larger acreage of leased land was pressed by his bank to give up these lease contracts because he was losing money on the arable farming. However, he was reluctant to give up these leaseholds as his environmental approval depended on an access to a particular spreading area for his manure. These examples tell an interesting story about the way that poultry farmers think about their strategies. Farmers do not think about their strategies strictly in terms of particular commodities, but rather consider their strategies in holistic terms that encapsulated all the operation of the farm.

5.7 Poultry production in Central Denmark Region – survey

The purpose of the survey was to quantify the distribution of the institutional arrangements that influence poultry producers in the central Denmark Region, to explore respondents’ engagement towards sustainability goals and their strategies for the future of their farms. The questionnaire has been common for all the SUFISA case studies.

5.7.1 Introduction

The survey was carried out among poultry producers in all of Denmark in the winter 2017 and spring 2018 by SDU. The national focus was adopted as poultry production is a highly specialized and large-scale branch of production and the number of poultry producers in the region of central Denmark alone is rather limited. For the survey we retrieved the phone numbers of all registered poultry producers, a total of about 170. All information reported in the survey by respondents should refer to the business’s latest completed financial year.

A total of 40 respondents participated in the phone survey, of which the vast majority was conventional poultry producers (95 %), see Table 14. We aimed for a higher number of respondents (150), but the phone numbers we had retrieved proved to be landline numbers and we were only able to get hold of respondents afterhours, and then also only with difficulty, so we had to reduce the ambitions. However,

the lower number of respondents is not considered to be a problem as the general characteristics of sales and marketing arrangements only vary very little as they are similar for all producers.

For the most part we have interviewed the owner of the place and the farms vary considerably in size and animal density with the smallest unit consisting of 1 ha and with an annual production of 24.000 chickens and, while the largest consists of 840 ha and 600.000 chickens, see Table 14. Farms are primarily privately owned (70 %), while a smaller number are also family owned (28 %), See Table 15. Furthermore, there is also a variance in the respondents in terms of age and a majority of the farmers are older than 50 years old. These general characteristics are quite representative for poultry producers in the region and Danish poultry producers at large, see above.

Table 14: General characteristics of respondents

Number of respondents	Conventional	Organic		Smallest	Largest	Mean
40	39	1	Acreage	1	840	242,6
			Number of animals	24.000	600.000	113.025

Table 15: Legal status of the farm, respondents' status on the farm and respondents age cohort

Legal status of the farm		Respondents' status on the farm		Age cohort	
Privately owned	28	Owner	36	<40	8
Private company	11	Tenant	1	41-50	9
Other	1	Other	3	51-65	19
Total	40	Total	40	>65	4
				Total	40

5.1.2 Sales channels

All respondents have a contract with an abattoir that collects the birds and is responsible for the further processing of the poultry products. The vast majority of the respondents have a contract with one of the two large Danish abattoirs HKScan and Danpo, but a smaller number also sells their chickens to Germany, see Figure 32.

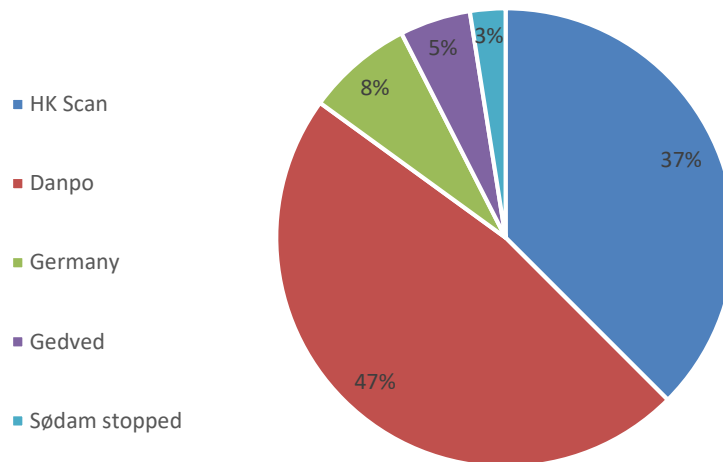


Figure 32: Sales channels

5.7.3 Characteristics of sale agreements

This basic organization of the sales channels imply very little variation in terms of the structure of the sales contract as each farmer is also a member of the producer organization of the abattoirs, and they offer equal terms for the members. Hence, contracts have a quite long duration, typically more than a year, although there is some variation, see Table 16. Furthermore, the content of the contract also varies very little, although there is some difference in terms of the managerial support that is provided for the farmers, see Table 17.

