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**PRODUCTION COSTS OF MILK, BEEF AND PIG MEAT
IN FINLAND, SWEDEN, DENMARK AND GERMANY**

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Helsinki 2004

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ABSTRACT: In the countries examined, livestock production structures vary significantly. Livestock farms are smallest in Finland and also the stocking density of livestock farms is typically low in Finland and in Sweden compared with Denmark and Germany.

Specific costs are the main production cost elements in each region, and feeding is the most important specific cost. Farming overheads and labour costs are highest in Finland, whereas external cost factors are relatively more significant in Denmark and Germany. The total labour cost is considerable in Finland, especially in relation to the small average size of farms.

Unfavourable regional conditions increase production costs in agriculture. Farm family labour input is substantial on the Finnish livestock farms studied. Use of machinery and building capacity in relation to average farm size is intensive, and depreciation, maintenance and energy costs are respectively significant in Finland and in Sweden. Farms in Finland also suffer from the small size of fields and long distances between them. The northern climate, sparse population and scarcity of certain key resources restrict structural development of Finnish livestock production.

Key words: production costs, livestock production, cost analysis

MARTTI PATJAS. 2003. MAIDON, NAUDANLIHAN JA SIANLIHAN TUOTANTOKUSTANNUKSET SUOMESSA, RUOTSISSA, TANSKASSA JA SAKSASSA. Pellervon taloudellisen tutkimuslaitoksen raportteja n:o 189. 63 s. ISBN 952-5299-76-7, ISSN 1456-3215.

TIIVISTELMÄ: Kotieläintuotannon rakenne vaihtelee huomattavasti tutkimuksen vertailumaissa. Kotieläintilojen keskikoko on pienin Suomessa, ja kotieläintiloilla on peltoa suhteessa eläinmäärään selvästi enemmän Suomessa ja Ruotsissa kuin Tanskassa ja Saksassa.

Muuttuvat kustannukset ovat merkittävin kustannuselementti kaikilla vertailualueilla, ja ruokintakustannus muodostaa valtaosan muuttuvista kustannuksista. Yleis- ja työkustannukset ovat Suomessa korkeimmat ja osuudeltaan merkittävimmät, kun tilan ulkopuolisten panosten käyttö on Tanskassa ja Saksassa selvästi merkittävämpää. Tilojen kokonaistyöpanos on todella huomattava Suomessa erityisesti suhteessa pieneen tilakokoon.

Epäsuotuisat tuotanto-olot nostavat kustannuksia huomattavasti, mikä näkyy etenkin tutkimuksen suomalaisten kotieläintilojen mittavassa työkustannuksessa. Kone- ja rakennuskapasiteetti on suhteessa tilakokoon suuri ja tilojen poisto-, kunnossapito- sekä energiakustannukset ovat korkeat Suomessa ja Ruotsissa. Lisäksi peltolohkot ovat Suomessa pieniä ja etäällä toisistaan. Pohjoinen ilmasto, harva asutus ja tiettyjen keskeisten resurssien niukkuus rajoittavat samalla merkittävästi kotieläintuotannon rakennekehitystä Suomessa.

Asiasanat: tuotantokustannukset, kotieläintuotanto, kustannusanalyysi

FOREWORD

During recent years, agriculture in Finland has encountered significant challenges. Finnish agriculture became part of the Common Agricultural Policy of the EU less than a decade ago, and in the last few years, the Common Agricultural Policy has also changed notably. Furthermore, there are significant pressures in agricultural markets and policy with major effects on future livestock production. Hence, it is important to study the qualifications and characteristics behind the competitiveness of livestock production. This is particularly vital in less favourable production areas such as Finland.

The present study analyses the production costs of milk, beef and pig meat in Southern Finland, Sweden, Denmark and Germany. These comparison countries are competitors for Finland's milk and meat production, and their views and actions concerning agricultural policy issues also affect the scope for action in Finnish agriculture. This study focuses on the structural cost differences between the comparison regions and describes central cost factors affecting livestock production in different production circumstances.

Pellervo Economic Research Institute would like to thank the Ministry of Agriculture and forestry in Finland for financing the study. The author would also like to express gratitude to the FADN unit of the European Commission and the farm accountancy group of MTT Economic Research for significant assistance with the basic data of this study.

Helsinki, January 2004

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TIIVISTELMÄ

Kotieläintuotanto on keskeinen osa maataloutta niin Suomessa kuin koko EU:ssakin. Viime vuosina sektoriin on kohdistunut voimakkaita muutospaineita niin kotieläintuotteiden markkinoiden kuin tuotantoa voimakkaasti ohjaavan maatalouspolitiikankin muutostekijöiden takia. Keskeisiä kotieläintalouteen vaikuttavia yleisiä markkinatekijöitä ovat mm. vapautuva ja jatkuvasti kiristynyt kilpailu elintarvikekaupassa sekä Keski-Euroopassa esiin tulleet eläintautikriisit.

Maatalouspolitiikan muutostekijöistä merkittävimpiä ovat tällä hetkellä EU:n itälaajeneminen vuonna 2004, EU:n yhteisen maatalouspolitiikan uudistaminen sekä Suomen kannalta tärkeät vuoden 2003 aikana käydyt Etelä-Suomen kotieläintalouden 141-tukineuvottelut. Näiden seikkojen takia Suomen kotieläintalouden asemasta ja kilpailukykyyn liittyvistä tekijöistä tarvitaan monipuolista ja vertailukelpoista tietoa.

Tässä tutkimuksessa on vertailtu maidon, naudanlihan ja sianlihan tuotantokustannuksia Suomessa, Ruotsissa, Tanskassa ja Saksassa. Kyseiset vertailumaat ovat merkittäviä Suomen kotieläintuotannon kannalta, ja näiden maiden ajamat yhteiseen maatalouspolitiikan liittyvät näkökohdat ovat tärkeitä myös Suomen kannalta.

Tutkimuksessa selvitettiin maidon- ja lihantuotannon ominaispiirteitä Suomessa ja näissä kilpailijamaissa, määritettiin tuotantokustannusten taso eri alueilla ja analysoitiin tuotantokustannusten rakenteellisia eroja vertailualueiden välillä. Tarkastelu kohdistettiin pääasiassa Etelä-Suomen kotieläintuotantoon, ja vertailumaiden osalta mukaan otettiin soveltuvin osin ne alueet, jotka ovat merkittäviä maidon- ja lihantuotannon kannalta. Näiksi alueiksi muodostuivat Keski- ja Etelä-Ruotsi (maito, naudanliha) sekä Skoone (sianliha), Tanska (maito, naudanliha) ja Saksan osalta Schleswig-Holstein (maito) ja Ala-Saksin ja Nordrhein-Westfalenin yhdistetty tarkastelualue (naudanliha, sianliha).

Keskeinen tutkimusmateriaali koostuu EU:n maatalouden kirjanpitojärjestelmän (FADN) tila-aineistosta vuosilta 1997-2000, ja materiaalia on lisäksi täydennetty kansainvälisillä ja kotimaisilla tilastoaineistoilla, tutkimustiedoilla ja tuotannon suunnittelutiedoilla. Tarkastelussa tuotantokustannukset on kohdistettu mahdollisimman vertailukelpoisesti lopputuotteille eli tilojen tuottamille maito- ja lihakiloille.

Tarkastelussa olevien kirjanpitoilojen tuotantorakenne oli varsin vaihteleva, sillä Suomen tilat olivat muiden alueiden tiloja pienempiä niin eläinmäärältään kuin peltoaltaankin. Eläintiheys oli suomalaisilla ja ruotsalaisilla maito- ja nautatiloilla selvästi alempi kuin tanskalaisilla ja saksalaisilla maitotiloilla. Sikatilojen osalta suomalaisilla tiloilla oli puolestaan tuntuvasti alhaisempi eläintiheys kuin muiden alueiden sikatiloilla, ja tilakokoon suhteutettuna suomalaisilla tiloilla tehtiin selkeästi eniten maatalouden töitä.

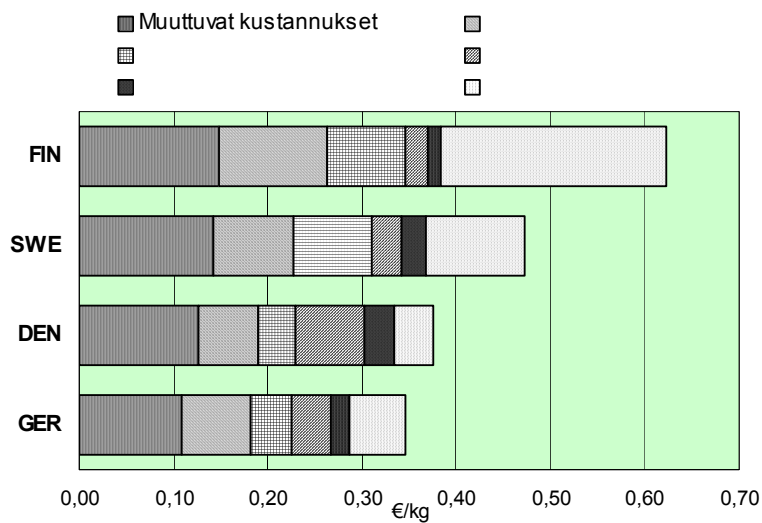
Kustannuslaskelmien tulokset

Maidontuotannossa tuotantokustannukset nousivat selkeästi korkeimmiksi Etelä-Suomen maitotiloilla. Maitokiloa kohti laskettuna kokonaiskustannus oli Etelä-Suomen maitotiloilla kirjanpitoaineiston mukaan kaikkiaan runsaat 60 senttiä kilolta, ja Ruotsin vertailutiloilla 24 %, Tanskassa 38 % ja Saksan Schleswig-Holsteinissa 44 % tätä alempi (kuva 1)

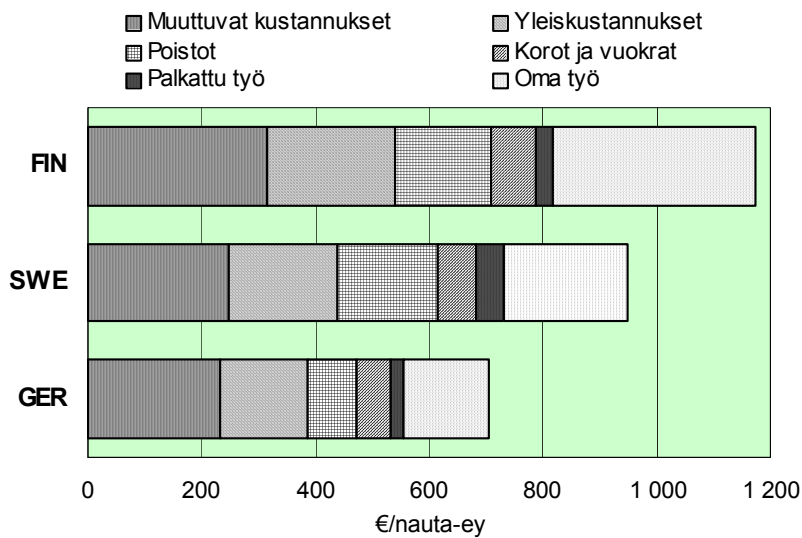
Naudanlihatilojen kustannuksia oli olennaisesti maidontuotantoa vaikeampi kohdentaa lopputuotteelle, koska aineisto ei sisältänyt tilojen tuottamia naudanlihamääriä. Lisäksi kirjanpitoaineiston nautatiloilla tuotanto koostui tyypillisesti useammasta eri tuotantosunnasta ja nautatilojen tuotantorakenne vaihteli voimakkaasti alueiden välillä. Tästä syystä vertailu oli tehtävä valittujen tilaryhmien välillä suhteuttamalla naudanlihan kustannukset nautaeläinten määrään.

Nautaeläinyksikköä kohti laskettuna naudanlihan tuotantokustannus nousi Etelä-Suomessa noin 1 200 euroon (kuva 2). Ruotsin vertailutiloilla kokonaiskustannus jäi 19 % ja Pohjois-Saksassa 39 % alemmaksi kuin Etelä-Suomen nautatiloilla. Karjakokoon suhteutettu tuotantokustannus kohosi kirjanpitoaineiston mukaan nautatiloilla maitotilojen tavoin korkeimmaksi Suomessa johdonmukaisesti pääasiassa samoista syistä kuin maitotiloillakin.

Myös sikatilojen osalta kustannukset nousivat korkeimmiksi Etelä-Suomessa vuosina 1997-2000 (kuva 3). Sianlihakiloa kohti laskettuna kokonaiskustannus nousi Etelä-Suomessa kirjanpitoaineistosta saatujen tulosten mukaan noin 2,10 euroon, kun Etelä-Ruotsissa ja Saksassa tuotantokustannus jäi runsaaseen 1,70 euroon kilolta eli lähes viidenneksen alemmas. Tanskassa sianlihan tuotantokustannukset jäivät kirjanpitoaineiston mukaan selvästi alimmaksi eli runsaaseen 1,40 euroon kilolta; noin kolmanneksen Etelä-Suomen kustannustasoa alemmas.



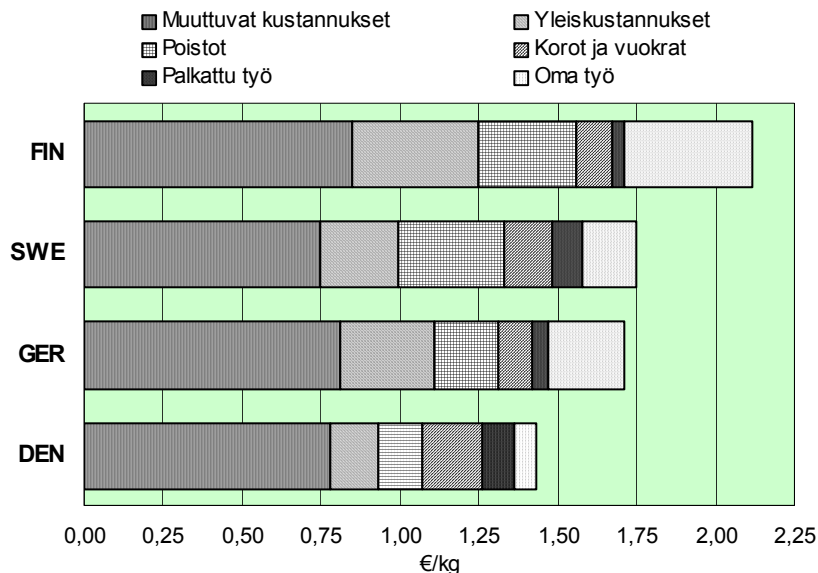
Kuvio 1. Maidon keskimääräiset tuotantokustannukset¹ FADN-maitotiloilla vuosina 1997-2000.



Kuvio 2. Naudanlihan keskimääräiset tuotantokustannukset² FADN-nautatiloilla vuosina 1997-2000.

¹ Maidon osalle määritetty osuus maitotilojen kokonaiskustannuksista.

² Naudanlihan osalle määritetty osuus nautatilojen kokonaiskustannuksista.



Kuvio 3. Sianlihan keskimääräiset tuotantokustannukset³ FADN-sikatiiloilla vuosina 1997-2000.

Näkyvimmissä kustannuseroissa selittäviksi tekijöiksi muodostuivat Etelä-Suomen korkeat muuttuvat kustannukset (ruokinta) ja yleiskustannukset (koneiden ja rakennusten kunnossapito, muut yleiskustannukset, energia) sekä erityisesti mittava suhteellinen työmäärä verrattuna muihin tarkastelumaihin. Sekä Ruotsissa että Suomessa poistot olivat merkittävät, mikä on seurausta tilakokoon nähden mittavasta omasta kone- ja rakennuskannasta. Maksetut korot olivat puolestaan suhteessa selvästi korkeimmat Tanskassa, jossa tilat ovat tyypillisesti hyvin velkaantuneita ja tiloja lainoitetaan yleisesti hyvin pitkällä laina-ajalla. Maksetut vuokrat taas olivat merkittävät Saksan kirjanpito-tiloilla.

Tarkempi kustannustekijöiden analyysi toi esille, että alueellisten tuotantorakenteiden erojen kuten keskimääräisen tilakoon vaihtelun lisäksi alueellisilla olosuhdehaitoilla on selvästi merkitystä tuotantokustannusten muodostumisessa. Suomen tarkastelutiloilla ilmasto-olot, pienet peltolohkot ja pitkät etäisyydet kasvattavat kustannuksia vertailumaihin verrattuna. Näiden tekijöiden vaikutus näkyy selkeästi kaikissa tämän tutkimuksen tarkastelluissa tuotantosuunnissa.

³ Sianlihan osalle määritetty osuus sikatiilojen kokonaiskustannuksista.

Tutkimuksen keskeiset tulokset ja johtopäätökset voidaan tiivistää seuraavasti:

Kotieläintuotannon rakenne vaihtelee huomattavasti alueiden välillä

- Nauta- ja sikatilat ovat Suomessa selvästi pienempiä kuin Ruotsissa, Tanskassa ja Saksassa.
- Tiloilla on enemmän peltoa suhteessa eläinmäärään Suomessa ja Ruotsissa kuin Tanskassa ja Saksassa.
- Alueelliset tekijät (mm. hyvien peltolohkojen ja osaavan työvoiman niukkuus) ja ulkoiset tekijät (ympäristörajoitteet) rajoittavat tilojen rakennekehitystä.

Tuotantokustannusten rakenne on erilainen tutkimusalueiden välillä

- Välittömät kustannukset (ruokinta) ovat keskeinen osa kotieläintilojen tuotantokustannuksia kullakin tutkimusalueella.
- Yleiskustannukset ovat korkeammat Suomessa kuin muilla vertailualueilla.
- Työn menekki ja siten työkustannukset ovat erityisen korkeat Suomessa.
- Ulkoiset tuotantokustannustekijät (korot, vuokrat, palkat) ovat suhteellisesti paljon merkittävämmät Tanskassa ja Saksassa kuin Suomessa.

Työvoiman käyttö on hyvin erilaista vertailualueilla

- Kokonaistyöpanos suhteessa tilakokoon on Suomessa erittäin suuri paikallisten tuotanto- ja ilmasto-olojen takia.
- Palkatun työvoiman ja urakointityön käyttö on selvästi yleisempää Tanskassa, Saksassa ja Ruotsissa kuin Suomessa.

Alueelliset olosuhteet vaikuttavat selkeästi tuotantokustannuksiin

- Alueelliset tuotanto-olot voivat tutkimustulosten mukaan nostaa merkittävästi tuotantokustannuksia maataloudessa.
- Suomessa maatilat kärsivät peltojen pienestä koosta ja lohkojen välisistä pitkistä etäisyyksistä.
- Kone- ja rakennuskanta on suhteessa tilakokoon Ruotsissa ja erityisesti Suomessa suurempi kuin Tanskassa ja Saksassa.

- Poistot, kunnossapito- ja energiakustannukset ovat huomattavat Suomessa ja Ruotsissa.
- Pohjoinen ilmasto ja harva asutus sekä useiden tärkeiden tuotantoresurssien niukkuus ovat keskeiset suomalaista nauta- ja sikataloutta rasittavat tekijät niin tuotannon kuin rakennekehityksenkin kannalta.

1. INTRODUCTION

1.1 Background

1.1.1 Market and policy changes

Agricultural markets

Livestock husbandry is an essential part of agricultural production throughout the European Union. Milk production is the key line of production of the EU, with a 20% share of the total agricultural production. In Finland, milk production is also the most significant line of production. Although dairy farms now constitute roughly one fourth of all Finnish farms, the annual value of produced milk makes up about one half of the value of livestock output and one third of the total agricultural output. As the quantity of produced milk has grown during the last few years despite a decrease in the number of dairy farms, milk production is likely to retain its central role in Finnish agriculture.

In meat production, attention in the EU has focused on animal disease crises in several member states. In Finland, however, the trust of consumers in the safety of domestic food has remained stable. Consumption of pig meat and especially poultry meat has increased during recent years. At the same time, Finnish beef production has been unable to cover domestic demand. The preservation and development of high quality domestic meat production and its competitiveness is seen as very important in Finland.

During recent years, agricultural producer prices have declined in the EU as the Common Agricultural Policy has undergone significant changes, and the world trade of agricultural products has also been under strong liberalisation pressures. In the future, both the continuously tightening competition on food markets and the seemingly slow but inevitable progress of trade liberalisation will challenge agricultural production.

This is particularly challenging for production areas where climatic conditions are not particularly favourable for agriculture. Such unfavourable conditions include a short growing season and long and cold winters. In such circumstances, crop production yields tend to be low and production costs often rise considerably both in livestock and crop production.

Mid-term review of CAP

When the Common Agricultural Policy (CAP) of the European Union was renewed with the Agenda 2000 reform, it was also agreed that the realised effects and the execution of the Agenda reform would be jointly evaluated in the so-called mid-term review. At the beginning of 2003, the European Commission introduced a package of proposals to reform the CAP further, and on 26 June 2003, EU farm ministers adopted a fundamental reform of the CAP.

The Commission argued that the mid-term review will make European agriculture more competitive and market oriented, promote a substantial simplification of the CAP, facilitate the enlargement process and help to better defend the CAP in the WTO. In addition, the proposed adjustments will allow maximum flexibility in the production decisions of farmers while guaranteeing them income stability and the implementation of the reform will provide further encouragement for more sustainable farming practices. According to the Commission, these changes will enable the EU to ensure a transparent and more equitable distribution of income support for farmers, and to better respond to what consumers and taxpayers want.

The key elements of the reform are (European Commission 2003):

- a single farm payment for EU farmers, that is independent of production ("decoupling"); limited coupled elements
- linking these payments to respect for environmental, food safety, animal and plant health and animal welfare standards, as well as the requirement to keep all farmland in good condition ("cross-compliance")
- a stronger rural development policy with new measures to promote the environment quality and animal welfare and to help farmers to meet EU production standards starting in 2005
- a reduction in direct payments ("modulation") for bigger farms to finance the new rural development policy
- a mechanism for financial disciplines to ensure that the farm budget fixed until 2013 is not overshoot
- revisions to the market policy of the CAP:
 - reduction of the monthly increments in the cereal sector by half

- a wider ranging and accelerated milk reform with differentiated price cuts for butter (-25%) and skimmed milk powder (-15%) and the maintenance of milk quotas until 2014/15

As was jointly determined in the Agenda 2000 reform negotiations, the whole area of Finland is currently classified as suffering from climatic disadvantages, and is therefore entitled to receive a special rural subsidy for less favourable areas (LFA). Finland's statement concerning the mid-term review proposal emphasised that the reform in general could be harmful for keeping up motivation to produce in the disadvantaged production areas of the EU. Due to this, the link between production and direct payments should not be completely removed (MMM⁴ 2003).

The decoupling of direct payments will leave the stress of direct payments unchanged, meaning that the new direct payment system would continually favour the most favourable production areas. The reason for this is that the payment level is determined by the regional production level; in other words, the higher the yield of arable crops, the higher the direct payment for them.

National aid in Southern Finland according to Article 141

National aids are an essential part of the overall support for agriculture in Finland. The objective of the national aid scheme is to complement the measures based on the Common Agricultural Policy of the EU and secure the preconditions for agriculture in the different production lines and regions, as well as maintain the viability of rural areas.

The most significant change in national aids occurred when the transitional aid of 1995-1999 was replaced by the national aid for Southern Finland based on Article 141 of Finland's accession treaty with the EU. In December 1999 the Commission made a decision on the so-called aid for serious difficulties in Southern Finland during the subsequent four years. Based on this decision, Finland was able to grant national direct payments to livestock production and horticulture as well as increased investment aid until the end of 2003. The existing national aid scheme consists of three main measures: national aid for Southern Finland, northern aid paid in Cen-

⁴ The Ministry of Agriculture and Forestry in Finland.

tral and Northern Finland and national aid for arable crops. Most of the national aid (70%) is paid for livestock production (MMM 2003).

The agreement concerning the aid for livestock production in Southern Finland had to be renegotiated during 2003, as the aid system was still only temporary in nature. Finland's main objective in the negotiations was to obtain a long-term and stable national aid scheme, which would ensure production requirements in all parts of the country. However, a temporary solution from 2004 to 2007 was achieved.

1.1.2 Objectives of the study

As there are significant pressures in agricultural markets and policy with major effects on future livestock production, it is important to study the qualifications and characteristics behind the competitiveness of livestock production. This is particularly vital in less favourable production areas such as Finland.

The present study analyses the production costs of milk, beef and pig meat in Southern Finland, Sweden, Denmark and Germany. These comparison countries are the most important market competitors for Finland's milk and meat production, and their views and actions concerning agricultural policy issues also affect the scope for action in Finnish agriculture. Furthermore, livestock production in these countries is also essentially the dominant line of production.

The key questions of this study can be expressed as follows:

- What is the structure of production costs of milk, beef and pig meat, and how high are these costs in Finland compared with the other countries?
- What are the explanatory factors behind the regional differences?

This study focuses on the structural cost differences between the selected comparison regions. As the primary data resource (Farm Accountancy Data Network FADN) is based on results from sample farms, it is relevant to study relative differences in actual production unit costs rather than only the estimated absolute production costs per produced unit.

Other production cost studies

Previous production cost studies concerning livestock production carried out in Finland include those by Riepponen (2003), Talpila (1999), Ala-Mantila & Riepponen (1998), Mäkimattila (1998), Rantala (1997, 1996), Ylätaalo et al. (1996) and Palonen & Oksanen (1995).

The Farm Accountancy Data Network (FADN) unit⁵ of the European Commission has also studied the production costs of milk and beef (European Commission 2001a, 2001b). These studies utilize the FADN farm data rather similarly to the present study, but with a somewhat different approach concerning cost allocation.

The International Farm Comparison Network (IFCN) has examined livestock production and also production costs. The IFCN is comprised of agricultural experts from several countries who collect and analyse farm data from so-called typical farms in various production regions all around the world. The IFCN has published studies on milk production in Germany and Central Europe, as well as comparisons between other EU countries and countries outside the EU (IFCN 2002).

During recent years, national studies of livestock production have been published in several EU countries and there is also quite a lot of material concerning cost calculations to aid in planning livestock production. However, there have been no studies that follow the approach of this research, which compares livestock production between Finland, Sweden, Denmark and Germany.

In the first chapter of the report, the background and objectives of the study are presented and characteristics of comparison regions are described. In the second chapter, the data and cost calculation methods are introduced. Production cost results for milk, beef and pig meat in the comparison regions are described and analysed in the third and fourth chapters. Finally, in the fifth chapter, the conclusions are presented.

⁵ Directorate-General VI, Analysis of the Situation of Agricultural Holdings.

1.2 Regions in cost comparison

Finland

Agriculture, together with food industry, is an important sector in Finland, as it covers the whole food chain, including primary production, processing and all required services of the food sector. With exports and domestic demand considered, the aggregated food sector employs over 300 000 persons, which is about 13% of all employed labour in Finland (Suomen maatalous ja maaseutuelinkeinot 2003). Of this, about 100 000 persons or somewhat over 4% of all employed labour works in agricultural production.

In 2002 there were approximately 73 400 Finnish farms with at least one hectare of arable area. However, the number of farms has declined considerably during Finland's EU membership, as in 1995 there were still 95 500 active farms in production. While the total cultivated area has remained at approximately 2.2 million hectares, the average area of arable land per farm grew from 22.70 hectares to 30.30 hectares between 1995 and 2002.

As the number of farms has declined and the average arable area has consistently grown, the distribution of different farm size classes has also changed. Since 1995, the proportion of farms with less than 20 hectares has dropped below 50% and that of farms with more than 50 hectares has doubled to 16%. However, production is still based on relatively small farms, as the share of Finnish farms with more than 100 hectares is under 3%.

Agricultural production is clearly based on family farming, as private persons run 89% and family companies and partnerships operate 11% of all active agricultural holdings. The average age of Finnish farmers has gradually risen to 49 years, as the number of younger farmers who enter farming and replace older farmers has markedly declined during the EU membership years.

The percentage of livestock farms is currently about 40%, and 55% of all active farms are crop producers⁶. In 1995, the corresponding shares were 52% and 39%. Hence, the significance of crop production in terms of the number of farms has grown, but livestock production is still the main sector with respect to the value of Finnish agricultural production.

About 27% of Finnish farms are dairy farms, 7% produce mainly beef and 5% are pig farms. Milk production constitutes approximately one half of

⁶ The remaining active farms undertake horticultural or some other production.

the total market value of agricultural production in Finland. Beef production's share is about 10% and pig production accounts for around 14%. In 2002, Finnish livestock farms produced 2 376 million litres of milk, 90 million kilos of beef and 184 million kilos of pig meat.

In Southern Finland⁷, the number of active farms has declined from 43 000 to 33 400 during EU membership (-23%). The average area of arable land (33.73 hectares) is slightly larger in Southern Finland than in the country as a whole. Dairy farms make up 16%, beef producers 5% and pig farms about 6% of all active farms in Southern Finland. Thus, the proportion of cattle farms is somewhat lower and the proportion of pig farms is slightly higher in Southern Finland than in the whole of Finland on average.

Sweden

In 2001 there were approximately 74 300 agricultural holdings with at least two hectares of arable land (SCB 2002). The average area of arable land was 36 hectares per farm. Production is mainly concentrated below the 60th parallel, in other words clearly south of Finland. More than 60% of arable land can be found on the fertile plains of southern and central Sweden (Slättbygds-län).

In 2000, Sweden produced 3 348 million litres of milk, 150 million kilos of beef and 277 million kilos of pig meat. Animal husbandry is the dominant line of production, as crop production dominates only in the central part of Sweden. Altogether, 40% of Swedish farms had cattle and 6% had pigs. Some 16% of all farms had dairy cows and 18% kept suckler cows. Thus, there were clearly fewer farms with dairy cows and significantly more farms with suckler cows in Sweden than in Finland. There were 35 dairy cows per herd on average and the majority of dairy cows were kept on farms with 25 to 49 cows. Beef producing farms had about 13 cattle per holding. Some 46% of all Swedish farms had no livestock.

The structure of Swedish cattle husbandry changed markedly during the 1980s and 1990s. By 2001, the number of dairy cows decreased to about 418 000 (down by 60% from 1980) while number of suckler cows doubled to around 166 000. Extensive forage production and the use of low-yield fallows are very typical of Swedish suckler cow production. A total of 30% of all Swedish cattle were kept in two provinces, Västra Götaland in the southwest

⁷ NUTS region classification not equal to subsidy areas A and B in southern Finland.

and Skåne in the southernmost part of Sweden. However, the proportion of farms with cattle was highest in the southern central part of the country. Therefore, Swedish cattle production is clearly concentrated to the south of southern Finland.

Pig farms are located in the southwest and south of Sweden. In 2001, one third of all pigs in the country were kept in Skåne. The largest pig farms were situated in the southern plains. As in cattle production, Swedish pig production is therefore concentrated in areas with more favourable climatic conditions than Finland. In 2001, farms producing pigs kept 71 sows and farms with slaughter pigs kept about 301 pigs on average.

Denmark

Agricultural land makes up 62% of the total area of Denmark. In 2001, the number of agricultural holdings was about 51 600 (down by 20% from 1990) and the average size of all Danish farms was 51.30 hectares. More than a third had over 50 hectares of arable area (Danish Farmers' Unions 2002).

For Denmark, agricultural production is an essential part of the national economy. In 2001, agricultural exports made up about 14% of Denmark's total exports, even though agriculture's share of active employment has been only 2%. Danish farms produced 4 553 million litres of milk, 169 million kilos of beef and as much as 1 836 million kilos of pig meat (Danmarks Statistik 2003). Of the total output value of agriculture in Denmark, livestock production constituted 63%. Pig production accounted for 53%, milk production 28% and beef production 5% of livestock production. Thus, the pig sector is clearly the dominant line of Danish agricultural production.