Although, conditions are similar in contractual terms respondents have a slightly different experience of the conditions. About half are content, either “completely” or “somewhat” satisfied about the conditions (45 %), whereas only about 17,5 % of the producers indicate that they are “somewhat unsatisfied” or “completely unsatisfied”. However, quite a large share indicate that they are “neither satisfied nor unsatisfied” (35 %). Furthermore, respondents generally do not agree on their sales conditions, see Figure 33.

Table 16: Contract duration

	Count	%
3-6 month	4	10
7-12 month	3	7,5
13-24 month	32	80
I do not know	1	2,5
Total	40	100

Some of the places where the perception of the conditions differ relates to “whether the production/quality standards required are too restrictive”, “whether there are alternative options to sell products” and “whether the sale agreement provides higher prices than alternative buyers”, see Figure 34. Hence, there are interesting divergences in the understanding of the market conditions for the poultry market.

Table 17: Characteristics of sales agreements

	Yes	No	Not applicable	Do not know
It requires exclusivity, i.e. – you have to sell 100% of the [Commodity] production to this buyer/collective organization	97,5	2,5	0	0
There are penalties if you fail to deliver the agreed quantities	5	95	0	0
There are safeguards if the buyer fails to fulfil the agreement	0	100	0	0
There are price premiums for delivering higher quality products	92,5	7,5	0	0
You receive interest in case of delayed payments from the buyer	0	0	95	5
You receive services like collection, storage, transport, handling, etc.	92,5	7,5	0	0
You receive managerial support or technical assistance	50	47,5	0	2,5
You receive credit assistance (information on credit products, bank loan guarantee, etc.)	2,5	97,5	0	0
You receive special assets, technology and/or machinery	0	100	0	0

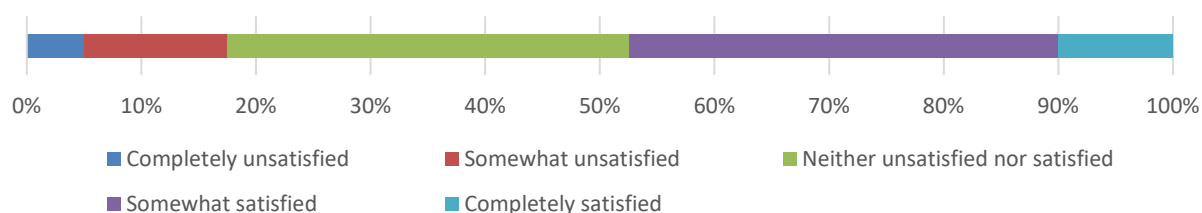


Figure 33: Replies to the question: “On a scale from 1 to 5, how satisfied are you with this sale agreement?”