The structure of livestock husbandry has changed notably during the last few years. By 2001, only 8% of Danish farms had both cattle and pigs, while in 1990 about 18% had both. At the same time, the percentage of farms without cattle and pigs rose from 35% to 42%, while number of pigs increased by as much as 20%. In 2001, 84% of all pigs were kept on specialised pig farms and 85% of all cattle were on specialised cattle farms.

There were about 1.9 million head of cattle on 22 400 farms in 2001, and 0.6 million head of dairy cows, which means a decrease of 13% since 1990-94. The number of suckler cows had increased to 130 000 head. The number of dairy herds totalled 9 800 in 2001, which was 49% down compared to 1990-94. Almost one third of dairy farms had more than 75 cows.

Dairy herds are most common on farms larger than 50 hectares, while herds of suckler cows are typical on relatively small farms. The recent growth in the average herd size of Danish cattle farms is likely to accelerate in the future (Stendal 2002, Barrett & Stendal 2003).

In 2001, 12 900 holdings kept pigs, representing a 48% decrease from 1990-94. At the same time there had been a considerable increase in the average size pig herds, as total number of pigs had grown to 12.6 million. In 1990-94 there were 386 pigs per holding, which increased to 975 pigs per holding by 2001; 2 200 holdings had more than 200 sows, representing 73% of the total number of sows. Altogether, 2 800 holdings had between 200 and 500 pigs for slaughtering and 2 400 holdings had more than 500 pigs for slaughtering.

Germany

Germany is one of the main agricultural producers in the European Union. Germany's share of total milk production in the EU reached 23% in 2001, while its share of the EU's beef and pig meat production was 19% and 22%, respectively (Deutscher Bundestag 2003). In that year, Germany produced 28 191 million litres of milk, 1 403 million kilos of beef and 3 903 million kilos of pig meat.

The total value of German agricultural output was 40 700 million euros in 2001, of which livestock products made up nearly 21 000 million (51%) and plant production (mainly arable crops, vegetables, wine, fruit) comprised the rest. Of the total value of livestock production, milk's share was 45%, while pig meat made up 30% and beef 12%.

In 2001 there were 412 000 active⁸ agricultural holdings in Germany. Western parts of Germany had about 383 000 farms and 28 400 farms were situated in the former East Germany. The average size of all active German farms was a little over 41 hectares of agricultural area.

The largest number of farms was found in Bavaria (140 400) in southern Germany. However, the largest farms of the country were those that had typically been state-owned farms in the former East Germany, where the average sizes were, depending on the state, between 122 and 269 hectares. About one third of the whole agricultural area but only 7% of holdings are located in eastern Germany.

⁸ With at least 2 hectares of agricultural area.

In the east, the share of farms with more than 100 hectares was also consistently very high: from 18% in Saxony to 44% in Mecklenburg-Vorpommern. In the western states, largest farms were found in Schleswig-Holstein (53.1 hectares) and in Lower Saxony (44.1 hectares). The percentage of farms bigger than 100 hectares was highest in Schleswig-Holstein, at 14%.

A little over 80% of all active farms in Germany practiced either cattle or pig husbandry or both in 2001 (Statistisches Bundesamt 2002); 217 500 farms (53%) had cattle and 131 800 farms (32%) had dairy cows. The majority of farms with cattle were found in Bavaria (38%) and in Lower Saxony (15%), as were the majority farms with dairy cows (46% and 14%, respectively).

In 2001 there were 14.6 million head of cattle in total with 4.5 million dairy cows and 736 000 suckler cows. Altogether, 28% of cattle were kept on farms in Bavaria and 19% in Lower Saxony, whereas 31% of dairy cows were in Bavaria and 17% in Lower Saxony. Cattle farms kept approximately 67 head of cattle per holding. On dairy farms, the number of dairy cows averaged 34.5 and farms rearing cattle had about 14 suckler cows per holding.

About 115 500 active farms (28%) kept pigs. These farms had a total of 25.8 million pigs, which included 10.1 million pigs for slaughtering and 2.6 million sows. Altogether, 29% of pig farms were in Bavaria, 18% were in Lower Saxony and 15% in North Rhine-Westphalia. However, 29% of pigs were kept in Lower Saxony, 24% in North Rhine-Westphalia and only 15% in Bavaria. This illustrates how intensive pig production is in Lower Saxony and in North Rhine-Westphalia. On average, German pig farms had 223 pigs per holding, while farms specialized in pigs for slaughtering had 142 pigs and farms breeding pigs had 59 sows per holding.

Schleswig-Holstein is the northernmost state of Germany, just south of Denmark. In 2001 there were 19 200 active farms in this state, which had on average 53 hectares of agricultural area per holding. About 11 000 farms kept cattle, of which 6 600 farms had dairy cows. There were 362 200 dairy cows, making an average of 54.9 dairy cows per dairy farm, which represented a significantly larger dairy herd size than the German average. In total, 53% of dairy farms had more than 50 dairy cows (Agrarreport Schleswig-Holstein 2002).

Lower Saxony is situated to the south of Schleswig-Holstein. In 2001 there were about 60 200 active farms in this state, with 44.1 hectares of

agricultural area on average. Altogether, 32 400 or more than half of all farms kept cattle, of which a little over half had dairy cows and 19% had suckler cows. In total there were 2.8 million head of cattle, and cattle farms had an average of 87 head of cattle per holding. In 2001, 20 500 farms had pigs, of which a little over half raised pigs for slaughtering. Pig farms averaged 366 pigs per holding, as there were 7.5 million pigs altogether. Farms concentrated on pig meat production had an average of 325 pigs for slaughtering per holding; farms producing mainly pigs had 66 sows per holding.

North Rhine-Westphalia, south of Lower Saxony, is a densely populated state with extensive industrial production, but also with significant agricultural production. In 2001 there were 50 900 active farms, which had approximately 29.4 hectares of agricultural area per holding. Altogether, 24 800 farms had cattle, of which 46% had dairy cows and 25% suckler cows. There were 1.5 million head of cattle, making an average of 61 head of cattle per cattle farm. In 2001, 6.1 million pigs were raised on 17 300 farms, of which 55% had pigs for slaughtering. On average, farms producing pig meat had 276 pigs for slaughtering and farms mainly producing pigs had 70 sows per holding.

A summary of the farms and milk, beef and pig meat production in Finland, Sweden, Denmark and Germany is presented in Tables 1 and 2 on the following page. These figures clearly illustrate the differences between the examined countries in livestock production structures. In the following chapters, several key aspects of the structural differences in livestock production are examined in further detail.

Table 1. *Agricultural and livestock holdings in 2001.*

	Agricultural holdings		Livestock holdings		
	Number in thousands	Average size, hectares	Dairy farms, thousands	All cattle farms, thousands	Pig farms, thousands
Denmark	51.6	52.3	9.8	22.4	12.9
Finland	75.3	29.5	19.8	26.7	4.0
Germany	411.8	41.5	131.8	217.5	115.5
Sweden	74.3	40.4	11.9	29.7	4.5

Sources: Danmarks Statistik (DK), MMM (FIN), BMVEL (D), SCB (S).

Table 2. *Livestock numbers and production in 2001.*

	Livestock numbers			Livestock production		
	Dairy cows, millions	All cattle, millions	Pigs, millions	Milk, million litres	Beef, million kilos	Pig meat, million kilos
Denmark	0.6	1.9	12.6	4.553	169	1.836
Finland	0.4	1.0	1.3	2.376	90	184
Germany	4.5	14.6	25.8	28.191	1.403	3.903
Sweden	0.4	1.7	1.9	3.348	150	277

Sources: Danmarks Statistik (DK), MMM (FIN), BMVEL (D), SCB (S).

2. IMPLEMENTATION OF COST CALCULATIONS

2.1 Research material

2.1.1 FADN farm data

The Farm Accountancy Data Network (FADN) of EU agriculture forms the central source of the research material of this cost analysis. The accountancy network consists of about 60 000 accountancy farms, which represent roughly four million active farms in the European Union. In Finland there are a little over 1 000 accountancy farms within the FADN system and they represent about 50 000 active Finnish agricultural holdings. MTT Economic Research administers the Finnish accountancy farm system.

The FADN system includes comprehensive data that describes, for example, the annual income, production costs and profitability of accountancy farms in various parts of the EU. The accountancy data is divided into different farm size classes⁹, production regions and lines of production.

The key farm accountancy data used in this study were obtained from the FADN unit¹⁰ of the European Commission through a specified data request. For some regions and lines of production, this practice enabled a more illustrative and detailed examination than the basic Standard Results of the FADN. This approach was essential when studying pig farms, because the basic FADN results consider pig and poultry farms as one aggregated farm group.

Limitations of cost analysis

This type of comparative cost analysis has several limitations that must be taken into account. First of all, the structure of livestock production varies quite considerably in the examined countries. There are distinct differences in, for instance, the typical farm size, use of labour, use of arable area and structure of fixed capital. In other words, the average quantity of livestock and agricultural area varies markedly, paid labour and unpaid labour are used differently and machinery and buildings are used and owned in very different ways in separate production areas. Diverse climatic conditions and

⁹ Economic size in terms of regionally determined Standard Gross Margins.

¹⁰ Analysis of the Situation of the Agricultural Holdings.

circumstances of agricultural production are inevitably the main explanatory factors behind these differences.

Secondly, there were limitations concerning the FADN system that had to be taken into consideration when collecting and utilizing the research material. The FADN farm data is based on farm samples that are limited for some regions and lines of production, and participation in the FADN system is also voluntary. Although variation within examined farm groups is wide, it can be assumed that the results from FADN farms are quite representative of active agricultural holdings in the EU.

Thirdly, production costs have not been allocated to any specific product in the FADN data, as costs are examined only regarding the entire agricultural production of accountancy farms. As with livestock production, other income almost always accumulates, such as that from crop production or sidelines, which has to be considered in allocating costs to livestock products. On dairy farms, in addition to milk, beef is also produced and sold to some extent. Distinguishing between the costs of milk and beef in this case is challenging. The method used in this study concerning cost allocation for different lines of production is described in more detail in chapter 2.2.

Fourthly, FADN farm data did not include all the information needed to estimate costs per produced unit. The annual quantity of produced milk was included in dairy farm data and thus the production cost per kilo of milk could be calculated. However, the quantities of beef and pig meat produced on cattle and pig farms were not included in the FADN data and had to be estimated in other ways. For beef, attention had to be focused on the production cost per unit livestock.

Livestock products are far from homogenous and beef is an especially complex product to assess compared with milk and pig meat. The structure of production¹¹, typical cattle breeds and hence the type of produced beef differs considerably between regions. Furthermore, the share of beef in the production and income of the cattle farms in this study is significantly smaller than the share of milk and pig meat in the production of the dairy and pig farms. This also weakens the interpretation of results concerning the allocation and analysis of the production costs of beef.

¹¹ E.g. frequency of specialised beef production, slaughter ages and weights, shares of different cattle types.

For pig farms, the annual quantity of pig meat was estimated from each country's average price¹² of pig meat and the examined pig farms' annual receipts from selling pig meat. This method of estimating the amount of pig meat is approximate, but it provides quite accurate information, as pig meat is a relatively uniform livestock product.

Because of the limitations of the farm samples and farm classification, it was not possible to separately analyse farms keeping pigs for slaughtering and those keeping sows. Therefore, the pig farm groups of this study have to be considered as farms with combined production where pig meat is the final product. In spite of these limitations, this approach is rational and provides a consistent analysis of the production costs of pig meat.

2.1.2 Supplementary material

As regional differences are significant in livestock production, and cost allocation is also rather complex, supplementary research material was collected and utilised in addition to the principal FADN farm data. The Finnish supplementary material includes additional accountancy data from MTT Economic Research and exemplar production calculations, current production results and price calculations for different crops performed by Pro Agria (Union of Rural Advisory Centres). Furthermore, it was possible to utilize technological and biological information that emerged in expert panel discussions carried out together with several research projects concerning livestock production in Southern Finland. Other Finnish research material sources were agricultural and especially livestock production studies carried out by MTT Economic Research, the University of Helsinki (Department of Economics) and the TTS Institute (Work Efficiency Institute).

Additional foreign research material was obtained from ministries of agriculture of various countries, from research institutes, advisory organisations and farmers' organisations. The AGRIWISE information service provided very useful information about agricultural and livestock production in Sweden. This Internet based (www.agriwise.org) and electronically utilizable system includes regional cost calculations, production results and production planning information (see Öhlmér et al. 2002).

¹² Average price of pig meat in 1997-2000. Source: European Commission.

Concerning Danish agriculture, supplementary material was received from the state administrated Food Economic Research Institute (Fødevareøkonomisk Institut, FØI) and the national Agricultural Advisory Centre (Landbrugets Rådgivningscenter).

For Germany it was possible to utilize information from administrations and organisations of both national and individual states. Important material was obtained from the Ministry of Agriculture (Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft, BMVEL), the German Association of Agriculture (Deutsche Landwirtschafts-Gesellschaft) and the Association for Technology and Structures in Agriculture (Kuratorium für Technik und Bauwesen in der Landwirtschaft, KTBL).

2.1.3 Farm groups in cost comparison

This analysis focuses, within the limitations of the farm data, on those regions and farm size classes that are significant for the individual production areas in question. In other words, the focus is on the areas and farm size classes responsible for the majority of milk, beef or pig meat production. In addition, the results for all farms of each region and line of production are also presented in cost calculation results.

In the FADN system, Finland is divided into four rather large accountancy areas. The accountancy area 'Southern Finland'¹³ is not wholly equivalent to support areas A and B, since they have been categorized in different ways. These southern support areas are generally referred to as Southern Finland to distinguish them from the northern support area C, which is entitled to receive nationally funded, long-term northern aid. However, 93% of the active farms of the accountancy area 'Southern Finland' belong to support areas A and B, as well as 87% of dairy farms, 94% of slaughter pig farms and 86% of farms with male beef cattle (MMM, IACS register). Therefore, the percentage of farms that belong to support area C is comparatively low in the accountancy area of Southern Finland, but this area distinction has to be kept in mind while interpreting results.

In order to determine whether the small proportion of farms belonging to support area C had any significant influence, national accountancy farm

¹³ NUTS area classification.

data from MTT Economic Research were also used. The national data system is logically based on the same criteria and principles as the central FADN system, but enables farms to be examined in even greater detail on the regional level. However, no significant differences were found when studying the larger accountancy area or individual support areas. While it was not unambiguous to form uniform farm groups from the FADN data and the Finnish support area data for comparison, cost analysis was focused on the basic FADN farm data.

The regions chosen for milk cost analysis outside of Finland were the FADN area of Central Sweden¹⁴, Denmark and the state of Schleswig-Holstein in Germany (Figure 1). The Finnish dairy farm groups are farms with less than 15 dairy cows and those with 15 to 29 cows. The dairy farms in other study areas are somewhat larger, especially in Denmark and Germany. Data from the two most representative dairy farm groups and also from all dairy farms in each region are included in the analysis.

For beef production, analysis includes the FADN area of Southern and Central Sweden¹⁵ and the aggregated German states of Lower Saxony and North Rhine-Westphalia. This aggregation enables the utilization of a larger farm sample and also the separate analysis of farm size groups. Denmark is not included in this analysis because there are no corresponding Danish farms in the FADN system. Danish beef production has been analysed by means of supplementary data and calculations.

For pig meat production, the accountancy analysis focuses on the province of Skåne in the southernmost part of Sweden, Denmark and the aggregated area of Lower Saxony and North Rhine-Westphalia in Germany. As with beef production, this aggregation enables a more representative and detailed analysis of production in Germany. Taken together, these two states produce a significant proportion of German beef and pig meat.

¹⁴ *Skogsbygds*län. Forested areas in Central Sweden.

¹⁵ *Slättbygds*län. Agricultural plains in Southern and Central Sweden.

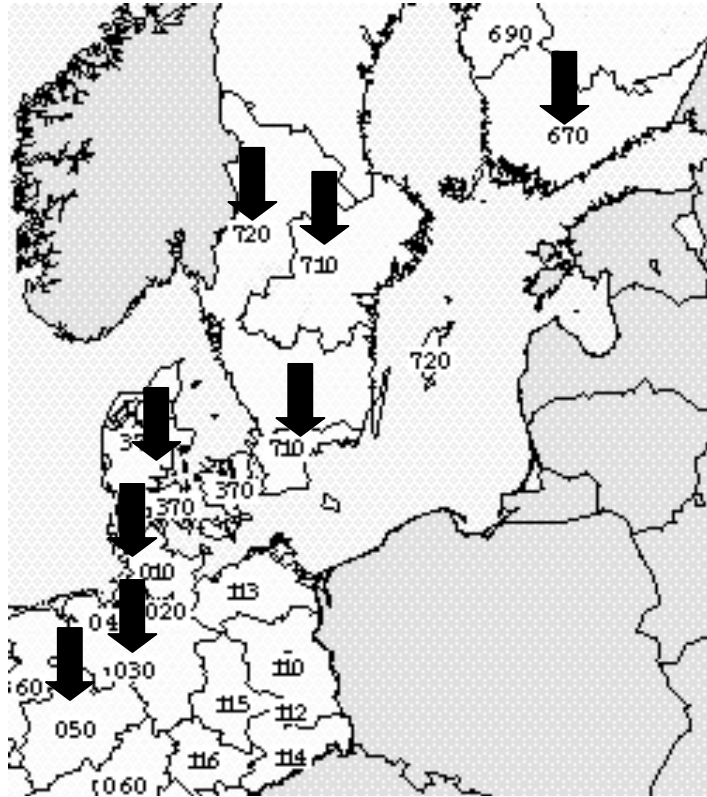


Figure 1. Accountancy regions of the study (Source: FADN)

Figure 1 illustrates the comparison areas of the study. Southern Finland (670) is the northernmost area, followed by Central Sweden (720), Southern and Central Sweden (710) and Denmark (370). Germany's assessment areas, from north to south, are Schleswig-Holstein (010), Lower Saxony (030) and North Rhine-Westphalia (050).

2.2 Allocation of production costs

The total production cost can be defined as the pecuniary value of all costs, variable and fixed, resulting from the production of a product. In this research, total production costs consist of specific (variable) costs, farming overheads, depreciations, paid rents and interests and labour costs. These cost entries are presented in the FADN farm data only as expressing the whole agricultural production of accountancy farms. Accordingly, one of the key stages of this study was the allocation of costs to the final products concerned: milk, pig meat and beef.

In several other studies of production costs in agriculture (e.g. Riepponen 2003, IFCN 2002), the allocation procedure has been applied so that total production costs have first been determined and returns from other products (e.g. beef) have then been deducted from the total production costs. Finally, the remaining portion of production costs has been divided by the quantity of the main product (e.g. milk), which has resulted in a production cost per produced unit (€/kg of milk or meat). However, this approach assumes that returns from secondary products always equal these products' production costs, which is in all probability rather uncommon.

In the present research, the first stage was to determine all specific costs for livestock production, which include feeding costs and other specific livestock costs such as veterinary fees. The main product's share of these livestock specific costs was assumed to equal its corresponding share of all receipts from livestock production. For example, if milk sales (18 000 €) accounted for 90% of all livestock sales (20 000 €), then milk's share of livestock specific costs was also assumed to be 90%.

On the other hand, the primary product's share of total specific costs is usually lower, as costs other than simply livestock specific costs also materialize on a typical livestock farm (in crop production, sidelines etc.). After the main product's share of livestock specific costs and the corresponding cost value were determined, the main product's share of total specific costs was also estimated by comparing its specific costs with the total specific costs. For example, if milk's share of the livestock specific costs of a dairy farm was estimated to be 90% or 9 000 € and the total specific costs of this farm were 12 000 €, then milk's share of total specific costs was equal to 75% or, $9/12$. The primary product's share of total specific costs formed the basic ratio for determining its share in the other cost entries.

The main cost entries¹⁶ analysed in this study are:

1. Specific (variable) costs:
 - Purchased and self-produced livestock feed
 - Grazing costs separated from crop production
 - Other livestock specific costs
2. Farming overheads:
 - Machinery and buildings
 - Energy
 - Contract work, machinery
3. Depreciation
4. Interest and rent paid
5. Labour costs:
 - Wages of paid labour
 - Wages of contract workers
 - Wage claim of unpaid labour

Specific costs

Feeding costs consist of purchased and self-produced marketable feed (grain, grass fodder, maize) and, with cattle, also the cost of grazing. These entries have been presented in the FADN farm data except for grazing. The grazing cost has been estimated from crop specific costs (seeds, fertilizers, crop protection) on the basis of use of cultivated agricultural areas.

In the accountancy data, the cost of feed for pigs also includes feed for poultry. Poultry husbandry is uncommon on the livestock farms examined, but nonetheless, feed shares of pigs and poultry have been separated in relation to the corresponding livestock unit shares.

Other livestock specific costs take account of, for example, veterinary fees and reproduction costs, and costs incurred in the market preparation, storage, and marketing of livestock products.

Farming overheads

Farming overheads include, among other things, the maintenance of machinery, the maintenance and insurance of buildings, car expenses, energy (electricity, motor and heating fuel etc.), machinery costs of contract work

¹⁶ Cost entries defined more precisely in annexes.

and so-called other direct inputs (water, various insurances, accountancy costs, telephone charges, etc.).

The calculatory labour cost of contract work has been transferred to total labour costs. In the basic FADN data, contract work has been presented as a single cost entry and the separate shares of contract machinery and contract labour have thus been estimated by a constant ratio¹⁷, which has been determined following discussion with technological experts.

As explained earlier, the primary product's share of farming overheads is assumed to equal its corresponding share of total specific costs. Therefore, if 75% of total specific costs on a dairy farm have been allocated to milk, 75% of farming overheads are also associated with milk.

Depreciation, paid interest and rent

As with farming overheads, the primary product's share of depreciation and external cost factors equals its corresponding share of total specific costs. Wages paid have been transferred to the total labour cost together with the labour share of contract work. In this study, interest on own capital has not been considered, since the capital structure varies considerably between examined regions and, moreover, the interpretation of assets presented in the FADN data is not unequivocal.

Labour cost

Total labour costs consist of wages paid to wage earners and contract workers and a calculatory wage claim for unpaid labour, which in practice is the use of farm family labour. As it was not possible to accurately determine the hourly wages for unpaid labour, the wage claim was estimated by multiplying the number of working hours by a constant hourly wage¹⁸, which is commonly used in farm accountancy practice in Finland. This aspect has to be taken into consideration while analysing the calculated labour costs of this study.

¹⁷ Machinery 60%, labour 40%.

¹⁸ 7.57 €/h.

3. PRODUCTION COSTS ON FADN FARMS

3.1 Dairy farms

This chapter introduces the key results of the FADN farm analysis, and these results are discussed in greater depth in chapter 4. The basic information and the results from the production cost analysis of milk are presented in Table 3 and Figure 2.¹⁹ The presentation includes both costs per farm and costs per kilo of milk produced. As explained earlier, the main focus of the study has been directed to structural differences and contributory cost factor variations between the production areas examined. Absolute cost values should be considered primarily as estimates that provide a basis for closer analysis of features behind apparent regional differences.

Considering the FADN dairy farm data (Table 3), it can be noted that the farm samples are quite representative in all of the studied regions. Therefore, the cost analysis results provide quite accurate information about the characteristics of dairy farming in these areas.

With respect to the production structure, the differences between the regions are clear. The Finnish dairy farms considered in the study were smaller in arable area and in livestock number. In Sweden, dairy farms had more than twice the arable area of the Finnish farms and almost twice as many dairy cows (29) as the Finnish farms (16). On the other hand, the dairy farms of Denmark and Schleswig-Holstein had over 50 dairy cows and over 60 hectares of arable area. In Sweden and Schleswig-Holstein, the proportion of rented agricultural area reached almost 50%. The stocking density was lowest in Sweden, which indicates that the use of low-yield pastures is very typical in Swedish cattle husbandry. In Finland, the stocking density was almost as low as in Sweden and only one half of that in Denmark and Germany.

There were no marked variations in the annual milk yield, as the average yield was 7 900 kilos in Sweden, 7 200 kilos in Finland and a little under 7 000 kilos in Denmark and Germany. However, the total labour input varied considerably, as the labour input on dairy farms in Southern Finland reached

¹⁹ More detailed farm data tables in annexes.

up to 284 hours per dairy cow, which was twice the amount employed on the Swedish farms and several times that on Danish and German farms.

Table 3. Dairy farms and production costs of milk in 1997-2000*.

Specialized dairy farms 1997-2000		FIN	SWE	DEN	GER
Structural information	Farms represented	6,520	5,630	10,040	6,458
	Sample farms	111	149	435	192
	Total utilised agricultural area - ha	32.15	80.18	61.73	64.05
	Rented agricultural area - ha	9.73	39.45	14.68	30.85
	Forage - ha	18.05	64.10	40.40	53.80
	Cereals - ha	12.24	14.24	15.84	6.56
	Other crops / set-aside & fallows - ha	1.87	1.84	5.49	3.69
	Total livestock - LU	25.7	54.4	101.7	104.9
	Dairy cows - heads/LU	16.3	29.1	59.7	51.8
	Other cattle - LU	9.2	24.6	38.2	48.9
	Stocking density - LU/ha	0.8	0.7	1.6	1.6
	Milk yield - kg/cow	7,173	7,920	6,872	6,568
	Total milk yield - 1000 kg	117	230	410	340
	Total labour input - hours	4,626	4,126	3,598	4,033
	Share of paid labour input - %	4.6	7.8	22.6	17.7
	Total labour input - hours per dairy cow	284	142	60	78
Allocated production costs, €	Purchased feed	8,175	21,320	32,352	10,965
	Farm-grown feed + forage	5,623	8,220	10,019	8,672
	Other specific costs	3,625	3,226	9,416	16,174
	Specific costs	17,424	32,766	51,786	35,811
	€/kg of milk	0.15	0.14	0.13	0.11
	Machin. & build. current costs	4,793	7,380	12,387	9,522
	Energy	2,639	5,206	3,306	5,228
	Contract work (machinery)	699	4,240	5,771	3,405
	Other direct inputs	5,247	2,698	4,411	7,108
	Farming overheads excl. contract labour	13,378	19,524	25,876	25,263
	€/kg of milk	0.11	0.08	0.06	0.07
	INTERMEDIATE CONSUMPTION				
	= specific costs + farming overheads	30,802	52,290	77,662	61,074
	€/kg of milk	0.26	0.23	0.19	0.18
	DEPRECIATION	9,556	19,352	16,752	14,373
	€/kg of milk	0.08	0.08	0.04	0.04
	Rent paid	1,040	2,245	4,128	9,995
	Interest paid	1,682	4,839	25,794	4,241
	RENT + INTEREST	2,721	7,084	29,922	14,236
	€/kg of milk	0.02	0.03	0.07	0.04
	TOTAL INPUTS excl. labour	43,080	78,725	124,336	89,683
	€/kg of milk	0.37	0.34	0.30	0.27
	Paid labour	1,227	2,996	8,979	3,915
	Unpaid farm labour	28,053	24,399	17,268	19,640
	Contract work (labour)	466	2,826	3,847	2,270
	Total labour costs	29,746	30,221	30,094	25,824
	€/kg of milk	0.25	0.13	0.07	0.08
	TOTAL INPUTS + LABOUR	72,826	108,947	154,430	115,507
	€/kg of milk	0.62	0.47	0.38	0.35

* FADN dairy farms' average results in the specified study areas.

In Southern Finland the specific costs were 15 cents per kilo of produced milk. Of this, the share of feed costs totalled 12 cents, with 7 cents from purchased feed and 5 cents from self-produced feed. It is important to take into consideration the fact that these specific costs only include specific inputs, while the use of labour, for example in feed production, is excluded. However, this labour cost is included in the total labour cost entry.

Specific costs were 5% lower on the Swedish dairy farms, 15% lower in Denmark and 28% lower in Schleswig-Holstein than in Southern Finland. There was little variation among farm size groups within separate areas. On larger dairy farms, specific costs per production unit were in some cases lower than on smaller farms (see annex 4).

The use of purchased feed and self-produced feed varied between examined areas. In Southern Finland and Schleswig-Holstein, self-produced feed made up more than 40% of the total feed cost, whereas in Sweden and Denmark this share was only 24 to 28%. In Schleswig-Holstein, the share of other specific costs was high, while the share of the total feed cost remained at only 56%. The circumstances of feed production are discussed further in chapter 4.1.

Farming overheads allocated to milk were highest in Southern Finland, where these costs per kilo of milk produced amounted to 11 cents. Farming overheads per kilo of milk were 45% lower on the Danish dairy farms, 35% lower on the German farms and 26% lower on the Swedish farms. The majority of overheads on the Finnish dairy holdings consisted of maintenance and other costs for machinery and buildings. The second largest category of farming overheads were other direct inputs, such as insurance (excluding buildings and accidents), water and accountancy costs. Contract work was more significant in other studied areas than in Finland. Regarding different farm size groups within separate areas, farming overheads were typically lower in larger farm size classes.

The cost effect of intermediate consumption (specific costs + farming overheads) was greatest in Southern Finland, at 26 cents per kilo of milk. In Central Sweden this cost entry was 14% lower, in Denmark almost 28% lower and in Schleswig-Holstein 30% lower than in Southern Finland.

The cost effect of depreciation was most significant on the Finnish and the Swedish dairy farms, at 8 cents per kilo of milk. In Denmark and in Schleswig-Holstein this cost was only 4 cents. On the other hand, paid rent

and interest were lower in Finland than in other areas. In Denmark, rent and interest costs were three times higher than in Southern Finland.

Total production costs, except for the use of labour, reached up to 37 cents per kilo of milk on the dairy farms of Southern Finland according to FADN farm accountancy results. Corresponding costs were 7% lower on the Swedish dairy farms, 18% lower on the Danish dairy farms and 27% lower on the dairy farms of Schleswig-Holstein. Thus, there was a unit cost difference of 11 cents between the Finnish and German dairy farms examined.

When labour costs were taken into consideration, differences between Southern Finland and the other studied regions became even more apparent. Total labour costs include wages for paid labour, the labour share of contract work and the calculatory wage claim for unpaid labour, which in practice is the labour of farm family members.

On the Finnish farms, the agricultural labour input was substantial, which raised the total labour cost to 25 cents per kilo of milk. Of the total labour cost, only one cent came from the use of paid and contract labour. On the Swedish dairy farms, the total labour cost came to 13 cents per kilo of milk, while in Denmark it was only 7 cents and in Schleswig-Holstein 8 cents per kilo of milk. The use of outside labour was significant, especially in Denmark and Germany.

Altogether, total production costs of milk in Southern Finland came to 62 cents per kilo, while the corresponding costs were 47 cents (-24%) in Central Sweden, 38 cents (-40%) in Denmark and 34 cents (-44%) in Schleswig-Holstein.

Figure 2 illustrates in further detail how specific costs, farming overheads and especially labour costs of milk production were highest on the Finnish dairy farms examined in this study. On the Swedish dairy farms, depreciations reached as high as in Finland, and in Denmark the cost effect of paid interest was notably the highest.

In spite of the fact that the hourly wage demand for unpaid labour is calculatory, it can be stated that this cost entry was significant in Finland and it raised production costs significantly. Alternative pricing of unpaid labour would not dramatically change this situation, as the annual labour input is extremely high in Finland according to the accountancy data. Factors behind these cost differences are discussed further in chapter 4.