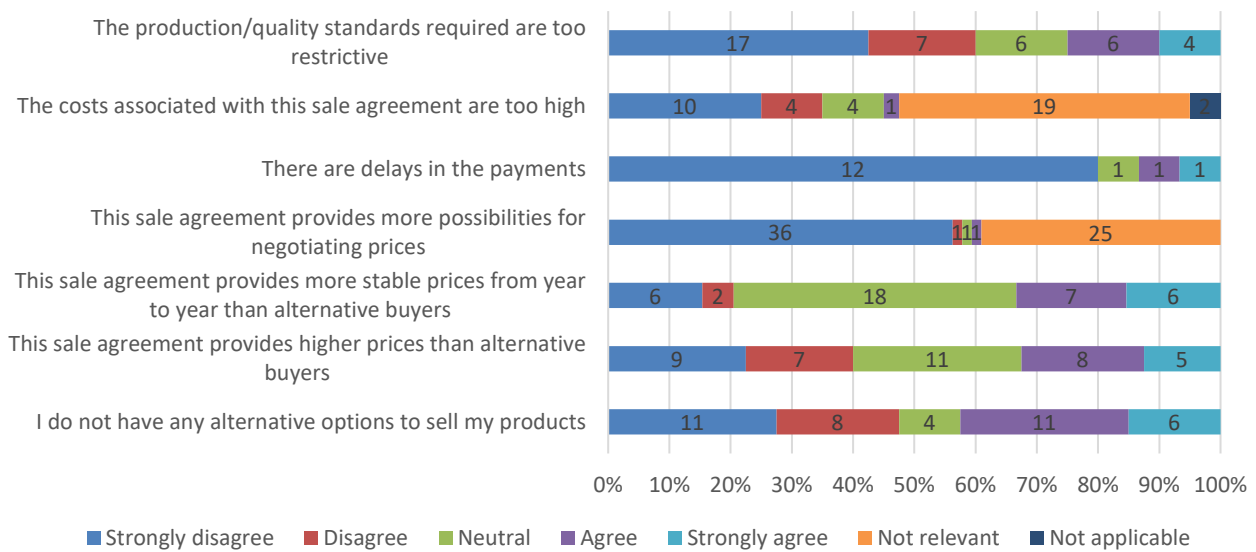


Figure 34: Replies to the question: “On a scale from 1 (strongly disagree) to 5 (strongly agree) how much do you agree with the following statements regarding your satisfaction with respect this sale agreement?”

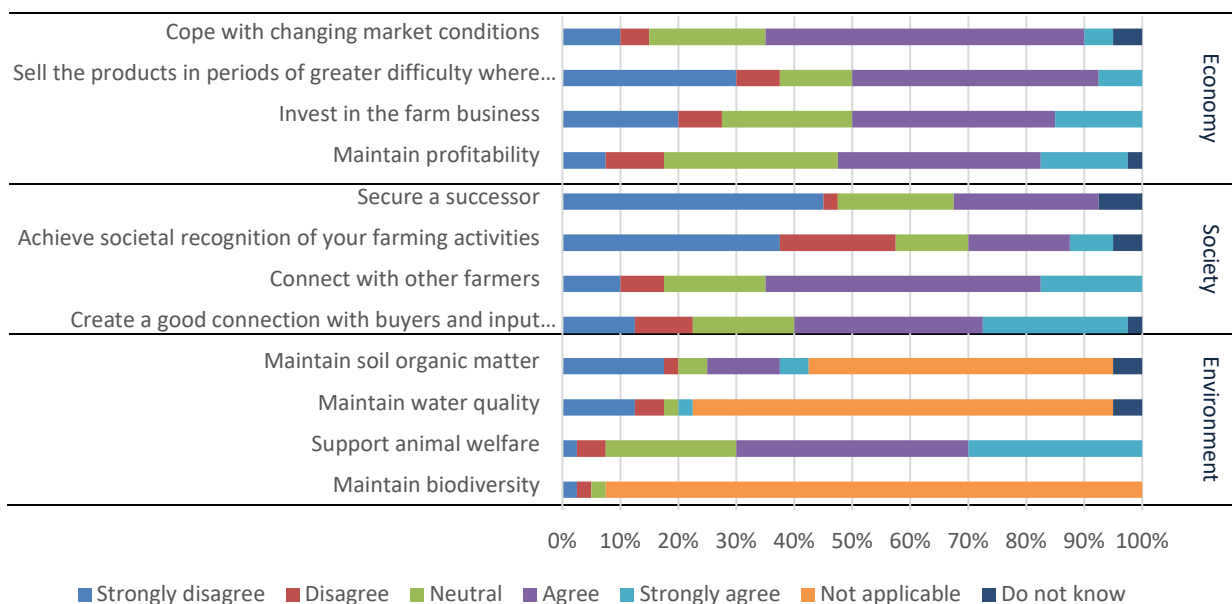


Figure 35: Replies to the question: "Please assign a score from 1 (strongly disagree) to 5 (strongly agree) regarding the potential impact of sustainability of the sale agreement/membership rules to the collective organization."

5.7.4 Sustainability

Regarding the sustainability effects of the sales agreement, there are also quite diverging views of the effects, see Figure 35. Concerning the economic aspects of sustainability about half of the respondents agree that their sales agreement has had a positive impact. However, the two elements “Invest in the farm business” and “Selling the products in periods of greater difficulty where prices were low” also mobilize a strong opposition as 40 % and 25 %, respectively, indicate that they “disagree” or “strongly disagree” to these effects. Concerning the societal effects the picture is more mixed as more than 60 % “agree” or

“strongly agree” that the contract allows them to “connect with other farmers” and “create a good connection with buyers and input providers. The last two aspects “Achieve societal recognition of your farming activities” and “secure a successor” respondents are almost equally divided between agreeing and disagreeing. Regarding the environmental effects, a number of respondents indicate that three of these indicators are “not relevant” (for all larger than 60 %). This could indicate that these effects are generally not included in any for in the sales agreements. However, there is considerable support that the sales agreements is able to “Support animal welfare” (70%).

5.7.4 Strategies and drivers of farming

There is considerable variation in terms of the strategies for the future development of the farm. The majority of respondents indicate that they plan to maintain the existing scale of operations (75%), whereas about 15 % indicate an interest in expanding the existing scale of operations and 7,5 % indicate that they plan to “downscale the existing scale of operations”, see Table 18. Furthermore, only 2,5 % indicate that they plan to “abandon farming”. This strategy appears to be well aligned with the strategy promoted by the cooperative dairies and adopted by Danish farmers at large.

This general focus on maintaining the existing production is also expressed in that the production related changes that the respondents plan to adopt. More than half does not plan to invest more in production facilities (65%), whereas a minority plan to invest more (32,5). This suggests that a large share of the poultry producers are content with the existing scale of operation and plan to continue to use these facilities. Generally, farmers do not plan to externalize particular aspects of their operations (7,5 %), which may also be due to the fact that this for many farmers is not an option due to an already highly specialized sector, see Table 19. Interestingly, 43% of the farmers plan to insure against crop or production losses and a large minority also plan to specialize production (37,5 %) indicating that these are important strategies.

In terms of the market related changes, the respondents also expect a number of changes that are quite remarkable, see Table 20. About two thirds plan to diversify, by introducing new products (57,5 %) , a large majority plan to add value to the poultry that they produce, for instance by converting to conversion to organic (82,5 %). Furthermore, a bit less than half plan to develop new partnerships, for instance with other farmers, retailers, processors (32,5 %) and about a third plan to develop new sale channels for their poultry products (35 %). This indicate that the poultry producers are in a situation where they are discontent with their current market situation and consider alternatives to their current marketing outlets.

Regarding the future of the farm there is also a divergence among the respondents. About half the respondents currently have no plans for the future of their farms (45 %), this is highly correlated with the age of the farmers and in particular the young farmers have not yet made any plans as to the future of their farm, see Table 21. About one fourth plan for a family member to take over the farm (27,5 %) and about one fifth plan to sell their farm on the market (22,5 %).

In relation to understanding the drivers of farming there is generally agreement that “change of farming regulations (e.g. nitrate, water and pesticides regulations)”, “changes in consumers behaviour and/or preferences “ and “Severe drop in market prices” are considered to be important drivers of farmers decision making. More than 60% of respondents indicate that this is a “considerable” or “strong” driver, furthermore, the opposition is less than 15 %. In addition, there is also widespread agreement that

Table 18: Replies to the question: " What are your strategies for the development of poultry production within the context of your farm business in the coming 5 years? (N=40)

	Count	%
I plan to maintain the existing scale of operations	30	75
I plan to expand the existing scale of operations	6	15
I plan to downscale the existing scale of operations	3	7,5
I plan to abandon farming	1	2,5
Total	40	100