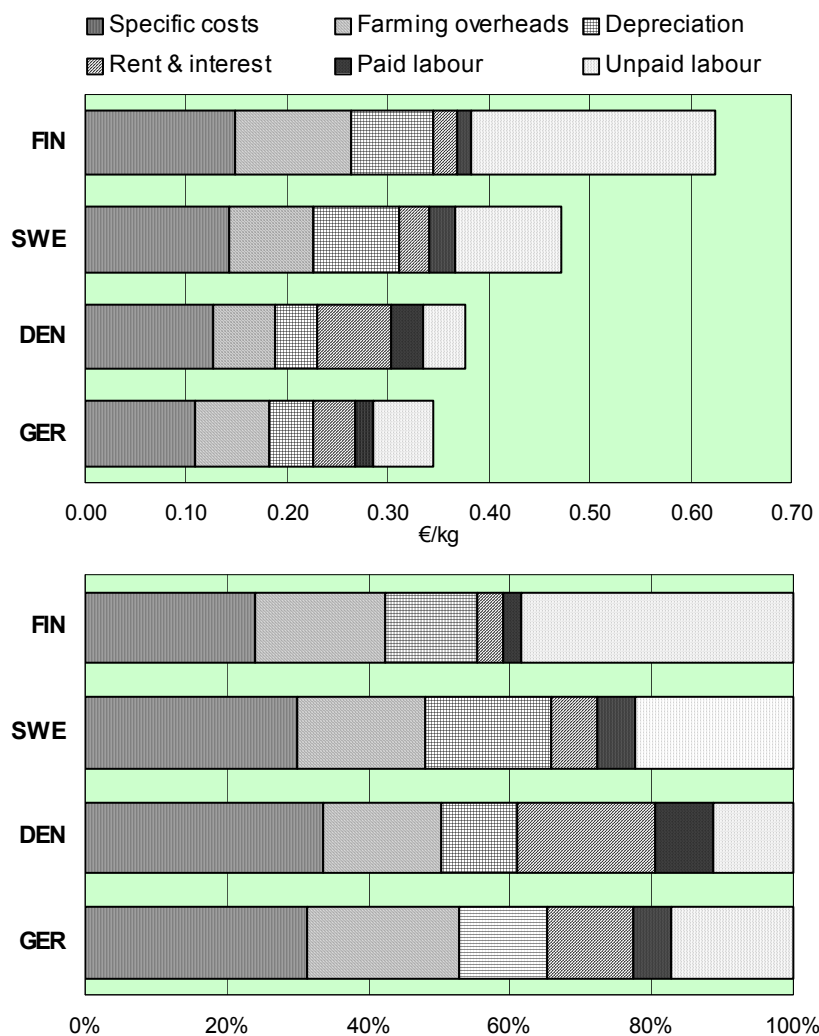


Figure 2. Production costs of milk and distribution of allocated costs on FADN dairy farms in 1997-2000.

3.2 Cattle farms

Regarding FADN cattle farms and beef production, allocated production costs have been presented as costs per cattle livestock unit (Table 4, Figure 3). This approach was necessary because the annual amount of beef produced on the studied farms could not be reliably assessed (see chapter 2.1.1.). However, production costs linked to average farm size (livestock units) give comparable information about the characteristics of cattle husbandry in the studied production areas. Except for the amount of beef, production costs have been allocated to beef according to the same criteria as in calculations for milk and pig meat production (see chapter 2.2.). One central aspect in the FADN cattle farm results is the fact that the available cattle farm samples were relatively small. Hence, these results should be considered as indicative.

The production structure of the cattle farms under study was rather diverse. Finnish farms had almost twice the head of cattle of the Swedish farms, but production in Sweden was apparently more based on suckler cows than in Finland. In Germany, farms were notably larger and only a small proportion of cattle were either heifers or cows. The stocking density was lowest in Sweden, as was also the case with dairy farms. On the Finnish cattle farms the stocking density was less than half of that in Germany. The labour input was distinctly highest on the Finnish cattle farms, at almost twice the level in Sweden and three times the level in Germany in relation to the number of cattle.

In Southern Finland, specific costs came up to 314 euros per cattle livestock unit; 90% of this cost entry consisted of feeding costs, of which the share of purchased feed was 58%. On the Swedish farms, the corresponding specific costs were 249 euros (-21%), with a similar feed use to that in Southern Finland. In Germany's study area (Lower Saxony + North Rhine-Westphalia), specific costs were 232 euros (-26%) per cattle livestock unit. On these farms, feeding costs also formed 90% of specific costs and, moreover, purchased feed made up 65% of feeding costs.

The structure of farming overheads was also very diverse on cattle farms. In Finland, this cost came to 228 euros, where the key factors were machinery and building costs together with other direct inputs (insurance etc.) In Sweden, farming overheads were 188 euros and in Germany 155

euros per cattle livestock unit. Contract work was more significantly used than in Finland.

Table 4. *Cattle farms and production costs of beef in 1997-2000*.*

Specialized cattle farms 1997-2000		FIN	SWE	GER
Structural information	Farms represented	1,914	1,606	4,537
	Sample farms	24	23	60
	Total utilised agricultural area - ha	40.18	57.80	44.70
	Rented agricultural area - ha	16.40	24.43	22.83
	Forage - ha	23.33	43.95	34.70
	Cereals - ha	14.15	10.93	8.56
	Other crops / set-aside & fallows - ha	2.70	2.92	1.44
	Total livestock - LU	38.2	47.5	85.9
	Cattle - LU	38.1	46.7	73.3
	Cattle - average total number	69	76	131
	Young cattle (under 1 year)	33	26	58
	Male cattle (over 1 year)	17	10	44
	Heifers, other female cattle (over 1 year)	7	14	12
	Cows	12	26	17
	Stocking density - LU/ha	0.9	0.8	1.9
	Total labour input - hours	3,587	2,591	3,222
	Share of paid labour input - %	7.0	8.6	5.2
	Total labour input - h / LU	94	55	38
Allocated production costs, €	Purchased feed	6,230	6,265	9,609
	Farm-grown feed + forage	4,499	4,455	5,245
	Other specific costs	1,217	906	2,180
	Specific costs	11,946	11,626	17,034
	€/cattle LU	314	249	232
	Machin. & build. current costs	3,181	3,787	3,811
	Energy	1,759	2,176	2,453
	Contract work (machinery)	301	1,365	1,757
	Other direct inputs	3,377	1,469	3,336
	Farming overheads excl. contract labour	8,618	8,797	11,357
	€/cattle LU	226	188	155
	INTERMEDIATE CONSUMPTION			
	= specific costs + farming overheads	20,563	20,423	14,085
	€/cattle LU	540	437	356
	DEPRECIATION	6,404	8,207	3,184
	€/cattle LU	168	176	80
	Rent paid	1,083	897	1,033
	Interest paid	1,920	2,338	644
	RENT + INTEREST	3,003	3,235	1,677
	€/cattle LU	79	69	42
	TOTAL INPUTS excl. labour	29,970	31,865	18,945
	€/cattle LU	788	683	478
	Paid labour	898	1,355	84
	Unpaid farm labour	13,549	10,238	8,624
	Contract work (labour)	201	910	620
	Total labour costs	14,648	12,504	9,328
	€/cattle LU	385	268	236
	TOTAL INPUTS + LABOUR	44,618	44,369	28,274
	€/cattle LU	1,173	950	714

* FADN cattle farms' average results in the specified study areas.

Altogether, the costs of intermediate consumption were 540 euros per cattle livestock unit in Finland, 437 euros (-19%) in Sweden and 356 euros (-34%) in Germany. Depreciation formed an almost equal unit cost in Finland and in Sweden, but depreciation in Germany was only about one half of this. Paid interest and rent were also similar on the Finnish and Swedish farms but were lower in Germany.

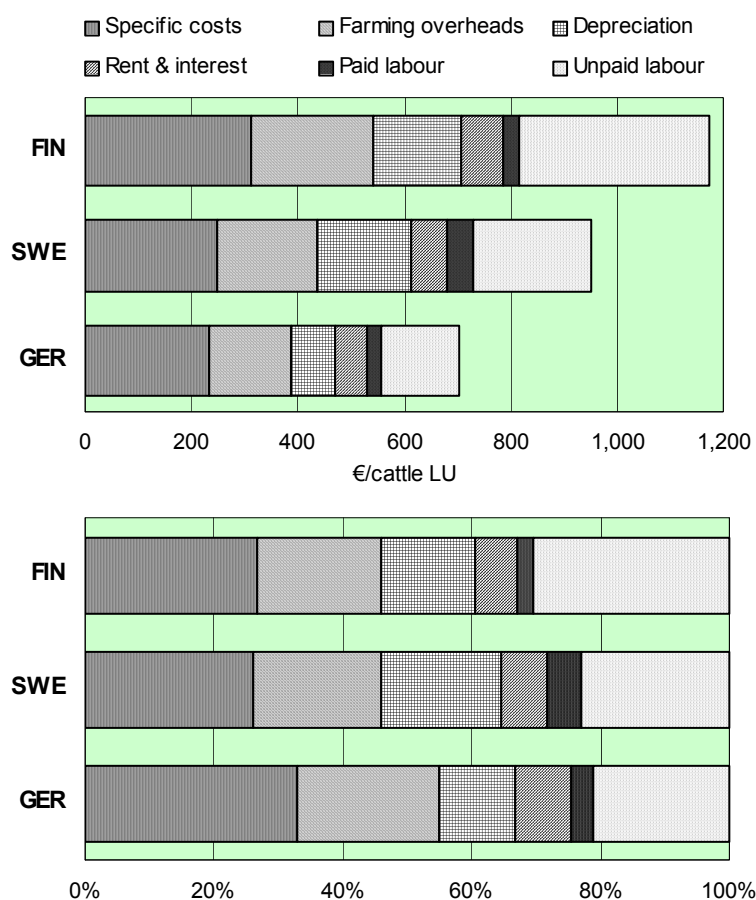


Figure 3. Production costs of beef and distribution of allocated costs on FADN cattle farms in 1997-2000.

Figure 3 shows how the cost structure on the studied FADN beef farms was quite similar to that on the FADN dairy farms. When labour costs were considered in addition to other production costs, cost differences became more apparent. The total costs allocated to beef were 1 173 euros per cattle live-stock unit in Finland, 950 euros (-19%) in Sweden and only 714 euros (-39%) in Germany.

Complementary review

Due to the limitations of the FADN farm data, Denmark was not included in FADN cattle farm review. Furthermore, the quantity of beef and thereby the production cost per kilo of beef produced could not be assessed. For these reasons an indicative comparison between the beef production in Southern Finland and in Denmark is presented in Figure 4. These cost results are based on example calculations published by Pro Agria (Union of Rural Advisory Centres) in Finland and Landbrugets Rådgivningscenter in Denmark. The comparison has to be considered as only suggestive, but it nevertheless presents fairly well the relative level of different cost factors in beef production for these studied areas.

The present assessment describes the characteristics of raising male cattle for beef with local production requirements in Finland (support areas A and B) and in Denmark. Assumptions regarding daily growth and length of the raising period²⁰ are equal, but interest rates, hourly wages and other similar appraisals have been determined directly from local figures in the original example calculations. Different cost factors are presented only in three main categories, as a more accurate comparison was impossible due to differences in the presentation of the original example calculations.

According to this approach, the estimated production cost of beef in Southern Finland comes to 3.94 euros per kilo of beef, with 71% of this formed by specific costs and farming overheads, as little as 5% formed by depreciation, rent and interest combined, and with the total labour cost corresponding to 24%.

In Denmark, the estimated total cost reaches 3.07 euros per kilo, which is 22% lower than in Finland. The share of the total cost formed by specific costs and farming overheads is similar to Finland but the labour cost seems to be clearly less significant in Denmark than in Finland. Furthermore, costs

²⁰ Growth 1 200 grams per day, raising period 14 months.

without labour are almost as high in Finland as the total production costs in Denmark.



Figure 4. Production costs of beef in Finland and in Denmark (Pro Agria, Landbrugets Rådgivningscenter).

These results are quite consistent with the findings from other calculations in this study and indicate how considerable livestock production cost differences can emerge. This provides useful additional information for the FADN farm data analysis.

3.3 Pig farms

Production costs of FADN pig farms were allocated to pig meat with the same basic principles as in the allocation of costs for milk and beef production. The quantity of pig meat produced was estimated from the annual pig meat sales of the studied pig farms and the average prices of pig meat in separate countries.

The farm structure of the observed pig farms was rather diverse, as it also was in cattle husbandry described earlier. The average number of pigs ranged from about 400 in Finland to almost 1 500 in Denmark. The stocking density in Finland was only about 30% of the level in Denmark and Skåne in Sweden, and some 43% of the level in Germany. Again, the use of labour was also different, as in Finland the amount of labour used per livestock unit

was about twice that on the Swedish and German farms and almost four times the amount used in Denmark.

Table 5. *Pig farms and production costs of pig meat in 1997-2000*.*

Specialized pig farms 1997-2000		FIN	SWE	DEN	GER
Structural information	Farms represented	1,855	323	3,700	2,638
	Sample farms	61	24	250	74
	Total utilised agricultural area - ha	41.83	25.80	54.43	30.50
	Rented agricultural area - ha	9.78	7.28	11.07	18.18
	Cereals - ha	33.41	15.19	40.31	19.57
	Other crops, set-aside & fallows - ha	8.42	10.62	14.12	10.93
	Total livestock - LU	96.2	197.2	397.3	164.7
	Pigs - LU	92.0	196.4	313.6	149.8
	Average number of pigs	405	827	1,481	556
	- piglets	147	273	622	73
	- breeding sows	54	114	195	21
	- pigs for fattening	201	439	659	186
	- other pigs	3	2	5	277
	Stocking density - LU/ha	2.3	7.6	7.3	5.4
	Total labour input - hours	3,533	3,539	4,074	3,522
	Share of paid labour input - %	6.8	17.3	39.9	12.3
	Total labour input- hours per LU	37	18	10	21
Allocated production costs, €	Feed	39,332	82,690	141,228	59,229
	Other specific costs	4,907	4,918	11,241	7,123
	Specific costs	44,240	87,608	152,470	66,352
	€/kg of meat	0.85	0.75	0.78	0.81
	Machin. & build. current costs	6,707	10,038	14,176	7,433
	Energy	5,355	8,646	6,758	7,120
	Contract work (machinery)	640	6,825	2,965	2,553
	Other direct inputs	7,935	3,518	5,658	7,681
	Farming overheads excl. contract labour	20,638	29,027	29,556	24,788
	€/kg of meat	0.40	0.25	0.15	0.30
	INTERMEDIATE CONSUMPTION	0	0	0	0
	= specific costs + farm. overheads	64,877	116,635	182,026	91,139
	€/kg of meat	1.25	1.00	0.93	1.11
	DEPRECIATION	16,160	39,167	26,659	16,199
	€/kg of meat	0.31	0.33	0.14	0.20
	Rent paid	1,812	3,039	3,082	5,873
	Interest paid	4,044	14,765	34,426	3,163
	RENT + INTEREST	5,855	17,805	37,507	9,035
	€/kg of meat	0.11	0.15	0.19	0.11
	TOTAL INPUTS excl. labour	86,893	173,607	246,192	116,373
	€/kg of meat	1.67	1.48	1.26	1.42
	Paid labour	1,710	6,485	17,739	2,688
	Unpaid farm labour	20,998	20,427	13,867	19,693
	Contract work (labour)	427	4,550	1,976	1,702
	Total labour costs	23,134	31,462	33,582	24,083
	€/kg of meat	0.44	0.27	0.17	0.29
	TOTAL INPUTS + LABOUR	110,027	205,069	279,774	140,457
	€/kg of meat	2.12	1.75	1.43	1.71

* FADN pig farms' average results in the specified study areas.

Specific costs per kilo of pig meat came to 85 cents in Finland, 75 cents in the province of Skåne in Sweden, 78 cents in Denmark and 81 cents in Germany's study area (Lower Saxony + North Rhine-Westphalia). Specific costs were dominated by feed costs, whose share was 89% in Finland and Germany, 93% in Denmark and 94% in Sweden. On the Finnish pig farms, the cost share of self-produced feed was 21%, while in the other areas it ranged from 8% in Sweden to 14% in Germany.

Farming overheads were clearly highest in Finland, at 40 cents per kilo of pig meat. The largest contributing factors were other direct inputs (water, insurance etc.), machinery and building costs and the use of energy. In Finland, energy's cost effect was 10 cents per kilo of pig meat, while in Denmark it was only 3 cents. As with the other lines of production examined, the use of contract work was clearly more common in the other areas outside Finland. Altogether, farming overheads were 30 cents per kilo of pig meat in Germany, 25 cents in Sweden and only 15 cents in Denmark. Thus, the total cost of intermediate consumption came to 1.25 euros in Finland, 1.11 euros (-11%) in Germany, 1.00 euro (-20%) in Sweden and only 93 cents (-25%) per kilo in Denmark.

Concerning external cost factors, the depreciation cost was highest on the Swedish pig farms, at 33 cents, while in Southern Finland it was 31 cents. In Germany the depreciation cost remained at 20 cents and on the Danish pig farms it was only 14 cents. Considering paid interest and rent, the cost effect was highest in Denmark, at 19 cents. In Sweden it reached 15 cents, and in Finland and Germany 11 cents.

With labour costs taken into account, cost differences widened further (see Figure 5). In Finland, the estimated cost effect of labour use reached 44 cents per kilo of pig meat. In Germany it was 34% lower, in Sweden 40% lower and in Denmark as much as 61% lower. Therefore, according to the FADN accountancy data, the total production cost was 2.12 euros per kilo of pig meat in Finland, 1.75 euros (-17%) in Sweden, 1.71 euros (-19%) in Germany and only 1.43 euros (-32 %) in Denmark.

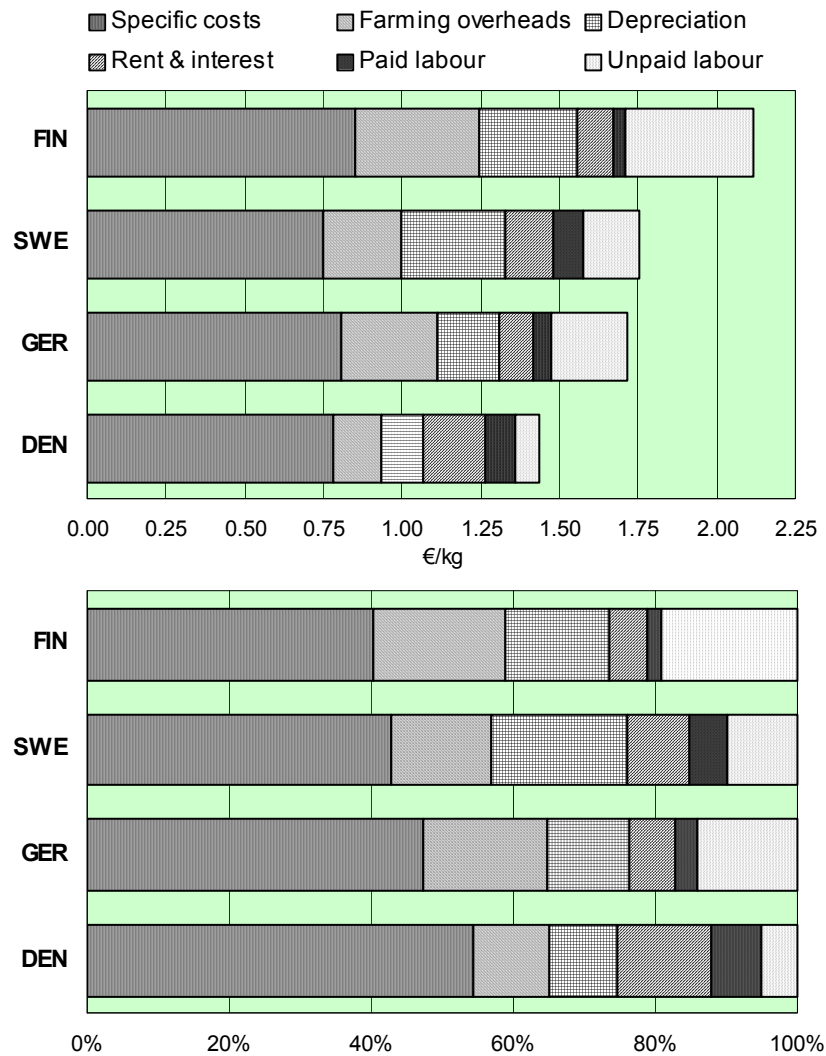


Figure 5. Production costs of pig meat and distribution of allocated costs on FADN pig farms in 1997-2000.

4. ANALYSIS OF PRODUCTION COST FACTORS

4.1 Specific costs and farming overheads

In reality, variation in production within different production areas and also between different farms in the same area is wide. It has to be taken into consideration that there are farms with higher costs and farms with lower costs in each production area. However, the approach taken in this study helps to describe and explain general circumstances under which livestock production is carried out in the examined countries.

The composition of **specific costs** was rather similar on dairy, cattle and pig farms. Feeding costs generally formed the largest share of the specific costs, from a little over 50% on the German dairy farms to well over 90% on the pig farms in Skåne and in Denmark.

With respect to feed production, it has to be taken into consideration that the presented feed costs only include inputs and do not assess labour use, the maintenance of machinery and other inevitable costs associated with, for instance, logistics and transportation.

If we compare the possibilities to produce different kinds of basic feed-stuffs for cattle, we can include in the assessment grass silage production in Finland and maize silage production in Germany. Maize production is not possible in Finland because of the climatic conditions, with the growing period being significantly shorter than in Central Europe. Therefore, Finnish cattle feed production is strongly dependent on grass feed and, as winters are long and cold in Finland, well-conserved grass silage is the primary feed for the long indoor feeding period.

In Finland, grass silage has been produced on about 400 000 hectares (about 20% of total arable area) and long-term average yields have been about 18 tons per hectare (MMM, Tike). In Germany, however, maize silage (Silomais = green maize) has been produced for cattle feed on about 1.4 million hectares (mostly in Bavaria, Lower Saxony and North Rhine-Westphalia), and average yields have reached well over 40 tons per hectare (Agrarreport Schleswig-Holstein 2002, Deutschen Maiskomitee).

Table 6. Comparison of specific costs of maize and grass silage²¹.

	Maize silage (GER)	Grass silage (FIN)
Yield, t/ha	44	18
Specific cost, €/ha	823	364
Dry matter yield, t/ha	14	5
Feed units (FU) /ha	12 800	4 800
Specific cost, €/FU	0.064	0.075

Sources: Enroth 2002. Deutschen Maiskomitee. MTT Kotieläintalous.

In Table 6, specific costs of typical grass silage production in Finland and maize silage production in Germany have been compared on the basis of local production results. Specific costs calculated per feed unit seem to settle higher in typical grass silage production in Finland compared to maize production in Germany. This simplified result is quite consistent with the result of the FADN dairy farm comparison, where the cost effect of feed was considerably lower on the German farms compared to the Finnish ones.

The comparative results presented in Table 6 are only indicative, but they do provide descriptive information on maize and grass feed production. This approach does not, however, consider the fact that grass has to be harvested from a significantly larger area compared to maize in order to obtain an equal total amount of feed in both types of production. This increases the use of labour and machinery, as well as maintenance costs and the use of energy.

As Myyrä (2002) has stated, Finnish farms suffer distinctly from their typically small fields and from the long distances between separate fields. Three quarters (in relation to number) of the cultivated fields in Finland are so small that the size creates an economic drawback for production. As livestock production demands a relatively large arable area, the production of fodder suffers distinctly from the small size of fields.

While the harvesting period is short in Finland, the machinery used has to be relatively large. Furthermore, as the winter is long and cold, conserving and storing grass silage in addition to other crop products further increases costs. Altogether, these factors significantly increase other production costs in addition to purely the specific costs of feeding livestock.

²¹ Uniform qualities of grass and maize silage: *Share of dry matter in total yield 30%, utilisable energy content (ME) 10.6 MJ/kg of dry matter.*

One important factor linked to specific costs that increases production costs on livestock farms in Finland is treatment of manure. Livestock manure has to be properly stored indoors during the winter and the permitted period for spreading manure is relatively short.

The requirements of the widely implemented²² environmental programme of agriculture together with rather strict environmental legislation restrict the operations of livestock farms. This tends to further increase production costs. These administrative factors also markedly limit the possibilities to enlarge farms. In the other studied countries, environmental programmes are not nearly as widely used in agriculture as in Finland.

The composition of **farming overheads** differs markedly between the studied areas, as described in the FADN dairy and cattle farm results. In Finland, the major part of farming overheads consists of the so-called other direct inputs, which include various types of insurance (except for buildings and accidents at work), accountancy expenses and other running expenses. The composition of this cost item in separate study areas could not be assessed more precisely from the FADN farm data. However, some observations can be noted.

Farmers in Finland and Sweden have partly financed their pension insurance system with compulsory insurance fees based on their agricultural income. In contrast, the state has financed a greater share of farmers' social security in Denmark and in Germany (Häkkinen 1995). In Denmark, farmers have only participated in financing their health insurance, while farmers in Germany have typically paid a low, fixed pension insurance fee. These differences in social security might also to some extent explain the differences in the above-mentioned direct inputs.

Maintenance costs of machinery and buildings were considerable on the Finnish farms. As explained earlier, the main reasons for this are evidently the climatic conditions and other disadvantages of the production circumstances. Machines are intensively used during the short growing period, especially as a greater cultivated area is needed than in regions with higher yields, fields are small and distances between separate fields are typically large.

With respect to the climate in Finland, the generally cold and snowy winter further increases the maintenance costs of buildings and also requires a lot of energy for heating. Energy consumption can be a significant cost

²² More than 90% of arable area and farms are committed to the program.

item in livestock production, as was especially noted on the studied FADN pig farms. Under northern conditions, animal shelters have to be ventilated mechanically during summers and heated during winters.

4.2 External costs and labour costs

The cost effect of **depreciation** is based on fixed farming assets, essentially on farm buildings and farm machinery. Concerning the FADN farms under study, it can be noted that fixed assets were considerable in Sweden and especially in Finland with respect to the average farm size. This situation is probably related to regional production characteristics, which include climatic conditions and other production characteristics discussed in chapter 4.1. In summary, the extreme seasonal variability in the climate, especially the cold and snowy winters, together with long distances place heavy requirements on the buildings and machinery necessary for livestock production.

Building costs associated with livestock production can be compared between Finland and Sweden, for example, with the help of administrative directives and advisory cost instructions (Ministry of Agriculture and Forestry in Finland, AGRIWISE service in Sweden). It is rather irrelevant to compare regionally estimated building costs per single animal place, since typical technological solutions and thereby also their costs are not directly comparable between countries. However, it is possible to compare construction costs between heated animal shelters and cold but otherwise corresponding shelters.

According to advisory example calculations used in Sweden (AGRIWISE Databoken 2003, Mjölproduktion – Byggnader), a typical heated cowshed in the main cattle area of Sweden is approximately one third more expensive per animal than a cold cowshed. This ratio is regularly used as the basis for comparing these two types of building solutions, and the same ratio is also used in comparing building costs for different-sized cowsheds. The cost difference between heated and cold shelters is therefore notable.

The official Finnish building directives (MMM-RMO) state that a heated cowshed in Finland is typically about 50-60% more expensive per animal than a cold cowshed. Hence, a comparison with the same type of building in Sweden indicates to some extent that the more northern location and colder climate of Finland pushes building costs higher than in Sweden. Furthermore, it has to be taken into consideration that using cold cowsheds is not

as feasible in Finland as it is in more southern production areas. Cold winters also increase building costs associated with input and manure storage.

On the Finnish and Swedish farms, machinery accounted for a notable share of all fixed assets. In Finland, this share was even more significant in relation to the average farm size. As described in previous chapters, farms need a large arable area, both for feed production and the handling of manure. The short growing period and long distances between fields increase the need for machinery and equipment in crop production.

The cost effect of paid **interest** was notably highest on the studied Danish FADN farms. This results from the fact that farms in Denmark typically have numerous debts and long repayment periods (Gravsholt 2002, Landboforeningerne 2002). This indebtedness can also be noted from the FADN data.

In all lines of production, the cost effect of paid **rent** was most significant on the studied German farms where, however, the share of rented arable area was not exceptionally large. This implies a rather high level of rent per hectare in the studied production areas in Germany (see also KTBL 2002).

The total **labour** cost in livestock production is directly related to the number of employed working hours on livestock farms in separate areas. According to the FADN farm data, the annual labour input in all lines of livestock production was markedly the highest in Finland. This is related to the obvious differences in production structure between the studied regions, as farms are typically larger in Sweden, Denmark and Germany than in Finland. Furthermore, regional production conditions evidently demand different types and amounts of work.

The use of paid labour and contract work was apparently more common on the studied FADN farms in Sweden, Denmark and Germany than in Finland. The use of contract work is especially common in Denmark (Landboforeningerne 2002). Contract working and machinery station services could also offer more possibilities to organise farm working and control machinery costs in Finland in the future.

However, the short growing period and long distances may notably also restrict the availability and use of contract work and machinery stations. Furthermore, the continually declining number of persons employed in agriculture may also restrict the availability of skilled paid farm labour.

5. SUMMARY AND CONCLUSIONS

This study analysed the production costs of milk, beef and pig meat in Finland and its main competitor countries: Sweden, Denmark and Germany. The analysis focused on assessing regional cost differences and the structure of production costs in different areas and on identifying the essential explanatory factors behind the cost construction. The use of wide-ranging research material and different approaches in the examination of cost factors were the main means to achieve this.

In order to make it as comparable as possible, the data in this study was mainly obtained from the Farm Accountancy Data Network of the EU. Supplementary research material included other fairly extensive information on livestock production characteristics and production results in the studied production areas. Production costs were allocated to final products with a uniform approach that takes into consideration the relative shares of different farming activities in each studied farm group.

The farm accountancy data covered the years from 1997 to 2000 and the cost analysis focused on Southern Finland and on comparison areas that are most significant with regard to livestock production in each individual country. More specifically, these areas are: Central and Southern Sweden (milk, beef), Skåne in Sweden (pig meat), Denmark (milk, pig meat), Schleswig-Holstein (milk) and the aggregated study area of Lower Saxony and North Rhine-Westphalia (beef, pig meat) in northern Germany

Milk production

The analysed dairy farms in different areas (in 1997-2000) were rather diverse, as the Finnish farms were smaller regarding both cattle herd size and average arable area. On the other hand, the average yield of milk was relatively high in Finland. The largest dairy farms in the study were in Germany and Denmark, with more than 50 dairy cows, while the Swedish dairy farms clearly utilised a greater agricultural area in milk production than those in the other countries. Stocking densities on the dairy farms were clearly lower in Finland and Sweden than in Denmark and Germany.

Concerning milk production in the comparison areas, total production costs were highest in Finland, as they exceeded 60 cents per kilo of milk according to the calculations in this study. In Sweden, the corresponding

production costs were 24% lower, while in Denmark they were 40% lower and in Schleswig-Holstein in Germany they were 44% lower than in Finland.

The key factors behind these differences were the specific costs (feeding), farming overheads (maintenance of machinery and buildings, other direct inputs e.g. insurance) and the use of labour (total labour input in relation to farm size). The labour cost per product unit was especially high in Finland, as the labour input per dairy cow is considerable. In Sweden and Finland, the depreciation per kilo of milk was also clearly higher than in Denmark and Germany, which results from the relatively intensive farm building and machinery capacity in these more northern countries. On the other hand, the interest cost per production unit is notably high in Denmark and the rent cost in Germany seems clearly higher than in the other studied countries according to the cost analysis.