Table 19: Production related changes (N=40)

	Yes	No	I do not know	Not relevant
I plan to invest more in production facilities	32,5 %	65 %	2,5 %	0 %
I plan to externalize particular aspects of my operations	7,5 %	87,5 %	2,5 %	2,5 %
I plan to specialize my production	37,5 %	55 %	5 %	2,5 %
I plan to insure against crop/livestock losses	62,5 %	35,0 %	0 %	2,5 %
I do not have specific plans	0 %	0 %	0 %	100 %

"adverse climatic conditions or pests (e.g. hail, drought, floods, animal disease)" and "changes in the CAP (single farm payment and agri-environmental payments)" are not considerable drivers of farmers strategies. More than 60 % indicate the effect to be "not at all" and "partly", however, there is also a minority of 20-25% who indicate that this has a "strong" or "considerable" effect. In addition to these 5 factors that producers largely share the views about there is an interesting variation concerning "fluctuation of input prices from year to year (seeds, fertilizers, pesticides, fuel, energy, feed, etc...)" and "access to credit for farms consumable inputs or materials". Here respondents are almost equally divided among the different response categories. This suggest that the configuration of the individual farm economy has a profound impact on how these factors are experienced by the individual farmer.

Table 20: Market related plans (N=40)

	Yes	No	I do not know	Not relevant
I plan to diversify into new products	57,5 %	37,5 %	2,5 %	2,5 %
I plan to insure against volatile prices and costs to avoid loss of income	37,5 %	17,5 %	12,5 %	30 %
I plan to develop new partnerships (for instance with other farmers, retailers, processors)	32,5 %	57,5 %	7,5 %	2,5 %
I plan to develop new sale channels for my poultry products	35,0 %	52,5 %	10 %	2,5 %
I plan to add value to the poultry that I produce (e.g. conversion to organic)	82,5 %	12,5 %	0 %	5 %
I do not have specific plans	0 %	0 %	0 %	100 %

Table 21: Replies to the question: “What is your current expectation for the succession of your farm?” (N=40)

	Count	%
I have no expectations at present	18	45,0
I expect a family member to take over the farm (e.g. son, daughter, brother)	11	27,5
I expect to sell the property	9	22,5
I expect to give up farming	1	2,5
Other, please specify	1	2,5
Total	40	100

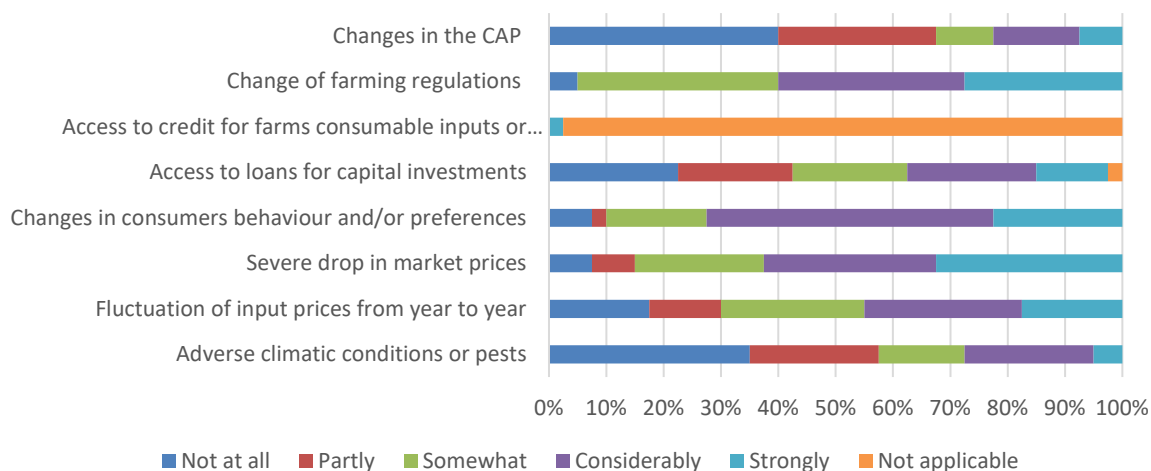


Figure 36: Replies to the question: “To what extent might the following factors influence your decisions regarding your production and farming strategies for poultry production? Please assign a score from 1 (not at all) to 5 (strongly influenced)”

5.7.5 Key findings

In sum, like the vast majority of Danish poultry producer, respondents in this survey are on contract with an abattoir. The survey indicate that in spite of being in a precarious market position with fluctuating commodity prices, that the majority of the poultry producers in Denmark are still satisfied with their sales channels. However, the survey also suggest that there are a large minority who are somewhat unsatisfied with the current state of affairs and they are on the lookout for alternatives in terms of sales channels, production strategies and ways to add value to their products as a strategy to strengthen the farm economy.

6. Concluding remarks

In this report, we have explored policy requirements, market imperfections and their implications for commodity sectors and regions, thereby providing an empirically grounded regional and commodity-sensitive analysis of the resilience of primary producers. In the inquiry we have attempted to move beyond generalized assessments of conditions, strategies and performances by exploring the issue in two case studies, dairy production in the Region of Southern Denmark and poultry production in Central Denmark Region, respectively. In this section, we will briefly draw out the key points that we have identified in the report.

The overall conclusion from the two case studies is that Danish agriculture is currently undergoing a fundamental restructuration and this has also been confirmed by a number of the respondents in the qualitative inquiry. The restructuration consists of a number of factors: 1) Danish agriculture is based on a business model, which is challenged in the world market economy. 2) Previous overinvestments, structural development and a soil price bubble has removed much of the equity in the sector and resulted in poor adaptive capacity. 3) A form of ownership, which is unable to address some of the current challenges, such as ensuring succession and managing the volatile market situation. This produces yet new questions like which mode of ownership will arise out of the restructuration and how the development of a resilient agricultural sector can be ensured?

Interestingly, the survey indicates that the majority of dairy farmers and poultry producers are satisfied with their marketing channels. However, a large minority of the farmers who are somewhat dissatisfied and they currently consider new ways to strengthen the farm economy, for instance by diversifying, developing new partnerships and sales channels or adding value to their products as a strategy to strengthen the farm economy. These results are in many ways remarkable as they indicate that a large share of the producers are considering new ways to develop their production and it also illustrates a community of farmers who are realizing that they are in an exposed position and need to adopt some defence mechanisms. Whether or not the farmers will be able to actualize these alternative strategies, however, also depends on their ability to develop partnerships, mobilize support in the value-chain or supporting industries.

6.1 Comparing the two forms of market chain organization and their relationship

In a number of ways, the two case studies are very similar, both commodity types are bulk commodities that are traded at the world market, where the individual farmer has no real influence on price and quality standards. Hence, both poultry and dairy farmers are currently highly embedded in the world market and therefore continuously need to improve efficiency to accommodate for the decreasing world market prices. Furthermore, both commodity types are produced in a value chain with specialized actors supply inputs and carry out sales activities. Hence, the farmers do not have to take care of these activities, but they can focus their attention on the operation of their farms, however, they also depend on these actors to deliver good prices and services.

Within the dairy sector and to a lesser extent within the poultry sector there is a growing differentiation due to the emergence of an organic and specialty food market, which has provided new business opportunities and therefore also an alternative production strategy for some producers. For instance, around 30% of the Danish fresh milk market is organic and there is a growing production of specialty cheese. The case study further indicates that the producers of these specialty products are generally doing better financially

compared with the producers of conventional products, and currently they are much less exposed to the volatility on the world market. The reason for this difference is that the organic and specialty food market are decoupled from the dynamics in the world market, where fierce competition and falling prices are the trend.

Furthermore, there are different responses to how the shocks and market volatility is managed in the two value chains. Within dairy farming commodity prices have traditionally been fairly stable, therefore, it has been easy for the farmers to predict future prices and therefore also to plan investments. Due to the increasing impact of the world market and abolition of the milk quotas this stability is also abolished, resulting in increasing production and decreasing milk prices.