Beef production

A comparison of unit production costs was more difficult to perform for cattle farms, as the FADN data did not include the quantity of beef produced on the accountancy farms. Therefore, the analysis was carried out by assessing production costs allocated to beef in relation to the number of cattle on the studied cattle farms (costs proportioned to cattle size). This approach was complemented with relevant regional material.

On the studied FADN farms in 1997-2000, the production structure varied between the studied areas. The number of cattle was similar on the studied cattle farms in Finland and in Sweden, but cows and heifers were more common on the Swedish farms, indicating that beef production is typically based on suckler cows. In Finland and Germany, beef production seems to be based more on young cattle and especially on male cattle. The studied German cattle farms had clearly higher numbers of cattle than in Sweden and Finland, where stocking densities were less than half of the German level.

The total costs allocated to beef reached almost 1 200 euros per cattle livestock unit in Finland, while in Sweden the corresponding costs were 19% lower and in the aggregated study area of Germany these costs were 39% lower than in Finland. Denmark was not included in the FADN cattle farm analysis, as no comparable cattle farm data for Denmark is available in the FADN system.

According to the FADN farm data analysis, the cost structure of beef production is rather similar to that of milk production. Specific costs (feeding) and farming overheads (maintenance, other direct inputs) are higher in Finland, while the cost effect of depreciation is high both in Finland and in Sweden. This also indicates how intensively farm machinery and building capacity are used in these countries in relation to farm size when compared with more southern production areas.

In the complementary review it was noted that the production costs of beef are also likely to be substantially lower in Denmark than Finland, as Finnish labour costs are considerable and costs excluding labour use in Finland already reach the indicative total production costs in Denmark. These findings are consistent with the results of the FADN farm data analysis.

Production of pig meat

The analysis considered all types of pig farms together (farms with sows and/or pigs for slaughtering), as the FADN farm data does not enable a more precise farm assessment. The amount of pig meat produced on the studied FADN farms was estimated on the basis of pig meat sales and average prices.

The production structure differed widely between study areas. The largest pig farms were found in Denmark, where the average number of pigs was two or even three times as high as in the other studied areas in 1997-2000. The studied pig farms were twice as big in Skåne as in Finland, and one third larger in the study area of Germany. Furthermore, the stocking density was clearly lowest in Finland.

Total production costs allocated to the production of pig meat in 1997-2000 were slightly over 2.10 euros per kilo of pig meat in Finland according to the analysis in this study. By comparison, the estimated production costs in Sweden (Skåne) and in the aggregated study area of Germany were, respectively 17% and 19% lower. In Denmark, the total production costs of pig meat remained under 1.50 euros per kilo of meat, or 32% lower than in Finland.

The structure of costs in pig production was rather similar to that in cattle husbandry. Specific costs, especially feeding, were commonly the most significant cost entry, while the significance of the other assessed cost entries varied between the studied regions. In Finland, farming overheads (maintenance, energy, other direct inputs) were considerable. As in the

analysis of cattle husbandry, the cost effect of depreciation was highest in Sweden and Finland, while the effect of paid interest was notably highest in Denmark and that of paid rent highest in Germany.

Main conclusions of the study:

Livestock production structures vary considerably

- Livestock farms are distinctly smaller in Finland than in Sweden, Denmark and Germany.
- The stocking density of livestock farms is typically low in Finland and in Sweden, especially compared to Denmark and Germany.
- Structural development is restricted by regional circumstances (availability of favourable fields, skilled labour) and also by external agricultural elements (environmental restrictions).

Production cost structures vary

- Specific costs (feeding) are the main cost elements in each region.
- Farming overheads are higher in Finland than in the other study countries.
- Labour costs are especially high in Finland.
- External production cost factors (interest, rent, paid labour) are relatively more significant in Denmark and Germany.

Use of labour is dissimilar

- The total labour input is considerable in Finland due to local production circumstances and natural conditions.
- Paid labour and contract working is clearly more common in the studied countries outside Finland.

Regional conditions have obvious effects on production costs

- Regional conditions may considerably increase costs in agriculture.
- Farms in Finland suffer from the small size of fields and long distances between them.
- Regional conditions increase the use of labour in Finland.
- Use of machinery and building capacity in relation to average farm size is intensive on livestock farms in Sweden and especially in Finland.

- Depreciation, maintenance and energy costs are significant in Finland and in Sweden.
- The northern climate, sparse population and restricted availability of favourable fields and other inputs are the main limiting factors in Finnish livestock production.

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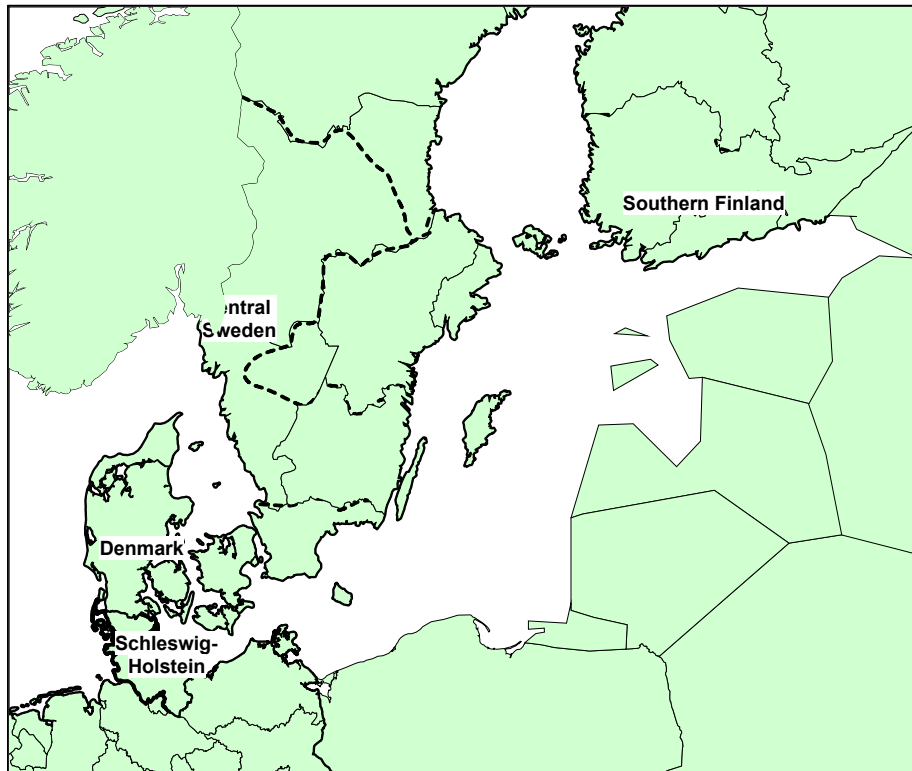
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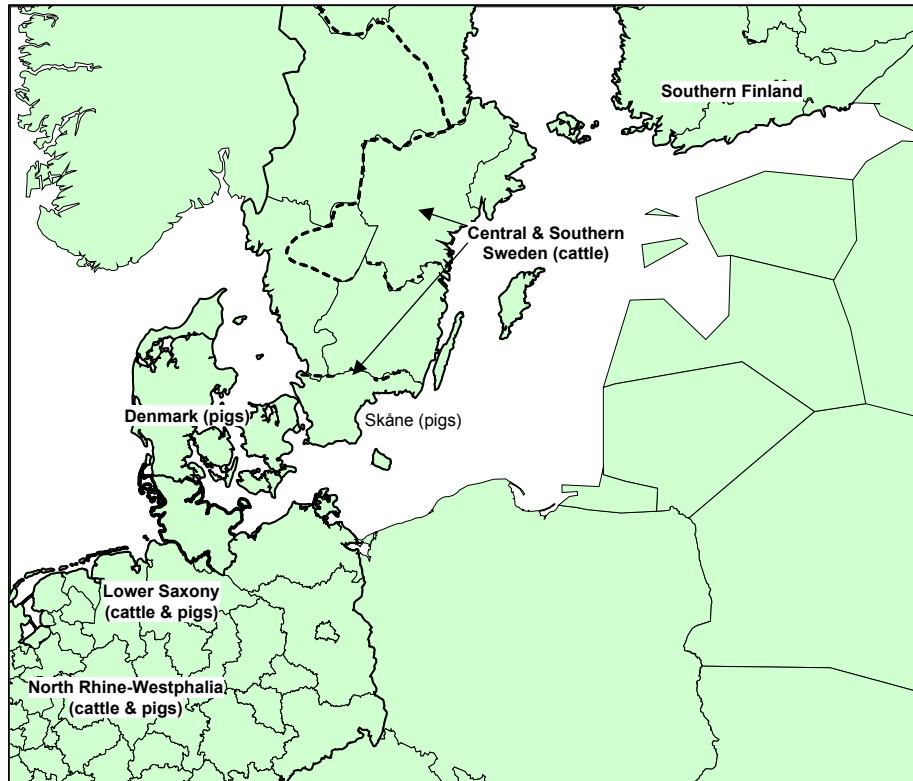
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ANNEXES

Annex 1. Milk production areas of the study.



Annex 2. Beef and pig meat production areas of the study.



Annex 3. FADN dairy farms, all studied size classes.

Specialized dairy farms 1997-2000		Southern Finland			Central Sweden			Denmark			Germany, Schleswig-Holstein		
	<i>Number of dairy cows</i>	<15	15-29	ALL	15-29	30-49	ALL	30-49	50-99	ALL	30-49	50-99	ALL
Structural information	Farms represented	3,337	2,716	6,520	2,500	1,529	5,630	3,123	4,262	10,040	2,402	2,688	6,458
	Sample farms	35	63	111	63	42	149	81	238	435	77	83	192
	Total utilised agricultural area - ha	23.10	36.83	32.15	65.58	109.53	80.18	44.00	70.73	61.73	52.78	79.85	64.05
	Rented agricultural area - ha	6.63	10.38	9.73	29.50	58.43	39.45	8.80	17.20	14.68	23.00	40.68	30.85
	Forage - ha	13.25	20.98	18.05	52.20	86.55	64.10	28.68	46.53	40.40	44.23	66.13	53.80
	Cereals - ha	8.58	14.02	12.24	12.32	20.39	14.24	12.99	17.27	15.84	5.85	8.34	6.56
	Other crops / set-aside & fallows - ha	1.27	1.83	1.87	1.06	2.58	1.84	2.34	6.94	5.49	2.70	5.38	3.69
	Total livestock - LU	16.8	30.1	25.7	41.4	71.3	54.4	72.5	113.6	101.7	85.7	131.8	104.9
	Dairy cows - LU	10.5	19.5	16.3	21.6	36.8	29.1	40.1	68.2	59.7	40.5	66.4	51.8
	Other cattle - LU	6.0	10.5	9.2	19.0	33.8	24.6	28.7	42.2	38.2	41.3	59.6	48.9
	Stocking density (grazing livestock) - LU/ha	1.2	1.4	1.3	0.8	0.8	0.8	2.3	2.2	2.3	1.8	1.8	1.8
	Milk yield - kg/cow	6,930	7,294	7,173	7,483	8,398	7,920	6,783	6,955	6,872	6,392	6,693	6,568
	Total milk yield - 1000 kg	72.8	142.5	116.8	161.2	309.1	230.4	272.1	474.0	410.5	258.9	444.3	340.1
	Total labour input - hours	3,926	5,080	4,626	3,749	4,814	4,126	2,941	3,973	3,598	3,617	4,491	4,033
	Share of paid labour input - %	2.6	4.4	4.6	1.7	5.4	7.8	8.6	24.0	22.6	11.0	22.1	17.7
	Total labour input - hours per dairy cow	373	260	284	174	131	142	73	58	60	89	68	78

Annex 4. FADN dairy farm results, allocated production costs.

Specialized dairy farms 1997-2000		Southern Finland			Central Sweden			Denmark			Germany, Schleswig-Holstein		
	<i>Number of dairy cows</i>	<15	15-29	ALL	15-29	30-49	ALL	30-49	50-99	ALL	30-49	50-99	ALL
Allocated production costs, €	Purchased feed	4,871	9,575	8,175	14,174	27,058	21,320	20,284	36,640	32,352	8,282	14,162	10,965
	Farm-grown feed + forage	3,726	6,768	5,623	6,697	11,146	8,220	6,875	12,114	10,019	7,261	10,868	8,672
	Other specific costs	2,282	4,299	3,625	2,726	3,405	3,226	6,266	10,991	9,416	10,958	21,512	16,174
	Specific costs	10,879	20,642	17,424	23,597	41,609	32,766	33,426	59,745	51,786	26,501	46,542	35,811
	€/kg of milk	0.15	0.14	0.15	0.15	0.13	0.14	0.12	0.13	0.13	0.10	0.11	0.11
	Machin. & build. current costs	3,328	5,380	4,793	5,921	9,218	7,380	8,244	14,365	12,387	7,594	11,983	9,522
	Energy	1,780	3,143	2,639	4,010	6,461	5,206	2,042	3,861	3,306	4,221	6,515	5,228
	Contract work (machinery)	500	916	699	3,161	6,238	4,240	3,894	6,606	5,771	2,496	4,375	3,405
	Other direct inputs	3,893	6,062	5,247	2,140	3,448	2,698	3,248	5,015	4,411	6,551	8,114	7,108
	Farming overheads excl. contract labour	9,502	15,501	13,378	15,232	25,366	19,524	17,428	29,848	25,876	20,863	30,986	25,263
	€/kg of milk	0.13	0.11	0.11	0.09	0.08	0.08	0.06	0.06	0.06	0.08	0.07	0.07
	INTERMEDIATE CONSUMPTION												
	= specific costs + farming overheads	20,380	36,143	30,802	38,829	66,975	52,290	50,854	89,593	77,662	47,364	77,528	61,074
	€/kg of milk	0.28	0.25	0.26	0.24	0.22	0.23	0.19	0.19	0.19	0.18	0.18	0.18
	DEPRECIATION	5,393	11,489	9,556	14,463	24,787	19,352	10,145	19,773	16,752	11,228	18,502	14,373
	€/kg of milk	0.07	0.08	0.08	0.09	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04
	Rent paid	696	1,120	1,040	1,380	3,145	2,245	1,987	4,625	4,128	6,759	13,947	9,995
	Interest paid	809	2,262	1,682	2,763	6,701	4,839	14,204	31,895	25,794	3,274	5,676	4,241
	RENT + INTEREST	1,504	3,382	2,721	4,143	9,846	7,084	16,191	36,520	29,922	10,033	19,623	14,236
	€/kg of milk	0.02	0.02	0.02	0.03	0.03	0.03	0.06	0.08	0.07	0.04	0.04	0.04
	TOTAL INPUTS excl. labour	27,278	51,014	43,080	57,435	101,607	78,725	77,189	145,885	124,336	68,625	115,653	89,683
	€/kg of milk	0.37	0.36	0.37	0.36	0.33	0.34	0.28	0.31	0.30	0.26	0.27	0.27
	Paid labour	560	1,307	1,227	477	2,221	2,996	2,625	10,267	8,979	2,304	5,059	3,915
	Unpaid farm labour	23,852	31,288	28,053	23,335	28,814	24,399	15,966	19,010	17,268	18,669	20,653	19,640
	Contract work (labour)	333	611	466	2,107	4,159	2,826	2,596	4,404	3,847	1,664	2,916	2,270
	Total labour costs	24,745	33,206	29,746	25,920	35,193	30,221	21,187	33,681	30,094	22,637	28,628	25,824
	€/kg of milk	0.34	0.23	0.25	0.16	0.11	0.13	0.08	0.07	0.07	0.09	0.07	0.08
	TOTAL INPUTS + LABOUR	52,023	84,220	72,826	83,354	136,801	108,947	98,377	179,566	154,430	91,262	144,282	115,507
	€/kg of milk	0.71	0.59	0.62	0.52	0.44	0.47	0.36	0.38	0.38	0.35	0.33	0.35

Annex 5. FADN cattle farms, all size classes.