The actors in the poultry industry have adopted a number of mechanisms that stabilize farmers' production economy and ensures a proper level of investments, such as "*postponed payments*", "*insurance schemes*" and "*contribution margin security*". However, this is absent in the dairy sector where the market fluctuations are individualized and each producer must find a way to deal with the volatile market on his own. Many dairy producers have been unable to do so, due to little or no liquidity and therefore a large number of dairy farms have gone bankrupt. Poultry producers on the other hand have been more cautious with their investments in the past. This is partly due to a classification as "*specialty*" production, which restricts the access to finance and because poultry producers have less investments in farmland. Furthermore, there have been relatively few bankruptcies within the poultry sector and generally, the poultry producers have a more resilient economy. However, particularly one of the poultry abattoirs have experienced economic problems, but in the poultry case the financial troubles are much more distributed in the value chain.

The increasingly volatile market situation poses a huge challenge to the Danish production system, particularly the dairy producers, where production takes place in modern high-tech production facilities. Ideally, this implies management of the environmental impact and animal welfare issues, but these facilities require huge start-up costs and require production at full capacity until the farms can be decommissioned, otherwise investments are not viable. However, this is challenging when prices are fluctuating, as production require a large amount of buffer capital to ensure the financial resilience. In an average farm economy this capital is absent and given the prevalence of private ownership it is difficult to rise. A future challenge is that many of the emerging sustainable technologies, such as self-guided vehicles, biogas technology and various robotic technologies presuppose a large farm size and large investments to be financially viable. Alternatively, a more flexible mode of production could be developed, but it is not given that this production system will fulfil requirement for environment or animal welfare protection.

6.2 The emergence of a new farming identity – the farmer as a businessman

The current crisis has made the banks more cautious in their way of dealing with the farmers. Many farmers depend on overdraft and the banks are in a position where they must decide which farmers they will support and which farmers will have to leave farming either through a bankruptcy or by selling their property. Hence, banks have begun to consider farms as they consider any other type of business.

Banks do not invest in agriculture as such, but provide capital for farmers who invest. This implies that banks have increasingly begun to observe the farmers as "capital managers" and they assess whether or not they are credible as capital managers. Therefore, an important new condition for the farmers is the framing that

banks and other credit and mortgage providers use to assess whether and under which conditions the farmers are credible loan takers. The interviews indicate that the banks take a number of factors into consideration when they make these decisions; including financial measures such as production costs pr. unit, but also a number of other measures such as management qualification, credibility ability to reflect on new ideas and reflect on proposals from outsiders. This has implied a stronger focus on skills, which traditionally have not been considered important in the collaboration with the banks like *“strategic leadership skills”*, *“marital status”* and *“management of employees”*. Increasingly, it becomes important for the farmer to fulfil the image of a “good farmer” in the view of the banks. This is also because the structural development is pronounced and banks tend to favour the “top 25 %”, and if a farmer is not within this category, banks are reluctant to give access to finance.

Recently in Denmark a development in benchmarking tools have taken place in both poultry and dairy production. These tools are used to benchmark farmers against one another and provide the banks with a number of key figures for each farm that continuously benchmark the performance of each farmer against a national average. However, farms and farm economy differ quite a lot, but the assessment practice differ quite a lot from bank to bank. Interestingly, banks are also just an intermediate actor as banks are not just observing farmers, but they are also observed by capital markets and they rely on a continuous access to credit, hence, they have to adapt their practice according to the expectations of their investors.

Due to the capital intensity of the Danish farming sector, the banks are the engine of transformation of the sector, and their decision to finance an investment or not are of crucial importance, not only to the individual farmer, but for the course of the entire Danish farming sector. This course is influenced by the performance of each individual farmer, but it is also constructed by a set of narratives that are determined by the logic of by the financial institutions. The increasing use of benchmarking tools are one example of this transition in the financial institutions. The benchmarking tools are built over historic data and they are not a neutral representation of the farm but a particular view of the farms performance. Hence, the benchmarking tools function as a *“future generating device”* that sort information given to the banker and thereby condition their decision-making concerning the farmers. This suggest that banks prefer a focus on the on the traditional strongholds of the Danish farming sector like standardized products for the world market, rather than an emphasis on a transformation to new modes of production.

Private ownership is by far the dominating form of ownership, although the structural development have resulted in farms at a size that are essentially unfit for private ownership as succession, capital emission and need for a high degree of loans is difficult. However, the establishment of advisory councils consisting of various types of competencies that are considered relevant for the particular farmer is a condition for obtaining new loans and investments in many banks. Structural development implies an increasing focus on leadership and employee management, therefore, there is no room for the farmers who are mainly interested in the practical aspects of farming, because the business aspect is increasingly important if farmers want to survive in farming. The volatile market conditions require a much more focused attention to the timing of investments, sales and purchasing behaviour as these aspects increasingly determine the profitability of the farmers. Furthermore, in the present situation farmers observe an equity loss and therefore it becomes increasingly pressing for the banks to manage their agricultural investments in a more active manner, because it is costly for the banks to keep farmers afloat.

6.3 Managing world market volatility

Both dairy and poultry producers are in a precarious market position, their own production have no influence on the general supply and demand on the world market. At the same time, they are very dependent on external input, but they have no influence on the price of these inputs either. This illustrates that farmers have become pawns in a global value chain and they are increasingly influenced by events they cannot control, like frost in Argentina or a draught in Russia. Hence, farmers are challenged as they cannot control the most important factors for the resiliency of their productions. For many animal and dairy producers, the costs of purchasing fodder is one of the most important costs and prices at the world market fluctuates significantly, therefore the producers need some strategies to manage this uncertainty and market risk.

Hence, the decision to purchase fodder is increasingly important for the overall farm economy and it is one of the ongoing decision-making situations that the farmers are spending many resources to get right. This has some direct consequences for the daily life of the producers as they have to be extremely careful in timing the investments of grain, soy meal and transport. However, there are different strategies at play depending on the temper of the farmer, some farmers have outsourced all their fodder trade to a purchasing club. Others conduct all the purchasing themselves, perhaps with the assistance of salesmen from the fodder companies, their colleagues and friends, or professional advisors. Furthermore, there is a difference in the time horizon of the investment, some farmers purchase for a full year whereas other only purchase small amounts at a time or invest in futures on soy meal and transport, others just purchase when products are on the market. Hence, there are many different strategies in play to manage the world market volatility.

The choice of fodder source is also one of the areas where dairy and poultry production differ, as poultry producers are very dependent on external fodder purchases. Generally, dairy farmers have better options for growing fodder for the animals on their own farm as dairy cows are able to eat grass, roughage and silage that can be produced by the farmer.

6.4 Opportunities and barriers for resilient production

The two cases illustrate different barriers and opportunities for a resilient transition of the Danish agro food system. The poultry case reflects a production system with low entrance barriers, it is cheap to purchase a small production facility and poultry producers can quickly build a sustainable cash flow. However, a few major actors on the supply and processing side that are adapted to a particular mode of production (using specific breeds and producing a uniform product) also dominate the system. In the dairy case it is fairly expensive to purchase a farm and it takes a long time to establish a sustainable cash flow, but through processing milk may be turned into a range of different products. This also indicates an important material difference between the two commodity types that code for a different organization of the value chain. Poultry is a fairly uniform product, where processing does not add much value to the final product, as the final product usually is just the chicken meat. Milk is different as range of different products such as fresh milk, milk powder, butter and cheese are produced, and these products are produced in qualities for many different market segments. Hence, the organization of the dairy value chain is more diverse as there is a better opportunity for demonstrating skills and adding value to the final product. Therefore, enabling new modes of production require a mobilization of a new food system or the enrolment of new actors who are able to understand and rethink consumers' engagement, competencies and roles.

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