Specialized cattle farms 1997-2000		Southern Finland	Central & Southern Sweden	Germany, Lower Saxony + North Rhine-Westphalia			
	<i>Number of livestock units</i>	ALL	ALL	25-49	50-99	100-	ALL
	Farms represented	1,914	1,606	2,116	1,633	948	4,537
	Sample farms	24	23	17	25	21	60
Structural information	Total utilised agricultural area - ha	40.18	57.80	30.10	47.10	75.55	44.70
	Rented agricultural area - ha	16.40	24.43	10.77	24.90	38.43	22.83
	Forage - ha	23.33	43.95	22.63	36.50	61.03	34.70
	Cereals - ha	14.15	10.93	6.95	9.24	11.29	8.56
	Other crops / set-aside & fallows - ha	2.70	2.92	0.51	1.36	3.24	1.44
	Total livestock - LU	38.2	47.5	48.0	88.1	172.9	85.9
	Cattle - LU	38.1	46.7	39.6	70.9	153.0	73.3
	<i>Cattle - average total number</i>	69	76	71	124	288	131
	<i>Young cattle (under 1 year)</i>	33	26	31	53	133	58
	<i>Male cattle (over 1 year)</i>	17	10	17	38	118	44
	<i>Heifers, other female cattle (over 1 year)</i>	7	14	10	13	13	12
	<i>Cows</i>	12	26	12	19	23	17
	Other livestock - LU	0.1	0.8	8.4	17.2	20.0	12.5
	Stocking density (grazing livestock) - LU/ha	1.6	1.0	1.7	1.9	2.3	2.0
	Total labour input - hours	3,587	2,591	2,985	2,985	4,300	3,222
	Share of paid labour input - %	7.0	8.6	1.0	4.7	12.1	5.2
	Total labour input - h / LU	94	55	62	34	25	38

Annex 6. FADN cattle farm results, allocated production costs.

Specialized cattle farms 1997-2000		Southern Finland	C & S Sweden	Germany, Lower Saxony + North Rhine-Westphalia			
	<i>Number of livestock units</i>	ALL	ALL	25-49	50-99	100-	ALL
Allocated production costs, €	Purchased feed	6,230	6,265	3,153	6,399	30,757	9,609
	Farm-grow n feed + forage	4,499	4,455	2,792	4,782	11,022	5,245
	Other specific costs	1,217	906	977	1,981	4,640	2,180
	Specific costs	11,946	11,626	6,922	13,161	46,419	17,034
	€/cattle LU	314	249	175	186	303	232
	Machin. & build. current costs	3,181	3,787	2,814	2,920	6,765	3,811
	Energy	1,759	2,176	1,388	1,941	5,064	2,453
	Contract w ork (machinery)	301	1,365	930	1,460	3,564	1,757
	Other direct inputs	3,377	1,469	2,031	2,765	6,254	3,336
	Farming overheads excl. contract labour	8,618	8,797	7,162	9,085	21,647	11,357
	€/cattle LU	226	188	181	128	142	155
	INTERMEDIATE CONSUMPTION						
	= specific costs + farming overheads	20,563	20,423	14,085	22,247	68,066	28,391
	€/cattle LU	540	437	356	314	445	387
	DEPRECIATION	6,404	8,207	3,184	5,207	12,877	6,137
	€/cattle LU	168	176	80	73	84	84
	Rent paid	1,083	897	1,033	2,113	6,304	2,674
	Interest paid	1,920	2,338	644	1,458	4,933	1,779
	RENT + INTEREST	3,003	3,235	1,677	3,570	11,238	4,453
	€/cattle LU	79	69	42	50	73	61
	TOTAL INPUTS excl. labour	29,970	31,865	18,945	31,024	92,180	38,982
	€/cattle LU	788	683	478	438	603	532
	Paid labour	898	1,355	84	408	2,424	610
	Unpaid farm labour	13,549	10,238	8,624	7,774	16,768	10,904
	Contract w ork (labour)	201	910	620	973	2,376	1,171
	Total labour costs	14,648	12,504	9,328	9,155	21,568	12,685
	€/cattle LU	385	268	236	129	141	173
	TOTAL INPUTS + LABOUR	44,618	44,369	28,274	40,179	113,749	51,666
	€/cattle LU	1,173	950	714	567	744	705

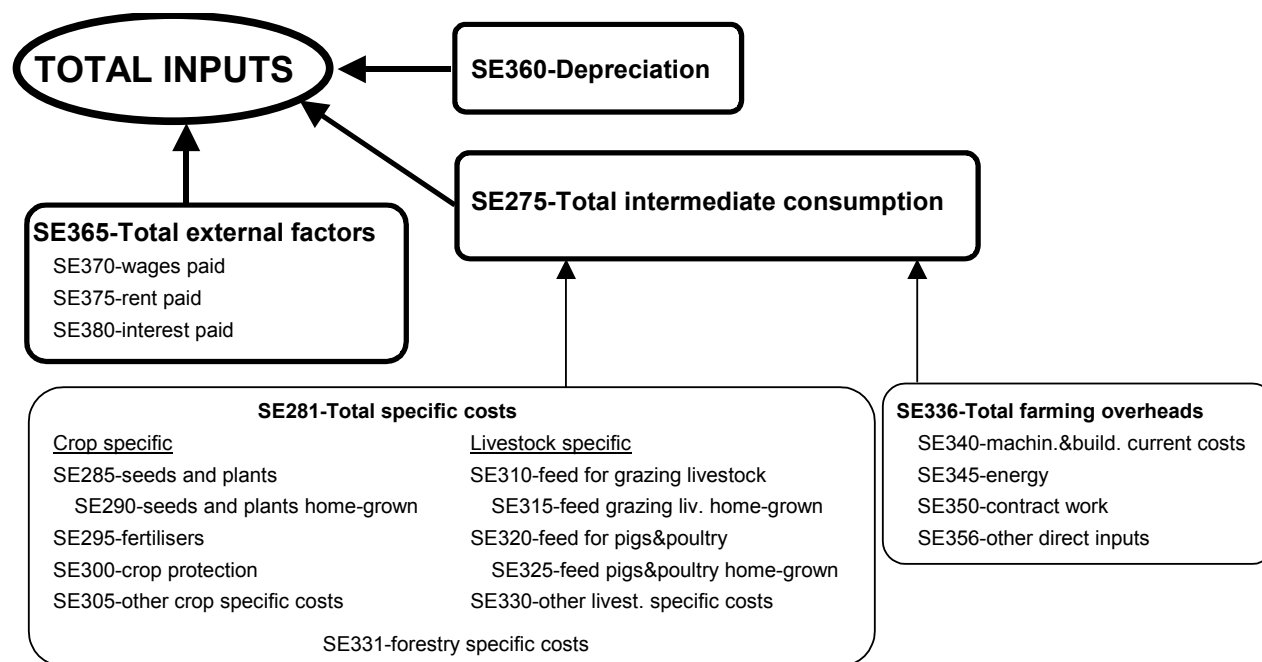
Annex 7. FADN pig farms, all size classes.

Specialized pig farms 1997-2000		Southern Finland			Sweden, Skåne	Denmark			Germany, L. Saxony + North Rhine-Westphalia		
	<i>Number of livestock units</i>	<100	100-199	ALL	ALL	200-399	400-	ALL	<100	100-199	ALL
Represent- tativity	Farms represented	1,230	508	1,855	323	1,099	977	3,700	977	1,174	2,638
	Sample farms	33	23	61	24	90	92	250	24	35	74
Structural information	Total utilised agricultural area - ha	33.07	50.10	41.83	25.80	50.23	107.80	54.43	21.27	28.85	30.50
	Rented agricultural area - ha	6.53	12.90	9.78	7.28	7.73	26.63	11.07	11.33	16.58	18.18
	Cereals - ha	25.62	41.20	33.41	15.19	37.67	78.87	40.31	12.48	18.09	19.57
	Other crops, set-aside & fallows - ha	7.45	8.90	8.42	10.62	12.57	28.93	14.12	8.79	10.76	10.93
	Total livestock - LU	52.0	133.6	96.2	197.2	317.5	764.3	397.3	81.9	150.2	164.7
	Pigs - LU	48.7	131.7	92.0	196.4	286.3	748.5	313.6	55.7	139.2	149.8
	<i>Average number of pigs</i>	253	516	405	827	1,359	3,465	1,481	246	520	556
	- piglets	131	127	147	273	585	1,373	622	73	73	73
	- breeding sows	43	58	54	114	191	419	195	17	23	21
	- pigs for fattening	73	327	201	439	579	1,663	659	132	195	186
	- other pigs	5	3	3	2	5	11	5	25	229	277
	Other livestock - LU	3.3	1.9	4.1	0.7	31.3	15.7	83.7	26.2	10.9	14.9
	Total labour input - hours	3,208	3,927	3,533	3,539	3,675	7,112	4,074	3,237	3,331	3,522
	Share of paid labour input - %	5.7	7.0	6.8	17.3	29.0	62.8	39.9	8.9	13.2	12.3
	Total labour input- hours per livestock unit	61.7	29.4	36.7	18.0	11.6	9.3	10.3	39.5	22.2	21.4

Annex 8. FADN pig farm results, allocated production costs.

Specialized pig farms 1997-2000		Southern Finland			Sweden, Skåne	Denmark			Germany, L. Saxony + North Rhine-Westphalia		
	<i>Number of livestock units</i>	<100	100-199	ALL	ALL	200-399	400-	ALL	<100	100-199	ALL
Allocated production costs, €	Feed	23,396	52,661	39,332	82,690	125,677	303,721	141,228	27,456	68,039	59,229
	Other specific costs	4,632	5,448	4,907	4,918	11,435	30,308	11,241	3,851	9,330	7,123
	Specific costs	28,029	58,109	44,240	87,608	137,112	334,029	152,470	31,307	77,369	66,352
	€/kg of meat	0.78	0.90	0.85	0.75	0.77	0.72	0.78	0.72	0.82	0.81
	Machin. & build. current costs	4,904	8,746	6,707	10,038	13,266	32,867	14,176	4,242	7,920	7,433
	Energy	4,101	6,388	5,355	8,646	6,012	15,643	6,758	3,938	8,271	7,120
	Contract work (machinery)	449	730	640	6,825	2,874	6,767	2,965	1,361	2,800	2,553
	Other direct inputs	5,855	10,024	7,935	3,518	5,945	11,381	5,658	5,068	7,474	7,681
	Farming overheads excl. contract labour	15,310	25,888	20,638	29,027	28,098	66,657	29,556	14,609	26,466	24,788
	€/kg of meat	0.43	0.40	0.40	0.25	0.16	0.14	0.15	0.34	0.28	0.30
	INTERMEDIATE CONSUMPTION										
	= specific costs + farming overheads	43,339	83,996	64,877	116,635	165,210	400,686	182,026	45,916	103,835	91,139
	€/kg of meat	1.21	1.31	1.25	1.00	0.92	0.86	0.93	1.06	1.10	1.11
	DEPRECIATION	10,894	19,305	16,160	39,167	26,617	65,140	26,659	9,134	18,848	16,199
	€/kg of meat	0.30	0.30	0.31	0.33	0.15	0.14	0.14	0.21	0.20	0.20
	Rent paid	1,038	2,296	1,812	3,039	2,098	9,777	3,082	2,316	7,303	5,873
	Interest paid	2,569	5,050	4,044	14,765	37,082	78,811	34,426	1,604	3,998	3,163
	RENT + INTEREST	3,607	7,346	5,855	17,805	39,181	88,589	37,507	3,920	11,301	9,035
	€/kg of meat	0.10	0.11	0.11	0.15	0.22	0.19	0.19	0.09	0.12	0.11
	TOTAL INPUTS excl. labour	57,839	110,647	86,893	173,607	231,008	554,415	246,192	58,970	133,984	116,373
	€/kg of meat	1.62	1.72	1.67	1.48	1.29	1.19	1.26	1.36	1.42	1.42
	Paid labour	1,114	1,883	1,710	6,485	12,682	61,318	17,739	1,152	3,508	2,688
	Unpaid farm labour	18,698	24,031	20,998	20,427	16,750	18,522	13,867	14,360	18,817	19,693
	Contract work (labour)	300	486	427	4,550	1,916	4,511	1,976	907	1,867	1,702
	Total labour costs	20,111	26,401	23,134	31,462	31,348	84,352	33,582	16,420	24,192	24,083
	€/kg of meat	0.56	0.41	0.44	0.27	0.17	0.18	0.17	0.38	0.26	0.29
	TOTAL INPUTS + LABOUR	77,950	137,048	110,027	205,069	262,357	638,766	279,774	75,390	158,176	140,457
	€/kg of meat	2.18	2.13	2.12	1.75	1.46	1.37	1.43	1.73	1.68	1.71

Annex 9. Basic structure of production costs in the FADN system.



Annex 10. Separate production cost entries in the FADN system.

<u>SE270 TOTAL INPUTS</u>	= Specific costs + Overheads + Depreciation + External factors. Costs linked to the agricultural activity of the holder and relating to the output of the accounting year.
<u>SE275 Total intermediate consumption</u>	= Specific costs + Overheads. Specific supply costs (including inputs produced on the holding) and overheads arising from production in the accounting year.
<u>SE281 Total specific costs</u>	= Crop-specific inputs (seeds and seedlings, fertilizers, crop protection products, other specific crop costs) + livestock-specific inputs (feed for grazing stock and granivores, other specific livestock costs) + specific forestry costs.
<u>Crop-specific</u>	
SE285 seeds and plants <i>SE290 home-grown</i>	Relate to agricultural and horticultural crops. New plantations of permanent crops and wood stands are considered as investments.
SE295 Fertilisers	Purchased fertilizers and soil improvers.
SE300 Crop protection	Plant protection products, traps and baits, bird scarers, anti-hail shells, frost protection, etc.
SE305 Other crop specific costs	Including soil analysis, purchase of standing crops, renting crop land for a period of less than one year, purchase of crop products (grapes, etc.), costs incurred in the market preparation, storage, marketing of crops, etc.
<u>Livestock-specific</u>	
SE310 feed for grazing livestock	Concentrated feeding stuffs (including mineral licks and preservatives), coarse fodder, expenditure on the use of common grazing land, expenditure on agistment.
SE315 feed for grazing livestock, home-grown	Marketable farm products (including milk other than suckled) used as feeding stuffs for grazing stock.
SE320 feedstuffs for pigs & poultry <i>SE325 home-grown</i>	All feed for pigs and poultry.
SE330 other livestock specific costs	Veterinary fees and reproduction costs, milk tests, occasional purchases of animal products (milk, etc.), costs incurred in the market preparation, storage, marketing of livestock products, etc.
<u>SE336 Total farming overheads</u>	Supply costs linked to productive activity but not linked to specific lines of production.
SE340 machine & building current costs	Costs of current upkeep of equipment (and purchase of minor equipment), car expenses, current upkeep of buildings and land improvements, insurance of buildings.
SE345 energy	Motor fuels and lubricants, electricity, heating fuels.
SE350 contract work	Costs linked to work carried out by contractors and to the hire of machinery.
SE356 other direct inputs	Water, insurance (except for buildings and accidents at work) and other farming overheads (accountants' fees, telephone charges, etc.).
<u>SE360 Depreciation</u>	Depreciation of capital assets estimated at replacement value. Concerns plantations of permanent crops, farm buildings and fixed equipment, land improvements, machinery and equipment and forest plantations.
<u>SE365 Total external factors</u>	Remuneration of inputs (work, land and capital) not the property of the holder. = wages, rent and interest paid.
SE370 wages paid	Wages and social security charges (and insurance) of wage earners.
SE375 rent paid	Rent paid for farm land and buildings and rental charges.
SE380 interest paid	Interest and financial charges paid on loans obtained for the purchase of land, buildings, machinery and equipment, livestock, circulating capital etc.

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